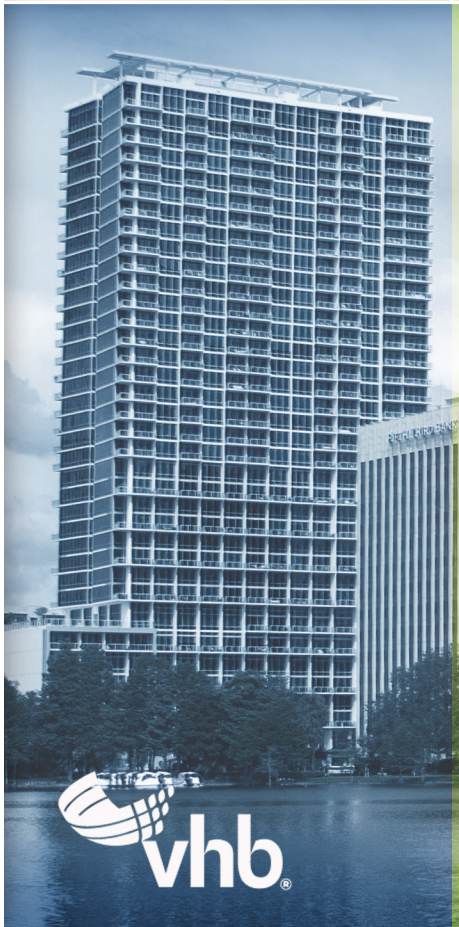
ORLANDO
FUTURE-
READY
CITY
MASTER PLAN

CITY OF
ORLANDO

ORLANDO FUTURE-READY CITY

MASTER PLAN



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EXECUTIVE SUMMARY

A **future-ready city** is one that uses stakeholder engagement, innovation and technology to cultivate a thriving and enduring community. The City of Orlando Future-Ready City Master Plan is a strategic plan that seeks not only to continue on the city's path of innovation, but to continue in the tradition of learning, listening and co-creating a beautiful community with the many diverse residents of the city. **The Future-Ready City Master Plan will guide Orlando's efforts to be a center of innovation, technological advancement and resilience.**

CITY OF ORLANDO

ORLANDO FUTURE-READY CITY MASTER PLAN

The Future-Ready City Master Plan is divided into **six main sections** that help to bring a path forward into focus. The introduction describes the city's vision, mission statement and foundational elements to become more future-ready. The next section describes the collaboration and **engagement** between the city and local stakeholders to identify challenges and ideas to overcome them. This guidance helped to build **the overall Master Plan Policy Recommendations**, which provide the policy framework for specific strategy development and recommendations. Next, the Master Plan provides an overview of **digital assets** and regional data sharing opportunities. These resources, along with the framework for funding, procurement and strategy prioritization help build the **roadmap to implementation**.

INTRODUCTION

This section introduces the overall vision, mission and foundational elements for the Future-Ready City Master Plan. It also describes the history of prior city efforts to become more innovative, equitable and sustainable.

VISION STATEMENT

Orlando will become America's premier future-ready city by staying ahead of our opportunities, ensuring the City Beautiful remains a global destination where everyone can thrive.

MISSION STATEMENT

Look to the future and leverage innovation and collaboration to enhance our services and investments.

Foundational Elements

In order to achieve the mission and vision of the Future-Ready City Master Plan, the following foundational elements have been established to guide the implementation of the plan.

- People First
- Transparent
- Security focused
- Collaborative
- Relevant & Timely
- Responsible
- Sustainable
- Reliable
- Resilient
- Diversity
- Prosperity for all

Pillar Focus Areas

In addition to the foundational elements, the Future-Ready City Master Plan and its proposed actions are organized by pillar focus areas. These focus areas categorize some of the major services already provided by the city and its partners, as a way of understanding the strategic implementations in this plan.

CONNECTIVITY

ENERGY

HEALTH & SAFETY

MATERIALS

MOBILITY

PLACEMAKING

WATER

Community Engagement

The City of Orlando engaged the community, including internal city and industry experts, the business community and academia to guide the direction of the Orlando Future-Ready City Master Plan. Inclusive community engagement has helped to identify current and future challenges the city faces, as well as potential solutions to address those challenges.

Identified challenges include:

- The digital divide and internet access
- Need for alternative energy sources
- Vulnerable populations, including those experiencing homelessness and mental health crises
- Safe transportation access and mobility for all users
- Reduction of waste
- Lack of affordable housing
- Consumption of water resources

Through a series of focused internal meetings with city staff, focus area roundtable meetings with local experts, community workshops and an online survey, a diverse group of hundreds of people have played a role in formulating the objectives and strategies presented in this document. Potential strategies to address the identified challenges were presented to community workshop participants and attendees were invited to provide feedback. This feedback helped to steer the final Master Plan.

Master Plan Policy Recommendations

The Master Plan Policy Recommendations provide a framework for specific strategy development. The section includes goals, objectives, and strategies for each of the seven pillar focus areas. This section also contains policy recommendations for regional issues, including transportation, resiliency, affordable housing, and workforce development, that require multiple partners to implement. The overarching goal of the master plan is to: leverage technology and innovation that enhance services for all Orlando residents, businesses and visitors.

CONNECTIVITY GOALS

- Bridge the digital divide
- Provide residents and visitors with unified digital resources and communications to improve civic engagement

ENERGY GOAL

- Provide resilient, reliable, affordable and sustainable energy service to all

HEALTH AND SAFETY GOAL

- Improve the health and safety of our diverse individuals and communities

MATERIALS GOAL

- Diversify educational programs and strategic partnerships to be a “Zero Waste” city

MOBILITY GOAL

- Improve transportation systems to provide safe, affordable, clean and accessible multimodal options for all

PLACEMAKING GOALS

- Encourage creative planning, design and programming of public and private spaces to increase cultural and social vibrancy
- Increase the inventory of green, healthy, efficient and affordable housing

WATER GOAL

- Reduce water consumption, improve water quality and protect residents from severe weather events

Strategy Development

The community engagement process identified the most pressing local problems and challenges, and the appropriate future-ready strategy that could best address these issues. These brainstorming activities generated a large list of potential strategies that require further evaluation for feasibility of implementation, identification of risks, cost, and applicability to the City of Orlando. Potential project types ranged from low-cost educational campaigns, to extension of existing pilot programs, to large capital projects that will require significant funding and multi-agency partner coordination. Following creation of this long list, the project team created an evaluation matrix to rank and prioritize potential projects and strategies. During the prioritization process, projects were grouped into short term, mid term and long term categories.

SHORT TERM STRATEGIES

- Digital Twin
- IDEA Lab
- Community Outreach and Engagement Plan
- Resilience Plan
- Define the Digital Divide
- Community Wi-Fi
- Wi-Fi Hotspot/Mobile Tablet checkout program
- Social Services Optimization
- Integrated Public Alert and Warning System (IPAWS)
- Smart Buildings with Advanced Sensor Network
- Food Recovery Network
- Materials Resource System Study
- Smart Parking
- Integrated Transportation Application
- Alternative Transportation Mobility Program
- Electric Vertical Takeoff and Landing (EVTOL)
- Resilience Hub
- Wastewater-Based Epidemiology

MID TO LONG TERM STRATEGIES

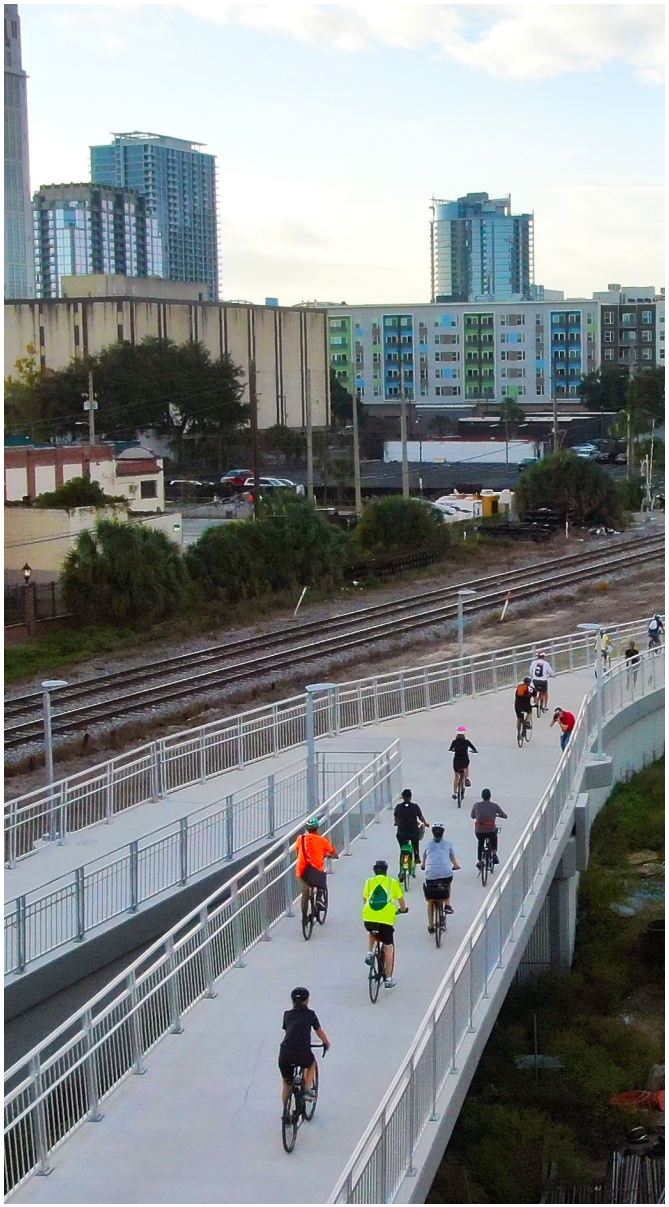
- Digital Information Sharing
- Open Data and Enterprise Performance Dashboard
- Improved Digital Community Engagement
- Expanded Fiber Infrastructure
- Consolidated Property Information
- Energy Microgrid
- Residential Energy/Water Consumption Monitoring
- Smart Street Lighting
- Air Quality
- Analytic Solutions
- Optimized Waste Collection
- Neighborhood/School Compost Kit
- Centralized Recycling Drop-off Locations
- Anaerobic Digester
- Digital Curbside Management
- Connected and Autonomous Vehicle (CAV) Infrastructure Readiness
- CAV Pilot Project Downtown
- Fast Charging EV Infrastructure
- Traffic Optimization
- Design Competition for Station and Onboard Amenities
- Single Payment System for Transportation
- Augmented Reality (AR) or Virtual Reality (VR) Wayfinding
- Land Development Code and Building Code Updates
- On-site Rainwater and Greywater Harvesting
- Net Zero Water Building Pilot

Digital Assets

As technology and innovation have progressed, the City of Orlando has incorporated more digital assets and procedures into municipal operations and services. The city unveiled the Open Data Website in early 2016 to put services and data at the fingertips of residents and provide customers with direct access to city specific data and analytic tools. This section describes an assessment of current city digital assets, as well as a high-level overview of new digital project initiation procedures. It also includes a summary of data sources used by partner agencies to determine consistency and compatibility, as well as opportunities for improved efficiency and data sharing.

Roadmap to Implementation

The successful implementation of the Future-Ready City Master Plan requires a **well-defined roadmap** to outline the operating procedures and protocol. **Several key factors** that were considered in the development of the Master Plan include: **funding models and opportunities, procurement procedures for strategies and identification of a prioritization process**. In addition, as the implementation of projects or strategies will be an annual process, the roadmap aligns with the traditional Capital Improvement Program (CIP) schedule and overall operating policies for adoption by the city.



Acronym	Full Term
AMI	Advanced Metering Infrastructure
ATMS	Advanced Traffic Management Systems
ATCMTD	Advanced Transportation and Congestion Management
AI	Artificial Intelligence
AR	Augmented Reality
AVMI	Autonomous Vehicle Mobility Initiative
BEWES	Building Energy and Water Efficiency Strategy
BI	Business Intelligence
CIP	Capital Improvement Program
CFAVP	Central Florida Automated Vehicle Partnership
CFX	Central Florida Expressway Authority
CAV	Connected and Autonomous Vehicles
DOE	Department of Energy
DB	Design-Build
EV	Electric Vehicle
ESM	Engineering Standards Manual
FDOT	Florida Department of Transportation
GMP	Growth Management Plan
IT	Information Technology
IPAWS	Integrated Public Alert and Warning System
ITS	Intelligent Traffic Operations and Transportation Systems
IKE	Interactive Kiosk Experience
ITN	Invitation to Negotiate
LDC	Land Development Code
MRF	Materials Recovery Facility
NACTO	National Association of City Transportation Officials
O&M	Operations and Maintenance
OUC	Orlando Utilities Commission
P3	Public-Private Partnership
RFI	Request for Information
RFP	Request for Proposals
RFQ	Request for Qualifications
SLA	Service Level Agreement
SCC	Smart Cities Council
SEP	State Energy Program
SDGs	Sustainable Development Goals
TAP	Technical Assistance Panel
TSM&O	Transportation Systems Management and Operations
USDOT	United States Department of Transportation
UCF	University of Central Florida
USGBC	US Green Building Council
VMT	Vehicle Miles Traveled
VR	Virtual Reality
WBE	Wastewater-based Epidemiology

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INTRODUCTION

A **future-ready city** is one that uses stakeholder engagement, innovation and technology to cultivate a thriving and enduring community. The City of Orlando Future-Ready City Master Plan is a strategic plan that seeks not only to continue on the city's path of innovation, but to continue in the tradition of learning, listening and co-creating a beautiful community with the many diverse residents of the city. The Future-Ready City Master Plan will guide Orlando's efforts to be a center of innovation, technological advancement and resilience.

As the economic, educational and cultural hub of the Central Florida region and one of the most visited cities in the nation, Orlando drives change within the region, collaborates with partners and has the opportunity to set a national and international example. **Orlando's leadership in this space will accelerate improvements to regional networks and build a greater quality of life for all residents, businesses and visitors.**

CITY OF ORLANDO

ORLANDO FUTURE-READY CITY MASTER PLAN

THIS PLAN SEEKS TO ACHIEVE SUCCESS THROUGH THE FOLLOWING CRITICAL STRATEGIES:

Leverage existing city assets and progress to-date to understand how to best access citywide operations.

Facilitate ways to engage all stakeholders to build consensus, support and empowerment that advances Orlando as an innovation leader.

Focus on the desired outcomes and identify the technology needed to ensure overall community benefits are realized.

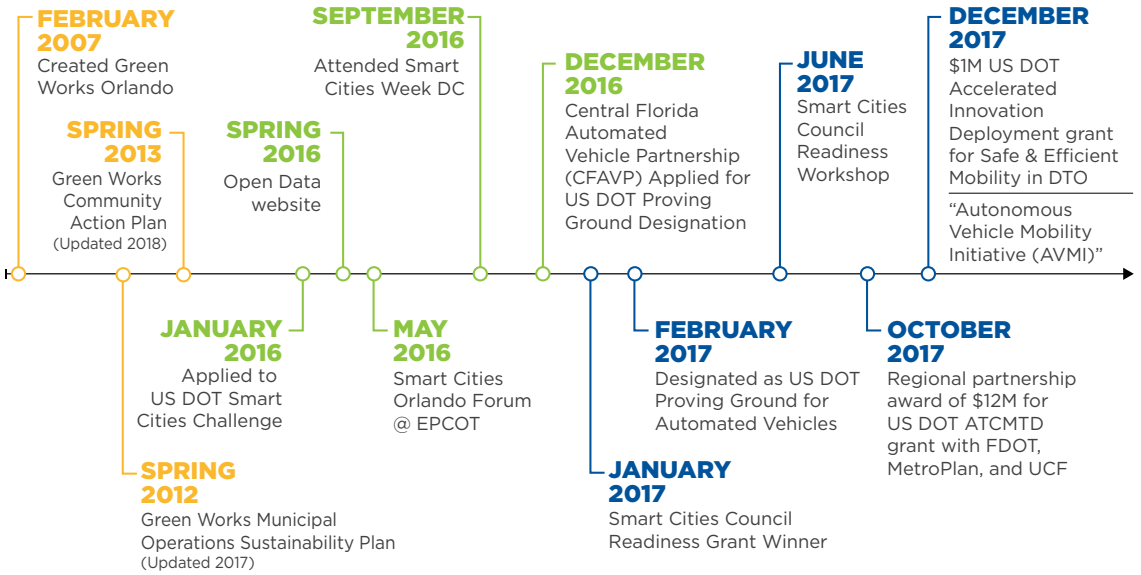
Ensure projects, strategies and solutions are attainable by addressing existing city policies, plans and standard operating procedures, data use and access, as well as business models and financing.

A. HISTORY OF PREVIOUS EFFORTS

While the Future-Ready City Master Plan is the City of Orlando's most comprehensive effort establish the strategic direction of innovation and technology investments, the city has long been a national leader in best practices for serving citizens. The following are city programs that both inform and engage the Future-Ready City Master Plan:

TravTek

In the early 1990's, the City of Orlando partnered with General Motors (GM), the Florida Department of Transportation (FDOT), the American Automobile Association (AAA) and the University of Central Florida (UCF) to evaluate an in-car vehicle navigation system. The cutting-edge navigation TravTek project leveraged the collection of driver patterns from visitors within Epcot Center to verify the global positioning satellites (GPS) in-car navigation accuracy of the vehicles on the Central Florida roadways. The TravTek project advanced regional understanding of GPS technology, communication with Traffic Management Centers, video detection and roadside sensors.



Green Works Orlando

The City of Orlando has been a recognized sustainability leader for over a decade, as established by Mayor Dyer's Green Works Orlando program in 2007. This commitment to sustainability has led to more than $2 million in annual energy savings in city-owned buildings. Recent accomplishments by the Green Works team include passing the Building Energy and Water Efficiency Strategy (BEWES) ordinance to track whole building energy use, as well as receiving a $2.5 million grant from Bloomberg to combat climate change. Fast-forward to today, Orlando is ranked amongst the top most progressive cities on sustainability and resilience efforts, including advancing renewable energy solutions, green building policies, local food systems, zero waste strategies, electric and alternative transportation solutions, water pollution prevention programs and initiatives that enhance livability and connection to nature. This comprehensive approach has been named a "model for urban sustainability" and recently earned the city an esteemed Leadership in Energy & Environmental Design (LEED) GOLD certification by the US Green Building Council (USGBC).

US DOT Smart Cities Challenge

This funding challenge was launched by the US Department of Transportation (DOT) in 2015 in order to *"develop ideas for an integrated, first-of-its-kind smart transportation system that would use data, applications and technology to help people and goods move more quickly, cheaply and efficiently."*

Orlando was amongst 78 submittals from mid-sized cities across the country. Though ultimately not selected for a funding award, the city used the application process as the foundation for strengthening partnerships, raising awareness and creating an internal working group to advance best practices for smart cities throughout Orlando.

City of Orlando Open Data Portal

To help fulfill the City of Orlando's initiative of an open and transparent government, the city unveiled the Open Data website in early 2016. The goal of the data portal is to promote the City of Orlando's Open Data Policy Guidelines by putting city-offered services and data at the fingertips of residents, providing citizens with direct access to city specific data and analytic tools. Through this **user-friendly data portal, users can perform simple analysis; view and interact with data,** including statistics from the City of Orlando Police Department; access information related to building permits and business tax receipts; and see solid waste maps by Commissioner District and neighborhood. Data from this portal and other transportation agency partners was integrated into the Vision Zero Orlando dashboard in 2019 to provide transparent data on transportation safety and to track the progress of the program as it moves towards the City of Orlando's 2040 goal of a fatality-free Vision Zero city.

City of Orlando Digital City Hall

Over the years, the city has made technological investments to improve the efficiency of city services for citizens and customers. The Digital City Hall was launched in March 2019 to bring more online services to citizens. The city's efforts to improve the accessibility of essential online services were recognized by Cities of Service, who named Orlando one of 10 finalists for the 2019 Engaged Cities Award. As a finalist, Orlando was praised for *"bold mayoral leadership and the reach of City Hall with the on-the-ground knowledge of citizens to address serious problems."*

Smart Cities Council (SCC) Application and Smart Cities Readiness Challenge Grant

In early 2017, Orlando was one of five cities nationwide awarded the Smart Cities Readiness Challenge Grant by the Smart Cities Council. Launched in 2012, the Council helps guide cities and states on incorporating smart technology to improve livability, workability and sustainability within their communities. Chosen from 130 applicants across the country, Orlando demonstrated success with cross-agency organization to problem-solve and achieve results. The city's vision focuses on a smart transportation network to reduce congestion and move people more efficiently whether they live, work, do business or are just visiting the City of Orlando. Further, Orlando established a Smart Cities Steering Committee to develop strategies that help turn workshop suggestions into action plans. The city is committed to ensuring that the various city departments are working closely as teammates to ensure implementation is as seamless as possible.

Central Florida Automated Vehicle Partnership (CFAVP)

The City of Orlando has participated in national and regional events to share best thinking on the use of technology in cities. The city is also a member of the Central Florida Automated Vehicle Partnership (CFAVP), which was designated as a USDOT Proving Ground for Automated Vehicles in 2017. In addition, members of the CFAVP received a grant of $12 million for the USDOT Advanced Transportation and Congestion Management (ATCMTD) program. CFAVP partners include the City of Orlando, FDOT, MetroPlan Orlando and UCF. Further, a $1 million USDOT Accelerated Innovation Deployment grant for Safe &

Efficient Mobility in Downtown Orlando was awarded to the partnership in 2017. Continued collaboration with LYNX and MetroPlan Orlando led to the Autonomous Vehicle Mobility Initiative (AVMI), with a shared goal to encourage travel by autonomous vehicles for 10% of total urban and public transit trips by 2040.

The city's momentum and longstanding commitment to learning how to best use innovation and technology to serve residents has been thoughtfully integrated into the Future-Ready City Master Plan. It is important that the city **work closely with internal and external partners to best establish an integrated and effective approach to solving and anticipating citizens' needs in the coming decades.**

B. WHAT IS FUTURE-READY?

A future-ready city is one that uses innovation and technology to better deliver the services its residents and visitors rely on and expect. When considering what it will take for a city to thrive for generations to come, **a future-ready city will need to be a place where residents are empowered to co-create opportunities using innovation and technology**. It should work to maximize the benefits of living in an urban environment, while minimizing its challenges. Overall, a future-ready city should work to be a place of prosperity, safety, equity, sustainability, resiliency and diversity for future generations.

As technology becomes more ubiquitous in society, it is easy for some cities to emphasize technology over their citizens. The City of Orlando and this Future-Ready City Master Plan seek to build a human-centered city that prioritizes people and only utilizes technology when it is the best solution to specific challenges.

ORLANDO
FUTURE-READY CITY
MASTER PLAN

Vision Statement

Orlando will become America's premier future-ready city by staying ahead of our opportunities, ensuring the City Beautiful remains a global destination where everyone can thrive.

Mission Statement

Look to the future and leverage innovation and collaboration to enhance our services and investments.

C. FOUNDATIONAL ELEMENTS

In order to achieve the mission and vision of the Future-Ready City Master Plan, the following foundational elements have been established to guide the implementation of the plan.

- **People First** - The Future-Ready City Master Plan is committed to equity, diversity, accessibility and inclusiveness when evaluating and using new technologies. Quality of life for our residents, employees and visitors are our highest priority.
- **Transparent** - The Future-Ready City Master Plan is committed to open decision-making. The city and our partners should disclose how data is collected and used.
- **Security focused** - The Future-Ready City Master Plan will outline security protocols to protect the privacy of all individuals who use public services.
- **Collaborative** - The Future-Ready City Master Plan will use public input to help develop the plan and prioritize strategies.
- **Relevant & Timely** - The Future-Ready City Master Plan will evaluate new technologies and innovation as they become available. It is a living plan that adapts as innovation supersedes existing technology.
- **Responsible** - We understand the importance of being responsible for citizen and employee data that is collected and stored. Vendors and partners must comply with the city's data privacy principles (under development).
- **Sustainable** - The Future-Ready City Master Plan is aligned with and furthers the goals of Green Works Orlando. The Plan will be mindful of our local ecology and provide a complimentary set of strategies to make Orlando the most sustainable city in the nation.
- **Diversity** - We will strive to make future-ready decisions and investments that increase our community's diversity.
- **Reliable** - The Future-Ready City Master Plan will improve the reliability of public services by improving efficiency within City Hall and communication with partner agencies.
- **Resilient** - The Future-Ready City Master Plan will prepare the city for natural disasters, climate change and other stressors. Investments in future-ready projects will help Orlando recover more quickly and maintain quality of life and continuity of business and government.
- **Prosperity for all** - The Future-Ready City Master Plan will prioritize new technologies and innovation that improve educational opportunities, strengthen economic conditions, increase accessibility and increase equity for all residents, businesses and visitors.

D. PILLAR FOCUS AREAS

In addition to the foundational elements, the Future-Ready City Master Plan and its proposed actions are organized by pillar focus areas. These focus areas categorize some of the major services that the City of Orlando already provides its citizens as a way of understanding the strategic implementations of innovation that follow in this plan.

Connectivity - Connectivity refers to digital civic engagement and providing modern and digital city services to the public. The Connectivity pillar recognizes the need to define the "digital divide," or those who lack reliable internet access and includes strategies to improve the sharing of information with all Orlando residents and visitors.

Energy - Energy powers everything around us, from our homes and offices to the personal mobile devices that we use to connect to the world. The City of Orlando Green Works program and the Orlando Utilities Commission (OUC) offer a variety of energy programs to conserve energy, as well as access to renewable energy sources. The Energy pillar is aligned with these initiatives and includes strategies for resilient, reliable and affordable energy for all.

Health & Safety - Protecting the health and safety of Orlando residents and visitors is one of the most important functions of local government. The Health & Safety pillar recognizes that a future-ready city is an equitable city and includes strategies for all residents and visitors to live healthy lifestyles and experience a feeling of safety.

Materials - Orlando has a long-term goal of becoming a Zero Waste community. In order to achieve this goal and find value in solid waste, the Materials pillar includes strategies to recycle and re-use materials, diverting them from the landfill.

Mobility - Transportation choices are rapidly expanding and the City of Orlando has the opportunity to transform from a single-occupant automobile-dominated system to a multimodal community. The Mobility pillar includes strategies to provide safe, affordable and efficient transportation choices for all.

Placemaking - Placemaking is the intersection of urban design, creativity and programming between the public realm (streets, sidewalks, parks and plazas) and the private realm (buildings, businesses and developments). The Placemaking pillar includes strategies for affordable and attainable housing, digital wayfinding and art and modernized land development codes.

Water - The City Beautiful is home to over 100 lakes and receives more than 50 inches of rainfall per year. However, conservation of water resources is needed to maintain sustainable water supply and mitigate severe weather events. The Water pillar includes strategies for water re-use , conservation and monitoring.

Goals, Objectives, and **Strategies** for each of the pillar focus areas were created through the community engagement process and are documented later in this report.

E. RELATIONSHIP TO OTHER CITY OF ORLANDO PLANS

The Future-Ready City Master Plan is aligned with and consistent with other city-wide planning efforts. A brief description of these plans are included below:

Growth Management Plan

The City of Orlando's Comprehensive Plan is known as the "Growth Management Plan" (GMP). This regulatory document provides a high-level vision and policies for physical growth and development within the city's limits, including the necessary public infrastructure required to support this growth. A policy analysis was conducted to ensure consistency with current GMP goals, objectives and policies.

Housing First Initiative

Housing First is a region-wide initiative with the goal of reducing chronic homelessness. As part of the strategy, the City is partnering with key local and national agencies to implement a comprehensive plan to end homelessness. At the crux of the plan is the "housing first" strategy, which breaks the cycle of homelessness by providing permanent housing with an array of tailored supportive services.

Green Works Community Action Plan

Green Works Orlando is intended to transform Orlando into one of the most environmentally friendly, economically and socially vibrant communities in the nation. This sustainability program represents the city's commitment to build partnerships and share resources that foster positive environmental changes and increase social awareness about how to reduce our negative impacts.

The first Community Sustainability Action Plan adopted in 2013 outlined ambitious goals, strategies and initiatives to be implemented under seven focus areas. Strategic initiatives were aligned with benchmarks for each focus area to improve city resilience and attentiveness to environmental concerns, while contributing to a sustainable and healthy economy for the City of Orlando. The 2018 Community Sustainability Action Plan celebrates the progress Green Works Orlando has made in the community since 2013, while providing new opportunities to evaluate and identify strategies to make even more impressive progress towards the established goals. The Action Plan outlines several measurable long-term goals, intermediate objectives and policy recommendations to promote environmental, social and economic sustainability and vitality within the Orlando community. The Action Plan update also integrates Orlando's sustainability goals and strategies with the United Nation's Sustainable Development Goals (SDGs) and aims to better incorporate strategies and initiatives that address social equity, climate resiliency and smart technology and innovation across all seven focus areas:

- Clean Energy
- Green Buildings
- Local Food
- Livability
- Solid Waste
- Transportation
- Water

GREEN WORKS ORLANDO

GREEN WORKS ORLANDO

The goals, objectives, strategies and initiatives as identified in the Future-Ready City Master Plan support many of the Green Works goals already established. From the ongoing certification of municipal and private buildings to meet green building standards, the integration of innovative technologies and services that reduce vehicle miles travelled while simplifying transit ridership and supporting the growth of renewable, reliable energy sources and storage, many of the future-ready city initiatives will work directly in tandem with those being implemented in the Green Works Action Plan. Future-ready city initiatives will help to bolster ongoing data collection and research to implement green technologies and support analytical processes including vulnerability assessments to propel progress in advancing sustainability practices across the city.

Vision Zero Orlando

VISION ZERO ORLANDO

In December 2017, the City of Orlando adopted a resolution to set a Vision Zero goal to eliminate traffic deaths and serious injuries within the city by 2040 and provide safe, equitable mobility for all. To achieve this, the city made a commitment to implement proven projects and programs to make our streets safer, as outlined in the Vision Zero Orlando Action Plan. The Action Plan follows a multi-disciplinary, data-driven approach to roadway safety and provides structure through which city residents, visitors and businesses actively work together to eliminate traffic-related fatalities and serious injuries.

The Vision Zero Orlando Action Plan is designed to establish trust and accountability in all Orlando communities as well as encourage individuals to become engaged in the process and work together.

The development of the Action Plan started with the creation of a task force of experts to discuss the Six E's of Vision Zero: education, engineering, enforcement, equity, evaluation and economics and to provide advice on

the type of projects, partnerships, programs, data and analyses the city could employ to reach this goal. Vision Zero recognizes that the city cannot tackle this feat alone and establishes a proactive approach in which our roads are designed to foster safety and every person is responsible for their actions on those roads. Whether you travel by walking, cycling, driving a car, or riding a bus, together, we must follow safe behaviors and become an advocate for others doing the same. A robust public outreach campaign was implemented to engage the public in conversations about localized transportation safety concerns and to better provide them with the resources they need.

Many of the top Vision Zero priorities align with the future-ready initiatives, such as expanding and enhancing our safe transportation options to connect more of our residents with access to jobs and opportunity; the utilization of data to improve health outcomes and safety; a digital platform on program updates to provide accountability; and an equity analysis used to prioritize projects and programs and **uplift the city's most vulnerable communities.** Ensuring that community members utilize available technology to provide safe, multimodal options is a key component of the Vision Zero Orlando mission.

The future-ready city program will continue to support the monitoring of available crash data to identify high risk corridors throughout the city and strategically identify the plausible cause of high concentrations of crashes. Equitable access to technology and communication platforms will help every resident work together as a community to implement proven solutions and eliminate dangerous roadway conditions and behaviors.

VISION ZERO ORLANDO

Livable Orlando: An Age-Friendly Initiative

In October 2019, the City of Orlando joined the AARP network of Age-Friendly Communities. As a member of the network, Orlando has committed to conducting a community assessment to determine our city's age-friendliness, to develop an Action Plan based on the assessment's findings and to implement a series of age-friendly initiatives. As the population of Orlando and the nation ages, it is important that the city creates a well-designed, livable community which promotes health and sustains economic growth, therefore creating happier and healthier residents of all ages. All AARP Age-Friendly initiatives focus on the following Eight Domains of Livability:

EIGHT DOMAINS OF LIVABILITY

1. Transportation
2. Housing
3. Outdoor spaces and buildings
4. Social participation
5. Respect and social inclusion
6. Civic participation and employment
7. Community support and health services
8. Communication and information

Orlando's Age-Friendly Action Plan will be organized around these eight domains of livability and is anticipated to be completed by late summer of 2021. The Mayor's Committee on Livability and Healthy Aging has been tasked with guiding the development of Orlando's first Age-Friendly Action Plan. Committee members include representatives from various community non-profit organizations, businesses and institutions who are subject area experts in various fields related to aging. They will provide invaluable input throughout the two-year

community engagement and planning process, resulting in the adoption of an Age-Friendly Action Plan that will provide policy and program recommendations for the Mayor and City Council. The Action Plan will also include recommendations for building and strengthening partnerships, knowing that entire Orlando community should be engaged.

The first step in developing Orlando's Age-Friendly Action Plan process was to engage the community through a comprehensive survey to hear from residents aged 45 and older about what recommendations and improvements they suggest to make the city more age-friendly. The survey was promoted through various digital platforms and paper surveys were distributed at the city's recreation and senior centers, neighborhood and community meetings, special events and at senior living facilities through March 2020. All told, the city received 1,223 completed surveys, with 1,001 being people aged 45 and older.

In review of the initial data collected for inclusion in the Orlando Age-Friendly Action Plan, a few emerging trends are applicable to the Future-Ready City Master Plan. For the respondents over age 45, transportation and the dissemination

of community information were very important. Orlando's age-friendly livability survey also found that **97% of respondents think it is important to live independently as they age** and the **two factors they worry about the most are public transit and housing affordability. Less than half (47%) think it's likely they'll be able to find an affordable home in the future.** As we plan for Orlando to be future-ready, we need to think about how we can effectively reach and support our elder population and other socio-economic groups that may not have access to new technologies.

The problem of social isolation is something that has become even more acute as a result of the COVID-19 pandemic, 76% of respondents said they feel connection to others and a plurality of 69% said they have contact with friends and family at least several times a week (36% every day and 33% several times a week). Most people drive themselves (56%) and only 26% think public transit is accessible. Twenty-nine percent think community information is accessible.

F. RELATIONSHIP WITH OTHER AGENCIES

The Future-Ready City Master Plan was prepared in collaboration with partners from other local agencies, including the Orlando Utilities Commission (OUC), Orange County, LYNX, MetroPlan Orlando and FDOT. A brief description of each agency and how they are related to Orlando's Future-Ready initiative is listed below:

Orange County

Over two million people live within Orange County, including residents of the City of Orlando. The city serves as the county seat of Orange County, which is the center of the Orlando-Kissimmee-Sanford Metropolitan Area. Orange County Government's main administrative offices are located in downtown Orlando and both Orange County and the city share a culture of innovation, collaboration and inclusiveness. Orange County Government leaders charged with advancing innovation and emerging technologies and sustainability at the county level contributed to the creation of plan issues and strategies. The county and city will seek partnerships and joint funding opportunities to implement the future-ready strategies.

Orlando Utilities Commission

OUC is a key partner for the City of Orlando in providing critical services to residents. Established in 1923 by a special act of the Florida Legislature, OUC is the second largest municipal utility in Florida and 14th largest municipal utility provider in the country. OUC provides electric, water, chilled water and lighting services to more than 240,000 customers. OUC functions as an independent commission, with the Mayor of Orlando sitting as one of five members of the board. In addition to electric, water and other infrastructure, the commission owns all light poles in the City of Orlando. OUC and the city will seek partnerships and joint funding opportunities to implement the future-ready strategies.

CURRENT **OUC** INNOVATIVE PROGRAMS

The programs listed below are available for City of Orlando residents and help to implement strategies of the Energy and Water pillar focus areas.

Advanced Metering Infrastructure (AMI) and Water Leak Detection

These new meters incorporate digital metering that provide more data to OUC and to users. The AMI meters enable OUC to read the meters remotely, so they were first installed at apartment complexes and in places where access was difficult, such as fenced and gated yards. Remote meters reading drive down costs and ensure an accurate and timely reading for the customer. OUC utilizes a low power "mesh network" where the meters act as repeaters passing the data to other nearby meters until the data makes it to a main collector.

AMI metering is already helping to predict and prevent outages, restore power faster and warn users of potential leaks. Digital meters lay the foundation for future innovative programs, such as pre-pay metering and real-time consumption alerts for residents.

Community Solar

This program allows users to access solar power in the form of a community solar farm, without the high startup costs involved with installing solar panels on their own residence. In 2018, OUC joined 11 municipal utilities from across the state and signed an agreement with the Florida Municipal Power Agency to build three solar farms in rural Orange and Osceola counties. OUC will serve as the anchor tenant, purchasing 108 of the 223.5 megawatts, or enough energy to power 20,000 residential customers. Adding to our solar portfolio, we installed a floating solar array that sends up to 31.5 kW of solar energy into the grid.

LYNX

The Central Florida Regional Transportation Authority (doing business as LYNX) provides public transportation choices for residents and visitors throughout the Orange County, Seminole County and Osceola County region. It operates 74 bus routes in the tri-county region, as well as commuter vanpool service, paratransit service and the LYMMO free circulator in downtown Orlando. LYNX has progressively taken steps to becoming more sustainable and future-ready by investing in alternative fuels (biodiesel, compressed natural gas and planned electric bus purchases). The City of Orlando and LYNX have a long history of collaboration, including the continued collaboration Autonomous Vehicle Mobility Initiative (AVMI) goal to encourage travel by autonomous vehicles for 10% of total urban and public transit trips by 2040. LYNX staff were involved in the focus area roundtable meetings and have representation on the City's Internal Task Force. Orlando Mayor Buddy Dyer currently serves as the Chair of the LYNX Board. LYNX and the city will seek partnerships and joint funding opportunities to implement the future-ready strategies.

CURRENT **OUC** INNOVATIVE PROGRAMS

OUCollective Solar

This program is designed to make it easier and more affordable for homeowners to install solar photovoltaic (PV) panels on their roofs by utilizing OUC's buying power. OUCollective Solar simplifies the process and brings transparency and choice to the solar-buying experience. OUC customers can schedule a free, no-obligation consultation with an energy advisor and receive a comprehensive solar suitability analysis with a 3D system design and three competitive quotes for their properties. Additionally, homeowners can add a hurricane resiliency package, including a battery back-up system that provides electricity during outages.

For this program, OUC has partnered with esaSolar Energy to design and install an optimized PV system tailored to each home. Once the resident is enrolled, esaSolar takes care of everything from financing, engineering, procurement, construction, maintenance and more.

Predictive Analysis for Solar Power Generation

Around Orlando, OUC has deployed 25 weather stations with weather prediction software to provide minute-by-minute updates on cloud formation and movement. These stations can impact solar-panel energy production and, if needed, reroute energy from other sources, preventing power interruptions.

Florida Department of Transportation (FDOT)

FDOT District 5 encompasses one of the fastest growing regions in the State of Florida. The department provides safe and reliable transportation systems in order to promote the mobility of people and goods on state facilities. FDOT has a longstanding partnership with the city (and agency affiliates to enhance innovative delivery of the transportation network. FDOT, the City of Orlando and other partners have successfully teamed on region-wide initiatives such as, but not limited to, CFAVP, ATCMTD and AVMI. FDOT staff also participated in the focus area roundtable meetings. FDOT and the city will seek partnerships and joint funding opportunities to implement the future-ready strategies.

CURRENT **OUC** INNOVATIVE PROGRAMS

OUCooling

OUCooling is the chilled water service of OUC, which consists of production and distribution of chilled water for air conditioning applications. Chilled water systems are approximately 25% more energy efficient than traditional air conditioning system. Operating more than 50,000 installed tons of chilled water services, OUC is the largest provider of chilled water in the Southeast. By outsourcing the production of chilled water for their air-conditioning needs, OUCooling's large commercial customers – including Dr. Phillips Center for the Performing Arts and Amway Center – have lowered A/C-related electricity charges and reduced capital and operational costs.

OUC Convenient Lighting

This service provides customized lighting solutions as a service to commercial customers who would like to reduce the up-front cost of purchasing their own lighting infrastructure. Outdoor applications range from industrial parks to sports complexes to residential developments. Indoors, customers can upgrade to more cost-effective and energy-efficient lighting by retrofitting ballasts, replacing inefficient lamps and installing intelligent lighting controls. Orlando Health, Orange County Public Schools and the Homeowners Association of Eagle Creek are among those that have taken advantage of this bright way to save.

2

ENGAGEMENT

Inclusive community engagement has helped to identify current and future challenges the city faces, as well as potential solutions to address those challenges. The City of Orlando engaged the community, including internal city and industry experts, the business community and academia to guide the direction of the Orlando Future-Ready City Master Plan. **Through a series of focused meetings with city staff, roundtable meetings with local experts and community workshops, a diverse group of hundreds of people have played a role in formulating the objectives and strategies presented in this document.**

CITY OF ORLANDO

ORLANDO FUTURE-READY CITY MASTER PLAN

A. COMMUNITY OUTREACH OBJECTIVES

A series of community outreach objectives were established for the Orlando Future-Ready City Master Plan to help guide the public involvement process. These include:

- Identify and establish relationships with key stakeholders to establish clear, thoughtful expectations and strategies for the implementation of the Orlando Future-Ready City Master Plan;
- Hold internal city stakeholder meetings where staff can begin to identify challenges and opportunities for the city to be future-ready;
- Hold focus area roundtable meetings where city staff, partner agencies, and external stakeholders identify opportunities based on the identified pillar focus areas;
- Hold community meetings where stakeholders can learn about the goals for the Future-Ready City Master Plan while also providing suggestions on how to address specific concerns;
- Share project information transparently across an array of online and community-based platforms which allow for an open forum for dialogue (including the sharing of issues and opportunities); and
- Provide project updates and information on a public forum with visibility for all residents.

B. INTERNAL CITY STAKEHOLDER MEETINGS

The first step of the engagement process was internally focused. The project team facilitated internal stakeholder meetings with city departments to discuss the overall Orlando future-ready city program. The internal stakeholder meetings took place in December 2019 and January 2020:

- SUSTAINABILITY AND RESILIENCY
- PUBLIC WORKS
- INFORMATION TECHNOLOGY
- BUSINESS AND FINANCIAL
- VENUES
- FLEET AND FACILITIES
- HOUSING AND COMMUNITY DEVELOPMENT
- FIRE DEPARTMENT
- ECONOMIC DEVELOPMENT
- FAMILIES, PARKS AND RECREATION
- TRANSPORTATION
- POLICE DEPARTMENT

In order to gain a preliminary understanding of what the term "future-ready" meant to city staff and the types of projects and programs that make up future-ready cities, several questions were asked of meeting participants using PollEverywhere, an interactive live polling software. As a result of the staff input, several words were identified to be commonly recognized as defining the term future-ready (e.g. connected, responsive, safe and inclusive).

Key Takeaways

Feedback heard during the internal stakeholder meetings was used to shape content provided in both the subsequent pillar focus area roundtable meetings and the public workshops that followed. Some of the key takeaways include:

City staff are interested in incorporating innovation and technology into daily work, including:

- Improved data management sharing
- Increased communication technology
- Increased sensors and hardware

Staff has interest in improving future-readiness through:

- Improved opportunities for data sharing and collaboration across departments
- Better tools for accessing and using data
- Better tools for communicating with the public

Staff had numerous ideas on how to improve the city services for residents, businesses and customers, including:

- Improved communication – both digitally and in public space
- Public transit improvements including technology on busses and apps to interact with transit services
- One point of payment and other technologies to make essential city services more simple

C.

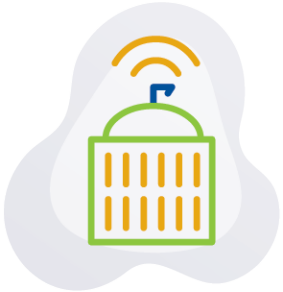
FOCUS AREA ROUNDTABLE MEETINGS

In addition to the internal department meetings held with city staff, six roundtable meetings were held with subject matter experts for each of the pillar focus areas, including partner agencies, the business community, non-profit agencies and academia. In these meetings, the project team solicited this feedback and leveraged input for further refinement of the Orlando Future-Ready City Master Plan.

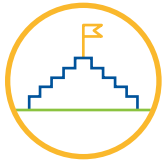
The roundtable meetings identified the challenges the city will face in the future, followed by brainstorming and prioritization of potential best practices. Based upon feedback at roundtable meetings, the project team determined Connectivity should become a separate pillar focus area. Therefore, comments related to connectivity have been summarized as a new, seventh pillar focus area in subsequent parts of this Master Plan.

Strategy Identification and Prioritization

In each roundtable meeting, small breakout groups worked together to brainstorm innovative strategies to solve the challenges identified. At the conclusion of the breakout sessions, each small group presented their ideas to the larger group. Following this exercise, all participants had the opportunity to prioritize the top ideas across all breakout groups. These prioritized ideas became the basis for broader community engagement and conceptual strategy development. Results from the meetings are summarized on the following pages.



CONNECTIVITY



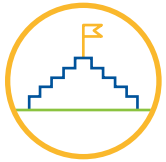
TOP CHALLENGES

1. Education to help bridge the digital divide
2. Acceptance by the community
3. Methods of engaging the public for education, listening and emergency response
4. Education about how to achieve and do these things – using real-world examples

STRATEGY IDENTIFICATION

1. Provide a central dashboard with real-time city services information that is accessible to the public
2. Provide Wi-Fi accessibility throughout the city

ENERGY



TOP CHALLENGES

1. Lack of funding
2. Limited roadway right-of-way for all the utilities to share
3. Grid and connectivity resilience and redundancy
4. Better methods of reusing batteries
5. Data analanalytics and interconnection
6. Local energy controls
7. Rate impacts (especially for low-income residents)

STRATEGY IDENTIFICATION

1. Notify consumers of when and where there is high energy use so they can make improvements
2. Create a platform to share utility data analytics such as report cards for buildings on the market
3. Find ways to improve solar capabilities with OUC, especially battery storage capabilities

HEALTH AND SAFETY

TOP CHALLENGES

1. Solve problems that make life difficult for vulnerable populations, including those experiencing homelessness and mental health crises
2. Provide safe transportation access and mobility throughout the city to all users, including residents without access to automobiles
3. Build a culture of preparedness at all levels in the community

STRATEGY IDENTIFICATION

1. Provide a central dashboard for public safety information accessible to the public
2. Focus technology on serving vulnerable groups of people such as the elderly or mentally and physically challenged people

MATERIALS

TOP CHALLENGES

1. Reduction of waste, both from producers of products and consumers of products
2. Challenges with availability of waste related technologies and the need to support these industries
3. Issues with shifting behaviors and perceptions of waste and recycling by shifting culture
4. Infrastructure for overall regional approach (outside of the city) to solid waste needs to be set up

STRATEGY IDENTIFICATION

1. Support the development of the intelligent Materials Recovery Facility (MRF) to increase recycling processing opportunities
2. Reduce waste at the source through educational outreach, coordination with existing partners, marketing, and collaboration with the “Beyond 34” program stakeholders
3. Generate recommendations for policy changes through interlocal agreements with cities and counties

MOBILITY

TOP CHALLENGES

1. Connectivity and data systems to support infrastructure
2. Cross-system standards that are user-friendly and integrated
3. Perception of the public to accept alternative modes of travel
4. Balance funding for existing and future uses
5. Accessibility for vulnerable populations
6. Location of affordable housing compared to workspaces may not be conveniently located and creates long commutes

STRATEGY IDENTIFICATION

1. Create a unified fare collection program such as a mobile application
2. Develop a marketing and education campaign to make riding the bus a more desirable mode of transportation, including benefits such as Wi-Fi capability and working on the bus on your way to work
3. Update the City of Orlando Engineering Standards Manual (ESM) to link land uses to the types of roadways and transportation networks

PLACEMAKING

TOP CHALLENGES

1. Housing affordability and accessibility, especially concerning vulnerable populations
2. Creating sustainable operation and maintenance of the built environment
3. Limitations on the right-of-way, 5G placement (utilities, street furniture, etc.)
4. Creating beneficial public open space and places that benefit human health
5. Education for innovative projects
6. Affordability of innovation for developers

STRATEGY IDENTIFICATION

1. Update the Land Development Code and other codes to create better incentives, especially for green infrastructure and low impact development
2. Create greater requirements for green space and open space
3. Plan for the use of a digital twin platform to support simulations of changes to the built environment, model the relationships and interactions between people, places, and devices, and create a digital asset management system

WATER

TOP CHALLENGES

1. Reduce consumption of water resources
2. Reduce failure of infrastructure such as leaks and septic failure
3. Educate consumers concerning water resources

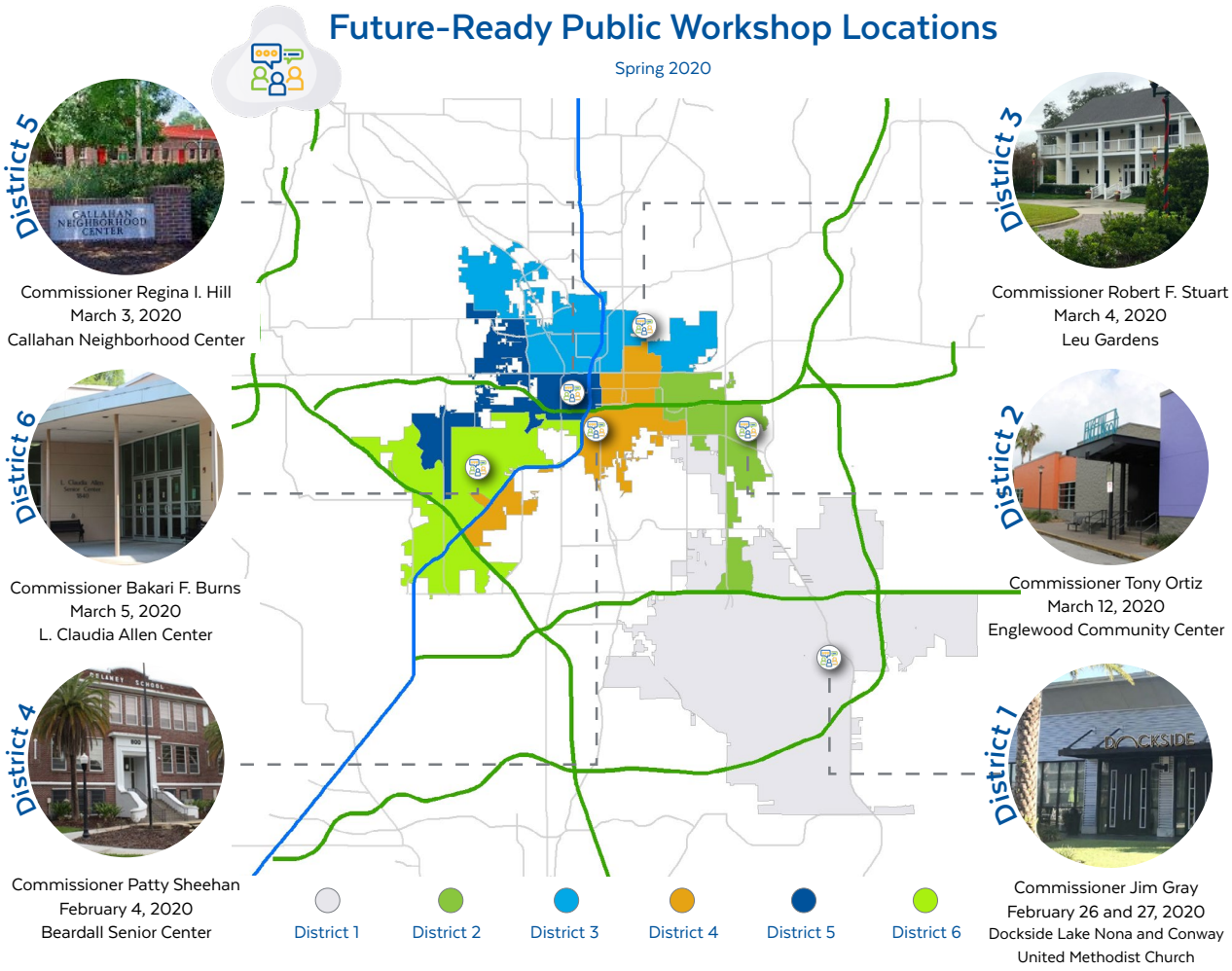
STRATEGY IDENTIFICATION

1. Retrofit existing infrastructure with sensors and gauges and expand rain barrels and cisterns for stormwater
2. Partner with OUC to create educational materials for homeowner associations (HOAs), city and county businesses, and residents on ways to eliminate the overuse of water and wastewater
3. Create a database and automated alert system to measure usage of potable and reclaimed water and which monitors water quality

D. COMMUNITY WORKSHOPS

The general public was also presented with the opportunity to learn about the Orlando Future-Ready City Master Plan and share their ideas and concerns. Six community workshops were held, using an informal, open house setting so that individuals were able to review project displays at their own pace. A final public workshop to review the draft plan was held virtually.

Project team members were also available to hold one-on-one conversations and respond to individual questions. Several boards with graphic illustrations were shared at the community workshops which helped to guide conversation and facilitate idea-generation for the Orlando Future-Ready City Master Plan. Content placed on the boards was generated through input received in the internal city stakeholder meetings and pillar focus area roundtable discussions. Workshop participants placed dot stickers next to the strategies they thought were most important for Orlando to pursue. The results of this input were used to develop conceptual strategies, as described further in Section 4 of this Master Plan. Workshop materials and results are summarized on the following pages.



ENERGY

WHAT ARE WE ALREADY DOING?

LED Retrofit of City Buildings

+ Works to decrease energy use as well as increase comfort and productivity

Solar and Electric Vehicle-Ready Policies

+ Tailor designs for the local market to speed installation

Building Benchmarking, Energy Audits, & Transparency Policy (BEWES)

+ Publicly viewable energy use benchmarking data for city-owned and commercial buildings

Sourcing Energy from Renewable Sources

+ 10% of city operations are powered by renewable energy
+ Continual implementation with OUC

CITY GOALS

» Reduce greenhouse gas emissions by 90% from 2007 levels by 2040

» Municipal operations to be greenhouse gas neutral by 2030

» Obtain 100% of electricity from clean, renewable sources

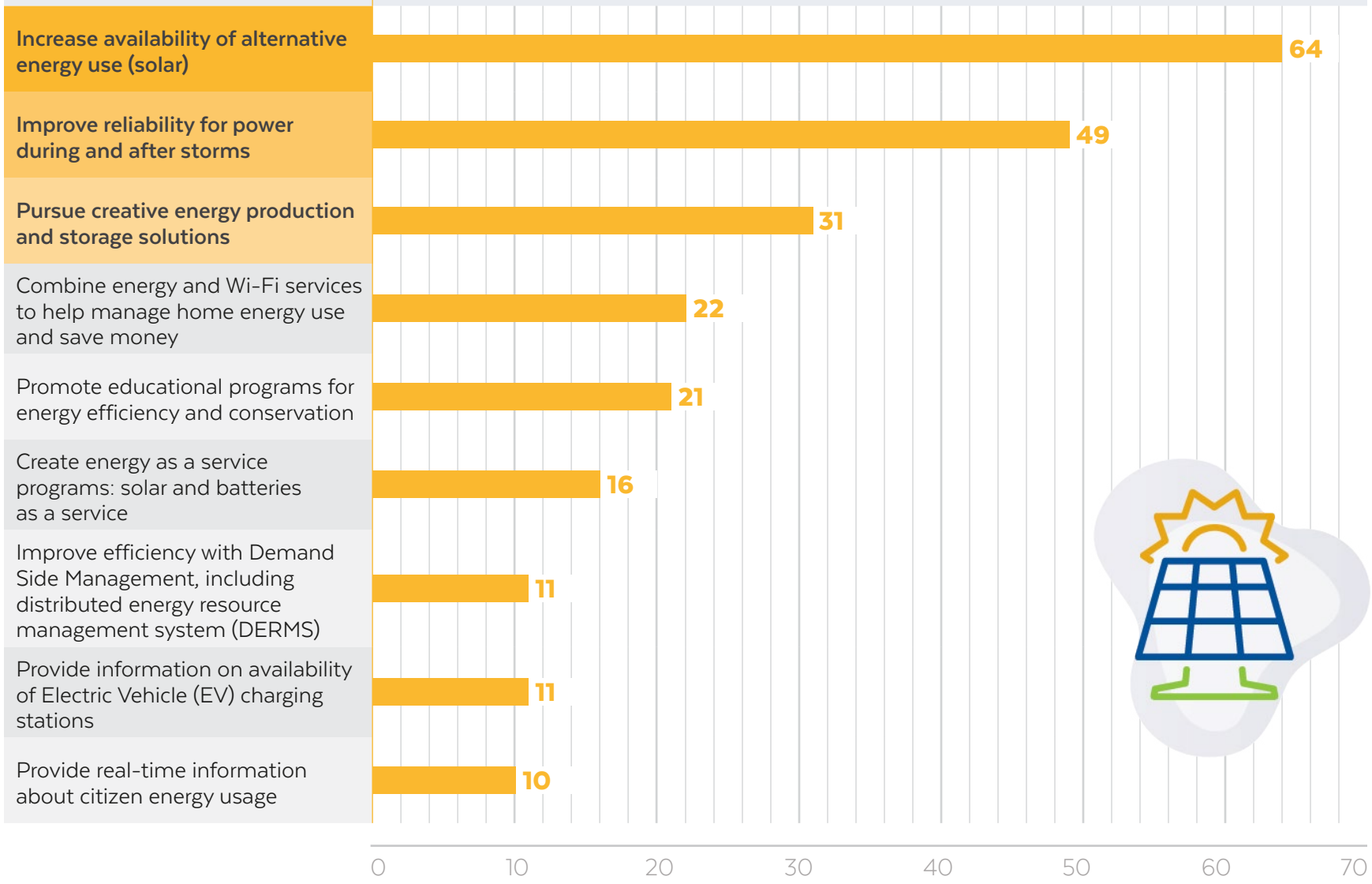
› Municipal Operations by 2030

› Citywide by 2050

POTENTIAL STRATEGIES

+ Promote educational programs for energy efficiency and conservation
+ Improve efficiency with demand-side management, including Distributed Energy Resource Management System (DERMS)
+ Pursue creative energy production and storage solutions
+ Create energy as a service programs: solar and batteries as a service
+ Combine energy and WiFi services to help manage home energy use and save money
+ Provide real-time information about citizen energy usage
+ Provide information on availability of Electric Vehicle (EV) charging stations
+ Increase availability of alternative energy use (solar)
+ Improve reliability for power during and after storms

ENERGY


POTENTIAL STRATEGIES
COMMUNITY INTEREST (MEASURED BY STICKERS PLACED)
Increase availability of alternative energy use (solar)
64
Improve reliability for power during and after storms
49
Pursue creative energy production and storage solutions
31
Combine energy and Wi-Fi services to help manage home energy use and save money
22
Promote educational programs for energy efficiency and conservation
21
Create energy as a service programs: solar and batteries as a service
16
Improve efficiency with Demand Side Management, including distributed energy resource management system (DERMS)
11
Provide information on availability of Electric Vehicle (EV) charging stations
11
Provide real-time information about citizen energy usage
10
0
10
20
30
40
50
60
70

WATER

WHAT ARE WE ALREADY DOING?

Smart Water Meters

+ Leak detection and unusual activity monitoring
+ Implemented in partnership with OUC

Rain Gauge Sensors

+ To detect flooding events in real time and provide alerts to the public and public works managers
+ In planning stage with local water management districts

Rain Collection Barrels

+ Encourage water conservation, prevent stormwater runoff and provide water source for gardening
+ Implemented in partnership with Barrels by the Bay, Coca Cola, Disney, OCPS, local churches and community gardens

CITY GOALS

» Enhance Orlando's reputation as "The City Beautiful" by promoting sustainable landscaping practices

» Reduce gross potable water consumption:
  › 50% municipal use by 2030
  › 20% per capita city-wide by 2050

» Increase number of lakes meeting good water quality standards (Trophic State Index less than 61)

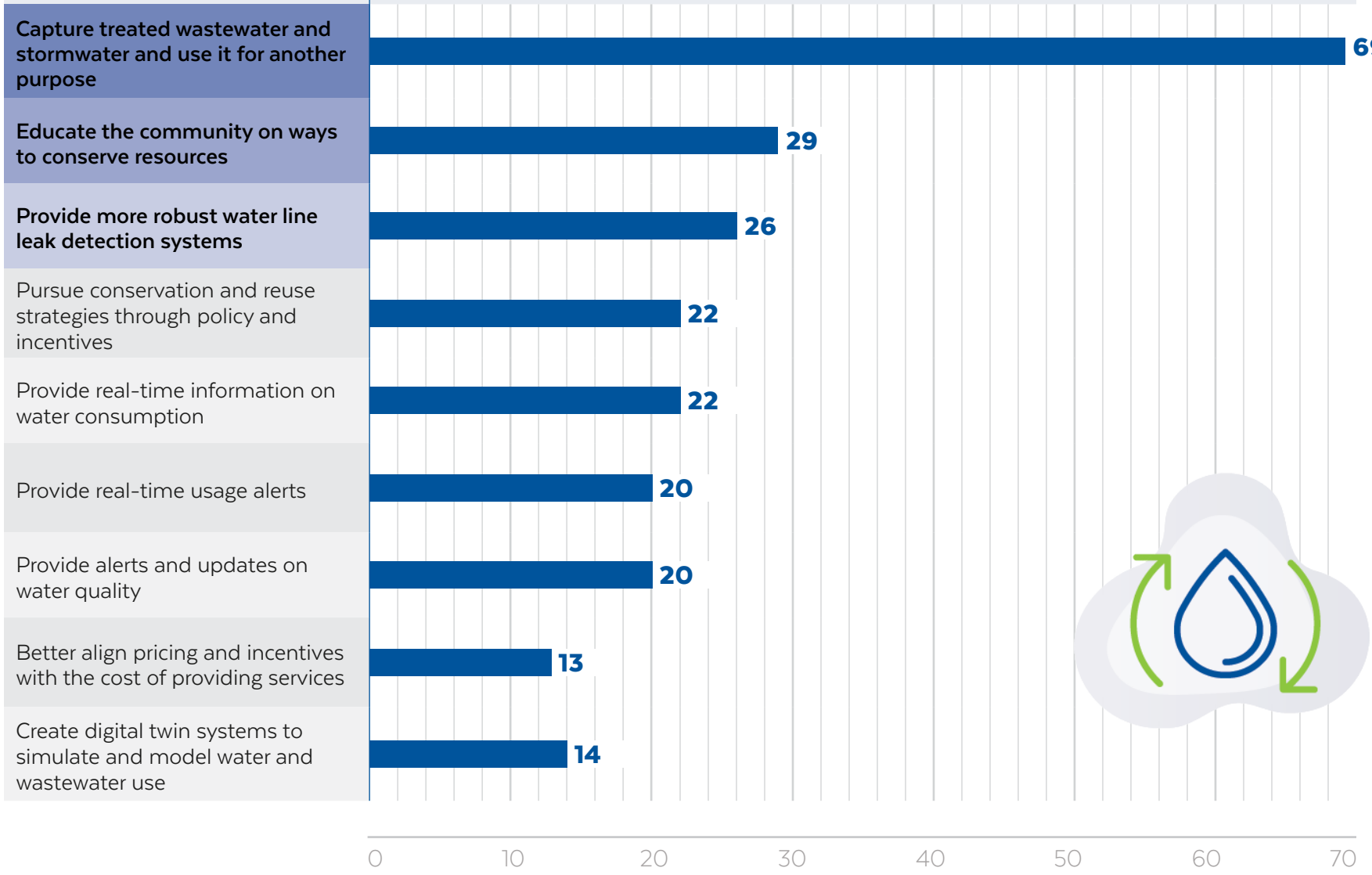
» Expand education and outreach efforts to increase understanding of how to manage water resources and pollution prevention

» Ensure Orlando mitigates inland flooding during future extreme weather events

POTENTIAL STRATEGIES

+ Better align pricing and incentives with the cost of providing services
+ Educate the community on ways to conserve resources
+ Provide real-time usage alerts
+ Pursue conservation and reuse strategies through policy and incentives
+ Create digital twin systems to simulate and model water and wastewater use
+ Provide more robust water line leak detection systems
+ Provide real-time information on water consumption
+ Provide alerts and updates on water quality
+ Capture treated wastewater and stormwater and use it for another purpose

WATER


POTENTIAL STRATEGIES
COMMUNITY INTEREST (MEASURED BY STICKERS PLACED)
Capture treated wastewater and stormwater and use it for another purpose
69
Educate the community on ways to conserve resources
29
Provide more robust water line leak detection systems
26
Pursue conservation and reuse strategies through policy and incentives
22
Provide real-time information on water consumption
22
Provide real-time usage alerts
20
Provide alerts and updates on water quality
20
Better align pricing and incentives with the cost of providing services
13
Create digital twin systems to simulate and model water and wastewater use
14
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70

MATERIALS

WHAT ARE WE ALREADY DOING?

Smarter Recycling & Waste Management

+ Optimized trash routes, reduced service time, analyzed recycling habits of residents and reduced fuel consumption of fleet vehicles
+ Currently being piloted with key partners (Rubicon, Easy Route)

Food Waste Collection

+ Divert organic food waste from the food service industry
+ Currently implemented with key partners (Harvest Power, Second Harvest)

Solar Public Space Trash Cans

+ Provides solar power to compact waste and provides real-time information on how full the bins are, frequency of pickup and other valuable metrics
+ Currently implemented with key partners (Big Belly Solar)

CITY GOALS

» Elimination of solid waste sent to landfills and incinerators

» Becoming a "zero waste" community

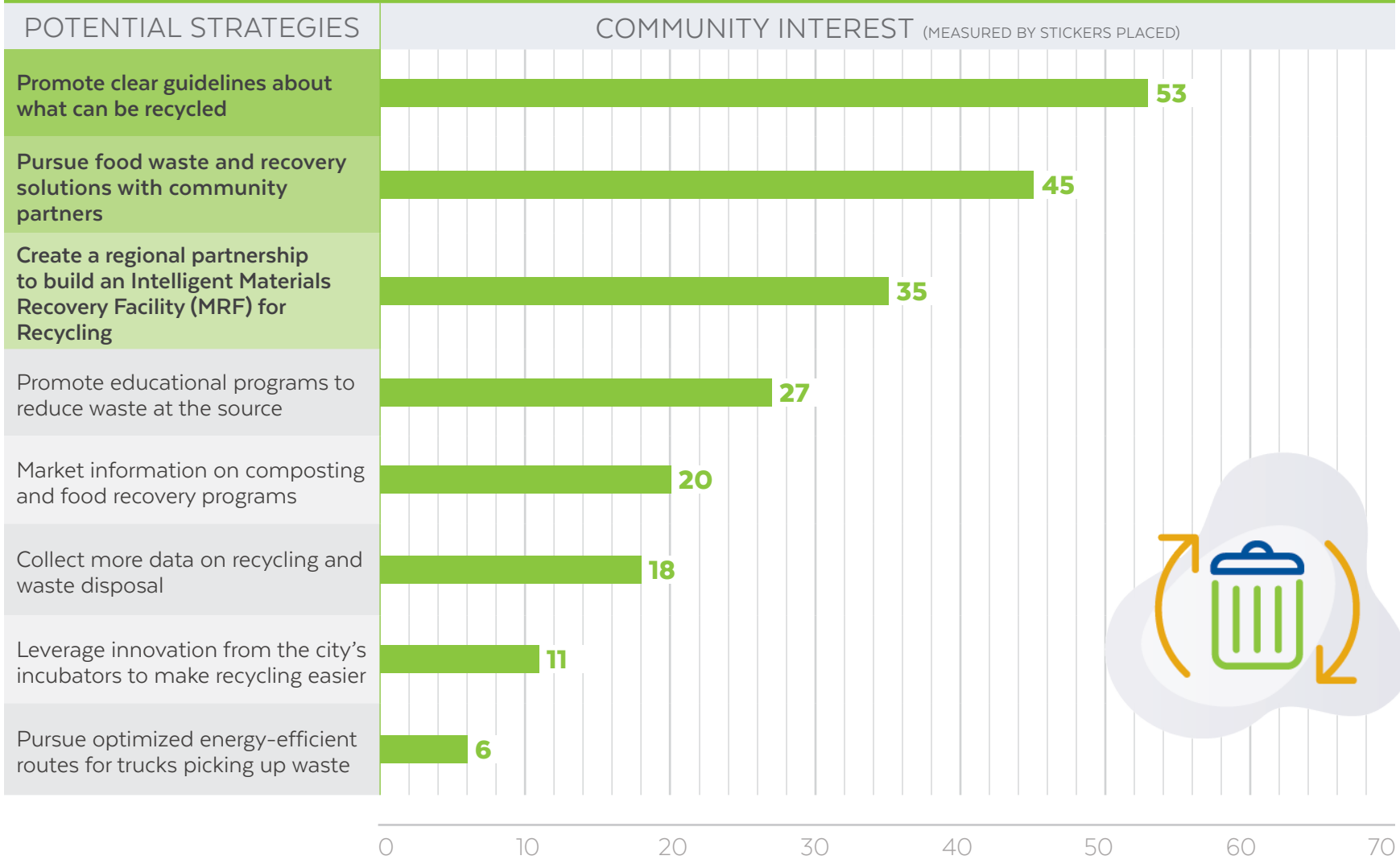
» Make waste a resource rather than an environmental liability; an opportunity for economic growth

» Improving quality of life in Orlando

POTENTIAL STRATEGIES

+ Create a regional partnership to build an Intelligent Materials Recovery Facility (MRF) for Recycling
+ Leverage innovation from the city's incubators to make recycling easier
+ Promote educational programs to reduce waste at the source
+ Pursue food waste and recovery solutions with community partners
+ Collect more data on recycling and waste disposal
+ Promote clear guidelines about what can be recycled
+ Pursue optimized energy-efficient routes for trucks picking up waste
+ Market information on composting and food recovery programs

MATERIALS


POTENTIAL STRATEGIES
COMMUNITY INTEREST (MEASURED BY STICKERS PLACED)
Promote clear guidelines about what can be recycled
53
Pursue food waste and recovery solutions with community partners
45
Create a regional partnership to build an Intelligent Materials Recovery Facility (MRF) for Recycling
35
Promote educational programs to reduce waste at the source
27
Market information on composting and food recovery programs
20
Collect more data on recycling and waste disposal
18
Leverage innovation from the city's incubators to make recycling easier
11
Pursue optimized energy-efficient routes for trucks picking up waste
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HEALTH & SAFETY

WHAT ARE WE ALREADY DOING?

Joint Police & Fire Computer-Aided Dispatch

+ Efficient police and fire data sharing, including vehicle location, public camera video streams and digital plans
+ Currently implemented and continually upgraded

Video & Predictive Analytics

+ Using existing assets such as body-worn cameras, drones and business partner footage
+ In planning stage with key partners (FDOT and LYNX)

Public Safety Dashboard

+ Single application to view all city-related public safety information including citizen reported issues, power outages, shelter locations and other important resources
+ In planning stage with key partners (Orange County)

CITY GOALS

» Eliminate pedestrian and bike fatalities (Vision Zero Orlando Action Plan)

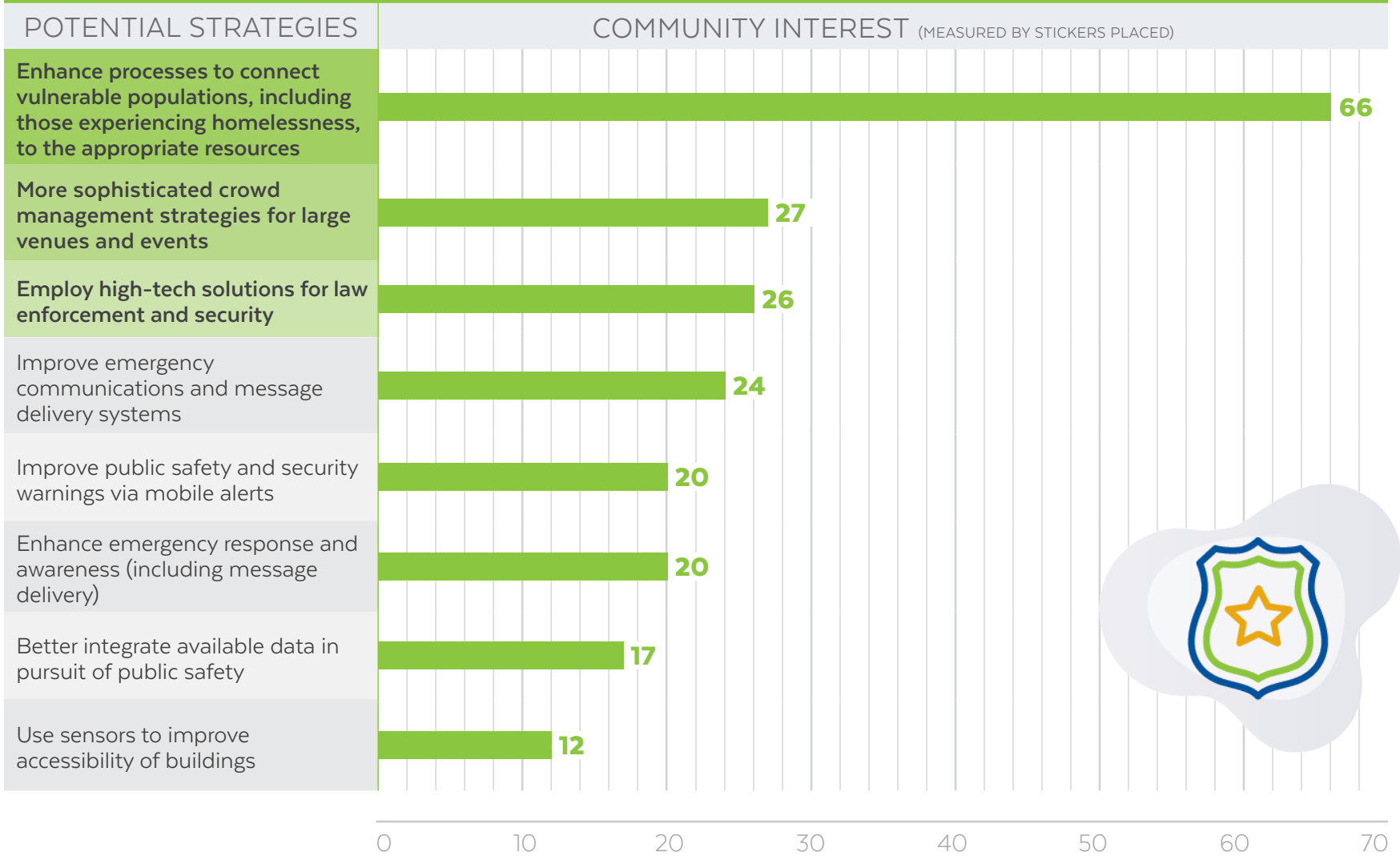
» Ensure access to affordable, healthy food options (community gardens, grocery stores or farmers markets) within ½ mile of every resident

» Reduce obesity and diabetes rates

POTENTIAL STRATEGIES

+ Enhance processes to connect vulnerable populations, including those experiencing homelessness, to the appropriate resources
+ Improve emergency communications and message delivery systems
+ Improve public safety and security warnings via mobile alerts
+ Better integrate available data in pursuit of public safety
+ Enhance emergency response and awareness (including message delivery)
+ Employ technology solutions for law enforcement and surveillance
+ Use sensors to improve accessibility of buildings
+ More sophisticated crowd management strategies for large venues and events

HEALTH & SAFETY



MOBILITY

WHAT ARE WE ALREADY DOING?

Live-Feed Bus Stops

+ Stops that provide real-time information and are integrated with LYNX smartphone applications

Bike & Scooter Sharing

+ Providing alternative 'micro-mobility' solutions
+ Currently implemented with public-private partnerships

Technology Solutions for Parking

+ On-street system to locate spaces, multiple payment methods, meter-less spaces and smart garages
+ System reduces traffic congestion and provides real-time parking availability with key partners (ParkMobile)

Intelligent Transportation Systems

+ Technology to improve the safety, efficiency and sustainability of roads

CITY GOALS

» Majority of trips made by foot, bike, carpooling or transit

» Achieve a Gold ranking from the League of American Bicyclists Bicycle Friendly Community Score

» Increase miles of safe, sustainable transportation infrastructure

» Double street miles within the city that meet "complete streets" criteria

» Eliminate pedestrian and bike fatalities

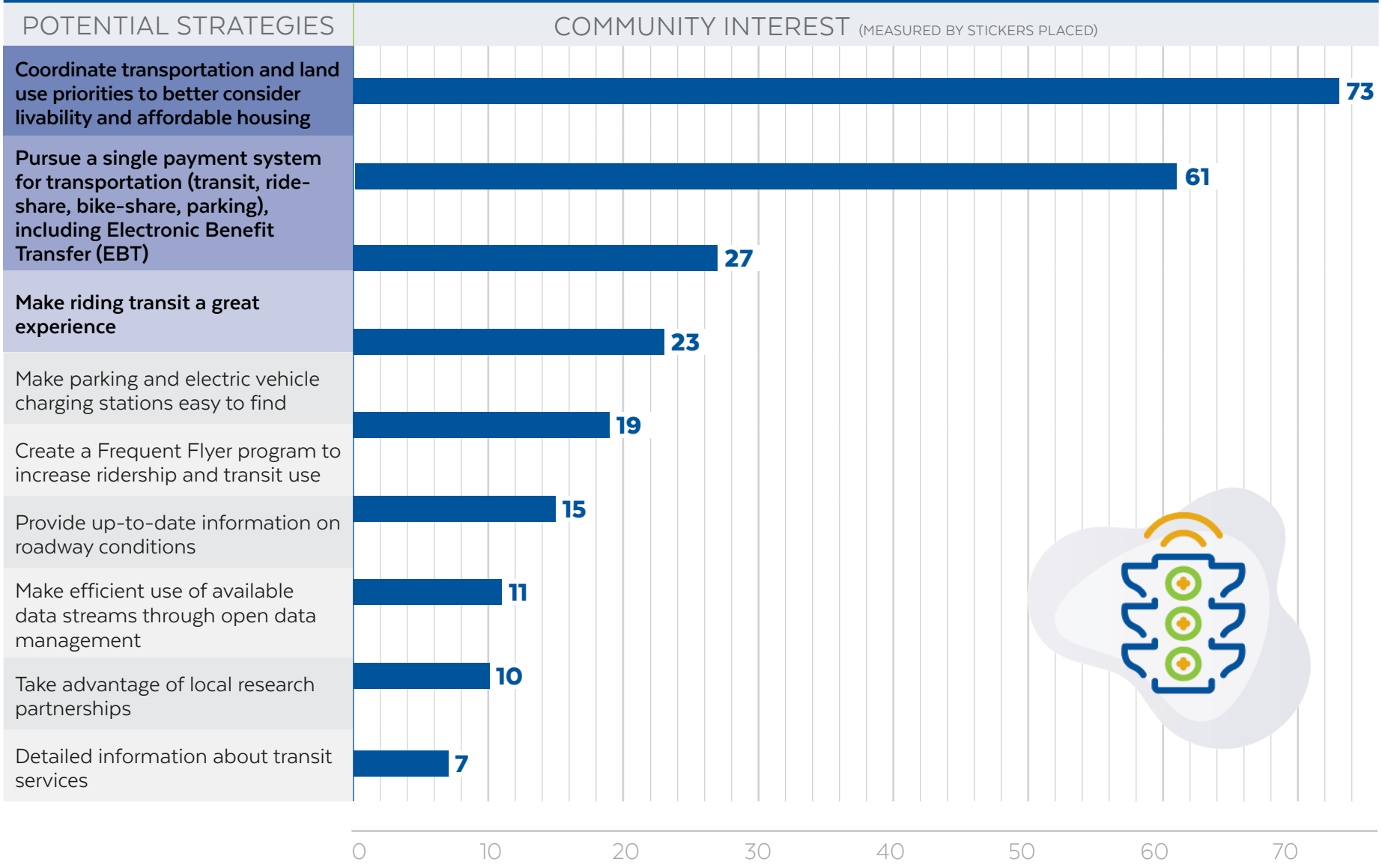
» Increase the use of electric vehicles and alternative fuel vehicles throughout the city

» Attain a "good" rating on the Air Quality Index (AQI) 365 days/year

POTENTIAL STRATEGIES

+ Pursue a single payment system for transportation (transit, ride-share, bike-share, parking), including Electronic Benefit Transfer (EBT)
+ Make riding transit a great experience
+ Detailed information about transit services
+ Create a Frequent Flyer program to increase ridership and transit use
+ Make efficient use of available data streams through open data management
+ Coordinate transportation and land use priorities to better consider livability and affordable housing
+ Take advantage of local research partnerships
+ Provide up-to-date information on roadway conditions
+ Make parking and electric vehicle charging stations easy to find

MOBILITY


POTENTIAL STRATEGIES
COMMUNITY INTEREST (MEASURED BY STICKERS PLACED)
Coordinate transportation and land use priorities to better consider livability and affordable housing
73
Pursue a single payment system for transportation (transit, ride-share, bike-share, parking), including Electronic Benefit Transfer (EBT)
61
Make riding transit a great experience
27
Make parking and electric vehicle charging stations easy to find
23
Create a Frequent Flyer program to increase ridership and transit use
19
Provide up-to-date information on roadway conditions
15
Make efficient use of available data streams through open data management
11
Take advantage of local research partnerships
10
Detailed information about transit services
7
0
10
20
30
40
50
60
70

PLACEMAKING

WHAT ARE WE ALREADY DOING?

Building Automation & Controls

+ Real-time information and control for energy and water use
+ Implemented with key partners (Building OS, WebCTRL)

Smart Street Lighting

+ 18,000 street lights retrofitted to LED
+ Partnership opportunities for pilot programs with OUC, special districts and property owners

Demand-Side Management

+ Control and manage loads during peak times of day by controlling non-essential assets (hot water heaters, HVAC)

Grid Energy Storage

+ Asset that provides a resiliency back-up power generator for future extreme weather events

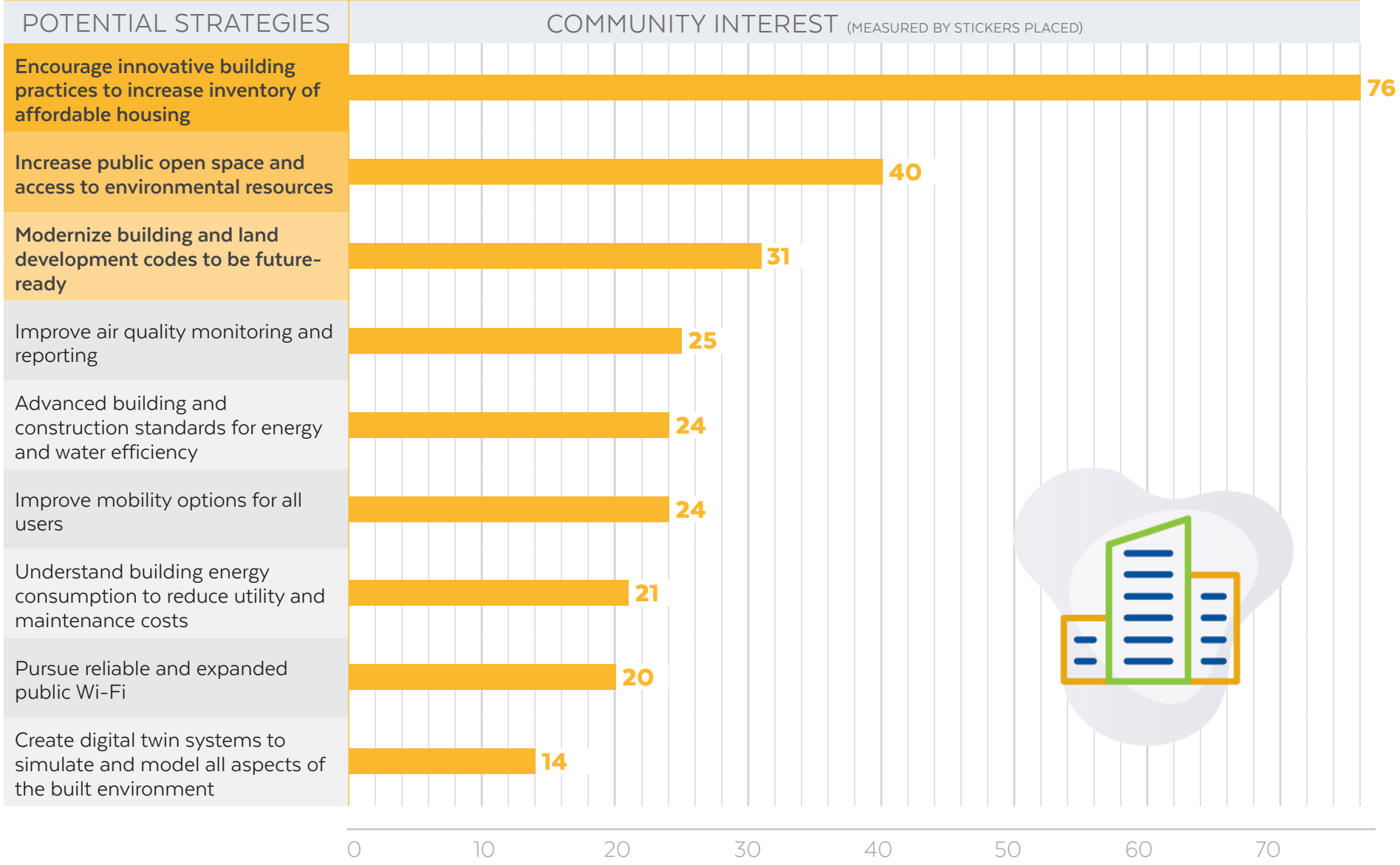
CITY GOALS

» 100% of municipal electricity from renewable sources by 2030
  › 50% reduction in municipal electricity consumption by 2030
  › Run city fleet vehicles on 100% renewable sources by 2030
» LEED requirement for all new municipal buildings
  › 15 buildings have received LEED certification since 2010
» 100% LED streetlights by 2020
» 27% of city operations powered by solar in 2020

POTENTIAL STRATEGIES

+ Modernize building and land development codes to be future-ready
+ Advanced building and construction standards for energy and water efficiency
+ Increase public open space and access to environmental resources
+ Improve mobility options for all users
+ Create digital twin systems to simulate and model all aspects of the built environment
+ Encourage innovative building practices to increase inventory of affordable housing
+ Understand building energy consumption to reduce utility and maintenance costs
+ Pursue reliable and expanded public Wi-Fi
+ Improve air quality monitoring and reporting

PLACEMAKING



Summary of Written Input by Pillar Focus Area

The following provides a summary of the comments that arose most frequently and sparked deep discussion during the community workshops:

CONNECTIVITY

- User-Focused - Being mindful of the end consumer in the implementation and communication of technologies.
- Distribute information on the street and at community events, do not rely solely on social media.
- Improve communication and education about code violations instead of just enforcing after the fact.

ENERGY

- Alternative Energy Sources - support increasing availability of alternative energy sources such as solar.
- Equity in dealing with people and natural systems.

HEALTH AND SAFETY

- Citizens recognized the responsibility to protect the homeless, elderly, and other vulnerable populations and discussed several specific and unique solutions that could involve technology.
- Health of the population was also discussed often, especially the need to create some priorities that address health.
- The safety of public spaces was another topic of heavy discussion. Residents were interested in making specific places in their neighborhoods safer through lighting, security cameras, and other means of monitoring.

MATERIALS

- Many attendees spoke about a need for more community facilities that would help improve proper disposal of waste including recyclables, hard to dispose of items and compostable waste.
- Several attendees provided input communicating their desire to see not just waste but consumption that leads to waste reduced. Ideas included manufacturers paying a fee when they produce hard to dispose of products, incentives to reduce packaging and/or waste at the source, as well as programs for community members to rent/share goods instead of purchasing for a one-time use.
- Many community members shared their desire for improved education when it comes to solid waste reduction and disposal.
- Commercial waste was another topic of conversation, as attendees saw the importance of improving processes for facilities that create the most waste.

MOBILITY

- There was much discussion around the culture of transportation, with a shift towards one that prioritizes pedestrians and bicyclists by closing down streets for transit and adding more bike lanes.
- There was also discussion around educating people, both on rules of the road as well as how to take transit.
- Vulnerable populations were a topic of discussion. Attendees were thoughtful about how all people take transit and access daily essentials.
- Transit frequency and improved transit stops were popular suggestions for improving transit quality, which many attendees recognized as vital to the future of Orlando.

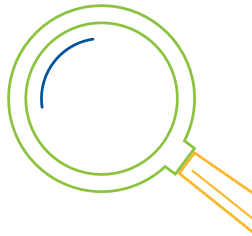
PLACEMAKING

- There was a strong interest in encouraging creative solutions to problems through incentives and enforcement of permitting processes.
- Attainable housing was another topic discussion at every meeting, including ways to make Orlando denser.
- Several attendees expressed the desire for more green space, more parks and overall more vibrant public spaces to encourage social cohesion.

WATER

- A common topic of conversation for Water was acknowledging our role in natural drainage systems. This included the use of bioswales, xeriscapes, better integrating wetlands into development and the use of native vegetation.
- Reducing water use, through incentives, education, or enforcement was another topic of conversation. Examples include the discussion of reduced commercial irrigation and rain barrels.

Common Themes identified through Community Engagement



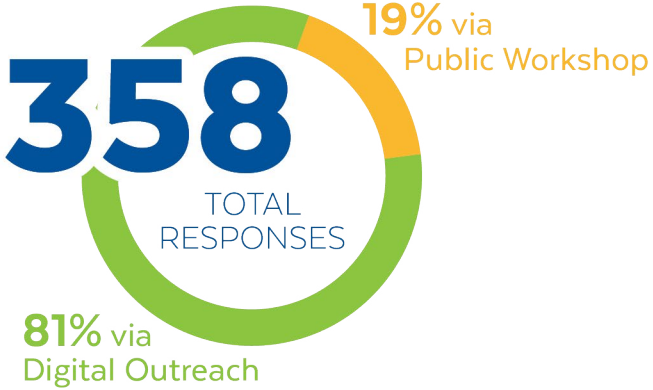
Across all of the conversations during internal stakeholder meetings, pillar focus area roundtable meetings and the six public workshops, several common themes emerged that are applicable for all pillar focus areas. These themes are listed in the table below:

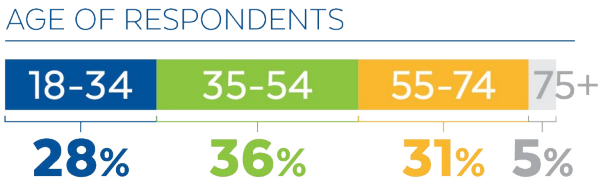
TOPIC	DISCUSSION
VULNERABLE POPULATIONS	Community members discussed vulnerable populations at every meeting, at every pillar board. They expressed a desire for equity and respect in everything from public transportation, attainable housing, access to public resources, community connection and safe public spaces.
EDUCATION AND COMMUNICATION	Community members repeatedly brought up their desire for access to information and training to create meaningful cultural shifts in the city. This included discussions on the creation of a dashboard to share valuable information and educational opportunities, with special emphasis on public safety, alternative energy and home ownership. Supplement with a partnership with the public school system.
PERMITTING, INCENTIVES AND REGULATORY PROCESSES	Community members recognize permitting, regulatory processes and incentives as a powerful tool to steer the city towards a brighter future. This included mandating sustainable building practices and incentivizing behavior that benefits the long-term health of the community. Use technology to streamline these processes and track the impact of incentive-based programs.
PARTNERSHIPS	Community members want to create partnerships with Orange County, other local governments and/or innovative technology companies to make sure its investments were in line with best practices and would continue to be valuable well into the future and move the community forward in a sustainable way.
NATURAL SYSTEMS	Community members reiterated that if the city is to lead the way in resilient planning for the future, it should consider natural systems thinking, including discussions of alternative energy, energy efficiency, composting, native plants in drainage systems and 'xeriscaping'. Working well with the natural world will ensure the City of Orlando continues to be a beautiful place to live with all the appropriate resources citizens need to thrive.
ENFORCEMENT	Community members want to guide the future through education and regulatory processes and better enforcement of existing rules. This was of particular concern for those discussing pedestrian and vehicle interactions but was also applicable to the built environment and permitting, waste management and wastewater. In addition to technologies that can improve ease of enforcement, this topic points to the desire for improved methods of communication and education between citizens and the city.

E. ONLINE SURVEY

The Orlando future-ready city team also deployed an online survey to gather the thoughts of residents and stakeholders in Orlando, some of whom were not able to engage through the in-person public meetings held throughout the city. Responses were received from February 4 to March 29, 2020.

In total, there were 358 responses, 81% of whom accessed the survey via digital outreach from the city, while the other 19% took the surveys at one of the six public workshops help by the project team. Of those who responded, 28% were from ages 18-34, 36% were from ages 35-53, 31% were from ages 55-74% and 5% were 75 or older. Nineteen percent of those who responded were parents of school aged children and 22% self-selected as being part of an underrepresented group. Regarding income, 45% had a household income of more than $100,000 and 11% had a household income below $40,000. The median household income in 2018 was $48,511 according to the 2018 ACS 5-year survey. Of those who answered, 76% were White Only, 14% were Hispanic and 9% were Black. The top zip codes report by respondents were 32803, 32801, 32804 and 32812. The survey saw input from many long-term Orlando residents, with 64% having lived in Orlando for more than 10 years.





19% Parents of school aged children

22% Part of an underrepresented group

Results

Seventy-one percent of those answering had at least some trust in the city, with 58% thinking that the city is at least somewhat prepared for the future. Just more than half of respondents were at least moderately familiar with smart and future-ready city projects. When prompted in exercises to use words to describe a future-ready city, the following emerged: **Resilient, Innovative, Accessible, Connected, Sustainable,** and **Inclusive**. These words corresponded well with feedback received from city staff and regional stakeholders. When asked to rank values to be included in the plan, the top three were: **Sustainable, Fairness,** and **Transparency.**

The **top three** priority focus areas were **Mobility, Energy** and **Water,** with Health and Safety, Materials, Placemaking, and Connectivity ranking fourth through seventh.

The following solutions were ranked as the **top five** of 24 possible solutions:

1. Health and Safety
   Optimized emergency response
2. Energy
   Improved reliability of power during and after storms
3. Energy
   Advanced building and construction standards
4. Water
   Advanced construction standards
5. Materials
   Clearer recycling guidelines

The survey also asked respondents for additional feedback on what the city should consider for the plan, with space for an open response. Residents' comments mentioned several topics repeatedly, including affordable housing and its relationship with jobs and land use. Transportation was another often-mentioned concern; from traffic to access to transit and safer streets for pedestrians and bicyclists, residents saw the opportunity for technology to improve the manner in which people move from place to place. Many of those who answered asked strongly for increased communication and transparency in the plan, including community outreach and education. Another frequently mentioned topic was sustainability and resilience, with long-term thinking and emphasis on maintenance over 'growth at all costs.' This valuable feedback has shaped the direction of the project and has directly impacted proposed short- and long-term strategies.

3

MASTER PLAN POLICY RECOMMENDATIONS

The policy framework for the Future-Ready City Master Plan is included in this section. It includes goals, objectives, and strategies for each of the seven pillar focus areas. It also contains policy recommendations for regional issues, including transportation, resiliency, affordable housing and workforce development, that require multiple partners to implement.

CITY OF ORLANDO

ORLANDO FUTURE-READY CITY MASTER PLAN

A. GOALS, OBJECTIVES AND STRATEGIES

Goals, objectives and strategies for each of the seven pillar focus areas are described in this section. A Goal is a high-level statement about what the future-ready program hopes to achieve in the City of Orlando. An Objective defines the implementation steps and measurable outcomes that are necessary to achieve the Goal. The Goals and Objectives were developed through stakeholder engagement (internal workshops, roundtable meetings and public workshops). Potential strategies, or specific actions, to implement the Goals and Objectives were prepared by the project team to address the issues identified by stakeholders. Section 4 of this Master Plan describes how strategies were prioritized as short-term or mid- to long-term.

A compliance and consistency analysis was performed on the city's Growth Management Plan (GMP) and Land Development Code (LDC) to ensure that the Master Plan goals are aligned with the city's long term growth management and development framework. As future-ready projects are approved and implemented by the city, amendments to these documents may be necessary at a later date. All amendments to the GMP must be considered at public hearings, including the Municipal Planning Board and City Council. Text and map amendments to the GMP are considered large scale amendments and must be submitted to the Florida Department of Economic Opportunity and other state agencies for expedited state review.

OVERARCHING GOAL | Leverage technology and innovation that enhance services for all Orlando residents, businesses and visitors.

Objective: Prioritize programs and improvements that contribute to the implementation of multiple pillar focus areas

- **Internal Strategy**: Create a city-driven incubator or "IDEA Lab" that issues Request for Information (RFI) challenges to local subject matter experts
- **Internal Strategy**: Prepare a Community Outreach and Engagement Plan to provide continuous information about the city's future-ready initiatives and technology investments
- **Internal Strategy**: Build a Data Fusion Center to manage all city and partner agency data feeds in a centralized environment
- **Internal Strategy**: Create digital twin systems to model and simulate impacts of growth on infrastructure, environment, energy and water consumption on real-world buildings, physical assets, processes, places, systems and devices
- **Internal Strategy**: Embed a workforce development component into all future-ready projects, such as an internship program, collaborating with local partners to incorporate training and education

Connectivity Focus Area

GOAL | Bridge the digital divide

Objective: Leverage existing and new data to define and eliminate Orlando's digital divide through expanded public connectivity

- **Internal Strategy**: Establish partnerships to pursue reliable and expanded public Wi-Fi services
- **Internal Strategy**: Evaluate distribution of loaner Wi-Fi hotspot devices to community centers

Objective: Improve public information sharing with residents and visitors

- **Internal Strategy**: Provide an online city dashboard with real-time city services information
- **Internal Strategy**: Leverage technology to provide equitable distribution of information to all city residents and visitors

GOAL | Provide residents and visitors with unified digital resources and communications to improve civic engagement

Objective: Enhance city communications to connect vulnerable populations, including those experiencing homelessness, to the appropriate resources

- **Internal Strategy**: Improve emergency communications and message delivery systems
- **Internal Strategy**: Deploy an Integrated Public Alert and Warning System (IPAWS) with mobile device alerts to enhance emergency response and awareness (including message delivery services)

Energy Focus Area

GOAL | Provide resilient, reliable, affordable and sustainable energy service to all

Objective: Improve energy resilience during and after severe weather events

- **Internal Strategy:** Create Resilience Hubs at community centers to provide back-up power, food, community Wi-Fi, public information and other supplies needed during natural disasters
- **Internal Strategy:** Analyze data to identify the city's most vulnerable populations to climate change and utility affordability
- **Internal Strategy:** Ensure that back-up resilient power source, including on-site controls, is present at all city-owned critical infrastructure (i.e. solar + storage generators)
- **Community Strategy:** Leverage new technologies to accelerate opportunities for renewable energy and storage solutions

Objective: Measure effects of educational campaigns in energy conservation and clean energy programs

- **Internal Strategy:** Publish and analyze Building Energy and Water Efficiency Strategy (BEWES) building data for public use to stimulate market transformation
- **Community Strategy:** Promote educational programs for energy efficiency and conservation
- **Community Strategy:** Continue to promote OUC programs available for city residents, including but not limited to Efficiency Delivered (ED), EV Charge-It, collective solar, community solar, OUCooling and rebates for energy efficient appliances and smart thermostats

Objective: Reduce utility consumption and maintenance costs

- **Internal Strategy:** Establish a new commercial and multifamily building energy efficiency retrofit program
- **Community Strategy:** Improve weatherization and low-income energy efficiency services
- **Community Strategy:** Leverage technology in collaboration with OUC to provide real-time information about citizen energy usage

Objective: Leverage emerging technologies to support the city's clean energy goals

- **Internal Strategy:** Engage in an advanced smart building pilot, to test new Internet of Things (IoT) systems and how they can further improve energy savings

Health and Safety Focus Area

GOAL | Improve the health and safety of our diverse individuals and communities

Objective: Encourage and establish partnerships and adopt public education campaigns that will improve public health outcomes and reduce non-emergency EMS calls and false alarm fire calls

- **Community Strategy**: Leverage a social services program that supports multi-agency coordination and ensures that limited public resources are used effectively and support the provision of health care services for vulnerable populations, addressing age-specific needs, mental health support services, substance abuse and healthcare access

Objective: Ensure that emergency response and workplace safety plans incorporate possible climate changes and public health concerns that could impact the protection of staff, infrastructure, facilities and residents during emergencies

- **Internal Strategy**: Incorporate city's Vulnerability Assessment findings into departmental safety plans and procedures and provide training for city staff

Objective: Leverage partnerships, public resources and facilities to create opportunities to promote healthy communities

- **Community Strategy**: Better integrate available community health data to identify vulnerable communities and plan interventions for improved public health and safety outcomes

Objective: Create partnerships to implement green infrastructure projects in neighborhoods disproportionately vulnerable to the urban heat island effect, poor surface water quality and poor air quality

- Analyze risks, vulnerabilities and potential impacts of extreme weather events and other climate change impacts on public health

Objective: Monitor and improve air quality

- **Internal Strategy**: Implement household indoor air quality monitoring solutions, particularly in vulnerable communities that are susceptible to asthma and other chronic diseases
- **Community Strategy**: Collaborate with Orange County and other agencies to receive increased outdoor air quality data

Health and Safety Focus Area Continued

- **Objective: Strengthen the city's capacity to plan for, prevent, respond to and recover from public health emergencies, including capabilities for first responders**
- **Internal Strategy**: Use Indoor Positioning System sensors to improve the ability to locate people inside buildings during emergencies
- **Internal Strategy**: Deploy analytic solutions to identify potentially dangerous situations
- **Community Strategy**: Coordinate with OUC to retrofit lighting poles with acoustic sensors, smart dynamic lighting and 24/7 power availability
- **Community Strategy**: Coordinate with businesses and residents for data and information sharing

Materials Focus Area

GOAL | Diversify educational programs and strategic partnerships to be a "Zero Waste" city

Objective: Increase educational programming that reduces waste generated at the source

- **Internal Strategy**: Implement the ReThink Your Waste communications plan and track key performance indicators
- **Internal Strategy**: Promote educational programs to reduce waste at the source
- **Internal Strategy**: Market information on composting and food recovery programs
- **Internal Strategy**: Promote clear guidelines about what can be recycled
- **Internal Strategy**: Collect and analyze more data on recycling and waste disposal
- **Community Strategy**: Work with partners and vendors to increase consistency in recycling processes and recyclable materials across the Central Florida region

Objective: Coordinate with other local governments to develop stronger regional recycling processing infrastructure

- **Community Strategy**: Create a regional partnership to build an Intelligent Materials Recovery Facility (MRF) for materials recycling and food waste/organics recycling
- **Community Strategy**: Increase access to smart technology solutions and community programming that help with sorting of recyclable materials
- **Community Strategy**: Partner with local economic development agencies to promote incentives for driving recycling markets to Central Florida

Objective: Develop partnerships along the life cycle of products to support a circular economy

- **Internal Strategy**: Evaluate Waste to Energy solutions and lessons learned from existing regional analyses (including the Beyond 34 regional waste needs and assets assessment case study and the Green Works Orlando Community Sustainability Action Plan)
- **Community Strategy**: Create a Food Recovery Network Program to provide resources to vulnerable communities

Objective: Reduce greenhouse gas emissions in the transportation of waste

- **Internal Strategy**: Pursue optimized energy-efficient routes for trucks picking up waste

Mobility Focus Area

GOAL | Improve transportation systems to provide safe, affordable, clean and accessible multimodal options for all

Objective: Establish a universal communication platform to share real-time information through partnerships on transportation choices, reduce congestion and increase transportation safety

- **Internal Strategy**: Develop a public user interface for an Integrated Transportation Platform that integrates route mode choice, parking, transit options and traffic information
- **Internal Strategy**: Optimize traffic flow that discourages freight and trucks from being routed through neighborhood areas
- **Community Strategy**: Pursue a single payment system for transportation (transit, ride-share, bike-share, parking), including Electronic Benefit Transfer (EBT) with regional transportation partners

Objective: Increase transit ridership to reduce vehicle miles traveled (VMT) within the city

- **Internal Strategy**: Create an alternative transportation rewards program to encourage travel modes other than single occupant vehicles
- **Community Strategy**: Work with regional transportation providers to improve transit rider experience and perception. Hold a design competition to crowdsource ideas for station amenities and onboard amenities

Objective: Eliminate traffic-related fatalities and serious injuries

- **Internal Strategy**: Continue use of data-driven decisions and countermeasures through implementation of the Vision Zero Action Plan
- **Internal Strategy**: Employ analytics solutions, including video to identify potentially dangerous situations

Objective: Expand smart parking solutions and use of advanced technologies to easily facilitate parking in downtown Orlando and in major activity centers

- **Internal Strategy**: Implement smart parking solutions in city-owned garages and on-street parking spaces, such as pre-payment, reservation, real time availability and trip planning
- **Internal Strategy**: Continue building the network of EV charging stations, including fast charge stations

Mobility Focus Area Continued

- **Community Strategy**: Encourage private garage owners and operators, as well as special event managers, to use compatible technologies to provide seamless connections with city managers and facilities

- **Objective: Prepare the city's transportation infrastructure for Connected and Autonomous Vehicles (CAV)**

- **Internal Strategy**: Adopt National Association of City Transportation Officials (NACTO) Autonomous Urbanism guidelines to improve CAV readiness

- **Community Strategy**: In partnership with LYNX, deploy a CAV pilot project downtown

- **Community Strategy**: Continue leadership and participation in existing CAV partnerships, including the Central Florida Automated Vehicle Partnership (CFAVP), Autonomous Vehicle Mobility Initiative (AVMI) and Advanced Transportation and Congestion Management (ATCMTD) program

- **Internal Strategy**: Expand redundancy of the transportation communications network to support transportation system technologies such as Advanced Traffic Management Systems (ATMS) and CAV

- **Community Strategy**: Encourage and partner with private developers to ensure CAV infrastructure, consistent with the city's infrastructure planning and implementation, is included with new development and redevelopment and ensure seamless operation from private to public realms

- **Objective: Create a resilient transportation network**

- **Internal Strategy**: Analyze the city's transportation network to determine which roadways are most threatened by incidents, including acute and chronic congestion, climate hazards and natural disasters, then create mitigation plans for future damage or disruption

- **Internal Strategy**: Adopt standards and policies to allow for flexibility in the design of transportation systems that promote safe, active transportation options in times of crises

- **Objective: Increase miles of safe, walkable and bikeable access to employment, housing, education, health care and other essential services**

- **Internal Strategy**: Update the city's Growth Management Plan and Land Development Code to balance transportation and land use priorities to better consider livability and affordability

Placemaking Focus Area

GOAL | Encourage creative planning, design and programming of public and private spaces to increase cultural and social vibrancy

- **Objective: Provide equitable access to high-quality public open spaces, parks, recreation facilities and natural resources**
- **Internal Strategy**: Pilot an Augmented Reality/Virtual Reality (AR/VR) wayfinding experience at city buildings, parks and cultural amenities
- **Internal Strategy**: Require public open space and access to environmental resources during evaluation of new development and redevelopment
- **Objective: Increase investment in green infrastructure to reduce climate change and flood risk to create more sustainable neighborhoods**
- **Internal Strategy**: Analyze financial impacts of climate change to city facilities and infrastructure and integrate analysis into future capital improvements decision-making
- **Internal Strategy**: Increase use of green infrastructure and landscaping practices to reduce the heat island effect

GOAL | Increase the inventory of green, healthy, efficient and affordable housing

- **Objective: Encourage innovative building practices to increase inventory of affordable housing;**
- **Internal Strategy**: Monitor industry trends to identify innovative building materials and methods that are less expensive than conventional materials, update the Land Development Code as appropriate
- **Internal Strategy**: Continue to update building and construction minimum standards as standards evolve for increased energy and water efficiency
- **Internal Strategy**: Adopt a pattern book containing pre-approved attainable and affordable housing prototypes, reducing overall costs for permitting and construction

Water Focus Area

GOAL | Reduce water consumption, improve water quality and protect residents from severe weather events

- **Objective: Increase rainwater storage capacity (cisterns, rain barrels) and raise awareness of benefits**
- **Internal Strategy**: Increase visibility of existing rain barrel program and educate the community on ways to reuse water
- **Internal Strategy**: Harvest greywater and stormwater onsite for reuse
- **Internal Strategy**: Create job training programs to increase the workforce available to install reuse systems
- **Objective: Increase reclaimed water supply and use**
- **Internal Strategy**: Require connections to reclaimed water mains where available
- **Internal Strategy**: Require residential smart valves to control reclaim distribution and enforce watering day irrigation restrictions
- **Objective: Provide development incentives (density bonuses, variances) for new developments that meet the city's Green Building Incentive Program**
- **Internal Strategy**: Adopt conservation and reuse strategies through policy and incentives
- **Internal Strategy**: Provide incentives for low impact development (LID) that is tied to monitoring and maintenance over time
- **Objective: Increase the use of smart technology in potable water consumption (smart irrigation controllers, remote management of systems, leak detection sensors, pollution monitoring devices and consumption management tools)**
- **Internal Strategy**: Incorporate Advanced Metering Infrastructure (AMI) data into the city's energy and water dashboard to monitor potable water and reclaimed water use
- **Internal Strategy**: Create a Net-Zero Water pilot project on a city-owned facility
- **Community Strategy**: Leverage technology in collaboration with OUC to provide real-time usage information on water consumption
- **Community Strategy**: Leverage technology in collaboration with OUC to provide more robust water line leak detection systems

Water Focus Area Continued

- **Objective: Decrease impacts of extreme weather-related events (drought, flooding, hurricanes)**
- **Internal Strategy**: Maintain participation in the National Flood Insurance Program Community Rating System
- **Internal Strategy**: Analyze the city's climate vulnerability assessment to assess future floodplain impacts on infrastructure and facilities and provide an adaptation plan for flood prone areas
- **Internal Strategy**: Manage stormwater and groundwater carefully to align with natural processes (infiltration and groundwater recharge) and minimize climate impacts
- **Internal Strategy**: Adopt standards for green infrastructure and low impact development (LID) for new roadways and developments
- **Objective: Monitor wastewater systems to detect the presence of disease or other contaminants**
- **Internal Strategy**: Conduct a pilot study to analyze wastewater samples from neighborhoods with vulnerable populations to determine if this is a viable early warning detection system
- **Internal Strategy**: Research and implement a productive use for disposal of wastewater biosolids, such as energy conversion or land application as fertilizer

B. REGIONAL POLICY RECOMMENDATIONS

Mobility

Although the personal automobile remains the primary form of transportation for many people, Orlando's residents and visitors have more mobility choices than ever before. The City of Orlando is the region's central hub for transportation connections, but it does not own or operate public transit (LYNX), commuter rail (SunRail, currently operated by FDOT), or micro-mobility options (such as bike and scooter share). Therefore, there is a need to continue inter-agency coordination for improved mobility across the region. This includes continued participation and leadership in partnerships such as the Central Florida Automated Vehicle Partnership (CFAVP), the Advanced Transportation and Congestion Management (ATCMTD) program and the Autonomous Vehicle Mobility Initiative (AVMI).

In addition to submitting joint applications for grant opportunities, the city should continue active participation on MetroPlan Orlando's Transportation Systems Management and Operations (TSM&O) Consortium to further the city's future-ready mobility goals. MetroPlan Orlando serves as the metropolitan transportation organization (MPO) for Orange, Seminole and Osceola counties, leading transportation planning efforts and setting priorities for how federal and state transportation funds are spent. Specific mobility strategies are included in this Master Plan.

Housing

In 2016, a Regional Affordable Housing Initiative was conducted to address the growing housing shortage in the Central Florida Region through a partnership with Orange County, Osceola County, Seminole County and the City of Orlando. To further the recommendations from the 2016 Regional Housing Initiative, and to address the current crisis in affordable housing, Orange County Mayor Jerry Demings has established a Housing for All Task Force to look broadly at issues of affordable housing. The Housing for All 10-Year Action Plan includes "high-priority recommendations that focus on the needs of Orange County residents to sustain and accommodate the County's growing population," as well as "creating financial resources targeting areas of access and opportunity."

Housing is a multi-faceted issue that should be coordinated with regional partners to address the overall housing needs of the region. To build on the recommendations of the Orange County Housing for All Task Force and the Urban

Land Institute (ULI) Attainable Housing in Central Florida Technical Assistance Panel (TAP) report, the city should:

- Continue coordination with other local municipalities and agencies as part of an overall regional approach to affordable/attainable housing.
- Explore expedited permitting process for affordable/attainable housing projects. This can be either based on pre-approved product type or location.
- Review land development regulations to reduce barriers to developing affordable/attainable housing.
- Use technology and data available from other city data sources and platforms to create an inventory of land available for development/re-development of affordable/attainable housing.

Resiliency

The City of Orlando Office of Sustainability and Resiliency conducted a Climate Vulnerability Assessment in 2017. The purpose of this document was to assess the most prominent climate hazards and resulting vulnerabilities within the City of Orlando and surrounding areas, including extreme heat, severe storms, lightning, tornadoes, tropical storms and hurricanes, inland flooding, sinkholes, drought and wildfire.

With the preliminary assessment conducted of the probabilities of these hazards, current vulnerabilities, magnitude of their impacts and factors for adaptation, the city and its partners should prepare a Resiliency Plan. The creation of a Resiliency Plan is included as a short-term strategy. The plan could include the following:

- Review of climate hazards and consequences with the Green Works Task Force, Office of Emergency Management, stakeholders and subject matter experts and community members to prioritize concerns, direct risk analyses and identify vulnerabilities.
- Work with partners in academia, the public and private sector to conduct Orlando asset and service vulnerability analyses, such as:
  - Extreme heat: Electricity demand projections, including required additional capacity and cost impacts on energy affordability for Orlando's low to moderate income households.
  - Sea level rise and hurricanes: Mass migration (long and short-term) into Orlando, known as "climate refugees," and impacts on housing demand, affordability and other infrastructure demands (e.g. water supply and treatment).
  - Inland flooding: Road impact projections under extreme precipitation events restricting travel of residents and visitors to employment, education, tourism, etc.
- Following a similar stakeholder engagement process as the Green Works Community Action Plan or Future-Ready City Master Plan, develop climate adaptation goals, targets and strategies as they pertain to climate hazards, vulnerabilities and opportunities to accelerate growth in climate adaptive capacity.
- Review these suggestions in terms of their ability to also address economic, equity and other locally relevant considerations, utilizing resources such as the U.S. Climate Resilience Toolkit, "Risky Business: From Risk to Return" report, Adaptation Clearinghouse, EPA, States at Risk Project and Covenant of Mayors resources.

Workforce Development

The city should establish projects, programs and strategic partnerships that generate diverse employment opportunities and support the creation of a resilient, local workforce that is ready for the jobs of the future. Within this initiative, the city should strengthen the academic institutions, community centers and non-profit organizations currently providing workforce readiness training, technical training, skills development and sustaining the success of small businesses and entrepreneurship. Through these initiatives and partnerships, the city can better help to grow the local economy, support innovation in future-ready initiatives, and continue to attract global talent and businesses that bring 21st century jobs. Particular attention should be given to supplying Orlando's vulnerable and marginalized residents with educational opportunities, thereby providing living wage jobs and career pathways in the future. This includes making assessments on those factors that create barriers to workforce participation, along with strategies on how to overcome these barriers. Within the workforce development initiative, the city should pursue the following strategies:

- Create a future-ready city internship or workforce development program with an emphasis on mentoring STEM students to prepare the future workforce for implementation of future-ready projects.
- Collaborate with the Orlando Economic Partnership, CareerSource Central Florida and other local business advocacy groups to create a more prosperous economy for all Orlando residents, with special emphasis on those enterprises that support the advancement of cutting-edge technology and innovation. The city should work with these groups to develop strategic outreach strategies, programs and employment services for city residents who experience significant barriers to living wage jobs and improve access to quality education for residents all of ages.
- Champion community efforts that ensure that Orlando residents gain a life-long love for learning, and that help them gain the skills and knowledge necessary to succeed in the 21st century workforce. Examples of educational programming include:

- BluePrint 2.0
- 21st Century Community Learning Centers
- Orange County Library System
- Parramore Education and Innovation District Initiative
- Orlando Science Center
- Playground City

» Use publicly available demographic data (US Census, American Community Survey, etc.) and other GIS datasets to identify areas with high unemployment and/or transportation disadvantaged populations. Place priority on the funding of transportation programs and capital improvement projects that improve mobility between areas with high unemployment and workforce opportunities.

» Continue to ensure that opportunities are afforded to local, small and disadvantaged businesses, as well as minorities and women (e.g. the city's M/WBE program)

» Partner with key stakeholders, including community-based organizations, local foundations and academic institutions to explore STEM-based educational programming with an emphasis on future-ready curriculum. Local partners could include:

- University of Central Florida
- Rollins College
- Valencia College
- Orange County Public Schools
- Orange Technical College

4

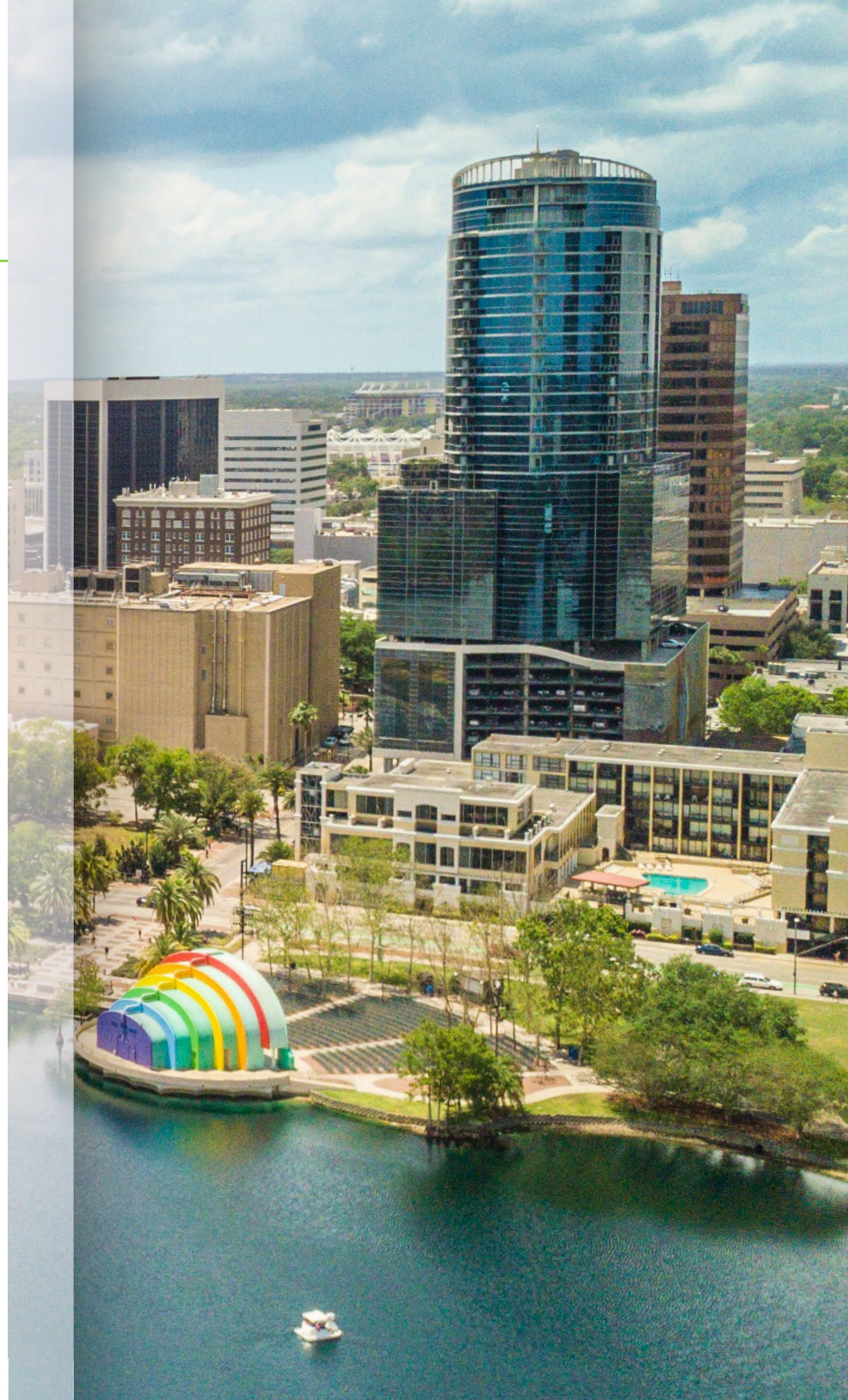
STRATEGY DEVELOPMENT

The community engagement process identified the most pressing local problems and challenges, and the appropriate future-ready strategy that could best address these issues. These brainstorming activities generated a large list of potential strategies that require further evaluation for feasibility of implementation, identification of risks, cost and applicability to the City of Orlando.

The Future-Ready City Master Plan is a living document and will be continuously updated to incorporate new technologies and innovations that align with the Vision, Mission and Foundational Elements.

CITY OF ORLANDO

ORLANDO FUTURE-READY CITY MASTER PLAN



A. COMMUNITY RESEARCH

To supplement the ideas generated during brainstorming sessions by the community, the project team researched comparable innovative cities around the world.

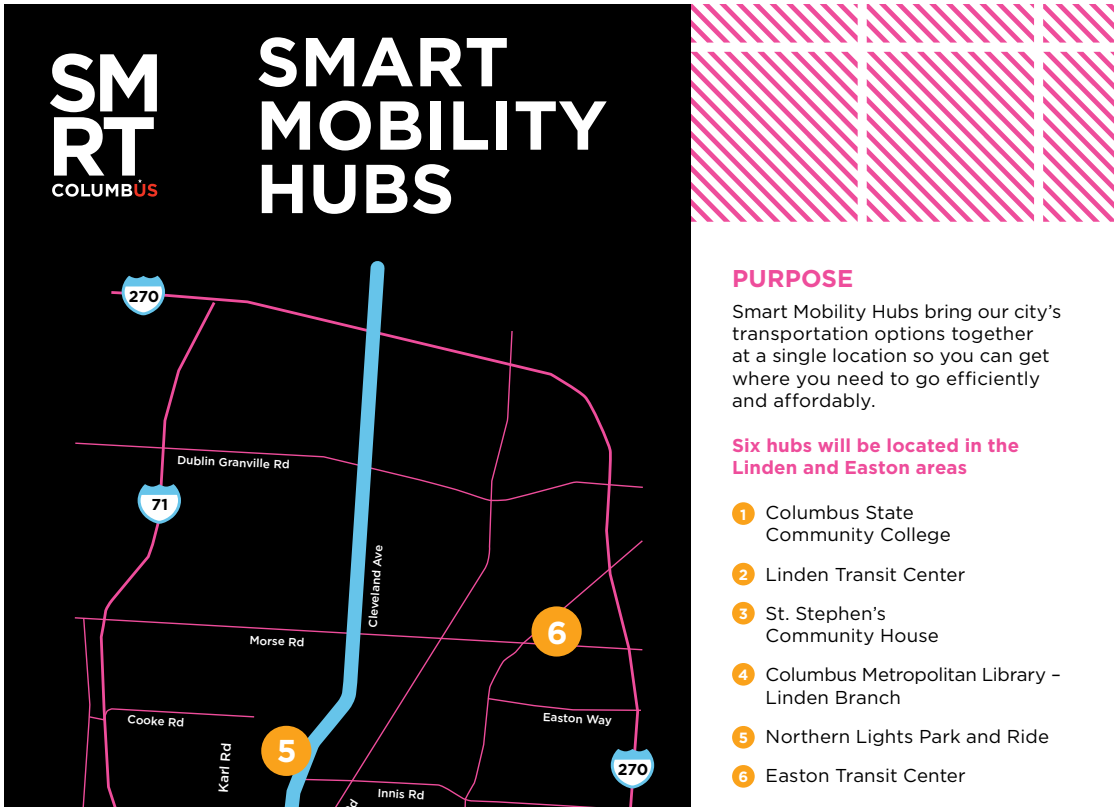
SMART COLUMBUS

COLUMBUS, OH

Smart Columbus seeks to demonstrate and evaluate a holistic approach to improving surface transportation performance. Smart Columbus plans to fully integrate a breadth of innovative technologies including intelligent transportation systems, connected vehicles, automated vehicles, a Smart Columbus Operating System and other advanced technologies into the transportation network. Specific best practices include:

- Smart Columbus Experience Center where individuals can see, touch, and drive smart technologies that are being tested
- Dynamic data platform: Smart Columbus Operating System

Photo credit: SMRT Columbus Program



PURPOSE

Smart Mobility Hubs bring our city's transportation options together at a single location so you can get where you need to go efficiently and affordably.

Six hubs will be located in the Linden and Easton areas

1. Columbus State Community College
2. Linden Transit Center
3. St. Stephen's Community House
4. Columbus Metropolitan Library – Linden Branch
5. Northern Lights Park and Ride
6. Easton Transit Center

- Smart Mobility Hubs with Interactive Kiosk Experience (IKE) systems installed throughout
- Multimodal Trip Planning App and Common Payment System
- Connected vehicle environment using the installation of on-board units to communicate with surrounding infrastructure
- Mobility assistance for individuals with cognitive disabilities through the use of a turn-by-turn smartphone app
- Non-emergency medical transportation services for prenatal trip assistance
- SmartCircuit self-driving shuttle

AUSTIN SMART CITY ALLIANCE

AUSTIN, TX

Austin Smart City Alliance aims to create a comprehensive, integrated, inclusive, sustainable, advancing smart city infrastructure that continuously improves operations, services and quality of life. Specific best practices include:

- Installation of smart kiosks with WiFi and cellular connections and free mobile device charging stations at transit stations
- Installation of WiFi, on-vehicle video monitoring and tracking, and instant location data on school buses
- First responder activity connected with smart street lights
- Utilization of internet of things (IoT) devices to instrument a five-block section in Austin to collect and analyze data such as pedestrian, traffic, sound and air quality

Photo credit: Austin Smart City Alliance

SMART CITY PDX

PORTLAND, OR

Smart City PDX seeks to make Portland a place where data and technology are used to improve people's lives. With a strong focus on equity and security, Smart City PDX will prepare for future technologies that promote community-driven values and goals. Specific best practices include:

- Installation of sensor technology on streetlights to gather travel and traffic safety data
- Open access to city data for public use as a part of the Open Data Program
- Installation of air quality sensors to provide more information about localized air quality
- Procurement and policy updates about sensor sustainability (air quality sensor procurement included criteria on upgradability and modularity focused on re-use of sensor device components)
- Cloud-based data platform to collect, store, integrate and analyze data from a variety of sources
- Emergency preparedness hubs (Prephubs) throughout the city that will provide emergency assistance to residents during natural disasters

PREPHub concept. Photo Credit: SmartCity PDX

SMART CITY

DENVER, CO

Denver is dedicated to reducing barriers between departments, optimizing city operations and addressing big challenges such as crime, traffic congestion, vehicle crashes, air pollution and economic imbalances using smart city tactics. Specific best practices include:

- Enterprise Data Management system
- Traffic signal activation for cyclists
- Living lab to connect low-income residents to safe and reliable transportation services while also collecting travel data
- Pena Station NEXT to serve as living laboratory for technology testing

SMARTCITY
Powered by the City and County of Denver

Photo credit: Denver Smart City

SINGAPORE SMART NATION

The Singapore Smart City (called Smart Nation) initiative is a nationwide approach that encourages the use of digital innovation and technology with sustainability and livability as the end goals. The city established a Government Technology Agency to establish applications of technology in the government, economy and society as a whole. The plan has a strong emphasis on data infrastructure to be used as the backbone of all future technology projects. Specific best practices include:

- Providing wide access to maps and creating geospatial databases that allow the community to add information and receive information from interactive maps
- Mobile Government provides citizens with simple to access government services and information via mobile applications
- An Enterprise Challenge program which provides funding for local businesses to test innovative ideas that will improve public services
- A robust system of police surveillance cameras to improve awareness and emergency response time
- Underground cooling networks to as a replacement for traditional air conditioning systems

Photo credit: Smart Nation Singapore

B. PROJECT IDENTIFICATION AND PRIORITIZATION

The community engagement process, including subject matter expert roundtable meetings and community workshops, identified over 60 unique project ideas to address Orlando's current and future challenges. Potential project types ranged from low-cost educational campaigns, to extension of existing pilot programs, to large capital projects that will require significant funding and multi-agency partner coordination.

Following the creation of this long list, as well as community feedback in the six public workshops, the project team created an evaluation matrix to rank and prioritize potential projects and strategies. This prioritization process was closely tied to input received from stakeholders throughout the engagement process, including at internal meetings, roundtable discussions and public meetings. With consideration of this stakeholder input, the project team used the following evaluation criteria to identify potential short-term strategies:

EVALUATION CRITERIA

- Quick Wins & Visibility of the Future-Ready Program
- Public Support
- Potential Cost
- Cross-Pillar (whether or not the strategy addressed multiple categories of needs)
- Ability to Leverage Ongoing Methods, Partnerships or Pilot Projects
- Potential to Scale

During the prioritization process, projects were grouped into the following categories:

- **Short-Term** (0-3 years)
- **Mid-Term** (3-6 years)
- **Long-Term** (7+ years)

Short-Term Strategies

Projects that were advanced as short-term priorities are described in Table 4.1 below. A full description of each short-term strategy, including responsible department, benefits, estimated costs and use cases, can be found in the Appendices.

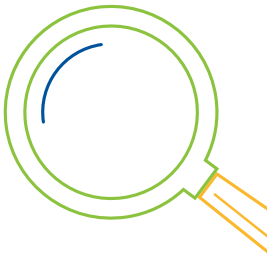


Table 4.1: Short-Term Strategies

PILLAR	STRATEGY NAME	DESCRIPTION
ALL PILLARS (Connectivity, Energy, Health and Safety, Materials, Mobility, Placemaking, and Water)	Digital Twin	A digital twin is an exact digital replica of real-world buildings, physical assets, processes, places, systems, and devices, and can be used to model and simulate impacts of growth on infrastructure, environment, energy and water consumption, and more. OUC would be a key partner for implementation. A detailed Concept of Exploration of this strategy is included in the Appendices.
ALL PILLARS (Connectivity, Energy, Health and Safety, Materials, Mobility, Placemaking, and Water)	IDEA Lab	The IDEA Lab is a city-driven incubator that will be open to industry subject matter experts, guiding the local technology community to help solve specific challenges identified by the city. The IDEA program will develop Request for Information (RFI) related topics through which applicants will submit responses, supported by research, industry information and strategies to support the advancement of new solutions for Orlando Future-Ready.
ALL PILLARS (Connectivity, Energy, Health and Safety, Materials, Mobility, Placemaking, and Water)	Community Outreach and Engagement Plan	The city's customer base (residents, business owners, visitors) will need continuous information about its initiatives and technology investments. The need for education was commonly cited during internal stakeholder and roundtable meetings as a means of reducing waste and improving efficiencies.
ALL PILLARS (Connectivity, Energy, Health and Safety, Materials, Mobility, Placemaking, and Water)	Resilience Plan	A Resilience Plan will address chronic stressors, such as economics and healthcare, as well as acute shocks, such as hurricanes and cyber-attacks. A detailed Concept of Exploration of this strategy is included in the Appendices.

PILLAR	STRATEGY NAME	DESCRIPTION
CONNECTIVITY	Define the Digital Divide	This strategy will collect data to show gaps in coverage and speed in the city and help define where and how prevalent the digital divide is in Orlando. This data could also be used to analyze cell connectivity issues during large events, which can impact public safety.
CONNECTIVITY	Community Wi-Fi	This strategy will make Orlando a better-connected city and bridge the digital divide on city-owned property, enhancing opportunities for education, communications and employment. A detailed Concept of Exploration is included in the Appendices.
CONNECTIVITY	Wi-Fi Hotspot/Mobile Tablet checkout program	This strategy will provide portable Wi-Fi hotspots or tablets with cellular connectivity via a checkout program at Orlando neighborhood centers.
HEALTH AND SAFETY	Social Services Optimization	Some of the most vulnerable citizens access social services almost exclusively through 911 calls, emergency room visits, or encounters with law enforcement. Through this initiative, we would harness the power of data analysis to identify those who need services and incentivize proper use and access. This program will optimize multi-agency coordination of social services to vulnerable populations beginning with a multi-agency pilot program to identify appropriate potential clients for these services.
HEALTH AND SAFETY	Integrated Public Alert and Warning System (IPAWS)	IPAWS is a national alert and warning infrastructure, which can be used to quickly provide life-saving information to the public. Similar to an AMBER alert, a warning could be pushed to all mobile devices throughout the City of Orlando.

PILLAR	STRATEGY NAME	DESCRIPTION
HEALTH AND SAFETY	Smart Buildings with Advanced Sensor Network	This strategy uses multiple distributed IoT sensors (light, temperature, advanced motion, acoustic, WiFi/Bluetooth) to improve indoor environmental quality, protect and assist first responders and help vulnerable groups.
MATERIALS	Food Recovery Network	The Food Recovery Network leverages partnerships between businesses, distribution centers, and the nonprofit organizations for collection of food and grocery products that can be distributed to people in need or vulnerable communities. The distribution of unused food will divert potential waste from landfills. A detailed Concept of Exploration of this strategy is included in the Appendices.
MATERIALS	Materials Resource System Study	The focus of this project will be to research and provide new innovative ideas to improve solid waste management regionally with partners such as Orange County. The study will document both the ideas as well as potential strategic partnerships.
MOBILITY	Smart Parking	This potential project seeks to expand on the smart parking initiative that was developed by the city, including the ParkMobile app partnership. A detailed Concept of Exploration of this strategy is included in the Appendices.
MOBILITY	Integrated Transportation Application	The strategy consists of providing users and visitors to the city the ability to plan multimodal trips in one centralized location through the use of a mobile application designed to run on smartphones/smart devices and transit kiosks. A detailed Concept of Exploration of this strategy is included in the Appendices.
MOBILITY	Alternative Transportation Mobility Program	This program will partner with a technology company to implement a rewards programs for alternative transportation (walking, biking, bus, train and carpooling). It should also provide rewards for single car riders to connect with them and encourage them to use alternative forms of transportation.

PILLAR	STRATEGY NAME	DESCRIPTION
MOBILITY	Electric Vertical Takeoff and Landing (EVTOL)	Develop a plan to engage private sector electric vertical takeoff and landing companies to connect activity centers within the central Florida regions (city taxi model) and connect Orlando to other cities in the southeast. The benefits of EVTOL include reducing congestion, providing for centralized economic development at and around EVTOL infrastructure and providing a more environmentally sustainable method of transportation.
PLACEMAKING	Resilience Hub	A Resilience Hub is infrastructure and programming (located near traditionally underserved neighborhoods, centers of employment, transit centers, or other public spaces) built to support residents and coordinate resource distribution and services before, during, or after a natural hazard event. A detailed Concept of Exploration of this strategy is included in the Appendices.
WATER	Wastewater-Based Epidemiology	Wastewater-Based epidemiology (WBE) is an innovative method that uses targeted analysis of the wastewater generated by the population to track the spread of SARS-CoV-2, as the virus is known to survive in sewage and is shed even by asymptomatic individuals. The goal of this project is to inform the community served by the treatment plant of the presence of the virus and assist in making data-driven decisions in a rapid, non-invasive manner. The city is prepared to partner with research institutions in pursuit of this strategy, including providing wastewater samples.

Mid- and Long-Term Strategies

Strategies listed in the Table 4.2 below were identified as mid- to long-term priorities for implementation. On an annual basis, these strategies should be reviewed and prioritized using the Evaluation Matrix described in Section 6 of this Master Plan. Other evaluation factors include available funding and grant opportunities, community support, current needs and Mayor's Initiatives. A full description of each strategy, including responsible department, benefits, estimated costs and use cases, can be found in the Appendices.

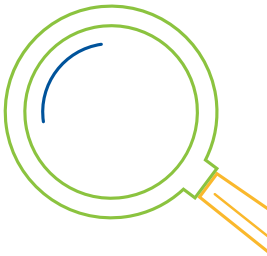


Table 4.2: Mid- and Long-Term Strategies

PILLAR	STRATEGY NAME	DESCRIPTION
CONNECTIVITY	Digital Information Sharing	Evaluate means/methods to provide information to residents and visitors without access to mobile devices.
CONNECTIVITY	Open Data and Enterprise Performance Performance Dashboard	Improve public information sharing by providing an online Open Data and Enterprise Performance Dashboard with city services information. This strategy would further enhance and expand the efforts of the city to continually provide information, engage citizens and improve transparency.
CONNECTIVITY	Improved Digital Community Engagement	This strategy is an extension of the proposed Community Outreach and Engagement plan and the open data performance dashboard. It is intended to provide additional ways for residents, business owners, and customers to engage with the city, as well as improve the quality of feedback received.
CONNECTIVITY	Continue to expand Fiber infrastructure	An expanded fiber network will facilitate data transfer and provide the digital backbone necessary to connect homes and infrastructure.
CONNECTIVITY	Consolidated Property Information	This strategy will provide the city with a digital database of property data to inform internal review of the existing conditions of city properties, what uses are legally permissible on each property, and what is physically possible to develop on each property given concurrency and necessary permitting considerations. This database will create a historic record of all properties in Orlando through the collection of prior annexations, development approvals, plats, development agreements, easements, staff reports and building permits.

PILLAR	STRATEGY NAME	DESCRIPTION
ENERGY	Energy Microgrid	A microgrid is a localized group of electricity sources and loads that normally operates connected to and synchronous with the traditional wide area synchronous grid, but can also disconnect and function autonomously as physical or economic conditions dictate. The strategy will ensure that back-up resilient power source is present at all critical infrastructure (i.e. solar + storage generators). OUC will be a key partner in implementation.
ENERGY	Residential Energy/Water Consumption Monitoring	This strategy proposes the use of Artificial Intelligence (AI) along with smart meters installed in residents' homes to supplement the existing OUC Advanced Metering Infrastructure (AMI) meters. This will leverage new technologies as they become available in partnership with OUC to provide residents more resilient and efficient solutions for their utility needs.
HEALTH AND SAFETY	Smart Street Lighting	In collaboration with OUC, leverage technology to install enhanced and connected smart lighting for major thoroughfares, walkways, parking lots and other infrastructure to improve efficiency and safety. The program could be used with in-pavement detection or motion sensors. The proposed lighting system could be equipped with air quality sensors, parking space management and speakers that could be used for events, including emergency evacuations.
HEALTH AND SAFETY	Air Quality	Coordinate with Orange County to receive increased outdoor air quality monitoring data and reporting. Implement household indoor air quality monitoring solutions, particularly in vulnerable communities that are susceptible to asthma and other chronic diseases.

PILLAR	STRATEGY NAME	DESCRIPTION
HEALTH AND SAFETY	Analytic Solutions	Analytics uses data and software to distinguish individual objects and events in camera feeds. This application can allow for the automation of the review of countless hours of camera surveillance in real time, freeing up human personnel to actively fix any issues that have been detected. There are several different applications for camera analytics including but not limited to motion detection, tamper detection, line crossing, object abandonment/removal, travel in the wrong direction and object counting. These applications show that a video analytics strategy has both transportation and public safety uses.
MATERIALS	Optimized Waste Collection – truck routing, source of waste container	This strategy would analyze and select optimized truck routing which could include smart waste containers with volumetric sensors. While not reducing waste at the source, this program could reduce costs and increase capacity of current programs.
MATERIALS	Neighborhood/School Compost Kit	Composting and low-impact forms of processing organic waste are important ways of building a resilient community. Neighborhood and school compost stations will help educate the public on reducing food waste that would otherwise be taken to the landfill. The compost can be used as soil material for gardening.
MATERIALS	Centralized Recycling Drop-off Locations	To service those that do not have recycling pick-up, the City of Orlando has established several recycling drop-off locations including the Dover Shores Community Center, Englewood Neighborhood Center, Lake Fairview Park, Northwest Community Center, Orlando Skate Park, the Solid Waste Management Division and the Beardall Center. It is recommended that the City of Orlando expand the number of drop-off locations to service residents not close to the existing centers and continue the expansion of multifamily housing recycling pick up.
MATERIALS	Anaerobic Digester	This waste-to-energy solution should be evaluated for feasibility.

PILLAR	STRATEGY NAME	DESCRIPTION
MOBILITY	Digital Curbside Management	A digital curbside management program is a modern approach to use curbs in dense urban areas for parking, passenger drop-off, deliveries and emergency services. This initiative proposes the use of video recognition as a low-cost method to detect and respond to curbside use characteristics. High-use curbsides could be monitored for detection of use type by categorizing objects entering zones of interest. This data could be used to dynamically adjust use-restrictions, fees, and enforcement to best meet city objectives.
MOBILITY	CAV Infrastructure Readiness	The Connected and Autonomous Vehicle (CAV) Infrastructure Readiness Strategy proposes to prepare the City of Orlando and its infrastructure for CAV deployment by drawing upon various published research, standards and guidelines. This will prepare the city's infrastructure and communications needs to support CAV piloting, testing and deployment opportunities.
MOBILITY	CAV Pilot Project Downtown	Develop a pilot project to showcase CAV technology in downtown Orlando. This would showcase these capabilities at both a user and operator level.
MOBILITY	Fast Charging EV Infrastructure	Provide information on availability of existing Electric Vehicle (EV) charging stations. Install new fast charging EV stations at pilot locations (City Hall, community centers).
MOBILITY	Traffic Optimization	Dynamic traffic optimization can improve the ability of the city's transportation network to improve capacity and flow, while also discouraging large vehicles in residential streets, improving pedestrian and bicycle safety at crossings, and providing better data for traffic analytics at priority intersections.
MOBILITY	Design Competition for Station and Onboard Amenities	Open a design competition to improve the transit riding experience. Could include public art at stations or on-board buses.
MOBILITY	Single Payment System for Transportation	Work with regional partners to integrate payment for LYNX, SunRail, City of Orlando parking and APIs for micromobility into a single platform and mobile application.

PILLAR	STRATEGY NAME	DESCRIPTION
PLACEMAKING	Augmented Reality (AR) or Virtual Reality (VR) Wayfinding	Create an interface or platform that provides contextual information, history, wayfinding, scheduled events and other important information about city parks and cultural amenities. This could include QR codes posted on signage that is scanned by the user.
PLACEMAKING	Land Development Code and Building Code updates	Monitor industry trends to identify innovative building materials and methods that are less expensive than conventional materials and update the Land Development Code as appropriate. Continue to update building and construction minimum standards as standards evolve for increased energy and water efficiency.
WATER	On-site Rainwater and Greywater Harvesting	Research additional uses and methods for water reuse. On-site rainwater and greywater harvesting will reduce the amount of potable water consumed and change the way residents recycle the water in order to repurpose it onsite.
WATER	Net Zero Water Building Pilot	A net zero water building is a facility that has been designed to minimize total water consumption, maximize alternative water sources, minimize wastewater discharge from the building and return water to the original source. Create a pilot demonstration project on a city building to encourage others to adopt net zero water conservation techniques and best practices.

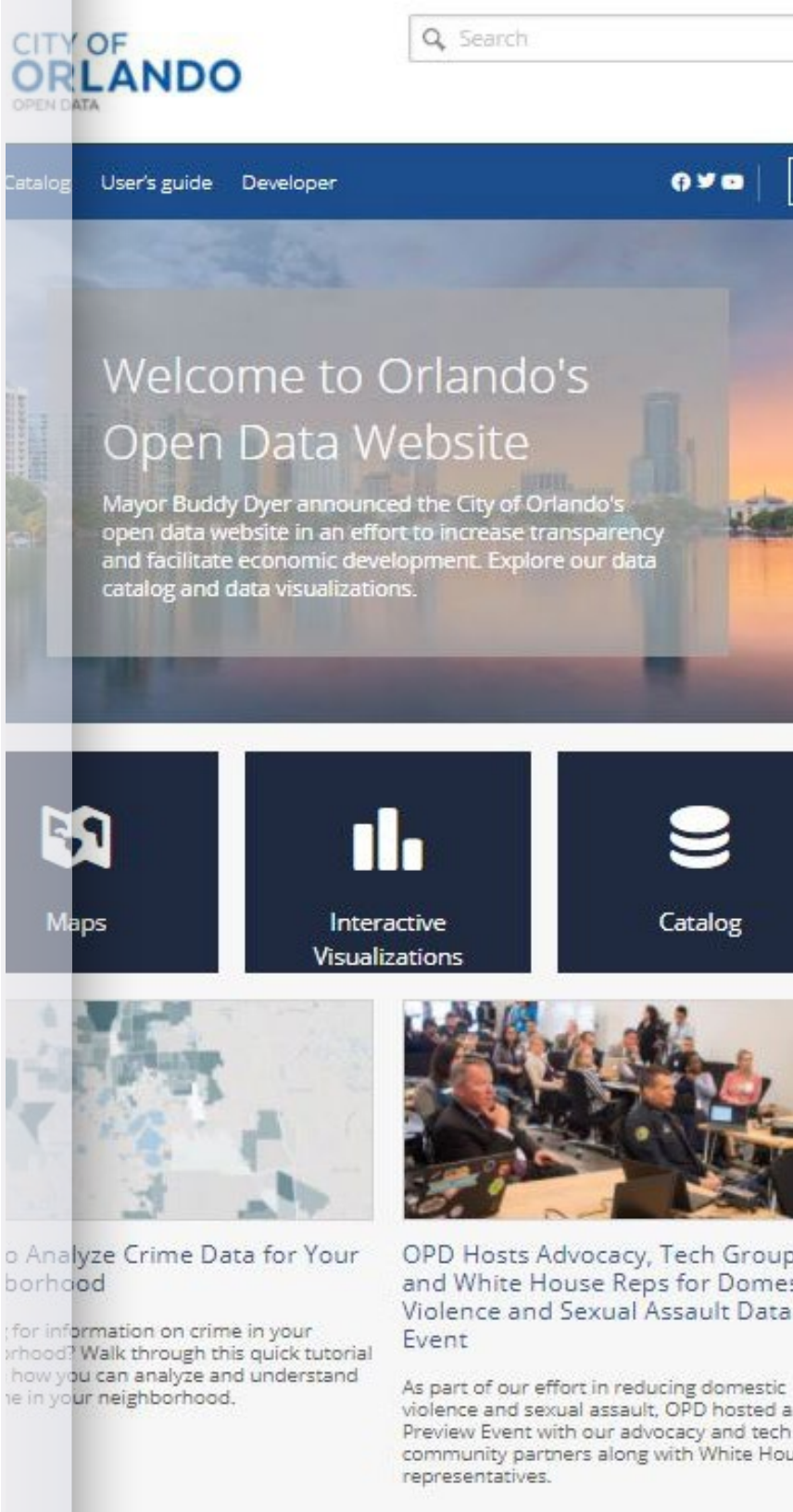
5

DIGITAL ASSETS AND PROCEDURES

As technology and innovation have progressed, the City of Orlando has incorporated more digital assets and procedures into municipal operations and services. **The city unveiled the Open Data Website in early 2016 to put services and data at the fingertips of residents and provide customers with direct access to city specific data and analytic tools.** Through this user-friendly data portal, users could perform simple analysis; view and interact with data, including statistics from the Orlando Police Department; access information related to building permits and business tax receipts; and see solid waste maps by commissioner district and neighborhood. The Digital City Hall was launched in March 2019 to bring more online services to citizens.

CITY OF ORLANDO

ORLANDO FUTURE-READY CITY MASTER PLAN



This section describes an assessment of current city digital assets, as well as a high-level overview of new digital project initiation procedures. It also includes a summary of data sources used by partner agencies to determine consistency and compatibility, as well as opportunities for improved efficiency and data sharing.

A. CITY OF ORLANDO DIGITAL ASSETS

In the first quarter of 2020, the City of Orlando conducted an employee survey across all departments to gain insights into their information technology (IT) assets and associated business processes. The city used the survey results to identify future opportunities for improvement and alignment between the city's future-ready and IT strategies.

The recommended next step is further alignment of the Future-Ready City Master Plan with the IT Master Plan, laying out a roadmap for advancing the foundational IT and communications assets/infrastructure needed to support future-ready strategies and optimize effectiveness of the city's overall information systems.

B. CYBERSECURITY REVIEW

The city's IT Department is responsible for assessing new technology and software investments. All potential future-ready projects will be evaluated using a Project Initiative Questionnaire that includes the following instructions:

- Describe the problem statement and/or business case for the investment
- Describe the identified solution
- Identify the time frame, budget, staff resources required, as well as potential risks

Each proposed project or technology investment undergoes a rigorous security assessment prior to approval, procurement, and initiation. The IT Department employs industry established best practices for cybersecurity and management of digital resources and sensitive data.

C. PARTNER AGENCIES

During the preparation of the Future-Ready City Master Plan, the City of Orlando engaged other governmental agencies, including transportation and utility providers, to leverage regional partnerships and shared resources. In April of 2020, the City of Orlando conducted a partner agency survey to gain insight on current software platforms, data management processes and needs for additional technology or data for their business processes. The project team met with representatives from FDOT D5, Central Florida Expressway Authority (CFX), MetroPlan Orlando, OUC, Orange County and LYNX to discuss the software platforms currently being used by each agency, their data management strategies and potential for shared projects and initiatives. The goal of each of these meetings was for the project team to understand the existing, planned and needed software and data resources used by other agencies to and promote consistency and cohesiveness with regional efforts.

FDOT

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

OUC The Reliable One®

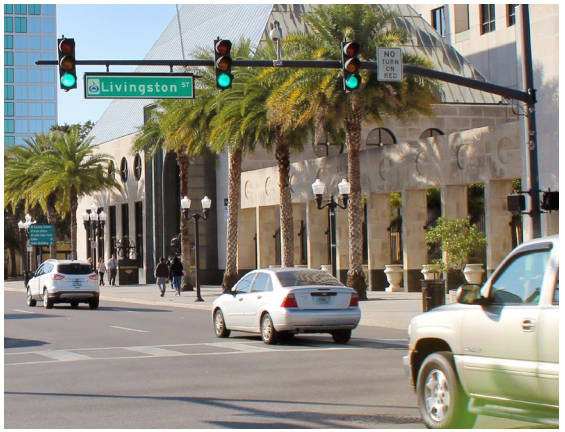
ORANGE COUNTY GOVERNMENT FLORIDA

LYNX®

FDOT D5

The study team coordinated with the FDOT D5 Transportation Systems Management & Operations (TSM&O) group to understand the FDOT existing data sets, data storage and dissemination, and planned enhancements to their data capabilities. The D5 TSM&O team is part of the Traffic Operations Department and maintains and deploys technology equipment on the roadway network, signal equipment, and manages the district data. These datasets are all publicly available on the D5 Data Dissemination platform, SunStore, through: **sunstore.cflsmartroads.com**.

The District intends to share as much of the data possible with regional partners to support data and reporting systems for both public and private uses. The city's Integrated Transportation Application strategy will leverage SunStore and its data along with back-end processing systems that have been developed by FDOT. This is explained further in the strategy summary.



CENTRAL FLORIDA EXPRESSWAY AUTHORITY

CFX

The Central Florida Expressway Authority (CFX) is a highway authority responsible for construction, maintenance and operation of some toll roads in five counties of the Greater Orlando area. For this effort, the study team coordinated with the CFX Intelligent Traffic Operations and Transportation Systems (ITS) team, who are responsible for ITS equipment deployed on the system, the infrastructure communications, and maintenance of the data generated from equipment deployed in the field. CFX is actively collecting data on its corridors to assist with planning and operations. This data can be shared with Orlando to better understand regional transportation operations. CFX also has various other data collections systems such as weather stations that can be used to supply localized weather information to the city.

metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

METROPLAN ORLANDO

MetroPlan Orlando leads transportation planning efforts in Orange, Osceola, and Seminole counties. As the metropolitan planning organization for Central Florida, they also set priorities and determine how federal and state transportation dollars are spent in the region. The study team coordinated with the MetroPlan Orlando Director of TSM&O and Director of Transportation Planning for the purposes of understanding current and future data and software needs of MetroPlan Orlando to support their planning and project prioritization functions for the tri-county region. As a regional body, MetroPlan Orlando leads multi-county projects and offers a platform to share grant opportunities and unify transportation projects amongst various agencies, including the City's Transportation Department, FDOT, CFX and Orange County.

OUC

Orlando Utility Company (OUC) provides the City of Orlando with electricity as the municipal electric and potable water utility. OUC has partnered with larger regional providers to expand their power generation abilities and is actively developing large scale sources of renewable energy such as solar power. The utility maintains various infrastructure for the city such as streetlights and collets data points for various systems and environmental conditions that can be made available to the city. Its sensor network and data collection efforts would ultimately support a large-scale digital twin, and its infrastructure would support the placement of IoT systems to help the city monitor its own infrastructure. To prepare for the future, OUC is also introducing automation into its data collection and system management practices to decrease overhead burden and increase operational efficiencies.

OUC closely participated in future-ready planning and will be an ongoing strategic partner in advancement. Many of the processes and data used by OUC have the potential to see benefit from innovation and collaboration with the Future-Ready City Master Plan.

Relevant software and hardware used by OUC includes those used for mapping, management of customer information, maintenance and monitoring of infrastructure and communication with customers. OUC uses and controls data related to metering, financials, customer information and information related power generation, power grid(s) and water distribution. Specifically, OUC has expressed a desire to innovate in relation to responses to common customer inquiries and to improve customer onboarding/offboarding.

ORANGE COUNTY

Orange County works closely with regional partners and aligns with their efforts to produce uniform systems that are readily available to all. As the maintaining agency for infrastructure beyond the city's borders, Orange County readily shares resources with the city. To support its operations, Orange County collects numerous sets of data, from healthcare to transportation, and shares this data with its regional partners. These data sets, coupled with the city's data, can build a higher resolution image of the city's operations, management, and need to support planning, maintenance, and public safety functions.

LYNX

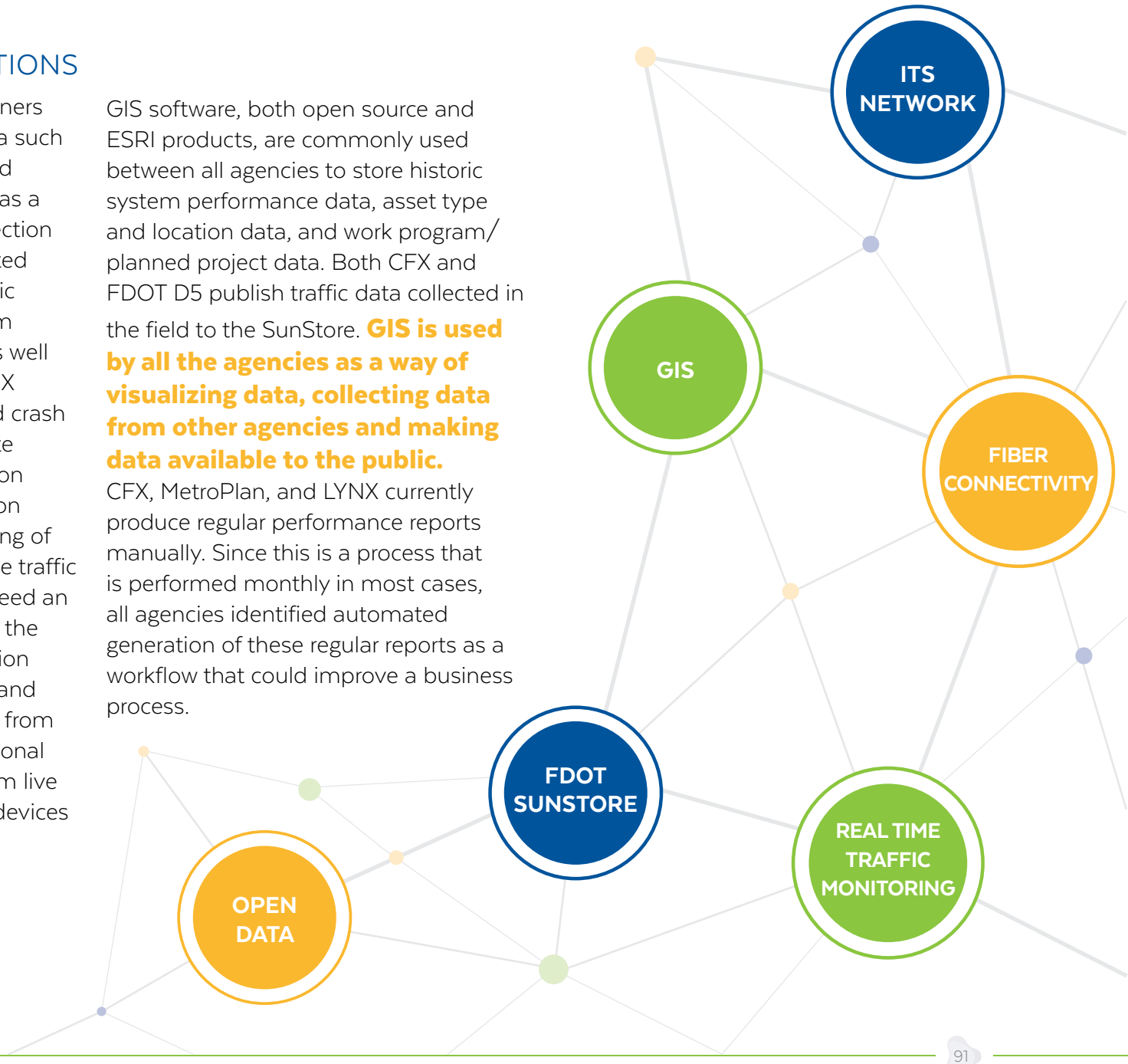
LYNX provides public transportation services for Orange, Seminole, and Osceola counties. Daily fixed-route bus service and alternative transit service such as para-transit provide more than 85,000 passenger trips each weekday spanning an area of approximately 2,500 square miles with a resident population of more than 1.8 million. The ITS team provided background on the software platforms and current and needed datasets for the organization. For the 300 fixed routes managed by LYNX, a tremendous amount of data is collected including ridership, vehicle operations and automatic vehicle location data.

As LYNX is looking to the future, it is currently exploring the feasibility of new vehicle technology to support its routes and provide a higher quality of service. The agency shares most of its data where it does not contain human resources or rider specific information. It is currently seeking opportunities to provide its riders with access to systems showing first/last mile options to connect more riders to the service. The city's Integrated Transportation Application Strategy supports this type of wayfinding and will be integrated with LYNX in partnership with the city.

SUMMARY OF OBSERVATIONS

All the transportation agency partners indicated that they use traffic data such as volumes, speed, crash data and turning movement counts. CFX has a robust ITS network and data collection capabilities. However, CFX indicated that they would benefit from traffic data and camera feed access from adjacent agencies and facilities as well as improved work zone data. LYNX indicated that real time traffic and crash data would support dynamic route planning and operations in addition to access to traffic camera feeds on fixed routes for real time monitoring of conditions. To enable this real time traffic condition monitoring, LYNX will need an infrastructure upgrade to connect the Operations Center to Central Station via a dedicated fiber connection, and MetroPlan Orlando would benefit from real time traffic data from the regional roadways. CFX would benefit from live data or access to data collection devices from adjacent facilities.

GIS software, both open source and ESRI products, are commonly used between all agencies to store historic system performance data, asset type and location data, and work program/ planned project data. Both CFX and FDOT D5 publish traffic data collected in the field to the SunStore. **GIS is used by all the agencies as a way of visualizing data, collecting data from other agencies and making data available to the public.** CFX, MetroPlan, and LYNX currently produce regular performance reports manually. Since this is a process that is performed monthly in most cases, all agencies identified automated generation of these regular reports as a workflow that could improve a business process.



Regional Recommendations

While the transportation partners operate as independent agencies using various data streams, Central Florida residents, businesses and visitors would benefit from improved multi-modal coordination and data sharing. As the center for regional transportation services (LYNX Central Station, SunRail and Orlando International Airport), residential, economic and tourism activity, the City of Orlando can provide leadership through the future-ready initiative. Next steps to implement the Mobility pillar focus area include the following:

- The City of Orlando should convene a Metro Orlando Transportation Task Force or regional transportation summit with the transportation partners. The purpose of this meeting is for all parties to identify unique and shared data sources and projects that are underway, strengthen partnerships and communication and brainstorm potential shared projects and cost sharing opportunities.

- The City of Orlando should develop an Integrated Transportation Application user interface, leveraging partner solutions, such as the FDOT Route Mode Choice Engine investment, to provide enhanced mobility for residents and visitors. This will also serve the current data storage needs of the transportation group, along with future needs associated with the proposed Integrated Transportation Application and Smart Parking strategies.
- The City of Orlando should evaluate the FDOT SunStore data lake model to determine if this system architecture is appropriate for a city-owned and maintained Data Fusion Center to support its future-ready initiatives.
- The City of Orlando should continue to collaborate with partner agencies to identify scalable, innovative solutions that can benefit the entire region. This cooperative approach can promote for cost sharing, efficiency of services and overall public support and understanding.

D. DATA NEEDS

As the city grows and new systems are introduced, the city will need to leverage existing new data sources to assist with management and operations, and to support a sustainable growth. As a driver for the future-ready city, data will provide a platform to create more informed decisions and identify new opportunities to enrich and improve the lives of its residents and visitors.

CITY OPERATIONAL DATA

The future-ready city will utilize high resolution operational data to track its performance. A Digital Twin to monitor city operations will require a constant feed of high-resolution data from IoT networks, system of systems, and new infrastructure monitoring systems to automate operations for the city. Additionally, city governance and economic development data will allow for correlations to be developed to help control city programs and identify community needs in detail.

STRATEGY SUPPORT

The strategies identified within Orlando's Future-Ready City Master Plan greatly rely on the availability of data. Often, for city-wide strategies, a large amount of data is required to support implementation. Additionally, the city may need to develop new methods to become more dynamic and supportive of unstructured data as more and more of the world becomes digital. This also extends to the data sources that may be discovered when some future-ready strategies are implemented.

REGIONAL CONNECTIVITY

A future-ready city is one that understands it is not alone. Supporting the needs of the region, Orlando will need to be ready to help identify new data sources within that it can lend to regional systems to help plan and develop a safe and sustainable future. The city can also leverage the region's data to help build a clearer vision of how its projects and growth are impacted by regional activities. It also provides the ability to create projects that not only benefit the city, but the rest of Central Florida, by understanding how the needs of the region align with the city's goals and objectives.

THIRD-PARTY NEEDS/ ACCESS

As the city grows, it will welcome new partners, businesses and residents. The future-ready city is one that is open and transparent; providing local initiatives, commerce and the public access to its data for both private and commercial use. An open and transparent city elicits trust from its constituents, which in turn encourages the development of new applications and technologies that benefit all parties. Third parties will be required to comply with the city's data privacy principles (under development).

6

ROADMAP TO IMPLEMENTATION

The successful implementation of the Future-Ready City Master Plan requires a well-defined roadmap to outline the operating procedures and protocol. As such, several key factors that were considered in the development of the Master Plan include, but are not limited to, funding models/opportunities, procurement procedures for strategies and identification of a prioritization process. In addition, as the implementation of projects or strategies will be an annual process, the roadmap aligns with the traditional overall Capital Improvement Program (CIP) schedule and overall operating policies for adoption by the city.

CITY OF ORLANDO

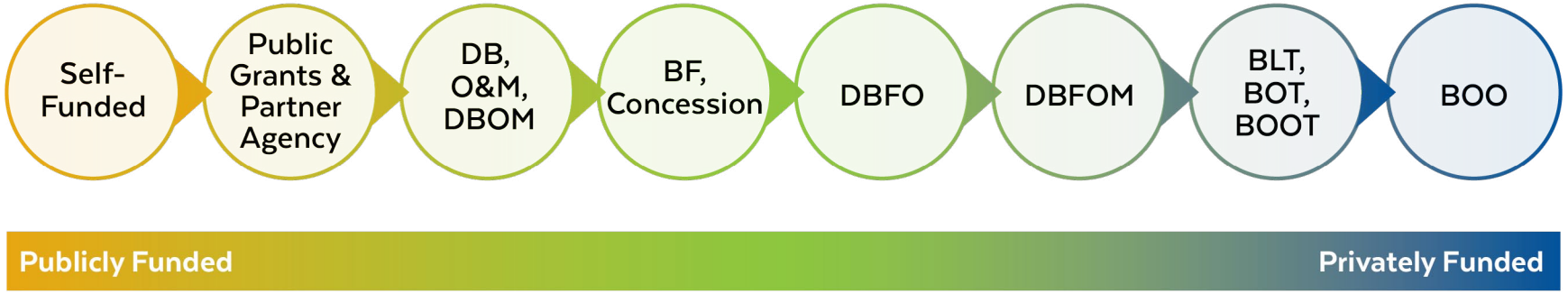
ORLANDO FUTURE-READY CITY MASTER PLAN

A. FUNDING MODELS AND OPPORTUNITIES

There is a wide variety of funding strategies and opportunities available for future-ready projects. This includes city self-funded options, grants and (public agency) cost sharing, and public-private partnership (P3) options. The information in this section and the associated Funding Assessment Aid (included in the Appendices) are intended to facilitate projects and initiative business case evaluation, refinement and decision-making on funding options appropriate for that project or initiative.

The options described in this section are based on a review of typical funding methods for smart city programs and the current state of P3s in the North American market. They require leveraging the project team's subject matter expertise in the design, development and implementation of global smart cities, as well as experience in the execution of projects under a public-private partnership model.

Three primary funding groupings were identified: self-funded, grants and (public agency) partnering (or cost sharing) and public-private partnerships. As illustrated in the figure below, these funding options run the gamut from fully publicly funded (Self-funded, Public Grants, Partner Agency cost sharing) to mostly privately funded [Build-Lease-Transfer (BLT), Build-Operate-Own-Transfer (BOOT), Build-Operate-Own (BOO)]. Generally, the methods farther to the left (more public funding) offer more direct control to the city; while those farther to the right (more privately funded) reduce the cities control and therefore inherently increase the risk(s) for the city. These trade-offs are discussed in more detail in the remainder of this section.



FUNDING OPTIONS ON A SCALE OF PUBLICLY FUNDED TO PRIVATELY FUNDED

Self-Funded

The city **self-funded** approach could include a combination of the following typical strategies:

Self-fund and operate

The city uses available funds for the project (per the standard budget and Capital Improvements Program planning process) and takes on most of the project risks.

Debt

The city leverages bonds or other loan vehicles to fund the project. The City already has experience with this, such as the Green Bond used to support the renovation of City Hall to improve energy efficiency, among other things.

Design-Build (DB)

This is the most common project type where the private entity is responsible for design and implementation based on performance and design criteria and requirements developed by the city prior to releasing the DB for procurement and using the standard project assessment and funding allocation approach. The city uses available funds for the project.

Operations and Maintenance (O&M)

Under this approach, the city engages in a contract with a private entity for the ongoing operations and maintenance of a facility or service. The contract typically includes incentives/disincentives based on a Service Level Agreement (SLA) where the city can levy some penalty against the private entity if they do not meet the SLAs.

Design-Build-Operate-Maintain (DBOM)

In this approach, the city engages a private entity who takes on primary construction and O&M risks (though does not alleviate the city of all risk). Typically, the private entity completes design for a lower fee or limited profit with a fee increase during the build and operate and maintain phases.

Grants and Public Agency Partnering

The **grants and (public agency) partnering** approach includes public (government) grants to partially or fully fund a project or initiative and partnering with other regional public agencies for cost sharing for a project or initiative. Private grants are also available; however, because these grants are typically for supportive consulting-type services and do not offer capital or operating funds, we did not assess them for this exercise. Public grants and partnering, on the other hand, offer a great path to direct cost reduction for the city, are generally well-received by the public and, particularly for partnering, offer the opportunity for broader implementations beneficial to the entire region.

Public grants, from both the state and federal government, are important project funding options that should be considered early in the project development process. Generally, grants are used for capital development and maintenance projects and, in some cases, to fund new technology deployments or innovative project delivery methods. When using grants, the project sponsor(s) needs to be highly organized, with clear project roles and responsibilities, formalized inter- and intra-government agreements and private sector partners. Prospective grantees often form project teams where a lead party is identified who understands any potential grant-placed limitations on project partner(s) or private sector participation, cost share (if required) and business model, and has the time and resources to support the project throughout the competitive application and award process.

Most grant programs accept and award applicants on an annual and reoccurring basis. Larger grant programs, such as from the federal government, are on appropriations-determined schedules or are initiative-specific opportunities. In both cases, grant programs prefer a phased project approach, requiring the grantee to reapply as the project progresses, i.e. from initial concept definition, design, construction and implementation.

Federal grants are either directly administered by the awarding agency or department or provided to states via formula grants, which are administered by the corresponding state agency or department for across projects. Cost share varies across grant programs, ranging from no cost share required up to 50% required. A primary example of directly administered federal grant programs are those from the United States Department of Transportation (USDOT). Successful USDOT grant projects use a combination of capital improvements (i.e. maintenance or building of highways, roads or bridges, etc.) with the deployment of new and innovative technologies (i.e. connected and autonomous vehicles, mobility on demand, smart highways, etc.) that increase user access to safe and reliable transportation, increase efficiency, economic vitality, support alternative business models and reduce emissions.

Formula grants use a different approach, where the federal government provides grant funds, based on a formula, to states for related initiatives. In these cases, the emphasis is on the state's role as the decisionmaker for program related activities and how funds are spent. A primary example of this type of grant funding is the Department of Energy's (DOE) State Energy Program (SEP). Every DOE solicits states to provide an overview of how the fiscal year's formula funds will be spent at the programmatic and project level. Once approved by DOE, funds are dispersed, and states administer the program while providing quarterly and annual reports. This type of grant may require partnering with another agency to access funds and, given the city's long-standing successful partnerships with regional public agencies, this is a strong option for funding future-ready projects.

Public-Private Partnerships (P3)

The **public-private partnership** (P3) approach includes those delivery models that involve private financing for one part of the project, like build-finance that offers private financing during implementation, to end-to-end private financing for funding methods like the design-build-finance-operate and maintain (DBFOM). P3s offer an opportunity for offsetting financial shortfalls and provide management and technical expertise for complex, large-scale, costly projects. There are several variations to the P3 model including:

- **Build-Finance (BF):** Private financing of capital cost only during project implementation.
- **Design-Build-Finance-Operate (DBFO):** Private financing of capital and operational costs.
- **Design-Build-Finance-Operate-Maintain (DBFOM):** Private financing of capital, operational and maintenance costs.
- **Concession:** Private concessionaire finances and operates the project for a fixed time, after which ownership transfers back to the city. The State of Florida P3 Framework currently does not consider this a P3. However, this is more typically included in the bucket of P3 options because of the level of private investment and the private entities reliance on the concessions to recoup their costs. Sometimes this funding method is used in conjunction with the publicly-funded Design-Build option where the latter is used to work through design and construction; then transferred to the concessionaire to operate.
- **Build-Lease-Transfer (BLT):** The city leases from a private entity for a period until the transfer of project ownership. The city is responsible for operations.
- **Build-Operate-Transfer (BOT):** Ownership remains with the city.
- **Build-Own-Operate-Transfer (BOOT):** Private entity maintains ownership until project is transferred to the city.
- **Build-Own-Operate (BOO):** Private entity maintains ownership after implementation is complete.

P3s have been utilized to fund large-scale infrastructure projects for over 30 years and are currently undergoing a re-evaluation in the marketplace to determine what works best in current P3s models and what has not worked well. For example, P3s have not always proven to be nimble and supportive of innovation, with cities often finding themselves locked in a design and unable to incorporate new technologies as they become available. This is largely due to the need to develop thorough design and delivery requirements and to provide some certainty to the provider on their investment and risk. That being said, they are well suited for large-scale infrastructure projects (i.e., bridge replacements) offering solid risk protection and reduction of ongoing operations costs.

Selection of a Funding Method

The funding model assessment will provide the city with a series of optional funding sources for each of the future-ready strategies. As defined above, there are varying operational characteristics and governing risks for each of the available funding sources. The Orlando Future-Ready City Master Plan has been established to enable the operating model to provide funding strategies for either a capital project or a discretionary funded request. The city will use the funding model assessment to review the funding options for the short-term strategies identified as part of the overall CIP process.

B. PROCUREMENT

Procurement and purchasing are regulated by Chapter 7 (Procurement Code) of the City of Orlando Code of Ordinances[1]. Procurement opportunities include competitive solicitations through Request for Proposals (RFP) or Request for Qualifications (RFQ), Invitation to Negotiate (ITN) and sole-source opportunities. Vendors and suppliers who wish to do business with the City of Orlando and bid on future-ready projects are encouraged to register with VendorLink, a third-party system that manages requests for proposals, bid opportunities, notices and procurement notifications. The website to register for VendorLink is: **vendorlink.cityoforlando.net/common/default.aspx**

Vendors may submit unsolicited bids that clearly define how their unique products and services will address a stated problem or issue identified by the city in the Future-Ready City Master Plan. Upon receipt of an unsolicited bid, the city, at its discretion, may determine if it is in the best interest of the city to pursue a sole-source opportunity or to publish a request for proposals via competitive solicitation.

Under Florida Law, all records and information, including the VendorLink system, is subject to public inspection and can be viewed by through a public records request. Proposals with proprietary information should be marked as such and may be exempted from this requirement.

[1] https://library.municode.com/fl/orlando/codes/code_of_ordinances?nodeId=TITIICICO_CH7PRCO

C. STRATEGY PRIORITIZATION TOOL

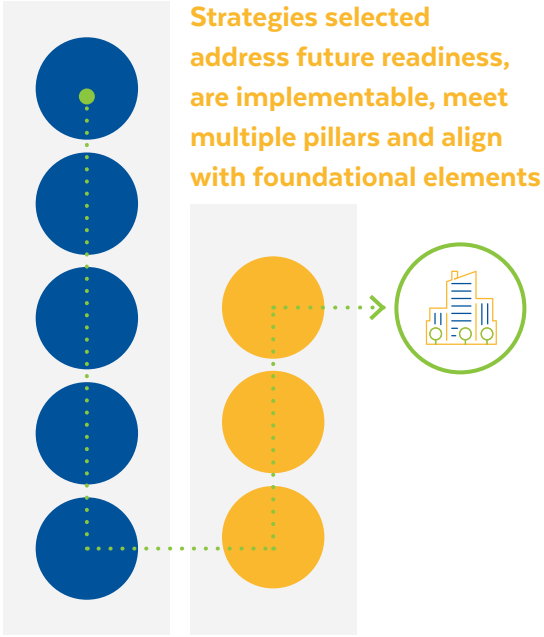
The Orlando Future-Ready City Master Plan identifies the need to prioritize innovative strategies that align with **four (4) key areas (e.g. readiness, implementation, across multiple pillars** and **foundational elements)**. The key areas were determined to be essential during the community engagement process. As identified below, each of the key categories are further evaluated against detailed and specific drivers or questions. The prioritization tool provides a general ranking of the strategies for the City of Orlando to consider advancing during the CIP process. The higher the score, the more the strategy aligns with Future-Ready City Master Plan mission, vision and foundational elements. As a policy decision, each of the four categories are evaluated with an equal weight or importance to the future-ready program.

The following information provides a detailed description of the evaluation criteria used in the prioritization tool. Each of these evaluation criteria are evaluated in the prioritization tool to result in the prioritized short-term strategies

ORLANDO FUTURE-READY CITY MASTER PLAN

Prioritization Process

Strategies selected address future readiness, are implementable, meet multiple pillars and align with foundational elements



STRATEGY FUTURE READINESS

- **Addresses Future Need:** Is this strategy forward-looking and able to address future needs?
- **Advances Long-term Vision of Orlando:** Does this strategy advance the long-term vision of Orlando as described in the Future-Ready City Master Plan?
- **Aligns with Regional Partners:** Does this strategy support strategies and priorities of regional partners?
- **Effective for a Minimum of Five Years:** Will this strategy address the city's need(s) for a minimum of five years?
- **Benefits All of Orlando:** Does this strategy improve the experience for all Orlando residents, employees and visitors?

STRATEGY IMPLEMENTATION

- **Time to implement Less than 2 years:** Can this strategy be implemented in under two years?
- **Implementation Risk:** Can risk be significantly limited to the city in implementing this strategy?
- **Visibility Conducted to Public:** Will this strategy be visible to the community?
- **Existing Resources Available to Support:** Does the city have staff and other necessary resources readily available to support this strategy?
- **Funding Sources Available:** Does the city have funding in place or readily accessible to finance this strategy?
- **Scalable:** Can this strategy be scaled up/expanded to other departments, partners, communities within the city?
- **Leverages Ongoing Initiatives/ Pilots:** Does this strategy build upon and use resources available from current, ongoing initiatives and/or pilot projects?
- **Local Job Creation:** Does this strategy have the potential for job creation within the city?

STRATEGY ADDRESSES MULTIPLE PILLARS

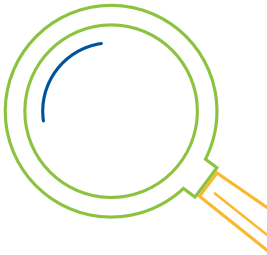
- **Connectivity:** Does this strategy address communications and/or IT infrastructure and/or support digital access to city services?
- **Health and Safety:** Does this strategy support the health and wellbeing of Orlando residents, employees and visitors?
- **Placemaking:** Does this strategy support Orlando's goals for urban design/planning and identity within the city?
- **Energy:** Does this strategy provide infrastructure, technologies or other solutions related to providing energy?
- **Mobility:** Does this strategy address mobility via any mode within the transportation network?
- **Water:** Does this strategy provide infrastructure, technologies or other solutions related to providing water or wastewater services?
- **Materials:** Does this strategy advance Orlando's goal of becoming a zero-waste community?

STRATEGY ALIGNS WITH FOUNDATIONAL ELEMENTS

- **People First:** Does this strategy address equity, diversity and inclusiveness among our residents, employees and visitors?
- **Transparent:** Does this strategy support open decision making with clear disclosure by vendors and partners on how data is collected and used?
- **Security Focused:** Does this strategy support security protocols to protect the privacy of all individuals who use public services and support vendor and partner compliance with the city's data privacy principles (under development)
- **Collaborative:** Has the strategy already or will the strategy use public input to help develop and prioritize the strategy?
- **Relevant:** Is the strategy addressing new technologies and innovation as they become available?
- **Timely:** Does the strategy allow for future evaluation and implementation of new technologies and innovation as they become available?
- **Responsible:** Is the strategy being responsible with citizen and employee data that is collected and stored in compliance with the city's data privacy principles (under development)
- **Sustainable:** Does the strategy align with and further the goals of Green Works Orlando supporting the ultimate overarching to make Orlando the most sustainable city in the nation?
- **Reliable:** Does the strategy improve the reliability of public services by improving efficiency within City Hall and in communication with partner agencies?
- **Resilient:** Does this strategy help prepare the city for natural disasters, climate change and other stressors enabling the city to recover more quickly and maintain continuity of business and government?
- **Diversity:** Does the strategy support diversity and avoid impacts that harm diversity?
- **Prosperity for all:** Does the strategy include new technologies and innovation that improves educational opportunities, strengthens economic conditions and promotes equity for all residents, businesses and visitors?

The strategy prioritization tool is designed to support the decision-making process by the city. While the result of the prioritization tool is a list of ranked strategies, the tool was designed to provide the city with enough information to make an informed decision for advancing for consideration into the CIP.

As a result of comparing the strategies against the evaluation criteria, the strategy prioritization tool identified the top 16-strategies as recommended priorities for the city. The following tables highlight the top short-term strategies, as scored by the consultant project team, as output of the strategy prioritization tool:



Short Term Strategy	Strategy Description	Other Strategies dependent on this one (Y/N)	Total Score
Community Outreach and Engagement Plan	The city's customer base (residents, business owners, visitors) will need continuous information about the city's initiatives and technology investments. The need for education was commonly cited during internal stakeholder and roundtable meetings as a means of reducing waste and improving efficiencies.	Y	700
Data Fusion Center	A Data Fusion Center (DFC) provides the needed centralized environment for the city to uniformly manage all data feeds moving forward each of the future-ready initiatives. This environment brings together big data and data management principles into a centralized environment.	Y	600
Defining the Digital Divide	This strategy will collect data to show gaps in coverage and speed in the city and help define where and how prevalent the digital divide is in Orlando. This data could also be used to analyze cell connectivity issues during large events, which can impact public safety.	Y	575
Smart Parking	This potential project seeks to expand on the smart parking initiative that was developed by the City of Orlando, including the ParkMobile app partnership.	Y	475
Resilience Plan	A Resilience Plan will address chronic stressors, such as economics and healthcare, as well as acute shocks such as hurricanes and cyber-attacks.		700

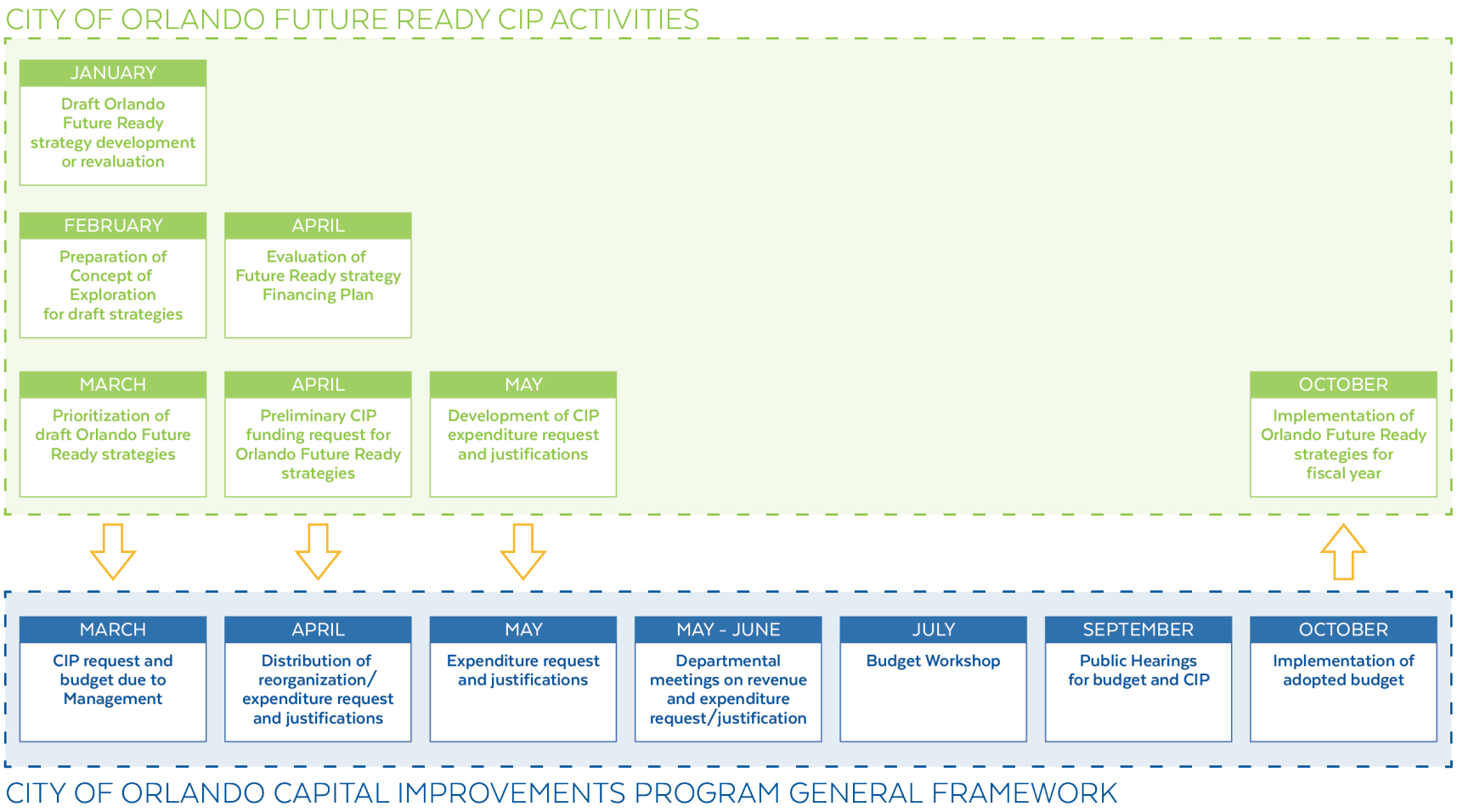
Short Term Strategy	Strategy Description	Other Strategies dependent on this one (Y/N)	Total Score
IDEA Lab	As an incubator program, the IDEA Lab will promote the connection with local innovative providers, establish partnerships with new start up organizations and expand the localized living labs, including a Request for Information (RFI) program to receive research, industry information and strategies to support the advancement of new solutions for Orlando future ready.		**675**
Integrated Transportation Application	The strategy consists of providing users and visitors of the City of Orlando the ability to plan multi-modal trips in one centralized location through the use of a mobile application designed to run on smartphones/smart devices and transit kiosks.		**650**
Resilience Hubs	A Resilience Hub is infrastructure and programming (located near traditionally underserved neighborhoods, centers of employment, transit centers, of other public spaces) built to support residents and coordinate resource distribution and services before, during or after a natural hazard event.		**650**
Community Wi-Fi	This program will prepare Orlando to become a better-connected city by advancing implementation of fiber public Wi-Fi on city-owned property; providing enhanced opportunities for education, communications and community services.		**650**
Digital Twin	A Digital Twin is an exact digital replica of real-world buildings, physical assets, processes, places, systems, and devices, and can be used to model and simulate impacts of growth on infrastructure, environment, energy and water consumption and more.		**600**
Alternative Transportation Mobility Program	This program will partner with a technology company on a rewards program for alternative transportation (walking, biking, bus, train, and carpooling). It should also provide rewards for single car riders, so we can connect with them and encourage them to use alternative forms of transportation.		**600**

Short Term Strategy	Strategy Description	Other Strategies dependent on this one (Y/N)	Total Score
Food Recovery Network	The Food Recovery Network leverages partnerships between businesses, distribution centers and the nonprofit organizations for collection of food and grocery products that can be distributed to people in need or the vulnerable communities		600
Integrated Public Alert & Warning System (IPAWS)	IPAWS is a national alert and warning infrastructure, which can be used to quickly provide life-saving information to the public. Similar to an AMBER alert, a warning could be pushed to all mobile devices throughout the City of Orlando.		575
Social Services Optimization	Some of the most vulnerable citizens access social services almost exclusively through 911 calls, emergency room visits, or encounters with law enforcement. Through this initiative, the city would harness the power of data analysis to identify those who need services and incentivize proper use and access. This program will optimize multi-agency coordination of social services to vulnerable populations beginning with a multi-agency pilot program to identify appropriate potential clients for these services.		550
Smarter Buildings with Advanced Sensor Network	This strategy relies on multiple distributed Internet of Things (IoT) sensors (light, temperature, advanced motion, acoustic, WiFi/Bluetooth) to improve indoor environmental quality, protect and assist first responders and help vulnerable groups.		500
Wi-Fi Hotspot/ Mobile Tablet Checkout Program	This strategy will provide portable Wi-Fi hotspots or tablets with cellular connectivity via a checkout program at Orlando neighborhood centers.		400
Materials Resource System Study	The focus of this project will be to research and provide new innovative ideas to improve solid waste management regionally with partners such as Orange County. The study will document both the ideas as well as potential strategic partnerships.		375

D. CAPITAL IMPROVEMENTS PROGRAM (CIP)

CIP and Annual Budget Procedures
The city defines capital improvements as physical assets, either constructed or purchased, that have a minimum useful life of three years and a minimum cost of $100,000. The CIP is based upon a five-year window and updated on an annual basis. Hardware and software requests and other technology improvements are included in the Technology Investment Program of the Technology Management Division and may be included as a lump sum in the CIP. **Other future-ready projects that are not capital in nature, such as a communications and outreach plan, may be considered an operating expense and evaluated as part of the annual budgeting process.**

To request a new project in the CIP, each department must submit a request that includes a project description, justification, cost estimate, statement of fiscal impact, schedule and service area. The diagram below depicts a process flow chart for consideration of future-ready strategies and projects and relationship to the city's annual budget and CIP process:



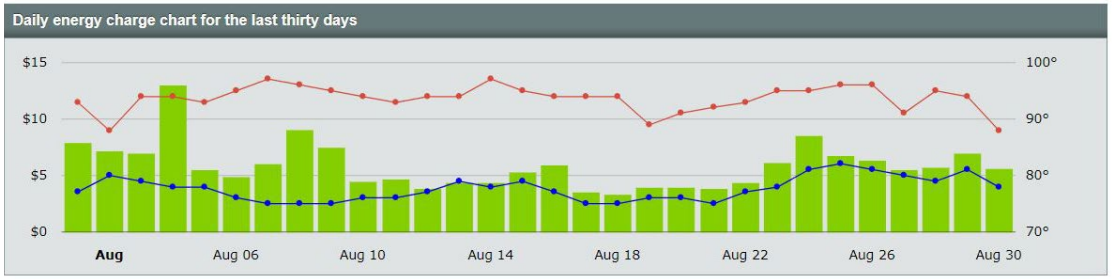
As a function of the CIP request form, each project must be able to answer the following questions and criteria:

- Has the business case been established?
- Is there risk to the city?
- Does the City have institutional capacity for procurement?
- Is self funding available?
- Identify political or community issues
- Does the city have institutional capacity for implementation?
- Identify the timeline and stakeholders
- Are data governance and policies in place?

Additional information for how the city prepares the annual budget can be found here: **https://www.orlando.gov/Our-Government/Departments-Offices/OBFS/Management-and-Budget**

E. ONGOING METRICS AND REPORTING

It is imperative to monitor the success for each of the strategies that are advanced during the CIP process. Therefore, each of the short-term strategies have been evaluated and a recommended measure of performance has been outlined in the Concept of Exploration for each strategy (Section 4). Annual monitoring and reporting of these metrics and performance indicators will help the city determine if a strategy or program is successful in its current state, or if it needs fine tuning.



Appendices

- Internal Stakeholder Meetings
- Roundtable Meetings
- Public Involvement Summary
- Virtual Workshop Summary
- Short Term Strategies
- Mid and Long-Term Strategies
- Concepts of Exploration

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Internal Stakeholder Meetings

- Business and Financial Services
- Economic Development
- Fire Department
- Fleet and Facilities
- Housing and Community Development
- Information Technology
- Parks and Recreation
- Police Department
- Public Works
- Sustainability and Resiliency
- Transportation
- Venues

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Meeting Notes

Place:	City Hall 3rd Floor Summerlin Conference Room		
Date:	January 7, 2020	Notes Taken by:	C. Storey
Project #:	63588.00	Re:	Business and Financial Services Internal Stakeholder Meeting

ATTENDEES

Mike Hess	Chris McCullion	Michelle McCrimmon
David Billingsley	Laurie Botts	Jeff Parrish
Raymond Scullian	Dave Mulholland (VHB)	Ryan Fetchko (VHB)
Jordan Crandall (VHB)	Crista Storey (VHB)	Dan Kirby (Jacobs)

All participants introduced themselves and described their role at the City or with the VHB team. Dave Mulholland opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future Ready City?
- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Dave Mulholland led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future-ready" means to the Business and Financial Services department.

Attendees agreed that this project will be a process for the City internally, to set up place the policies, procedures, and mindset needed for success.

The group identified that there was a concern about the plan becoming "vendor driven" and feels confidence that by selecting a local team, VHB is not driven by vendors or products, but dedicated to building this community.

Attendees identified key elements of a **successful Future Ready city** through a word cloud exercise:

- **Connected**
- **Responsible**
- **Innovative**
- **Reliable**
- Resilient
- Technology

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Meeting Notes

- Efficient
- Adaptable
- Adaptive
- Seamless
- Flexible
- Trusted
- Responsive
- Equitable
- Secure
- Relevant
- Transparent

Attendees discussed how to approach interaction with our citizens. The City has a responsibility for everyone and needs to provide an option for everyone across the board, not leaving anyone behind.

Attendees identified the **Future-Ready or Smart City approaches this department has already implemented** through a polling exercise:

- Digital city hall
- Web applications
- Electric vehicles
- Information online
- Cloud based ERP
- Garage parking availability
- Researching/developing P3 policies
- Technology security
- Charging stations
- ITN procurement method
- Online submittals
- Resource allocation
- Cyber security training
- Electric vehicles
- Building controls

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion
Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Culture of continuous improvement and learning, including lessons learned to stay focused on original goals
- Growth is at any cost, are environmental issues practical or realistic?
- Convenience and making life easier –not just about technology, but making Orlando a better place to live
- Safety – feeling safe and secure in the community, protecting people and property
- Perception – panhandling was discussed as an example. If we create a perfect reality and the perception does not match, people do not feel the community has gotten any better.

Attendees identified the **top three challenges of a Future Ready City** through a polling exercise:

1. Acceptance by the public 25%

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Meeting Notes

2. Business model 19%
3. Managing data 19%

Other: Challenge of trying to reach other people, relevant improvements vs. what is irrelevant, what are the right decisions, resistance from groups like ACLU who are incentivized/paid opponents, starting from a position of transparency to prevent this type of resistance, confidence about handling as a community

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that the key words within the document included: privacy assessment, disclosure, and retention.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future Ready:

- Resources
- Not a high priority compared to other city needs
- Education
- Cross department communication
- Confidence/courage
- Time
- Legal/statutory
- Change management

Attendees identified **innovation and technological advances** that would help them do their job better:

- Cloud based solutions/services
- Mobile technology
- Collaborative software
- Automating process
- Collaborative tools
- Mobile applications
- Artificial intelligence

Attendees identified what actions the City could implement to **serve its citizens more efficiently**:

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vhb

Meeting Notes

- Multi modal transit applications
- Easy communication with our citizens
- Community involvement
- Outsource/privatization
- Equitable connectivity
- Equitable resiliency
- Complete I-4 project
- One point of payment
- Educate about existing services
- Status of vendor payments
- Bike highways
- Solid waste holiday schedule more transparent
- How citizens can engage with departments

Attendees identified how **new technologies will have the most effect on their department** through a polling exercise:

1. Improve processes 26%
2. Increase productivity 21%
3. Require retraining of staff 21%

Other: Difficulty with new software, converting from previous, difficulty implementing, time consuming, especially across departments. Departments don't use the same software programs.

Next steps:
Dave Mulholland outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in June 2020.

Mike Hess adjourned the meeting at 1:45 PM.

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Meeting Notes

Place:	City Hall 3rd Floor Summerlin Conference Room		
Date:	January 8, 2020	Notes Taken by:	C. Storey
Project #:	63588.00	Re:	Economic Development Internal Stakeholder Meeting

ATTENDEES

Mike Hess	Brooke Devon Rimmer-Bonnett	Sherry Gutch
Matthew Soss	Paul Lewis	Curt Ostrodka (VHB)
Crista Storey (VHB)	Melissa Gross (InNovo)	Dan Kirby (Jacobs)

All participants introduced themselves and described their role at the City or with the VHB team. Curt Ostrodka opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future Ready City?
- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Curt Ostrodka led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future-ready" means to the Economic Development department.

Attendees identified key elements of a **successful Future-Ready city** through a word cloud exercise:

- **Responsive**
- **Connected**
- Efficient
- Inclusive
- Progressive
- Equitable
- Intuitive
- Resident-centered
- Customer-oriented
- Age-friendly
- Livable

Attendees discussed this plan's coordination with a concurrent age-friendly Orlando action plan with the American Association of Retired Persons (AARP). The City just finished best practices for transportation design which includes age-friendly considerations. The City is AARP certified, and after the action plan, AARP will submit to World Health Organization (WHO). Future-Ready has the potential to support this age-friendly plan and others. It is important to

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Meeting Notes

follow up and share recognitions and certifications with other departments to encourage cooperation with other plans.

Attendees identified the **Future-Ready and Smart City approaches this department has already implemented** through a polling exercise:

- Digital city hall
- Implementing EDIS (integrates code enforcement and planning on one place; vendor is Productivity Apex)
- Virtual building inspections (coming soon)
- Digital planning and permitting
- Help fund starter studio
- Focus on livability in built environment
- Finding of the incubator
- Technology enhancements to better serve development service customers, digital permitting, QLess digital service pages, testing cloud-based services
- Recruit tech-based companies to Orlando
- Drone roof inspections
- Recruitment and retention of tech companies
- Accessible GIS data (trying to get to a place to where citizens can review data in real-time)
- Building and maintaining partnerships within the community
- Digital kiosk RFP
- Working on the first ever age-friendly action plan
- Looking at cloud instead of city servers

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion
Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Attendees discussed that the City needs to prioritize what can be done. Some software is outdated (Oracle) and the servers are not keeping up with needs. The department wants to take service offerings to a greater level and be more responsive. For example, cities are flooded with public records requests daily and making certain documents more accessible to the public may help.
- The group discussed a contractor information system with passage rates on inspections, plan approvals, etc. While this is not a recommendation of any vendor, customers can still review this information to see facts and make educated decisions based on actual data.
- The attendees would also like to continue to look at ways to be more efficient with inspections. They discussed ideas including virtual inspections which would save travel time and increase number of inspections completed daily. Roof inspections by drone would also increase efficiency.
- Add Code Compliance to include code enforcement and permitting

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Meeting Notes

- How do we address the growth rate? Orlando is growing so fast which puts pressure on our systems and processes.
- City is trying to focus on risk mitigation. Trying to avoid staff time spend on low risk issues, want to use permitting and plan reviewer time for more critical risk factors. State statue allows builders to bring in their own inspectors to fast track process, usually more expensive and transfers the risk to the developer.

Attendees identified the **top three challenges of a Future-Ready City** through a polling exercise:

1. Managing data 38%
2. Acceptance by the public 27% (fear of big brother, acceptance within City departments)
3. Equity 13%

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that the key words within the document included: privacy assessment, disclosure, and retention.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future-Ready:

- Lack of financial and staff resources
- Internal push back
- Not sufficiently skilled IT staff – the City's pay structure makes it hard to compete with the private sector. IT is a service for other departments that are running projects independently, rather than managing projects.
- Funding
- Vision
- Oracle database
- Different goals for different entities
- Dealing with cell companies – the number of permits for small cells
- Structure of IT, not able to drive projects, has gotten decentralized
- OUC

Attendees identified **innovation and technological advances** that would help them do their job better:

- MapWorks is essential

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Meeting Notes

- Innovative and creative staff who will focus a majority of their time on innovation
- Greater support from IT to drive innovative ideas
- Google for research into best practices nationwide
- City's new web site

Attendees identified what actions the City could implement to **serve its citizens more efficiently**:

- More service pages on website
- Allow digital signatures
- Eliminate more permit requirements
- Multi modal transit applications
- Better internal cooperation among regulatory departments
- Better ways to distribute information through email
- Continued focus on customer service training

Attendees identified how **new technologies will have the most effect on their department** through a polling exercise:

1. Improve processes 30%
2. Increase productivity 25%
3. Introduce new data 15%

Other: More work, how much time planning staff is spending on 5G permits, others that want to put new technologies in the right of way

Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in June 2020.

Mike Hess adjourned the meeting at 12:45 PM.

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Meeting Notes

Place: City Hall
8th Floor
Crossroads Conference Room
Date: January 8, 2020 Notes Taken by: C. Storey
Project #: 63588.00 Re: Fire Department Internal Stakeholder Meeting

ATTENDEES

Mike Hess	Rich Wales	Hezedean Smith
Tonette Nelson	Charles Rinaldi	Raphael Ferreira
Benjamin Barksdale	Marvin Francis	Curt Ostrodka (VHB)
Crista Storey (VHB)	Melissa Gross (InNovo)	Dan Kirby (Jacobs)

All participants introduced themselves and described their role at the City or with the VHB team. Curt Ostrodka opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future-Ready City?
- Discussion of Best Practices
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- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Curt Ostrodka led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future-ready" means to the Fire Department.

Attendees agreed that this project will be a process for the City internally, to set up place the policies, procedures, and mindset needed for success.

Attendees identified key elements of a **successful Future-Ready city** through a word cloud exercise:

- Safe
- Safety
- Responder
- Inclusive
- Innovative
- Motivating
- Efficient
- Progressive
- Data-driven
- Intelligent
- Effective
- Less-traffic
- Economical
- Adaptable

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Meeting Notes

- Friendly
- Convenient
- Reliable
- Useful

Attendees identified the **Future-Ready and Smart City approaches this department has already implemented** through a polling exercise:

- Inventory control systems
- Analyzing data from 911 calls
- Response plans driven by data
- Data driven work processes
- RFIP processes for inventory control
- New computer aided dispatch (CAD) system – online in August
- Computer based EMS report said on scenes paperless report system
- Biometric use for narcotics control (ready for deployment)
- Pulse point (verified responder): connects into CAD system from smart phone app, cardiac arrest happening in a public space and location of AEDs around you, another way to get data to firefighters and provide better service to people in an emergency
- ArcGIS for preplanning, hydrant maintenance (draft)
- Risk analysis (smoke detector and community CPR training)
- AVL: Automated vehicle location – track real time location for emergency apparatus in the field, closet unit can go to the call, not just the one assigned to the location
- New portable radios for LTs and Chiefs (CIP process)
- HAAS alert trial for accident avoidance (soon): device installed in vehicles, works with Waze to send alerts to other drivers in the area: two vehicles hit in the last 13 months on high speed roads, avoid hitting truck or personnel working in the roadway, alert similar to hazard or red-light camera ahead
- Discussion about connected vehicles, FD not following but have discussed with FDOT re: HAAS alert
- Use of hands free
- Exploring VR for training

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion
Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Chief Wales noted that the department needs to encourage feedback from the public on what they need from the FD.
- Attendees discussed that nearly 85% of the department's responsibilities are emergency/medical to avoid placing too much emphasis on "only" fire. More of a fire-based EMS department.

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Meeting Notes

- Attendees discussed privacy related to how 911 calls are shared between the FD and PD.
- The group discussed challenges related to the amount of data available, what is appropriate to be shared, what should be presented, how to find what is actionable at certain times (not to overload people with irrelevant data). The discussion further delved into "paralysis by analysis" should first responders get caught up in reviewing data and not acting on immediate threats or dangers.
- AT&T is the national vendor for First Net and the City is deciding in the next few months which technology will serve customers best in both the short- and long-term.

Attendees identified the **top three challenges of a Future-Ready City** through a polling exercise:

1. Privacy 30%
2. Managing data 30%
3. Acceptance by the public 15%

Other: acceptance by employees of new technology

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that the key words within the document included: privacy assessment, disclosure, and retention.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future Ready:

- Funding
- Willing participants
- Cost
- Equipment
- Funding restraints
- 5G (lack of)
- Processes
- Need for additional personnel to manage data
- Personnel – FTEs to implement, train to us, and deploy
- GIS staff
- Dept staffing deficiencies – need to get a new position in the budget, we can find the right people for the jobs, but need the funding in the budget

Attendees identified **innovation and technological advances** that would help them do their job better:

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Meeting Notes

- Interactive data silos
- Updated software
- Wearable devices for firefighter health and safety monitoring during/post high-risk incidents
- Going paperless on everything
- IoT for inventory and maintenance
- Virtual reality training equipment
- Windows 10
- Z Coordinate – getting the latitude and longtidue, Z is the floor or elevation
- Implementation of drones for firefighter and command situational awareness
- Training facility for fire/EMS personnel
- Mass gathering tools for safety and preparedness – crowd source and information awareness when people are gathering in an area, enhance preparedness and readiness to respond to any incidents

Attendees identified what actions the City could implement to **serve its citizens more efficiently**:

- Public access to submit health info/risks privately
- Solicit feedback from the appropriate customers
- Virtual tours of fire stations
- Transparency with emergency response performance measures
- Increased customer education of services provided
- Public education on what is involved in providing public safety
- Cardiac arrest save rates shared
- Community liaison for the fire service
- Fire data and where fires are occurring in the city (zip codes)
- Forward facing data page to citizens

Attendees identified how **new technologies will have the most effect on their department** through a polling exercise:

1. Improve processes 25%
2. Increase productivity 21%
3. Introduce new data 18%

Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in June 2020.

Mike Hess adjourned the meeting at 10:45 AM.

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Meeting Notes

Place: City Hall
8th Floor
Crossroads Conference Room
Date: January 7, 2020 Notes Taken by: C. Storey
Project #: 63588.00 Re: Fleet and Facilities Internal Stakeholder Meeting

ATTENDEES

Mike Hess	David Dunn	Ian Lahiff
Joseph Hinely	Jonathan Ford	James Peters
Meshia Jennings-Davis	Chris Castro	Benjamin Stacey
Brittany Sellers	David Mulholland (VHB)	Ryan Fetchko (VHB)
Jordan Crandall (VHB)	Crista Storey (VHB)	Melissa Gross (InNovo)
Dan Kirby (Jacobs)		

All participants introduced themselves and described their role at the City or with the VHB team. Dave Mulholland opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future-Ready City?
- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Dave Mulholland led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future ready" means to the Fleet and Facilities department.

Attendees identified key elements of a **successful Future-Ready city** through a word cloud exercise:

- **Resilient**
- **Equitable**
- **Community**
- **Healthy**
- **Connected**
- Collaboration
- Interconnected
- Accountability
- Technology
- Inclusive
- Data
- Efficiency

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Meeting Notes

- Understandable
- Efficient
- Cohesive
- Sustainable
- Environmentally-friendly
- Less-traffic
- Economical
- Adaptable
- Convenient
- Reliable
- Useful

The group questioned, "Where are we now?" and discussed that the City is at the forefront as most places are talking about implementing new policies, procedures, and technologies, but Orlando is at the beginning of pushing towards a Future City with a citizen-led approach. The City is building a foundation of trust with all players involved (new technology driven approaches, privacy, etc.), so everyone works better together.

Attendees identified the **Future-Ready and Smart City approaches this department has already implemented** through a polling exercise:

- Solar Photovoltaic (PV) cells
- Electric vehicles
- Lucid energy dashboard
- LEED buildings
- Forward thinking
- BAS
- Smart streetlights
- EVs
- Assessments (greenhouse gases, climate vulnerabilities, LEED for Cities)
- Measuring and verifying
- Supervisory Control and Data Acquisition (SCADA) systems for wastewater treatment plans (WWTP)
- Pilot new technologies
- Resiliency planning
- Sustainable procurement
- Waste sensors
- Assessments
- Energy management
- Route optimization tools for Solid Waste
- Electric Vehicle (EV) charging infrastructure
- Energy efficiency
- Electric vehicles
- Collaboration with end users
- Building Automation Systems (BAS)
- Digital city hall

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion
Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Resiliency master planning – discussion on what we already have, examples of Japan food storage and benches that turn into hibachi grills
- Ways to maximize space, building designs

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Meeting Notes

- Net zero future
- Vehicle infrastructure communication
- Discussion re: vendors (vehicles, connected technology, solar roadways, UCF startup 5G tech on solid waste trucks
- Microgrid example, avoiding backup generator, 100% clean energy
- Taking a community asset and giving it more purposes
- Carbon neutral planning
- UCF digital twin to achieve carbon neutral
- Smart buildings (coupling AI with electric meters), potential pilot
- Compare total cost of fleet ownership to examples of how to maximize
- Advanced asset tracking with IoT
- Unmanned aerial vehicles (UAVs) for maintenance and construction assets (imagery and monitoring)
- City currently using for roof design
- Digital replicas of actual systems (example water treatment facility)
- Use of digital twins and analytics to improve operations and reduce costs

Attendees identified the **top three challenges of a Future Ready City** through a polling exercise:

1. Acceptance by the public 26%
2. Business model 22%
3. Equity 19%

Other: Optimization and prioritization between different stakeholders (balance between groups), shared mental models to be transparent and collaborative, being on the same page, training and education

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that the key words within the document included: privacy assessment, disclosure, and retention.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future-Ready:

- Cross department communication
- Technology availability
- Money
- Cross department data sharing
- Access to/obtaining data

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Meeting Notes

- Business models to scale projects (P3, funding strategies)
- Technology acceptance
- Current lack of emergency forecasting
- Technology implementation
- Optimizing multiple objectives
- Legal
- Procurement

Attendees identified **innovation and technological advances** that would help them do their job better:

- When applications have upgrades, do it
- Data lake
- Machine learning/AI
- Techno-economic resilience valuations
- Advanced data collection software
- Data availability, transparency, and fluidity
- Anything that eliminates the repetition of processes
- Unlimited budget
- Decreasing prices for solar and battery
- Suitability analysis for EVs-telemetrics

Attendees identified how **new technologies will have the most effect on their department** through a polling exercise:

1. Improve processes 27%
2. Increase productivity 20%
3. Require re-positioning of staff 17%

Next steps:
Dave Mulholland outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in June 2020.

Mike Hess adjourned the meeting at 11:45 AM.

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Meeting Notes

Place: City Hall
8th Floor
Crossroads Conference Room
Date: January 8, 2020
Notes Taken by: C. Storey
Project #: 63588.00
Re: Housing and Community Development Internal Stakeholder Meeting

ATTENDEES

Mike Hess	Oren Henry	Linda Rhinesmith
Sidonia Swan	Paul Lewis	Curt Ostrodka (VHB)
Crista Storey (VHB)	Melissa Gross (InNovo)	Dan Kirby (Jacobs)

All participants introduced themselves and described their role at the City or with the VHB team. Curt Ostrodka opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
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- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Curt Ostrodka led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future-ready" means to the Housing and Community Development department.

City staff asked for definitions of sensor tech and IoT and suggested that the mission statement is too specific by using those terms. Attendees also suggested adding civic engagement and livability to the mission statement.

Attendees identified key elements of a **successful Future Ready city** through a word cloud exercise:

- **Safe** (confidentiality and Sunshine Laws, cybersecurity. Safe transportation, pedestrians can move, physical safety, considerations for ADA movements.)
- Responsive (that it works, the systems do what they are supposed to, and that they are useful)
- Affordable
- Walkable
- Useful
- Livable
- Resilient
- Flexible
- Green

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Meeting Notes

- Inclusive
- Creative
- Positive
- Available
- Connected

Attendees identified the **Future-Ready and Smart City approaches this department has already implemented** through a polling exercise:

- Location of affordable housing, close to transportation
- A smart city isn't building new housing sprawled so far from the city and transit
- Compact/walkable development
- HUD databases are automated
- Submittals to US Department of Housing and Urban Development (HUD) have been automated
- Building as green as possible
- Use of energy efficient materials
- Working with OUC on energy efficiency
- Allow for accessory dwellings (including other departments working on this)

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion
Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Emphasis that Future Ready is NOT synonymous with technology
- Clientele are usually elderly, computer illiterate, not mobile, can't drive downtown, low education levels, disabilities, etc. This plan needs to be careful of age discrimination and not leaving anyone behind. Reaching out to these customers need to be safety focused – if we cannot rehab a 90-year-old person's home because we cannot put a 20-year lien on the home to pay for it, what other steps can we take to help the person feel safer?
- Planned senior housing projects are often built on the cheapest land. Residents are forced to have a car. There is often nothing around but industrial parks, and many places do not even have sidewalks.
- Erratic funding
- Best practices from Seattle homeless strategies, but they have a whole different set of problems there that aren't necessarily the same issues we will experience in Orlando, different regulations, different funding state to state
- Understanding the reach of mobile technology now and in the future

Attendees identified the **top three challenges of a Future-Ready City** through a polling exercise:

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Meeting Notes

1. Managing data 25%
2. Resiliency 25%
3. Business model 17%/Equity 17%

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that the key words within the document included: privacy assessment, disclosure, and retention.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future-Ready:

- Funding
- Politics
- The will to do something
- Legislation – prevents us from developing processes
- Limitations due to state legislation, blocking
- Some people are low tech, can't leave them behind
- Tablets that city employees could use to go out and give surveys
- Broadband access is not the same for all

Attendees identified **innovation and technological advances** that would help them do their job better:

- New construction techniques (decreasing costs, faster to build)
- Faster income eligibility processing

Attendees identified what actions the City could implement to **serve its citizens more efficiently**:

- Improve transit
- Consistency (difficult when funding sources change)
- Pursue additional Public Private Partnership (P3) opportunities (ie Parramore Oaks)

Attendees identified how **new technologies will have the most effect on their department** through a polling exercise:

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Meeting Notes

1. Increase productivity 33%
2. Improve processes 25%
3. Introduce new data 17%/Require retraining of staff 17%

Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in June 2020.

Mike Hess adjourned the meeting at 2:45 PM.

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Landmark Center Two
Orlando, FL 32801-4326
P 407.839.4006

Meeting Notes

Place: City Hall
8th Floor
Crossroads Conference Room
Date: January 6, 2020 Notes Taken by: L. Bowers
Project #: 63588.00 Re: IT Internal Stakeholder Meeting

ATTENDEES

Mike Hess	Rosa Akhtarkhavari	Matt Broffman
Timothy Davis	Jason Kuhlman	Todd Berube
Duane Stephens	Dave Mulholland (VHB)	Curt Ostrodka (VHB)
Lisa Bowers (VHB)	Dan Kirby (Jacobs)	

All participants introduced themselves and described their role at the City or with the VHB team. Dave Mulholland opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future-Ready City?
- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Curt Ostrodka led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future ready" means to the IT department.

Attendees identified key elements of a **successful Future Ready city** through a group discussion:

- **Innovative use of technology**
- **Sustainable**
- **Resident-focused**
- **Secure**
- Nimble
- Scalable
- Improved safety
- Resiliency
- Simplified and standardized (master source of data)

Attendees discussed how IT will reach out to customers (client and customer focus, internal and external).

Best Practices Discussion

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Meeting Notes

Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- City of Cocoa Supervisory Control and Data Acquisition (SCADA) Master Plan: discussed system automation and data aggregation that feeds and application. Automation comes with a risk – on this example, some of the City IT staff might be involved and would not typically be involved at a detailed level. System optimization is the goal.
- Cyber security (multiple layers and not just relying on a few)
- Computerized Maintenance Management System (CMMS): benefit to decisions supported by data, internal departments need to start categorizing assets, more departmental ownership of new technology and solutions, and building understanding that there are huge benefits to moving to single systems for things like work order generation.
- Geographic Information Systems (GIS): GIS fed dashboards to monitor budget and schedule for individual projects
- Wet Weather Management by the Metropolitan Sewer District of Greater Cincinnati (MSDGC): use of automation to save money and enhance quality of life for residents
- Water System Surveillance: use of automation to save money and enhance quality of life for residents

Additional solutions the group discussed include:

- Predictive Analysis – tied to future planning
- Classification Models
- Data Consolidation/Security
- Data Mapping/Platform (City/IT)
- Regional solutions – City/County "one government" idea
    - One login that a resident could use to get at all the government entities they interface with
- Customer Focus – how to look at City level
- Governance over solutions that come in – governance model
- We need to be sure that the examples are tailored to the departments

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that the key words within the document included: privacy assessment, disclosure, and retention.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

Next steps:

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Meeting Notes

Dave Mulholland outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in June 2020.

Mike Hess adjourned the meeting at 4:45 PM.

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Meeting Notes

Place: City Hall
8th Floor
Crossroads Conference Room
Date: January 10, 2020
Notes Taken by: C. Storey
Project #: 63588.00
Re: Families, Parks and Recreation Internal Stakeholder Meeting

ATTENDEES

Mike Hess	Lisa Early	Tyler Chandler
Brenda March	John Perrone	Rodney Williams
Gabriel Lara Del Rio	David Wagg	Ken Pelham
Paul Lewis	Dave Mulholland (VHB)	Curt Ostrodka (VHB)
Crista Storey (VHB)	Dan Kirby (Jacobs)	

All participants introduced themselves and described their role at the City or with the VHB team. Curt Ostrodka opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future Ready City?
- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Curt Ostrodka led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future ready" means to the Families, Parks and Recreation department.

Attendees identified key elements of a **successful Future-Ready city** through a word cloud exercise:

- Livable
- Equitable
- Resilient
- Efficient
- Inclusive
- Connected
- Age-friendly
- Secure
- Intelligent
- Happy
- Fun
- Diverse
- Friendly
- Fast

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Meeting Notes

- Family
- Green
- Festivals
- Entertaining
- Effective
- Resilient
- Cultural
- Changing

Attendees identified the **Future-Ready and Smart City approaches this department has already implemented** through a polling exercise:

- Green buildings
- Using data to drive decisions: tree survey, upgrading as we speak, info about every street/park, their health, empty spaces to plant trees, using info to manage forest for years to come in Planit Geo
- Data-driven decisions
- Citywide master plan
- Expertise in evidence-based practices
- Online surveys
- Qualitative level of service analysis on the horizon
- Training
- Enhanced evidence-based programming for youth
- Grass roots connections with all demographics of citizens via on the group presence in all city neighborhoods
- 10-minute walk analysis
- Walk time planning
- Efforts to Outcomes (ETO) database
- Tree inventory
- Active Net
- Senior enrollment in programs tracking

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion
Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Every department has unique database systems and we need to get a handle on what is being used
- This department does not use the term “customer” – feels it is too impersonal to use when discussing families and children
- Need to emphasize equality of opportunity, respect the diversity of the community and lifts it up, celebration of equity, inclusivity
- Smart playgrounds video – the group feels like kids don’t need an app to play, most kids don’t have phones, maybe other park apps or digital kiosk, walking tours of Orlando parks
- Outdoor DJ table – how we prove the return on investment (ROI) on this? Can we prove that people will use it multiple times? Does it spark an interest?
- Technologies and benefits are already out there but are individual driven. Need people to lead, demonstrate to the public, etc.

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Meeting Notes

- The sample best practices did not focus on the actual needs of people. How do you do things to get more people involved, caring for the health, wellness, and prosperity of people?
- Discussed low income after school facilities, cheap, neighborhood-based, after school and summer camps, which were only recreational at first, but best practice in the filed is to provide academic enrichment programs. How can this translate to helping to prevent juvenile crime? We need to get the resources to do those things and make strategic investments to help people early on.
- The department would like a Program Evaluator on staff especially as it pertains to children's services.

Attendees identified the **top three challenges of a Future Ready City** through a polling exercise:

1. Equity 23%
2. Managing data 23% (internal capacity and staff to process)
3. Transparency 13%

Other: sustainability, political will, seeing the vision, being behind it, putting the resources there

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that the key words within the document included: privacy assessment, disclosure, and retention.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future-Ready:

- Money
- Staffing
- Communication
- Municipal red tape and old school attitude
- Perceived priorities – what people think needs done w/ money vs. what it should be used for
- Comfort with old ways
- Political will
- Attitude
- Turf wars
- Lack of tech expertise of elders
- Goals

Attendees identified **innovation and technological advances** that would help them do their job better:

- All-encompassing data system – this is most important of all
- A full-time program evaluation manager
- Effective call log system

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Meeting Notes

- Local talent to handle tech
- Combo data system across the city
- Collaboration with outside agencies/firms
- Reaching to everyone to receive service
- Virtual Orlando – any official can go into any part of the city (fireman to see inside a burning building)
- Augmented Reality (AR) app development highlighting educational info and potential activities
- Fix the City's website

Attendees identified what actions the City could implement to **serve its citizens more efficiently**:

- QR code
- Active engagement with ROI
- Stop wagging the dog, decisions shouldn't be made based on who has the loudest voice or the most money/influence
- Multiple levels of communication and not status quo
- Public WiFi
- 311 type system
- Instant online thoughts/reviews/polling from any location
- Regular neighborhood/citizen needs assessment
- Gather citizen insight
- Information available through handheld devices about park history, environmental, etc.

Attendees identified how **new technologies will have the most effect on their department** through a polling exercise:

1. Introduce new data 25%
2. Improve processes 22%
3. Increase productivity 19%

Other: data would be more accurate

Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in June 2020.

Mike Hess adjourned the meeting at 2:15 PM.

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Meeting Notes

Place:	Orlando Police Department 3rd Floor Chief's Conference Room		
Date:	January 29, 2020	Notes Taken by:	C. Storey
Project #:	63588.00	Re:	Police Department Internal Stakeholder Meeting

ATTENDEES

Mike Hess	Chief Orlando Rolon	Jay Draisin
Deputy Chief Douglas Goerke	Al Williams	Curt Ostrodka (VHB)
Crista Storey (VHB)	Dan Kirby (Jacobs)	Melissa Gross (InNovo)

All participants introduced themselves and described their role at the City or with the VHB team. Curt Ostrodka opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future Ready City?
- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Curt Ostrodka led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future-ready" means to the Police Department.

Chief Rolon provided an overview of their greatest needs as a department. The group agreed that sensors are required for roads, parks, lighting, etc. This will improve response time to accidents and provide greater safety to the public. The example was used of intersection lighting which becomes brighter when a pedestrian is waiting to cross. The lighting alerts the driver there are pedestrians and provides more light for the pedestrian to see to cross. Pedestrian incidents on South Semoran Boulevard demonstrate a good example of where sensors could increase safety. Smart lighting could also help as well-lit areas are crime deterrents.

The group discussed that real-time cameras are needed to feed into the OPD Crime Center. In addition, the City should engage with developers to ensure they provide infrastructure needed to attach sensors (sensors added at the time of construction and are monitored later). The group also stated it is very important to work with private sector security companies to incorporate technology into new development.

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Meeting Notes

Attendees identified key elements of a **successful Future Ready city** through a word cloud exercise:

- Collaborative
- Safe
- Responsive
- Efficient
- Green
- Sensors
- Transportation
- Scalable
- Inclusive
- Effective
- Technology
- Street lighting

Attendees identified the **Future-Ready or Smart City approaches this department has already implemented** through a polling exercise:

- IRIS cameras
- Real Time Crime Center
- Electric motorcycles
- Body-worn cameras
- License plate recognition
- Automatic Vehicle Locator (AVL)
- Green Police Headquarters
- Collaboration with external partners
- Real Time Location
- Facial recognition
- Virtual stakeouts
- Red light cameras
- Unmanned Aerial System (UAS) program
- Interagency partnerships

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion
Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Concerns over 5G vs. WiFi – need a designated WiFi just for police/first responders for ease of connecting devices

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. Mike noted that OPD will likely have its own set of data privacy principles.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

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Meeting Notes

The group discussed that the Police Department is competing with other departments for IT needs, fighting for top spot in terms of project implementation of technology. They would like in-house IT support. Currently they have two staff as liaisons to City Hall and one hands-on hardware staff person. They are the largest department and IT heavy, but all IT personnel are currently located in City Hall.

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future Ready:

- Understanding the technology
- Funding
- Personnel
- Don't own the streetlights
- Educating the public
- Personnel to make it happen
- Access to commercial license plate data
- Competing factors within City departments
- Reliable network

Attendees identified **innovation and technological advances** that would help them do their job better:

- Camera video analytics (Brief Cam)
- Improved body armor
- Crowd analytics
- Camera health
- Stagnant device detection
- Gunshot detection
- Intersection analytics

Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in Summer 2020.

Mike Hess adjourned the meeting at 10:35 AM.

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Meeting Notes

Place: City Hall
Rogers-Kiene Room
Date: January 8, 2020
Notes Taken by: L. Bowers
Project #: 63588.00
Re: Public Works Internal Stakeholder Meeting

ATTENDEES

Mike Hess	Richard Howard	James Hunt
Thomas Connery	Michael Carroll	Lisa Henry
David Bass	Nat Prapinpongsanone	Nikki Wesson
Richard Allen	Roderick Scott	Dave Mulholland (VHB)
Curt Ostrodka (VHB)	Lisa Bowers (VHB)	Melissa Gross (InNovo)
Dan Kirby (Jacobs)	Bernie Jacobsen (Jacobs)	

All participants introduced themselves and described their role at the City or with the VHB team. Curt Ostrodka opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future Ready City?
- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Curt Ostrodka led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future-ready" means to the Public Works department.

Attendees identified key elements of a **successful Future-Ready city** through a word cloud exercise:

- **Accessible**
- **Efficient**
- **IoT**
- Resilient
- User-friendly
- Cost Efficient
- Helpful
- Friendly
- Common Sense
- Open
- Intuitive
- Green
- Needed
- Secure

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Meeting Notes

- Equitable
- Proven
- Responsive
- Public

Attendees briefly discussed the definition of "accessible" and was defined by team of access to data, or people access to data, goods, or services, in addition to ADA definition of accessible.

Attendees identified the **Future-Ready and Smart City approaches this department has already implemented** through a polling exercise:

- Smart trash cans
- EPIC (software/near AV system)
- Perpetuation of records
- Green Buildings
- Inventory (software package)
- New rain gauge systems
- Service Confirmation
- Master Planning
- Wastewater asset management

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion
Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Must include the City's ability to help staff learn how to use new technology
- How does this impact staffing and jobs? Does the City need to help drive job creation?

Attendees identified the **top three challenges of a Future-Ready City** through a polling exercise:

1. Managing data 22%
2. Privacy 22% (As we begin to collect more data from service requests, we could encounter unexpected privacy issues with survey data, and therefore new standards will be needed)
3. Business model 17%/Acceptance by the public 17%

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that the key words within the document included: privacy assessment, disclosure, and retention.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

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Meeting Notes

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future-Ready:

- Finding old records
- Budget
- Staffing
- Disparate security needs
- Politics
- Communication across departments
- Staffing training
- GIS staff/lack of disconnect with Public Works; need higher job classifications in department
- Cost of "bells and whistles"
- Need more AutoCad drafters
- Ability to model stormwater
- Underground utility mapping
- Integrate Building Information Modeling (BIM) and 3D modeling to leverage with police and fire

Attendees identified **innovation and technological advances** that would help them do their job better:

- Getting ahead of technology curve x2
- Constant funding/staffing
- Streamlines IT process
- Less rules on tech expansion
- 3D infrastructure info
- Defined City requirements for data submission

Attendees identified what actions the City could implement to **serve its citizens more efficiently**:

- Make staff job more efficient and therefore Public Works gets fewer calls
- Routing work orders
- Mapping products for public (we don't push it because it does not look good)
- Let them know what utility work is occurring in their area
- Real-time info regarding roadway work
- Continue computer system processes

Attendees identified how **new technologies will have the most effect on their department** through a polling exercise:

1. Increase productivity 20%
2. Improve processes 20%
3. Introduce new data 20%

Next steps:

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Meeting Notes

Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in June 2020.

Mike Hess adjourned the meeting at 2:45 PM.

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Meeting Notes

Place: City Hall
3rd Floor
Summerlin Conference Room
Date: December 11, 2019
Notes Taken by: M. Gross/C. Ostrodka
Project #: 63588.00
Re: Sustainability and Resiliency Internal Stakeholder Meeting

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ATTENDEES

Mike Hess	Joe England	Daniel Friedline
Ian LaHiff	Brittany Sellers	Curt Ostrodka (VHB)
Melissa Gross (InNovo)	Dan Kirby (Jacobs)	Jason Byrd (Jacobs)
Matt Davenport (Jacobs)		

All participants introduced themselves and described their role at the City. Mike Hess opened the meeting by providing a brief description of the Future Ready Master Plan and Roadmap project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future Ready City?
- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Curt Ostrodka led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future ready" means to the Sustainability and Resiliency department.

Attendees identified key elements of a **successful Future Ready city** through a word cloud exercise:

- Resilient
- Connected
- Efficiency
- Inclusive

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Meeting Notes

Attendees identified the **top three challenges of a Future Ready city** through a polling exercise:

- Equity
- Acceptance by the public
- Managing Data

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion

Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Climate Vulnerability Assessment: The City recently completed a climate vulnerability assessment. Brittany will provide to the project team.
- Air Quality: UCF won National Science Foundation grant to develop air sensors to deploy in City, starting with Creative Village. There is a partnership with Orange County to increase the number of air quality sensors. The few air quality censors located in the City, but they are not in underserved communities and is not a good representation (such as Griffin Park adjacent to SR-408).
- Data and Digital Twins: this is similar to energy modeling and dynamic simulation.
- Life Cycle Assessment: evaluate economic and social impacts of potential solutions - measuring trade offs for different solutions

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that City's Solid Waste division already redacts personal information from public records requests.

Asset Identification and Discussion: The project team will follow up to collect Green Works Orlando metrics and data through a formal request.

Department Operating Protocols

- Risk Management Plan is missing from current list
- Department alignment between climate modeling/resiliency with finance or police fire based on anticipated natural environment/weather trends

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future Ready:

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Meeting Notes

- Available funding
- Focus on paper based ops tracking
- Staff capacity
- Manpower time maintaining current workload versus prepping for “future ready”
- Procurement policy
- Communication between different departments
- Current level of collaboration with other departments/divisions
- (un)empowered co-workers
- Current data collection methods
- Alignment between Goals/Plans/Needs
- Not willing to change – can’t do it attitude
- Fear of failure – instead of fail fast and learn from it.

Attendees identified **innovation and technological advances** that would help them do their job better:

- Better software
- Provide new computers to employees faster
- Life-cycle cost/benefit analyses with ROI for resilience and future-ready decisions
- Tech that talks to other tech
- Efficient computers
- Route mapping
- Integration between current data collection (Excel) and forecasting methodologies (e.g. ICLEI for climate GHG indicators)

Attendees identified what actions the City could implement to **serve its citizens more efficiently**:

- Multi-modal transit applications
- Improved communication regarding our Future readiness
- Real time confirmation of service
- Intentional, effective targeted outreach to include marginalized and underserved communities in planning
- More comprehensive/coordinated energy and food storage in prep for disasters
- Continuity/equity of services
- More connection
- Solve the digital divide
- Education regarding using data services (how to access data, what they would want to, how to use it, etc)

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Meeting Notes

- Encourage new tech to help solve affordable housing issues

Subsequent internal stakeholder meetings will include the following polling question: *What is your department already doing in support of Future Ready?*

Mike Hess adjourned the meeting at 1:55 PM

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Meeting Notes

Place: City Hall
8th Floor
Crossroads Conference Room
Date: January 10, 2020 Notes Taken by: C. Storey
Project #: 63588.00 Re: Transportation Internal Stakeholder Meeting

ATTENDEES

Mike Hess	Roderick Scott	Billy Hattaway
Emily Thompson	Chris Cairns	Cade Braud
Mark Tobin	Benton Bonney	Jeremy Crowe
Chris Tucker	Evan Magley	Claudia Korobkoff
Chris Castro	Michelle Robinson	Paul Lewis
Dave Mulholland (VHB)	Curt Ostrodka (VHB)	Crista Storey (VHB)
Melissa Gross (InNovo)	Dan Kirby (Jacobs)	

All participants introduced themselves and described their role at the City or with the VHB team. Curt Ostrodka opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future Ready City?
- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Curt Ostrodka led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future-ready" means to the Transportation department.

Attendees identified key elements of a **successful Future-Ready city** through a word cloud exercise:

- Equitable
- Resilient
- Sustainable
- IoT
- Convenient
- Connected
- Adaptable
- Wireless

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Meeting Notes

- Technology
- Inclusive
- Transparent
- Options
- Multimodal
- Networked
- Fiber

Attendees identified the **Future-Ready and Smart City approaches this department has already implemented** through a polling exercise:

- Smart street light pilot
- Meterless parking technology
- SeeClickFix – mobile app used in solid waste, transportation, and others – for maintenance
- Vision Zero
- Complete streets
- Electric Vehicle (EV) charging stations
- Pedestrian safety programs
- Fiber
- Meterless parking
- Connected
- Dynamic Message Signs (DMS)
- Safety focused – dealing with existing problems, improve safety, provide opportunities for transportation choice, inadequate transit system needs more funding
- Efficient street lighting – OUC
- Free LYMMO bus
- Intelligent Transportation Systems (ITS)
- People centered
- Fiber
- Road closure info to Waze
- Fiber options
- Bike trails
- Wireless electronic signage monitoring and control
- Infrastructure
- Technology testing
- Real time travel info for Lynx
- Improving trail connectivity, improving transit circulation
- Bike/scooter share
- FDOT District 5 data pond
- Data platform integration
- Central Florida Automated Vehicle partnership
- Autonomous Vehicle shuttle pilot
- UCF Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) grant
- Lynx Autonomous Vehicle Mobility Initiative (AVMI) initiative
- Electric Vehicle buses
- Automated Traffic Signal Performance Measures (ATSPM) traffic signal data visualization
- Vertical take-off and landing (VTOL) research
- Transit priority
- Improving access to information for parking, routing during events

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion

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Meeting Notes

Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Working with FDOT District 5 to upgrade signals to 21st century standards; many signals need updates/networked to make more future ready, ATSPM for timing, working to make all devices communicate to change timings on the fly and monitor status of equipment; working with vendors to push data to outside users
- Red light cameras are being used as part of Vision Zero efforts
- Piloted auto enforced system for railroad crossings (SunRail to build on this for all crossing crashes); federal railroad put cameras at two locations where violations are recorded and served as a warning instead of a ticket for drivers stopping on tracks and going around gates
- Pilot study for automated cameras for dense crossings at downtown library. This is an area of focus, signing and marking has been completed to make the crossing more visible. A feedback survey has been developed for anyone that violates the crosswalk. They will receive a notice and survey to find out why they violated the crosswalk. Can also send safety notices and track repeat offenders.
- Speed profiles on certain corridors to put resources where most needed through collaboration with PD
- Complete streets
- Parking - modernizing all garages in process, studies to add meterless parking throughout the city, demand pricing based on location in the next couple of years
- Events – venue study going on now, goal for people coming to events downtown to go to garages, route peds/motorists to improve safety. Rideshare hubs fall more under this category, related to access during events
- Start deploying EV charging stations on city property to be equipped with proper infrastructure
- Micro-mobility options have become bigger in the last three years
- D5 data pond: SunStore integrated with DOT corridor system, similarly want to integrate with our parking system. However, the City is not getting a lot of data back yet, but building a foundation for it. Pushing towards not exclusive use for data, reserving that ability for the future
- Not selling, getting cost recovery: FDOT can't charge for signing phasing and timing data but other agencies can, charges vendors to receive the data, not a profit center, simply recovering the cost of collecting it, may look at this in the future, can we recover the cost of some of these activities? Las Vegas as an example
- Use LYMMO as a test bed for technologies, including electric buses (first one to be deployed in June 2020, last 7 Q4 of this year, all 8 by the end of 2020, 2 lines fully electric by end of year)
- Discussion urban mobility, Project Edmond re: multimodal data collection
- Digital twin, virtual reality to do predictive analysis, but who maintains?
- Decrepit land use data based currently used in the city, need to upgrade Oracle
- 10-11 positions short of what we had in 2008 while workload has doubled since then. Need people who understand the data and the operation of the network, plus we need to compensate or we will have

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Meeting Notes

positions we can never fill. Understaffed and underfunded, need 20 times what we have now for operations and maintenance, every year
- Omni model – working with now, bike shares, LYMMO, car shares, scooters, a program to see in real time how everything is integrating, goal of software is to adjust it for use by the public, currently an internal system, feeding into Lynx's system and there is a delay
- Information received from micromobility vendors is more reliable; real time, data, analysis of whole system, through a contract with vendor for data management (managed by Ian Sikonia). The City can evaluate how all systems work individually and as a multimodal system, paying about $300/month for this service

Attendees identified the **top three challenges of a Future-Ready City** through a polling exercise:

1. Managing data 24%
2. Resiliency 18% (maintaining existing infrastructure, how well will it adapt to changes in technology, adaptability to new technology)
3. Acceptance by the public 15%

Other: Funding, staffing, infrastructure upgrades

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that the key words within the document included: privacy assessment, disclosure, and retention.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future Ready:

- Access to data -some people do not have access to garage data
- Funding
- Staffing
- Lack of data lake for City's data
- Equipment that can collect data
- Aging infrastructure
- Software
- Asset management data
- Coordination of projects with other jurisdictions/agencies
- Training
- Inconsistent efforts between departments
- Digital divide
- Access to third party data
- Documentation
- Working with regional partners
- Ability to attract and retain talented staff
- Access to real time information

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- Procurement process
- Interagency coordination
- Too little time
- Private sector cooperation
- Labor/tech pool
- Hard to be proactive when you are always reactive
- Public understanding/acceptance
- Travel time for mass transit
- Perception of mass transit

Attendees identified **innovation and technological advances** that would help them do their job better:

- Multimodal transit app – similar to the Cambridge video
- Integration of different types of data
- More cost effective IoT equipment
- Integrated document management system
- Smart phones
- Public WiFi
- Staffing
- Mapworks – City's GIS existing tool
- Efficient document management
- Access to information, ability to communicate real time with the public
- Access to the data cloud or pond
- Internet speeds
- More mixed use
- Redundant connectivity
- 5G
- More telecommuting by residents
- Detailed traffic sensor data for adaptive and off-line signal optimization
- Advancement of battery capacity
- Electronic work order tracking
- Autonomous vehicles for safety
- Adaptive control
- Vehicles to Everything (V2X) infrastructure
- Dynamic signals
- Software
- Citywide project management database
- Dedicated Short Range Communications (DSRC) – bandwidth now limited, looking at some other technologies
- Experienced staffing
- MIMS
- Traffic signals resilient to storms
- Clean backup generators – solar, battery powered

Attendees identified what actions the City could implement to **serve its citizens more efficiently**:

- Expand electric vehicle (EV) charging network
- Wayfinding
- Better prioritize and track work activities
- Dynamic parking pricing
- Improve safety
- More time to respond to emails
- Smart parking sensors w/ app
- Consistent citizen platform across depts – trying to help understand
- License Plate Recognition (LPR) for parking enforcement – do the citizens actually want this?
- Connectivity
- Better data collection for accurate responses
- Protected bike lanes
- Stronger enforcement of traffic laws
- Real time information on parking availability, routing for detours for events, etc.

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Meeting Notes

- Digital city hall
- Wayfinding and availability for transit/parking, bike connectivity
- More multimodal options for travel
- Roundabouts
- Real time info for transit
- Clear communications on resolution for citizen requests
- Larger amount of staff with experience in responding to citizens
- Faster transit

Attendees identified how **new technologies will have the most effect on their department** through a polling exercise:

1. Improve processes 32% (reevaluate processes to make more effective)
2. Require retraining of staff 21%
3. Increase productivity 18%

Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in June 2020.

Mike Hess adjourned the meeting at 11:45 AM.

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Meeting Notes

Place: Amway Center
Lake Eola Conference Room
Date: January 7, 2020
Notes Taken by: L. Bowers
Project #: 63588.00
Re: Venues Internal Stakeholder Meeting

ATTENDEES

Mike Hess	Allen Johnson	Craig Borkon
Clyde Boutte	Charles Leone	Oscar Gonzalez
Chris Cairns	Curt Ostrodka (VHB)	Ryan Fetchko (VHB)
Lisa Bowers (VHB)	Dan Kirby (Jacobs)	

All participants introduced themselves and described their role at the City or with the VHB team. Curt Ostrodka opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the internal stakeholder meeting was to cover the following agenda items:

- Project Introduction
  - Project Overview
  - What is a Future Ready City?
- Discussion of Best Practices
- Discuss draft data principles
- Asset identification and discussion
- Identify future opportunities within the primary focus area strategies
- Outline department operating protocols

Curt Ostrodka led the discussion using the meeting Powerpoint presentation (attached). The discussion included polling exercises to understand what "future ready" means to the Venues department.

Attendees identified key elements of a **successful Future-Ready city** through a word cloud exercise:

- Safe
- Interactive
- Connected
- Convenient
- P3
- Cohesive
- Inclusive
- Efficient
- Responsive
- Diverse
- Creative
- Collaboration
- Progressive
- Easy
- Smart
- Systematic
- Fluid
- Technology

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Attendees identified the **Future-Ready and Smart City approaches this department has already implemented** through a polling exercise:

- Building automation
- Paperless tickets
- Concession Kiosks – Ordering on a screen
- IT backbone infrastructure
- Data-driven targeting
- Magic money
- Mobile App
- Cashless dedicated concessions
- Mobile ordering and delivery
- Text messaging for guest relations
- Short-term disaster distribution centers

The full results of the polling exercises are included in the Powerpoint presentation (attached).

Best Practices Discussion
Dan Kirby led the discussion of best practices being used by other cities and communities. Additional best practices discussed by the group include the following:

- Offering a great customer experience; many visitors are not residents, but regional, national, and international customers
- Tottenham Hotspurs Stadium video prompted discussions that there are aspects at Orlando venues that are in process today, but it is all fragmented. Structurally, all things are run via different backbones (separate City Venues and Orlando Magic systems).
- Smart parking technologies
- Magic App – wayfinding technology, previously overwhelmed customers with too many options
- Not enough bandwidth capacity. This is especially a problem during concerts because everyone is on their phone posting to social media platforms, impacting people who are still in line trying to use their mobile ticketing apps.
- Want to optimize end-to-end guest experience
- Challenges with policy as it is written for venues, customized policies need created for venues, police, and safety

Attendees identified the **top three challenges of a Future-Ready City** through a polling exercise:

1. Other 24%: transportation (people arrive angry and it is hard to overcome), concession prices
2. Acceptance by the public 20%
3. Managing data 19%

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Meeting Notes

Draft Data Privacy Principles: A list of draft data privacy principles were distributed by Mike for review and comment. The draft principles were prepared in coordination with the City Attorney and Information Technology. It was noted that the key words within the document included: privacy assessment, disclosure, and retention.

Asset Identification and Discussion: The project team will follow up to collect information via survey through a formal request.

Additional Polling Questions and Discussion:

Attendees identified **barriers** that prevent their department from being Future-Ready:

- Money, money, money
- Funding for infrastructure – wireless and communications bandwidth
- End-users – customer education
- Willingness to adapt
- Traffic
- End-users
- Data is not being shared between the City and the Orlando Magic

Attendees identified **innovation and technological advances** that would help them do their job better:

- Better mass transit experience
- Gmail instead of Outlook
- Easy access to 5G
- Integrated technology platforms
- Strong bandwidth
- iOS instead of Android
- Become less risk adverse
- Microsoft 365 platform, AI and camera analytics
- Several business systems and several operation systems are siloed systems

Attendees identified how **new technologies will have the most effect on their department** through a polling exercise:

1. Improve processes 29%/Increase productivity 29%
2. Introduce new data 24%
3. Reduce waste 12%

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Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in June 2020.

Mike Hess adjourned the meeting at 5:00 PM.

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Roundtable Meetings

- Built Environment
- Energy and Utilities
- Public Safety and Health
- Solid Waste
- Transportation
- Water and Wastewater

ORLANDO
FUTURE-READY CITY
MASTER PLAN

ORLANDO
FUTURE-
READY
CITY
MASTER PLAN

BUILT ENVIRONMENT ROUNDTABLE

JANUARY 28, 2020

CITY OF ORLANDO

Agenda

1. **INTRODUCTION**
2. **INSPIRATION**

   Where are we now?
3. **EXPLORATION**

   Where do we want to go?
4. **FEEDBACK**

   How do we get ready?
5. **NEXT STEPS**

   How do we get there?

History of Smart ORL program

FEBRUARY 2007
Created Green Works Orlando

SPRING 2016
Open Data website

JANUARY 2016
Applied to US DOT Smart Cities Challenge

MAY 2016
Smart Cities Orlando Forum @ EPCOT

SEPTEMBER 2016
Attended Smart Cities Week DC

DECEMBER 2016
Central Florida Automated Vehicle Partnership (CFAVP) Applied for US DOT Proving Ground Designation

JANUARY 2017
Smart Cities Council Readiness Grant Winner

FEBRUARY 2017
Designated as US DOT Proving Ground for Automated Vehicles

JUNE 2017
Smart Cities Council Readiness Workshop

OCTOBER 2017
Regional partnership award of $12M for US DOT ATCMTD grant with FDOT, MetroPlan, and UCF

DECEMBER 2017
$1M US DOT Accelerated Innovation Deployment grant for Safe & Efficient Mobility in DTO

"Autonomous Vehicle Mobility Initiative (AVMI)"

ORLANDO FUTURE-READY CITY MASTER PLAN

Purpose of the Future-Ready Master Plan

Vision Statement:

For Orlando to become America's premier Future Ready City through continual advancement, embracing new opportunities to help address community challenges and ensure our city remains one of the best places in America to live, work, visit and raise a family.

Mission Statement:

The City of Orlando desires to enhance its ability to deliver efficient and secure human-centered public services through the development and use of interconnected data systems, communication, sensor technology, and Internet of Things (IoT) solutions

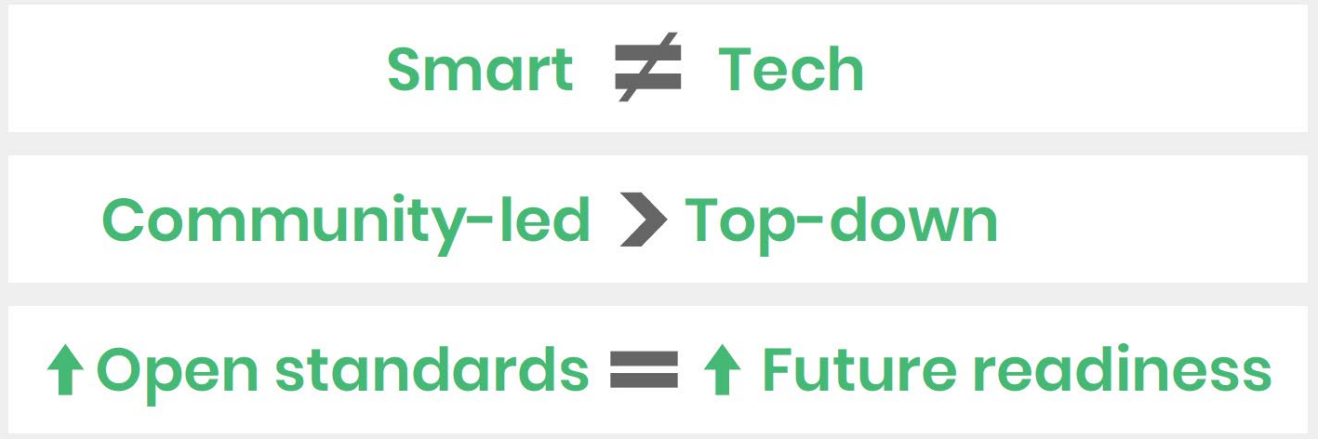
Purpose of the Future-Ready Master Plan

Guiding Principles

- ✓ Security focused - Informational and physical
- ✓ People first - culture of safety
- ✓ Sustainable, reliable, and resilient solutions
- ✓ Responsible (financially, morally, etc.)
- ✓ Relevant and timely
- ✓ Equitable and inclusive
- ✓ Transparent
- ✓ Collaborative

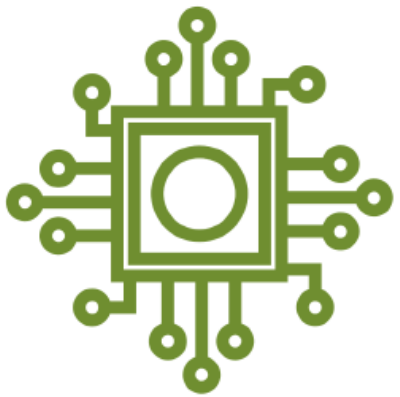
What is Future-Ready?

- A place where residents are empowered to **cocreate opportunities using technology**
- A place that maximizes the urban form's benefits while minimizing its challenges
- A place of prosperity, safety, equity, sustainability, resiliency, diversity, and serendipity



Credit: David Gilford

Smart Cities (1.0)



Technology-led,
City-procured

Responsive Cities (2.0)

City-led,
Technology-enabled

Future Cities? (3.0+)

Citizen-led,
co-created

Credit: David Gilford

Stakeholder Engagement Touchpoints

Summary of Internal Stakeholder Interviews

- ✓ 11 of 12 complete
- ✓ Describe a Future-Ready city
- ✓ Top challenges of a Future-Ready city
- ✓ Identify barriers that prevent Department from being Future-Ready
- ✓ What innovation and technological advances help do job better?
- ✓ Actions to serve City citizens better
- ✓ Feedback regarding data privacy principles
- ✓ Refining data / assets survey

What is a Successful Future-Ready City?

What is a Successful Future-Ready City?

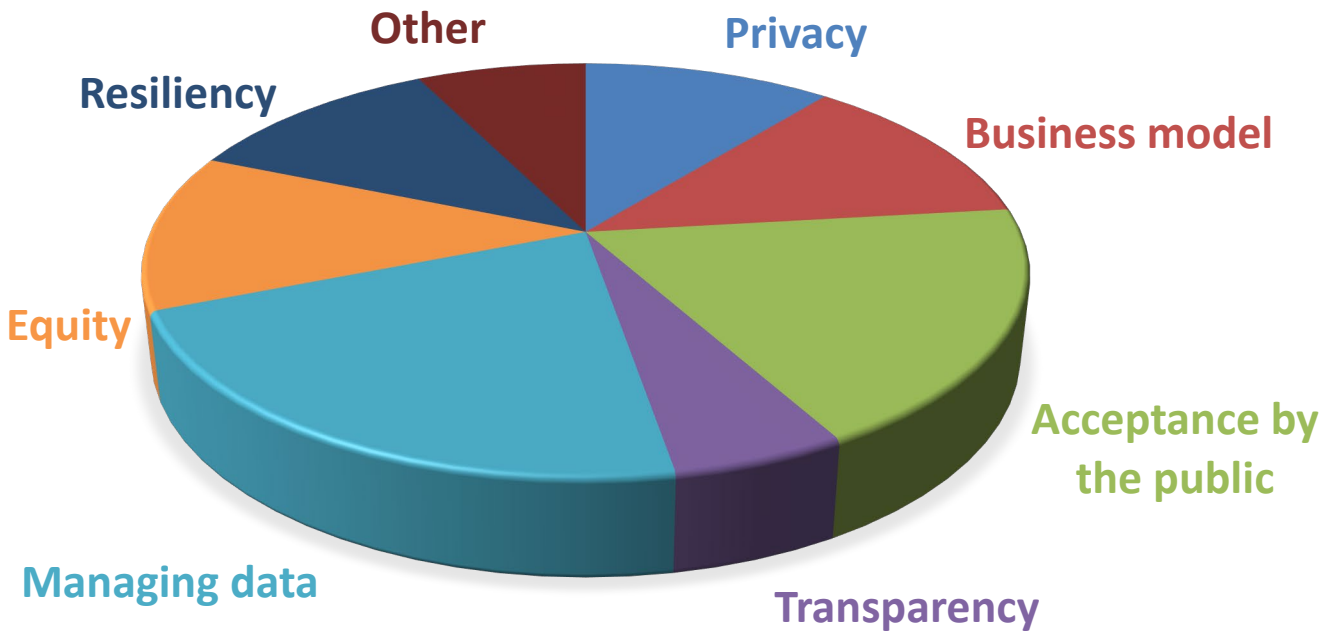
Summary of Internal Stakeholder Interviews

Top departmental barriers to being a Future-Ready city

- Prioritize, procure and/or fund solutions and strategies
- Staff resources and time
- Technical expertise
- Training or educational
- Legislative, legal and political constraints
- Inter-agency, department and private sector collaboration
- Change management (culture)
- Availability of technology
- Standard governance and operating protocol
- Common goals and visions

Summary of Internal Stakeholder Interviews

Top challenges of a Future-Ready city



Pillar Focus Areas

ENERGY / UTILITIES

PUBLIC SAFETY

TRANSPORTATION

BUILT ENVIRONMENT

SOLID WASTE

WATER / WASTEWATER

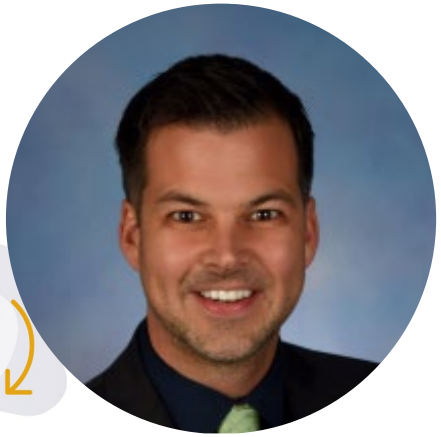
Pillar Focus Areas | **City Champions**

ENERGY / UTILITIES
Chris Castro

PUBLIC SAFETY
Deputy Chief Doug Goerke

TRANSPORTATION
Claudia Korobkoff

BUILT ENVIRONMENT
Ian LaHiff



SOLID WASTE
Joe England

WATER / WASTEWATER
Brittany Sellers

Built Environment

- Municipal Goals
- Smart Infrastructure
- New technology
- Building Benchmarking and BEWES
- Energy and Financial Savings
- Solar Energy
- Resilient Infrastructure

Municipal Goals

- **100% of municipal electricity from renewable sources by 2030**
  - 50% reduction in municipal electricity consumption by 2030
- **Run City Fleet Vehicles on 100% renewable sources by 2030**
- **LEED req. for all new Muni buildings**
  - 15 new LEED certified buildings since 2010

Smart Infrastructure

Applications	Typical Features	City Key Features	Status	Existing Partners	Partnership Opportunities
Building Automation & Controls	Real-time information on energy and water use for buildings in the district	City LUCID Building OS system for municipal buildings using Automated Logic controls (ALC)	Implemented	BuildingOS, WebCTRL	Verdigris

Smart Infrastructure

Applications	Typical Features	City Key Features	Status	Existing Partners	Partnership Opportunities
Chilled Water	Provide district cooling to commercial customers in the Downtown Orlando core, I-Drive,		Implemented	OUC	
Advanced Metering Infrastructure (AMI)	Collect real-time information about electricity and water usage.	OUC has 100% AMI network for both Electric and Water. Interval data is available for both water and electricity.	Implemented	OUC	Advanced Metering Infrastructure (AMI)
Smart Grid	Resiliency, self-healing grid	Implementing a trip-saver program and various several grid R&D projects	Partially implemented	OUC	Smart Grid

Smart Infrastructure

Applications	Typical Features	City Key Features	Status	Existing Partners	Partnership Opportunities
Smart Street Lighting	Smart Street poles with LED, energy cost savings and various environmental benefits	OUC LED streetlight retrofit. The City and OUC are currently in communication about a pilot program to test various smart streetlight applications	Planning	OUC	Possible partnerships in special districts, owners of large properties & developments, campuses, & neighborhood associations, to collaborate and/or coordinate on several opportunities and to achieve cost savings.
Renewable Energy	Providing service that installs and maintains solar PV and other renewable energy systems	OUC Community Solar, OUC Collective Solar, Orlando Solar Co-ops	Implemented	OUC	
Demand-Side Management	Control and manage loads during peak times of the day by controlling non-essential assets (e.g. Hot water heaters, HVAC, etc)	N/A. OUC does not currently offer DSM programs	Planning	OUC	
Energy Efficiency as a Service	Provide service to retrofit DTO buildings with energy efficiency technologies, such as LED lighting, HVAC, building automation & controls, etc.	OUC Efficiency Delivered, OUC Convenient Lighting	Implemented	OUC, Ferran Energy Services	
Energy Storage	Ability to provide a grid-asset that stores excess energy. Provides a resiliency back-up power generator for future extreme weather events.	OUC is currently piloting energy storage technologies	Planning	OUC	

New Technology

GOAL: 100% LED streetlight by 2020

- Exploring test of new **"Smart Streetlights"** in Downtown
  - LED technology
  - Video awareness
  - Environmental monitoring
  - Traffic analytics
  - Gun shot detection
- OUC working to retrofit 25,000+ streetlights to LED
- Distributed Energy Resources- Solar + storage

FLEET & FACILITIES COMPLEX

Will create ubiquitous EV charging infrastructure by installing 100 publicly accessible EV charging throughout the cit

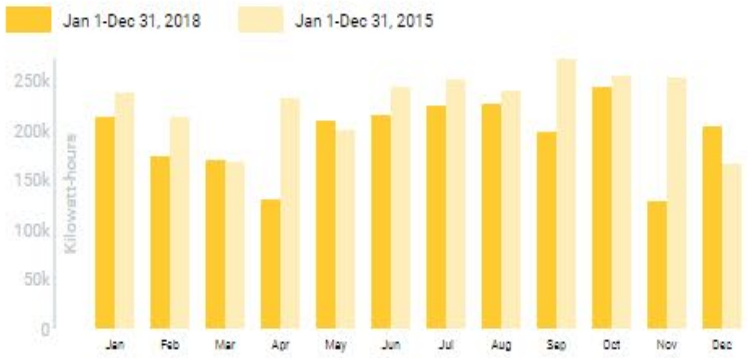
Energy and Financial Savings

- **LEED req. for all new city-owned buildings**
  - Built 15 new LEED certified buildings since 2010
  - New Buildings: Wetlands Education Center, Fire stations (3), Records Building
- **$17.5 million municipal EE bond**
  - Retrofitting 55 Buildings (of 550)
  - **19% savings since 2011 baseline**
  - **$1.6 Million annual savings to date**
    - Pay down bond debt
    - Fund future EE investments

Orlando Fire Department Going Green

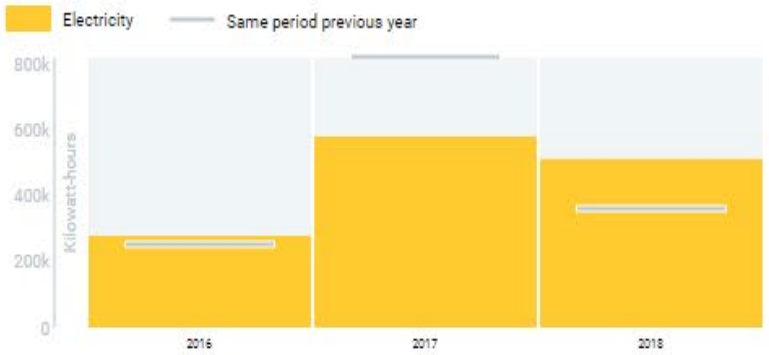
The Orlando Fire Department operates 17 fire stations across the City of Orlando. With an ISO Class 1 rating, they are recognized as providing first class service to the citizens and visitors of Orlando. Aside from making itself known for its quality service, the department is also becoming a hero of the environment. Nearly every fire station is now cutting electricity use by utilizing all LED technology on both the interior and exterior of the buildings.

All Fire Stations / 2018 compared to 2015



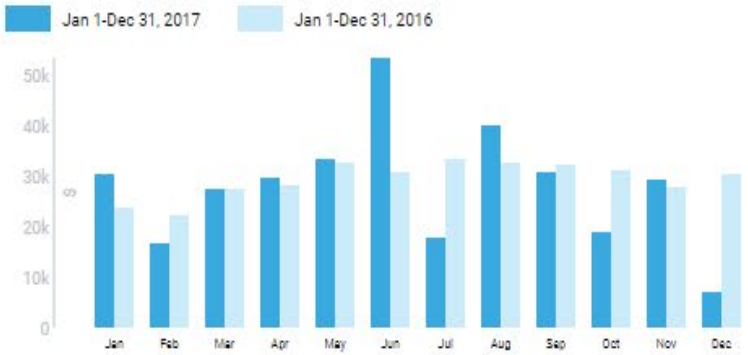
Jan 1-Dec 31, 2018	Jan 1-Dec 31, 2015	Difference
2.34m kWh	2.74m kWh	↓ 14.53 %

Fire Station 1 Electricity / Aug 28, 2016-Aug 28, 2018



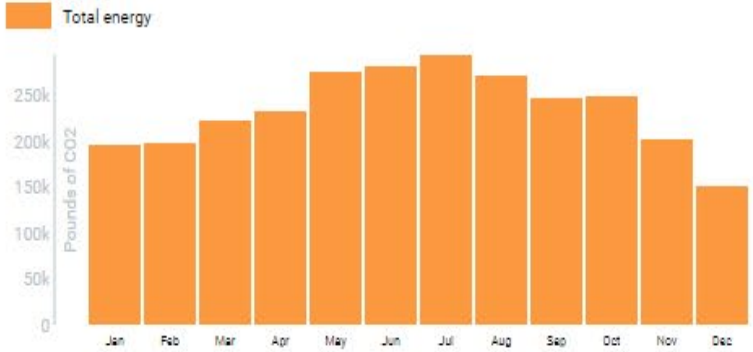
Jan 1, 2016-Dec 31, 2018	Jan 1, 2015-Dec 31, 2017	Difference
1.37m kWh	1.42m kWh	↓ 3.69 %

Annual Water Spend - All Stations / 2017 compared to 2016



Jan 1-Dec 31, 2017	Jan 1-Dec 31, 2016	Difference
$333,846	$352,915	↓ 5.4 %

Total Co2 all fire stations / Last 12 months



Total	Min	Max
2.82m lbs CO_2	151,668 lbs CO_2 (Dec)	294,044 lbs CO_2 (Jul)

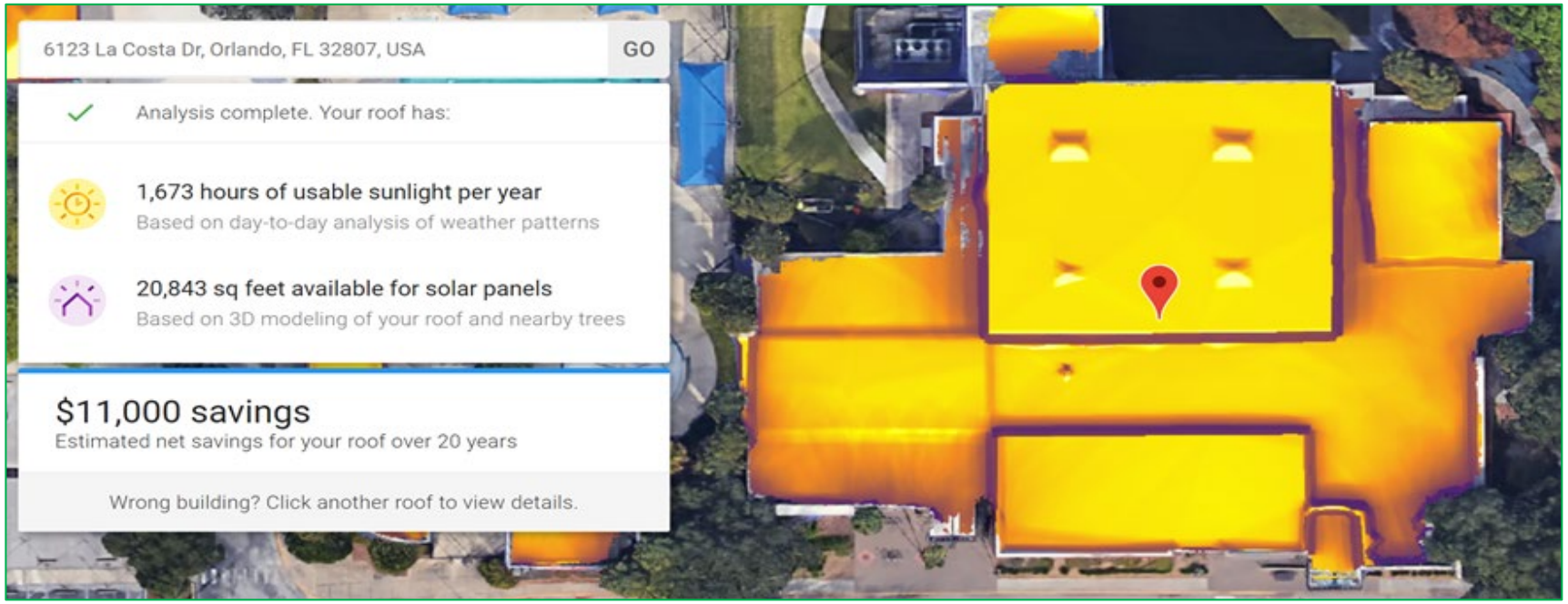
First Year Average Monthly Electricity Use Following LED Retrofit

Jun 1, 2016-May 31, 2017

Average	Average, Fire Station 15 Baseline	Difference
11,361 kWh	16,268 kWh	↓ 30 %

Solar Energy

- **30 municipal buildings** have been analyzed to assess solar panel suitability. Some of the largest buildings included:
  - Englewood Community Center (163kW)
  - Dover Shores Community Center (142kW)
  - Rosemont Community Center (79kW)
- **$2.3 million** allocated in the FY20 CIP for solar PV installations.



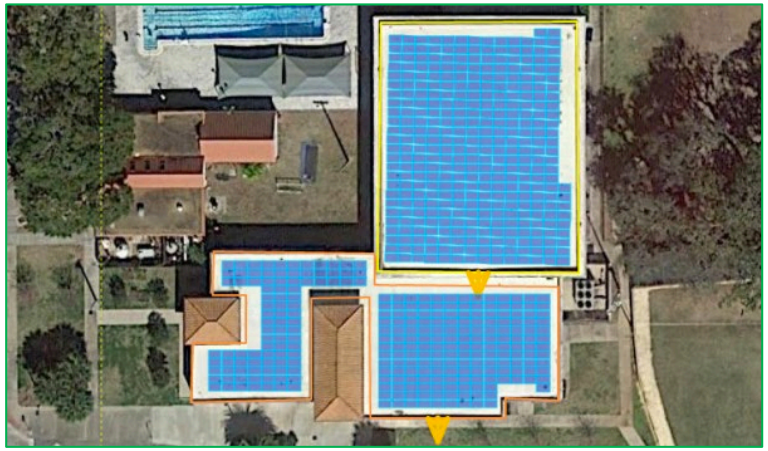
Solar Energy

Current solar capacity: 10% of City Ops powered by Solar

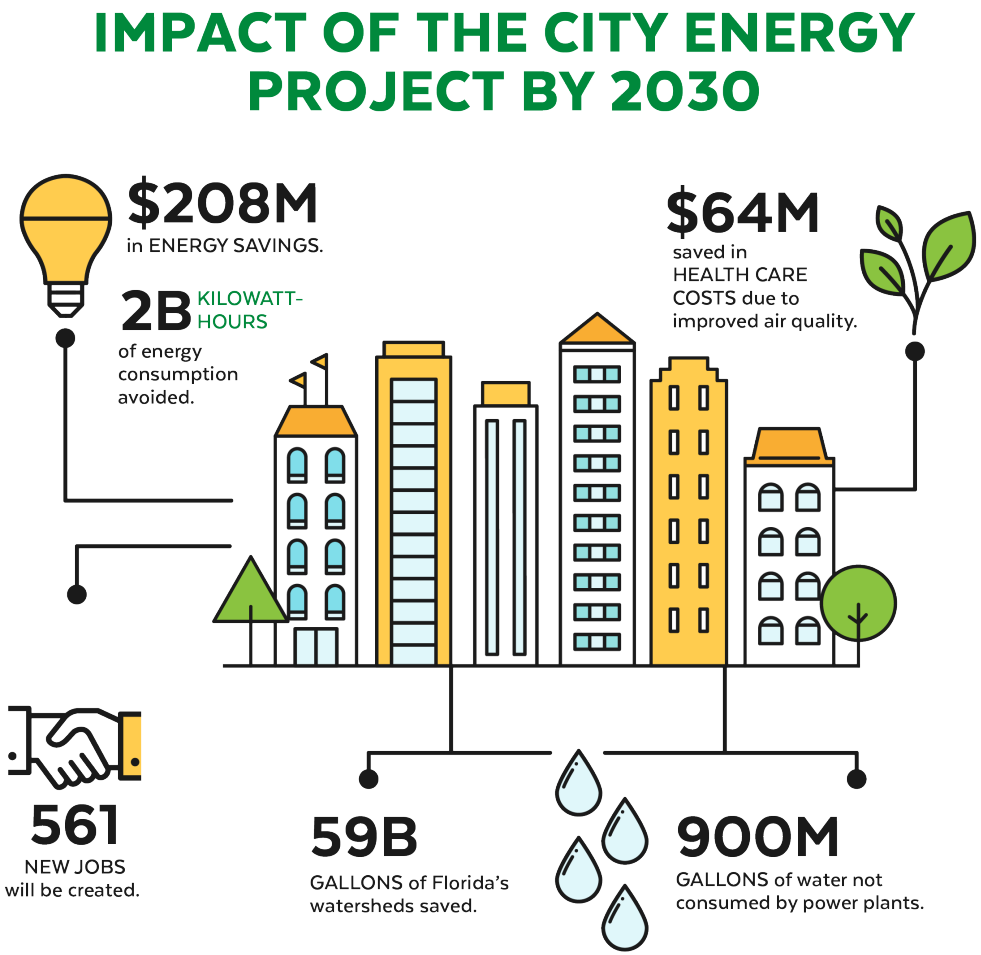
- 420 KW Fleet & Facility complex
- 250 KW Fleet & Facilities carport (planned)
- 114 KW Permit & Records bldg.
- 5.2 MW OUCommunity Solar (subscription)

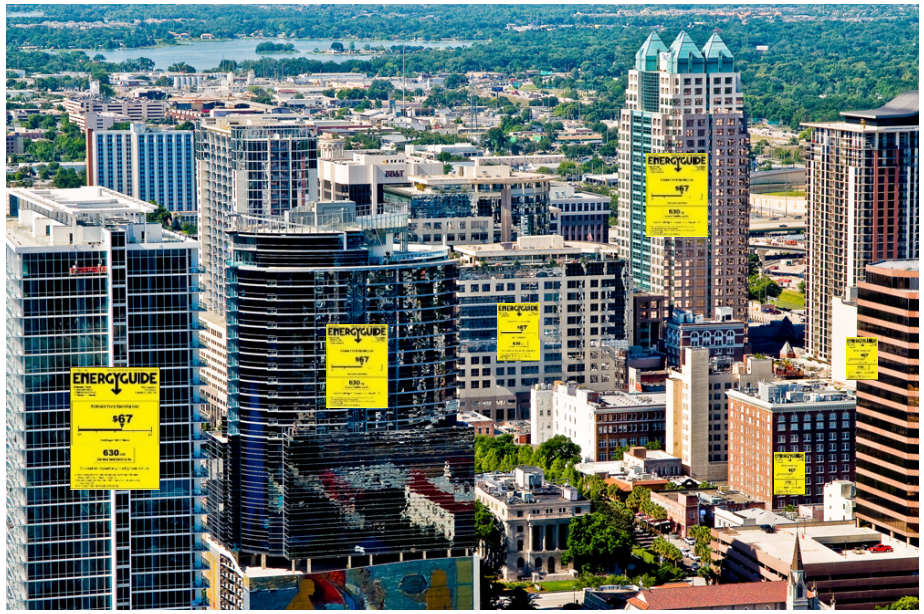
New FY20 planned capacity:

27% of City Ops powered by Solar



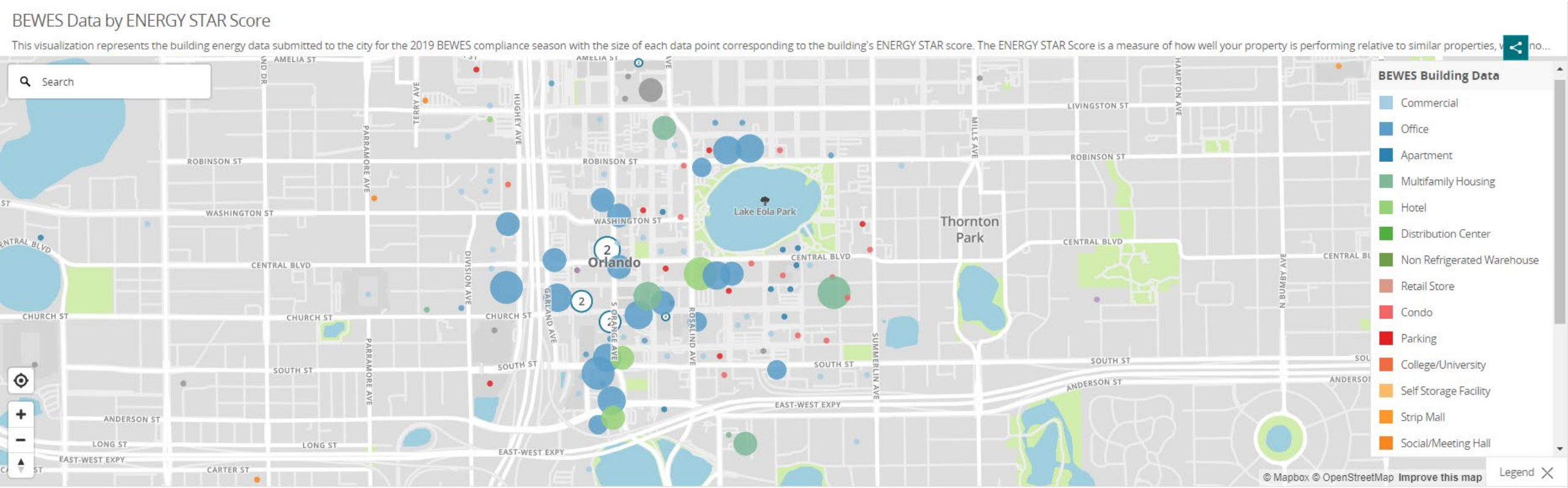
Building Benchmarking, Energy Audits, & Transparency Policy





- Completed the 2017 Central Florida Battle of the Buildings, 265 buildings participated
- Developed 'Energy & Green Buildings" sub-committee
- First year of ENERGY STAR benchmarking report, August 2018

Building Energy and Water Efficiency Strategy (BEWES)



What are the top challenges that a Future-Ready City must solve?

GROUP DISCUSSION

Identify 5 short term & 5 long term solutions

- Key performance indicators
- Implementers/Partners
- Funding

Future-Ready Best Practices

Built Environment

Network and Communications:

- Evaluate current network and fiber and identify what future network needed
- Expand Network and Wi-Fi to reduce digital divide
- Increase high-speed broadband availability to all citizens
- Implement 5G testing and deployment
- Broadband on public transportation systems
- Public Wi-Fi around City for Citizens and Visitors

Future-Ready Best Practices

Built Environment

Cyber Security:

- Digital Trust Platform
- Privacy by Design
- Cyber intelligence and analysis platform
- Cyber response and resilience
- Cyber competencies and awareness program

Open Data:

- Dedicated servers with embedded cyber security
- Publishing domains to allow for public access to Future City data

Future-Ready Best Practices

Built Environment

City APP:

- Information about points of interest;
- Provide real-time traffic/weather info
- Connect tourists with attractions and businesses
- Permit Approval
- Payment of Bills for Citizen and Business
- Integrated City Payment System

City Operations Center:

- Integrated City Command and Control Center to bring operations efficiencies
- Predictive Maintenance
- Cross department intelligence sharing

Future-Ready Best Practices

Built Environment

Health Care:

- Telemedicine Remote patient monitoring,
- Lifestyle wearables
- First aid alerts Real-time air quality information
- Infectious disease surveillance
- Data-based public health interventions:
- Maternal and child health
- Data-based public health interventions:
- Integrated patient management systems

Future-Ready Best Practices

Built Environment

Economic Development:

- Digital business licensing and permitting
- Digital business tax filling
- Online retraining programs
- Personalized education
- Local e-career centers
- Digital land-use and building permitting

PRIORITIZATION

What short term solutions should be prioritized?

What governance & policy changes are needed for implementation?

Next Steps

- Focus Area Roundtable Meetings
- 1st Public Workshop – February 4
- Online Survey
- Strategy Development
- Summer 2020 City Council Presentation

ORLANDO FUTURE-READY CITY MASTER PLAN

CITY OF ORLANDO

Meeting Notes

Place: Orlando City Hall
1st Floor
Rogers-Kiene
Conference Room

Date: January 28, 2020

Notes Taken by: C. Macintosh (Jacobs)

Project #: 63588.00

Re: Built Environment Focus Area Roundtable Meeting Summary

ATTENDEES

Mike Hess
Benjamin Bossley
John Slot
Will Meyers
Robyn Garrett
Chris O'Bannon
Doug Jamison
Natalia Paredes
Kristy Walson
James Cook
Bob McQueen
Dave Mulholland (VHB)
Madeline Almodovar (Jacobs)
Lilian Scott-Payne
Chris Castro
Doug Metzger
Cole Blake
Timothy Johnson
Andres Hoyos
Jeff Chabon
Richard Jones
Gail Johnson
Sarah Nemes
Curt Ostrodka (VHB)
Chris Macintosh (Jacobs)
Elisabeth Dang
Ian Lahiff
Alex Gaggoro
Paul Lewis
Dino Antzoulis
Greg Curtain
Jeff Pridmore
Roberta Fennessy
Y Gurt Ge
Ian Brown
Melissa Lucas
Michael Melzer
Dan Kirby (Jacobs)

MEETING SUMMARY

All participants introduced themselves and described their role at the City or with the VHB team. Dave Mulholland opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the Roundtable Meeting was to bring subject matter experts from the private sector, public sector, and

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P 407.839.4006

Meeting Notes

academia together to discuss issues related to the Built Environment and brainstorm potential solutions. The agenda for the roundtable was as follows:

- History of the Smart Orlando program
- Draft Vision, Mission, and Guiding Principles of the Future-Ready Master Plan
- Description of what it means to be "Future Ready"
- Stakeholder Engagement process
- Summary of Internal Stakeholder Interviews
- City's Progress to Date
- Group Discussion
    - Challenges that must be addressed
    - Identification of five (5) potential short term and long-term solutions
    - Identification of key performance indicators, partners, and funding sources
    - Prioritization of short-term solutions
    - Discussion on governance and policy issues.

Curt Ostrodka described the community engagement process. The project team has met with each internal City department to understand challenges, and opportunities. He noted that the Roundtable Meeting represented one of six focus areas that the City is studying to become more future-ready. The six focus areas are:

- Solid waste
- Energy and utilities
- Public safety and health
- Water and wastewater
- Transportation
- Built environment

There will be a series of public workshops in each City Commissioner District so that the public can learn about the project and comment on the potential solutions that are identified by Roundtable participants.

Ian LaHiff, City of Orlando "champion" for the Built Environment roundtable, presented the next group of slides and led the discussion on what the city is currently working on for the Built Environment:

- The city set a goal to have 3,000 fleet vehicles running on 100% renewable energy by 2030.
- Municipal buildings to meet the highest level of LEED that is cost effective.

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- Looking at energy storage on fleet garage.
- Looking to expand solar capabilities.
- Adding 36 bi-directional charging capabilities for EV, and a further 100 EV charging facilities throughout the city.
- To date there has been an energy reduction in buildings with $1.6M in savings.
- Adding solar to fire stations and other high visibility locations also provides visibility of the use of solar.

Group Discussion

Curt Ostrodka led a discussion to identify the top challenges that a future-ready city must solve. The challenges identified by the group were:

- Affordability and the homeless
- Building /public/private realm
- Operation and maintenance for applications, needs to be sustainable long term – paying for and maintaining this new environment
- Education about how to achieve and do these things – using real-world examples
- Sustainable operational model
- Speed of change in the built environment
- Limitations on the right of way, 5G placement (utilities, street furniture, etc.)
- Inclusivity, age friendly plan, etc.
- Wayfinding
- Opportunities and alternatives for sources without rooftops
- Open space/human health
- Scalable programs and education on programs
- Being future ready is sometimes not cost effective for developers, this can be a perceived barrier
- Programs like solar need to be circular to continue growth
- Holistic planning (area-wide) for future applications such as solar, air quality sensors, etc.
- Indoor air quality
- Balance between the natural and built environment

Curt then divided the Roundtable attendees into small groups for a brainstorming exercise. Each group was responsible for identifying at least five short-term solutions for the Built Environment, including key performance indicators, partners, and funding sources. At the conclusion of the exercise, each small group presented their ideas back to the entire roundtable for comments and questions.

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Attendees in Group 1 identified short-term solution strategies including the following:

- Update the Land Development Code to optimize connectivity.
- Provide more opportunities for open space and placemaking within the city.
- Locate pilot projects throughout the city.
- Leverage and maximize existing infrastructure.
- Enhance and promote strategic partnerships.

Attendees in Group 2 identified short-term solution strategies including the following:

- Enhance mobility opportunities such as bikes, scooters and pedestrians.
- Evaluate the location and design of bus stops throughout the city.
- Update the land development code and allow for diversity with the building code by using incentives.
- Maximize use of PACE and strengthen building codes, energy as a service and demand response programs.
- Create an inclusive community that considers the elderly and those without smart phones. What programs can be developed to inform all sectors of the population.
- Encourage and promote green infrastructure and low impact development.

Attendees identified Key Performance Indicators:

- The number of miles of separated bike lanes has a direct relationship to the decrease in bike and pedestrian severe injuries.
- There is a direct relationship between PACE participation and a reduction in energy use.
- Number of kiosks
- An increase in tree canopy and open space acreage is directly related to improvement in air quality.

Key Partners include the following:

- FDOT, MetroPlan, Orange County, Lynx
- City permitting, developers
- HOAs, developers, building owners
- AARP, UFC
- Families, Parks and Recreation

Funding sources to consider include PACE, SELF and PPP.

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Meeting Notes

Attendees in Group 3 identified short-term strategies including the following:

- Plan for the use of a digital twin platform.
- Use predictive analysis for the coordination and maintenance of capital projects.
- Promote regional governance and cooperation between varying municipalities.
- Eliminate off-street parking requirements for new projects.
- Create an educational platform for existing digital resources.

Key Performance Indicators include:

- Digital twin – track performance and conduct analysis
- An increase in mass transit and density is an indicator for improvements to the built environment.

Key Partners

- UCF

Funding sources to consider should rely on a stable business model, be financially sustainable and be a reliable partner.

Attendees identified long-term strategies including the following:

- Increase the commitment to renewable energy.
- Install solar roadways pathways, walkways and floors.
- The need to adapt to climate change.
- Evaluate ownership, security and stewardship of acquired data.
- Update the land development code to accommodate future ready development and renovations.
- Require a minimum density and FAR to encourage infill and urban development.
- Update land development code requirements for remodeling and redevelopment.
- Install weather ready bus stops and covered walkways throughout the city.
- Create a living laboratory as an analogue for future development.
- Create a Smart City Lab district within the city limits.

Attendees identified their top solutions for the Build Environment and include the following:

- Update building codes.
- Create greater requirements for green space and open space.

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Meeting Notes

- Plan for the use of a digital twin platform.
- Use predictive analysis for the coordination and maintenance of capital projects.
- Leverage and maximize existing infrastructure.
- Enhance and promote strategic partnerships.
- Eliminate minimum parking requirements.
- Enhancement mobility opportunities for bikes, scooters and pedestrians.
- Update the land development code and allow for diversity with building codes by using incentives.
- Encourage green infrastructure and low impact development.

Attendees identified the following Governance and Policy Suggestion:

- The City as a governmental agency to facilitate development and use of standards.

Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in summer 2020.

Mike Hess adjourned the meeting at 3:50 PM

PRIORITIZED STRATEGIES

After further synthesis, the project team organized the findings of this meeting and previous internal stakeholder meetings into the following:

- Modernize building and land development codes to be future-ready
- Advanced building and construction standards for energy and water efficiency
- Increase public open space and access to environmental resources
- Improve mobility options for all users
- Create digital twin systems to simulate and model all aspects of the built environment
- Encourage innovative building practices to increase inventory of affordable housing
- Understand building energy consumption to reduce utility and maintenance costs
- Pursue reliable and expanded public Wi-Fi

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Meeting Notes

- Improve air quality monitoring and reporting

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ORLANDO
FUTURE-
READY
CITY
MASTER PLAN

ENERGY/UTILITIES ROUNDTABLE

JANUARY 22, 2020

CITY OF ORLANDO

Agenda

1. **INTRODUCTION**
2. **INSPIRATION**

   Where are we now?
3. **EXPLORATION**

   Where do we want to go?
4. **FEEDBACK**

   How do we get ready?
5. **NEXT STEPS**

   How do we get there?

History of Smart ORL program

FEBRUARY 2007
Created Green Works Orlando

SPRING 2016
Open Data website

JANUARY 2016
Applied to US DOT Smart Cities Challenge

MAY 2016
Smart Cities Orlando Forum @ EPCOT

SEPTEMBER 2016
Attended Smart Cities Week DC

DECEMBER 2016
Central Florida Automated Vehicle Partnership (CFAVP) Applied for US DOT Proving Ground Designation

JANUARY 2017
Smart Cities Council Readiness Grant Winner

FEBRUARY 2017
Designated as US DOT Proving Ground for Automated Vehicles

JUNE 2017
Smart Cities Council Readiness Workshop

OCTOBER 2017
Regional partnership award of $12M for US DOT ATCMTD grant with FDOT, MetroPlan, and UCF

DECEMBER 2017
$1M US DOT Accelerated Innovation Deployment grant for Safe & Efficient Mobility in DTO

"Autonomous Vehicle Mobility Initiative (AVMI)"

ORLANDO FUTURE-READY CITY MASTER PLAN

Purpose of the Future-Ready Action Plan

Vision Statement:

For Orlando to become America's premier Future Ready City through continual advancement, embracing new opportunities to help address community challenges and ensure our city remains one of the best places in America to live, work, visit and raise a family.

Mission Statement:

The City of Orlando desires to enhance its ability to deliver efficient and secure human-centered public services through the development and use of interconnected data systems, communication, sensor technology, and Internet of Things (IoT) solutions

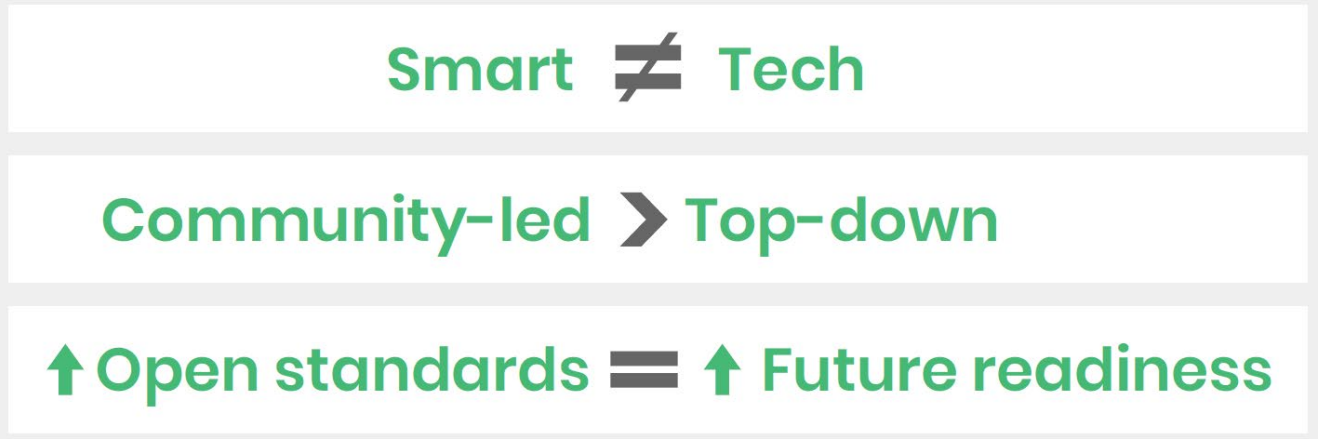
Purpose of the Future-Ready Action Plan

Guiding Principles

- ✓ Security focused - Informational and physical
- ✓ People first - culture of safety
- ✓ Sustainable, reliable, and resilient solutions
- ✓ Responsible (financially, morally, etc.)
- ✓ Relevant and timely
- ✓ Equitable and inclusive
- ✓ Transparent
- ✓ Collaborative

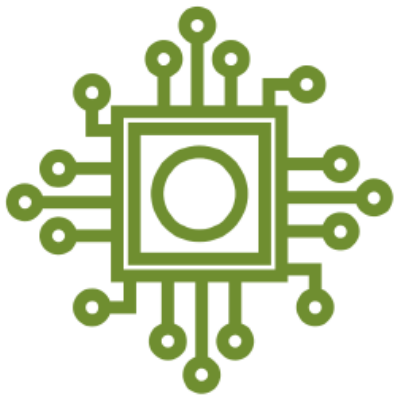
What is Future-Ready?

- A place where residents are empowered to **cocreate opportunities using technology**
- A place that maximizes the urban form's benefits while minimizing its challenges
- A place of prosperity, safety, equity, sustainability, resiliency, diversity, and serendipity



Credit: David Gilford

Smart Cities (1.0)



Technology-led,
City-procured

Responsive Cities (2.0)

City-led,
Technology-enabled

Future Cities? (3.0+)

Citizen-led,
co-created

Credit: David Gilford

Stakeholder Engagement Touchpoints

Summary of Internal Stakeholder Interviews

- ✓ 11 of 12 complete
- ✓ Describe a Future-Ready city
- ✓ Top challenges of a Future-Ready city
- ✓ Identify barriers that prevent Department from being Future-Ready
- ✓ What innovation and technological advances help do job better?
- ✓ Actions to serve City citizens better
- ✓ Feedback regarding data privacy principles
- ✓ Refining data / assets survey

What is a Successful Future-Ready City?

What is a Successful Future-Ready City?

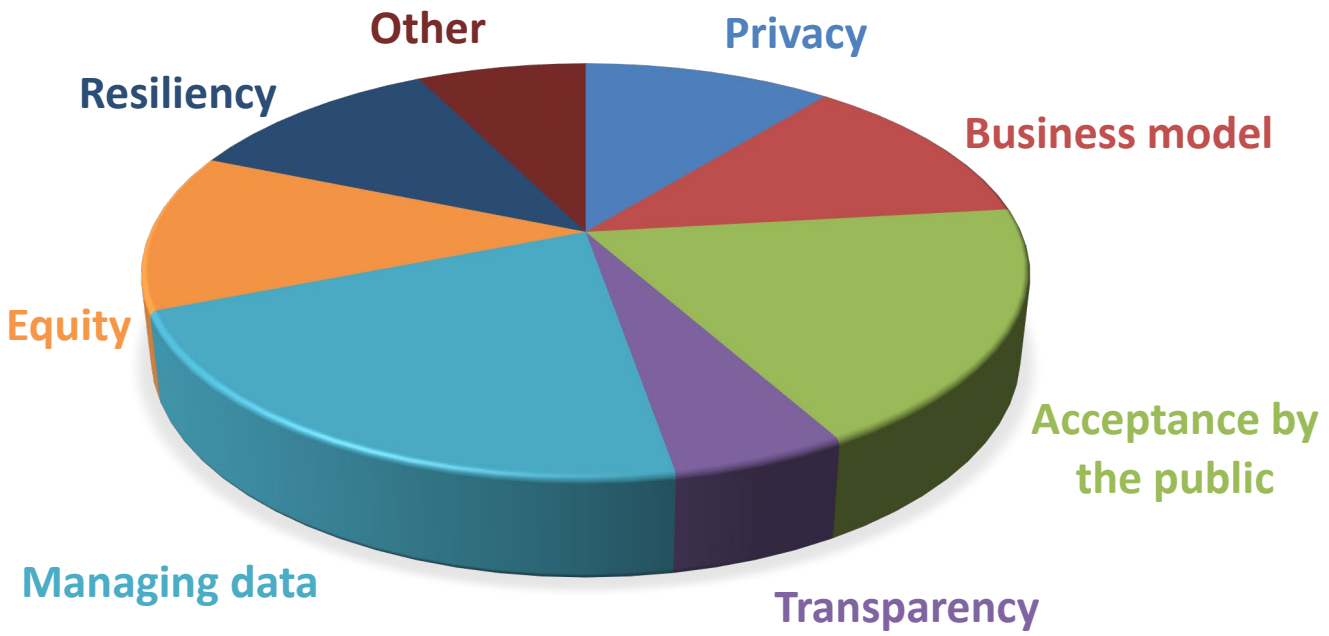
Summary of Internal Stakeholder Interviews

Top departmental barriers to being a Future-Ready city

- Prioritize, procure and/or fund solutions and strategies
- Staff resources and time
- Technical expertise
- Training or educational
- Legislative, legal and political constraints
- Inter-agency, department and private sector collaboration
- Change management (culture)
- Availability of technology
- Standard governance and operating protocol
- Common goals and visions

Summary of Internal Stakeholder Interviews

Top challenges of a Future-Ready city



Pillar Focus Areas

ENERGY / UTILITIES

PUBLIC SAFETY

TRANSPORTATION

BUILT ENVIRONMENT

SOLID WASTE

WATER / WASTEWATER

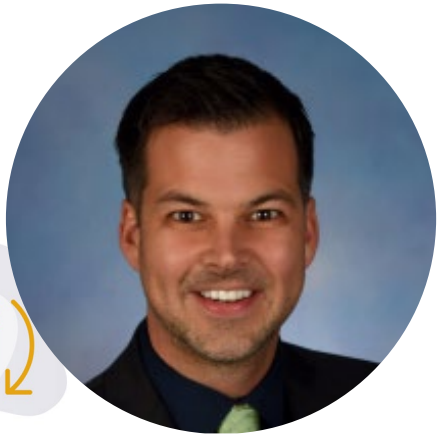
Pillar Focus Areas | **City Champions**

ENERGY / UTILITIES
Chris Castro

PUBLIC SAFETY
Deputy Chief Doug Goerke

TRANSPORTATION
Claudia Korobkoff

BUILT ENVIRONMENT
Ian LaHiff

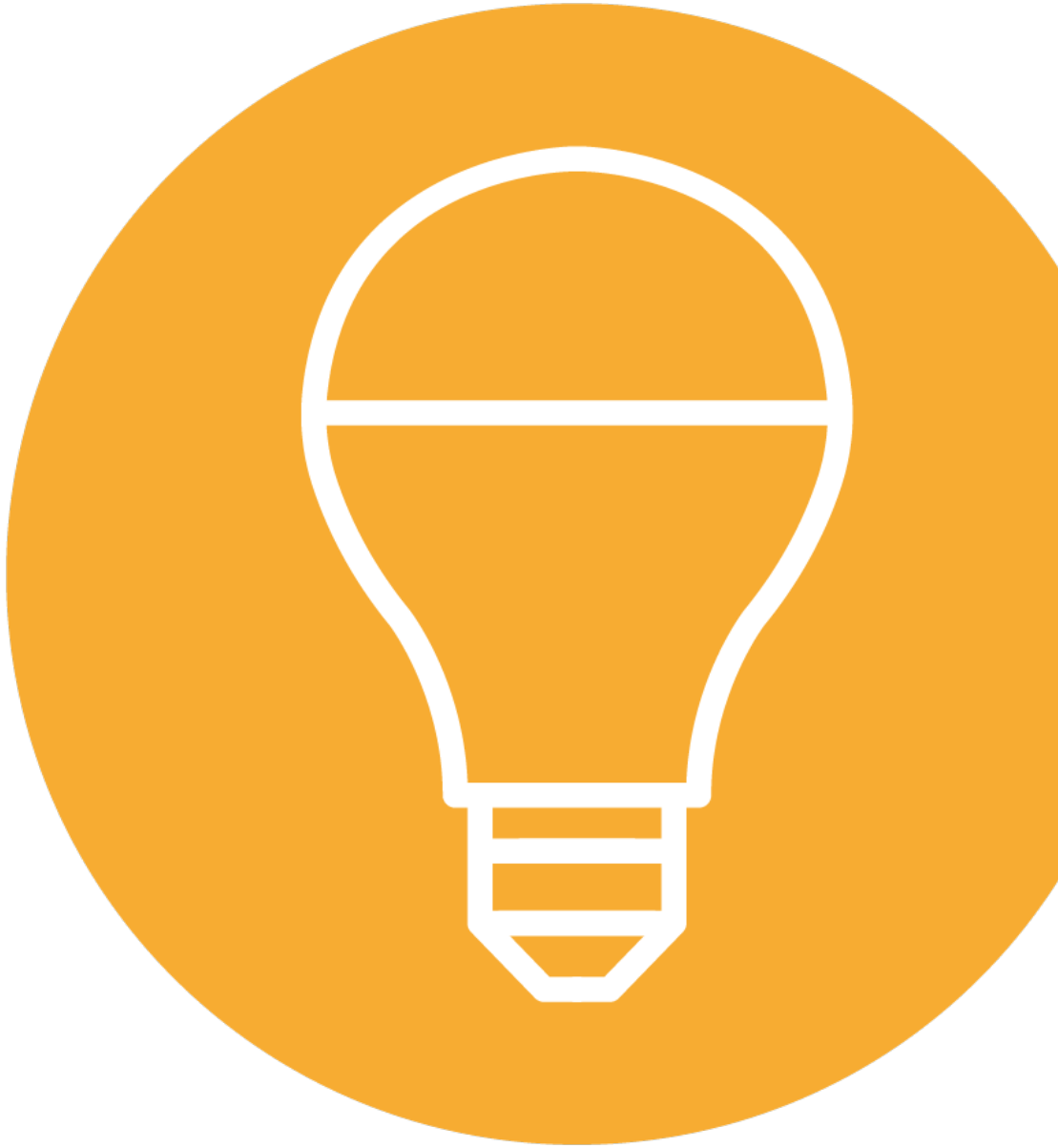


SOLID WASTE
Joe England

WATER / WASTEWATER
Brittany Sellers

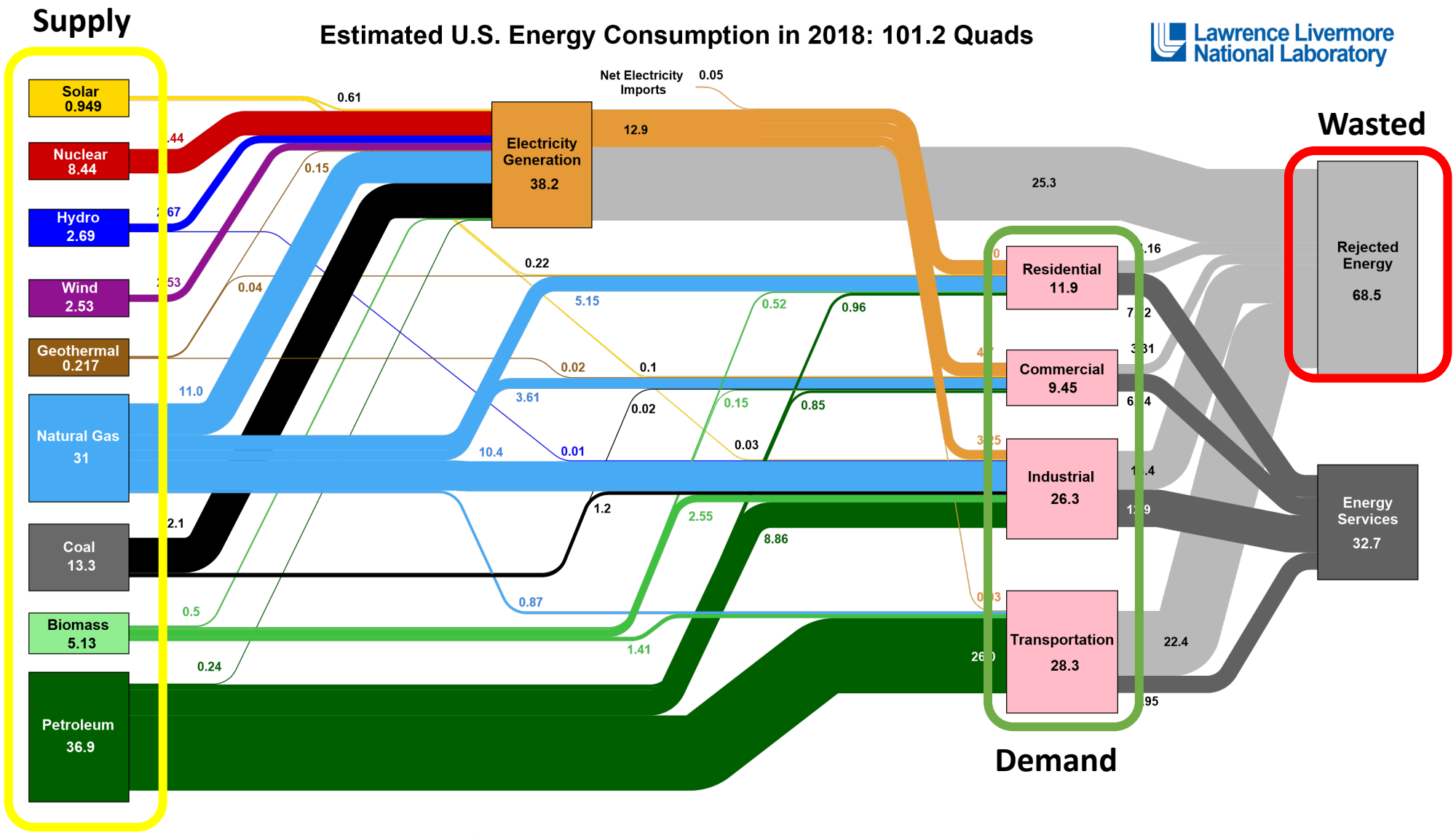
Green Works 2040 Goals

- Reduce greenhouse gas emissions by 90% from 2007 levels by 2040
  - Municipal operations to be greenhouse gas neutral by 2030
- Obtain 100% of electricity from clean, renewable sources
  - Municipal operations by 2030
  - City wide by 2050



Green Buildings

The vast majority of the energy we use is wasted



Source: LLNL March, 2019. Data is based on DOE/EIA MER (2018). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, 21% for the transportation sector and 49% for the industrial sector, which was updated in 2017 to reflect DOE's analysis of manufacturing. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

Our City Operations power bill is $19,000,000/year.

- Mandatory LEED [Silver] buildings for City-owned buildings
- Internal EE Retrofit Program
- **$17.5 million municipal bond**
  - Phase I – 55 Buildings
- **Saving $2+ Million annual return**
  - Fund future EE investments
  - Pay down bond debt

OUC The Reliable One

SERVICE ADDRESS: 11401 BOGGY CREEK RD

CITY OF ORL WATER CONSERV I

Customer Reference: WAS0008_C

CURRENT CHARGES

OUC Electric Service	**$57,869.37**
Totalizer Name: TOT00042 - Service Charge	$ 30.00
GSD Secondary Demand TOU Totalized (03/22 - 04/24)	
Demand Charge 1,390.500 kW @ $6.12	8,509.86
Demand Charge 1,196.100 kWT @ $1.88	2,248.67
On Peak	
99,942 kWh @ $0.04219 (Non-Fuel)	4,216.55
99,942 kWh @ $0.05387 (Fuel)	5,383.88
Shoulder	
92,302 kWh @ $0.0322 (Non-Fuel)	2,972.12
92,302 kWh @ $0.04111 (Fuel)	3,794.54
Off Peak	
503,430 kWh @ $0.02673 (Non-Fuel)	13,456.68
503,430 kWh @ $0.03413 (Fuel)	17,182.07
3 Channel(s) at $25.00	75.00
($16,385.48 of your Fuel Cost is exempt from Municipal Tax)	

Fire Station 15

Built in 2007, Fire Station 15 is a true neighborhood fire station. Nicknamed "The Lions Den", the crews adopted the mascot of the nearby Lake Nona High School Lions for their station insignia.

Serves a number of schools from elementary to college, single and two story-homes, garden apartments and some of the largest homes in the City.

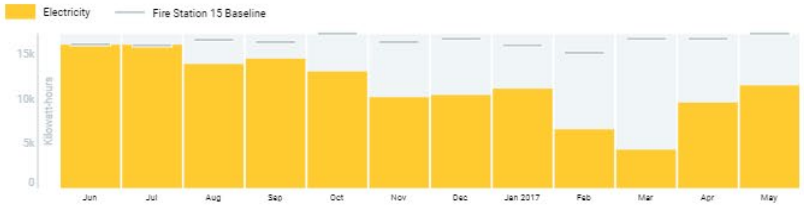
Project Spotlight

As a part of Orlando's City Energy Project, Fire Station 15 underwent a complete LED lighting retrofit of all interior and exteriors lights in April & May 2016. The LED retrofit was designed and implemented not only to decrease energy usage but also increase comfort and productivity across the fire station.

Upgraded lighting wasn't the only improvement made. Fire Station 15 underwent installation of building automation and logic controls. The building automation included installation of motion sensors that shut off the air conditioning system in unoccupied rooms and it allows for more control over temperature and humidity.

In the first 12 months following the energy efficiency upgrades, the station has saved enough energy to power the average household for over 4 years!

First Year Average Monthly Electricity Use Following LED Retrofit / Jun 1, 2016-May 31, 2017

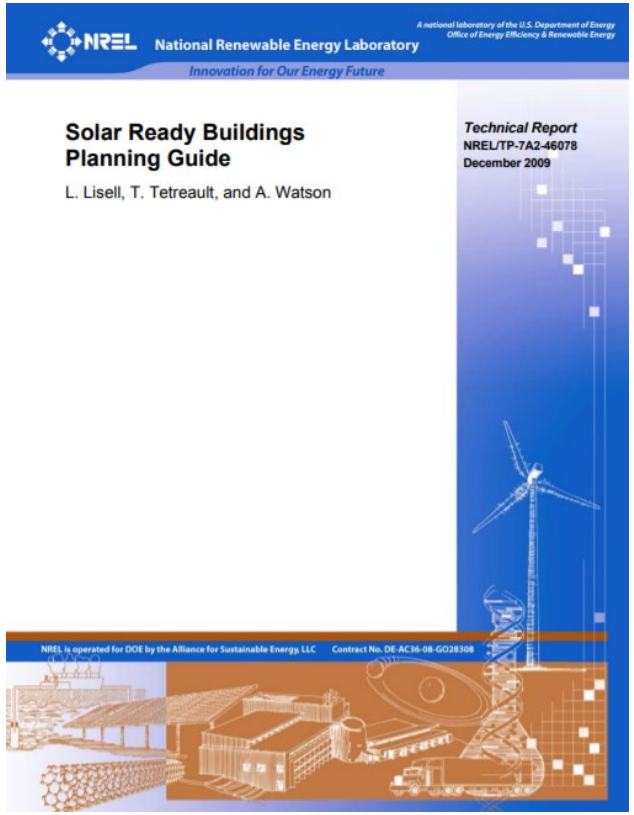


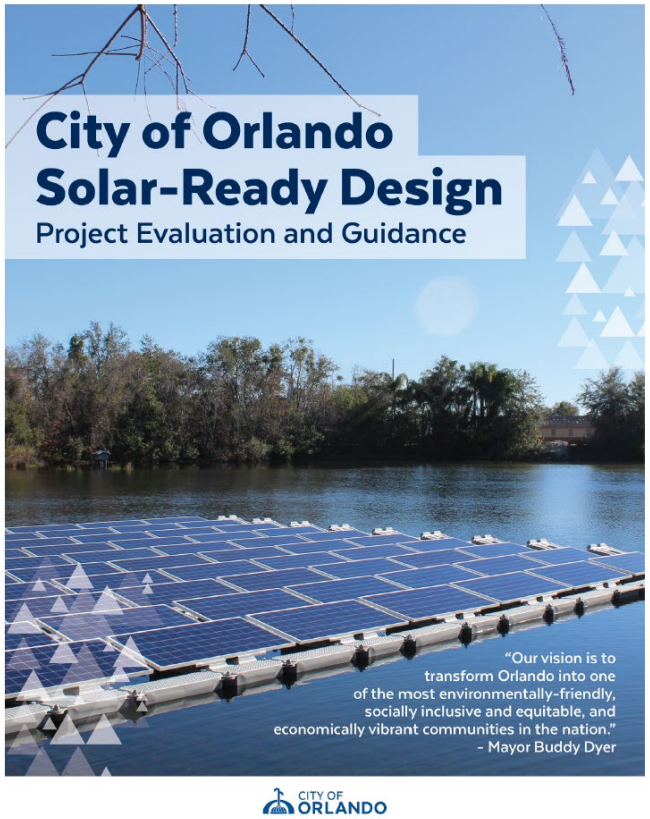
Average	Average, Fire Station 15 Baseline	Difference
11,361 kWh	16,268 kWh	↓ 30 %

Fire Station 15 Electricity Use Post LED Retrofit / Last 12 months

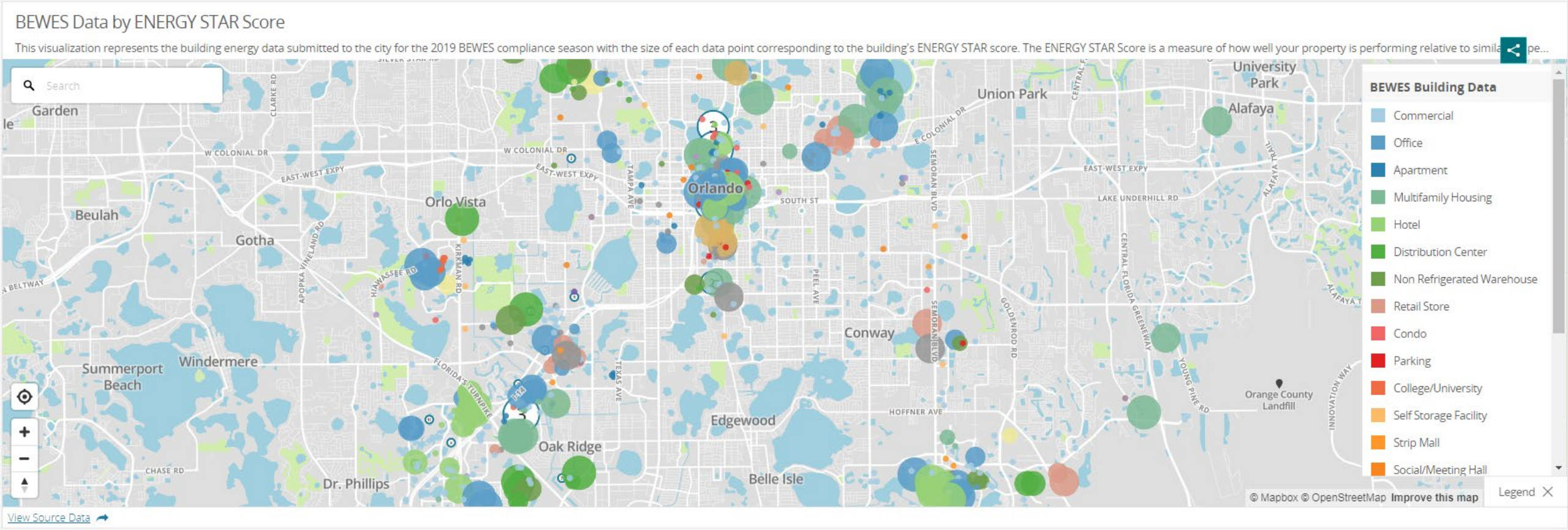
SOLAR & EV-READY GUIDELINES

- Tailored "solar-ready" designs for Florida Building market
- Ensure proper weight load requirements
- Inverter pad placement
- Electrical panel capacity
- Conduit to the rooftop



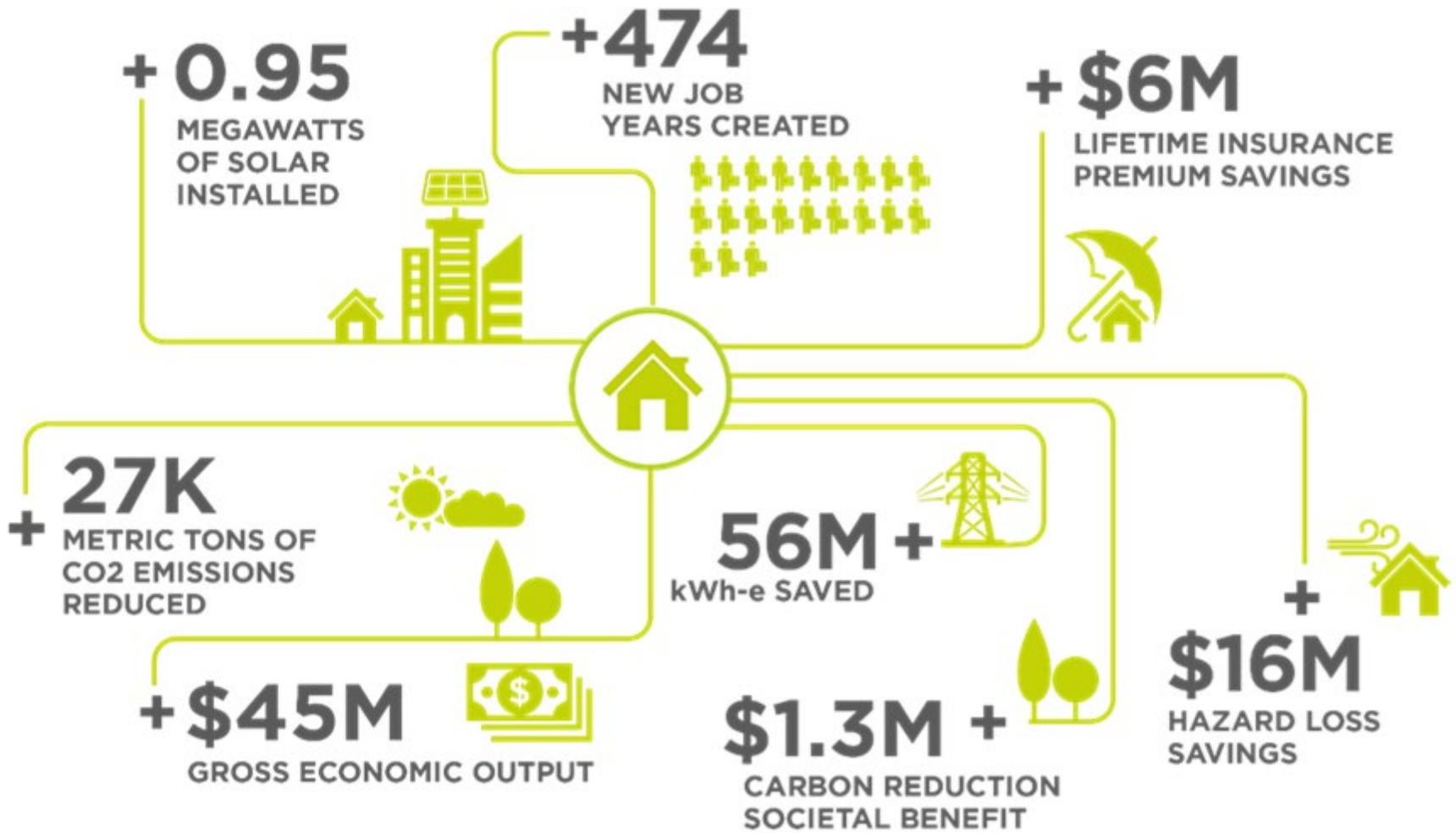


Building Benchmarking, Energy Audits, & Transparency Policy (BEWES)



Ena

Estimated impact[1] of $18M[2] in nearly 1,000 funded disaster resiliency, renewable energy, and energy efficiency property improvement projects across the Orlando Area.

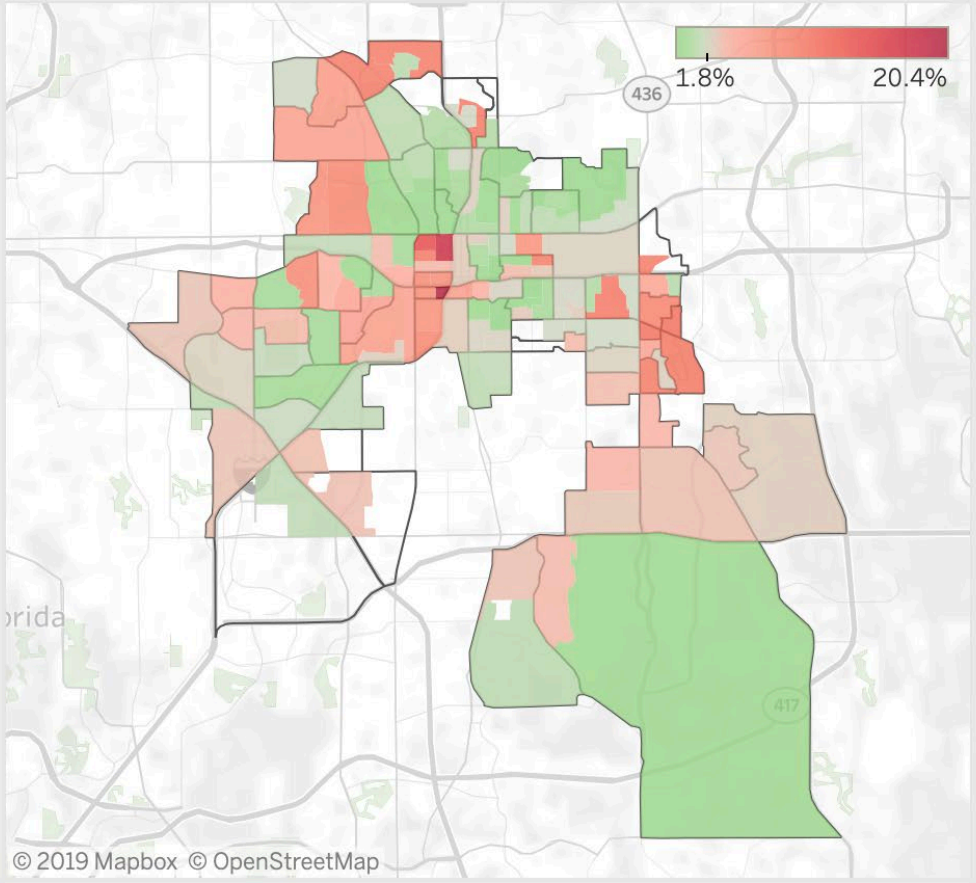


[1]Data based on University of Southern California Schwarzenegger Institute research, "Impacts of the Property Assessed Clean Energy (PACE) Program on the Economies of California and Florida," utilizing, in part, Ygrene's proprietary impact model. This represents estimated lifetime impacts of PACE projects completed by Ygrene from inception through October, 2019. The research report can be accessed here: http://schwarzenegger.usc.edu/research

[2]Represents rounded dollar amount of PACE contracts funded by Ygrene through October, 2019.

Energy and Water Equity Mapping

Electricity Burden

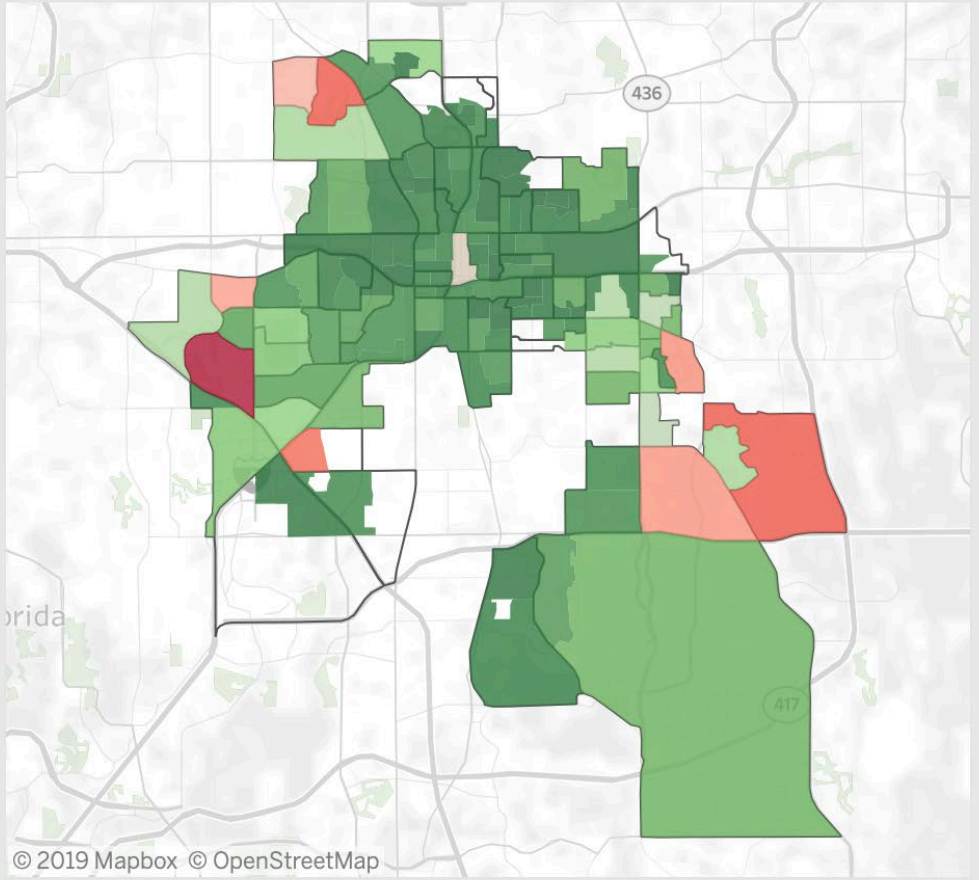


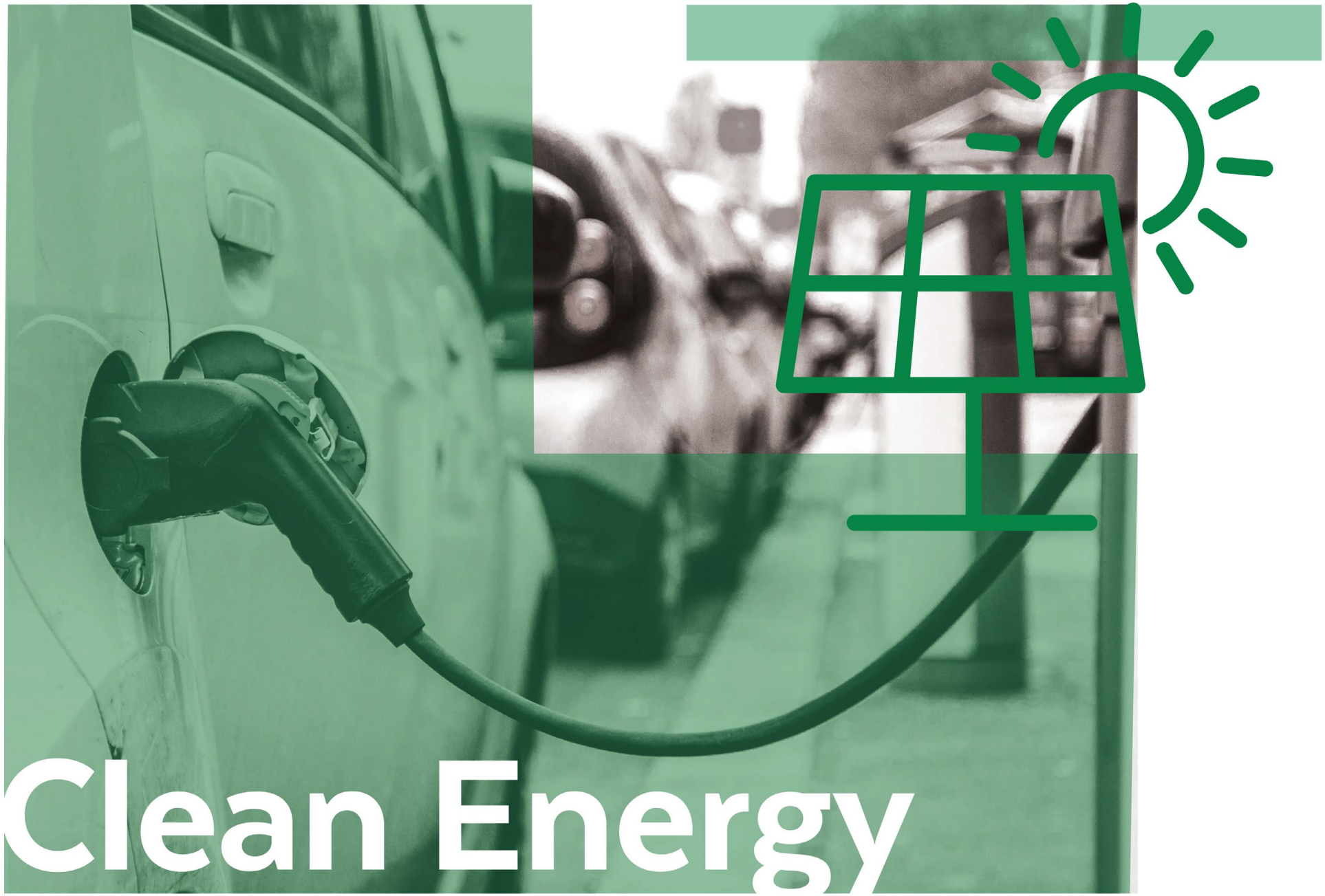
Households in Burden

Households Above Electricity Burden

4.5%

Use the slider to see how many households are living above the electricity burden that you choose. The average electricity burden for Orlando is **4.48%**, while the national average is **2.56%.**





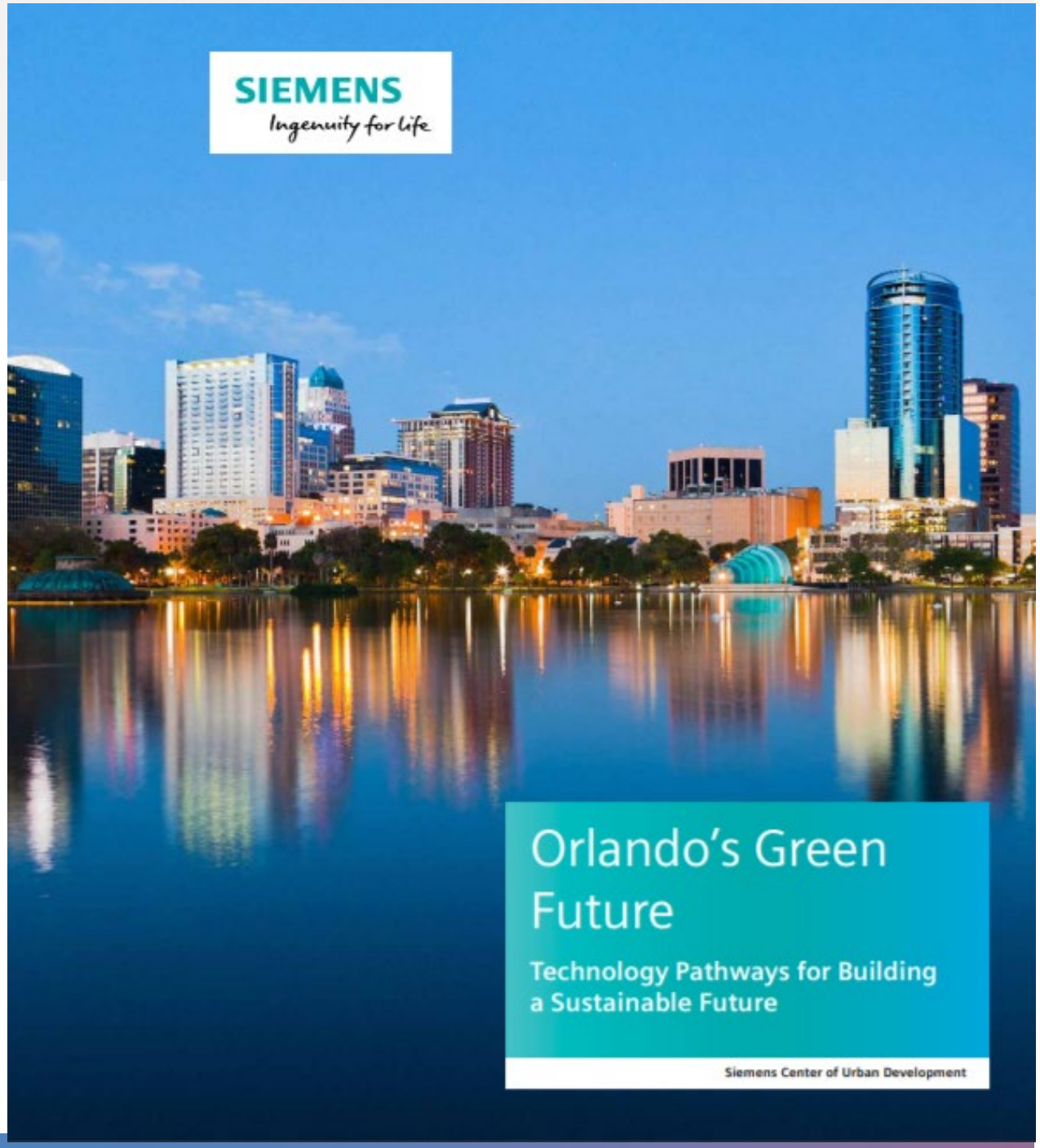
Clean Energy

OUC's Fuel Mix

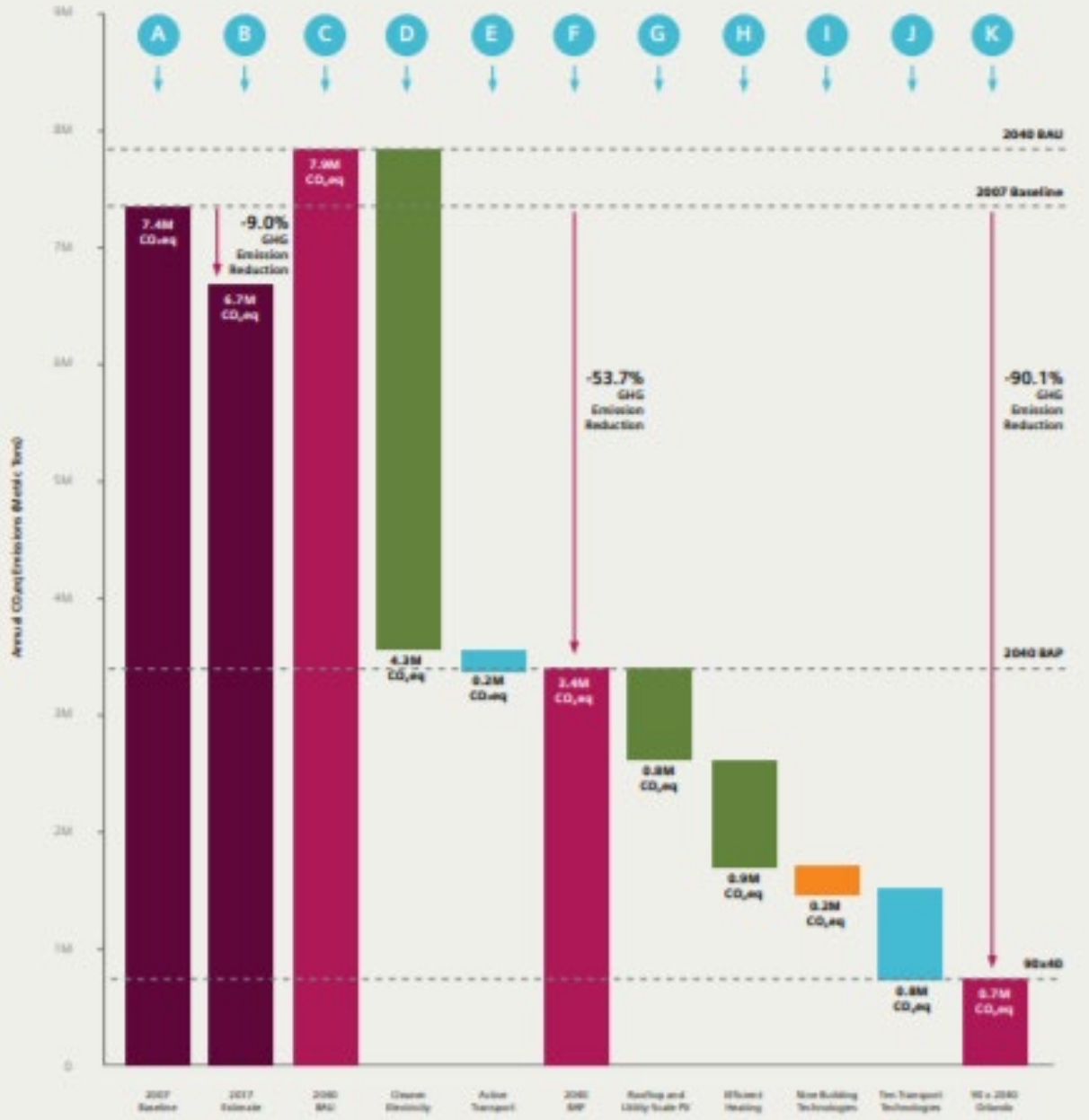
- Coal = 775 MW
- Natural gas = 674 MW
- Nuclear = 60MW
- Solar = 30 MW
- Landfill Gas = 35 MW
- Purchased = 277 MW

READY FOR
100%

MAYORS FOR
100% CLEAN ENERGY
"I am proud to support a vision of transitioning entirely to 100 percent clean and renewable energy in our City."
—MAYOR BUDDY DYER of Orlando, Florida



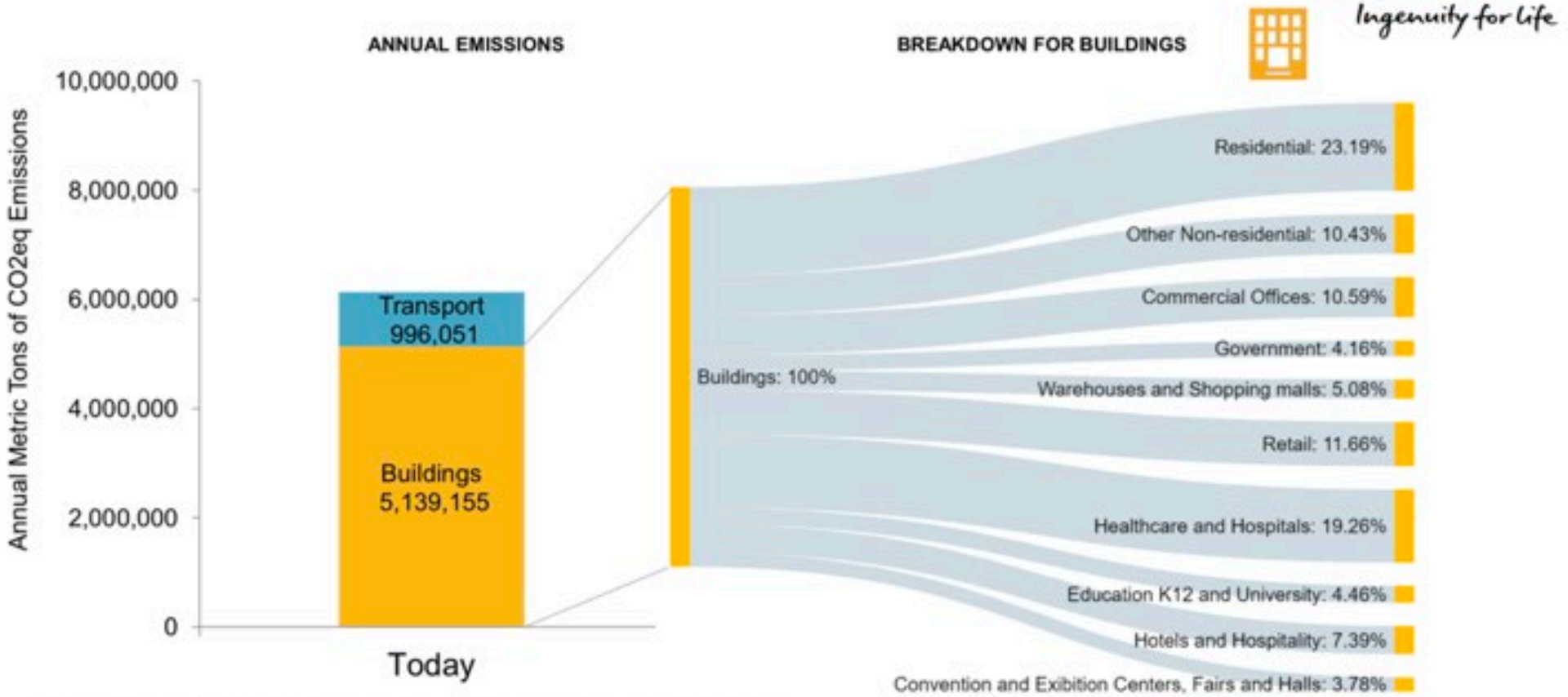
Pathway to 90 x 2040



GHG Emissions, 2016 Estimated

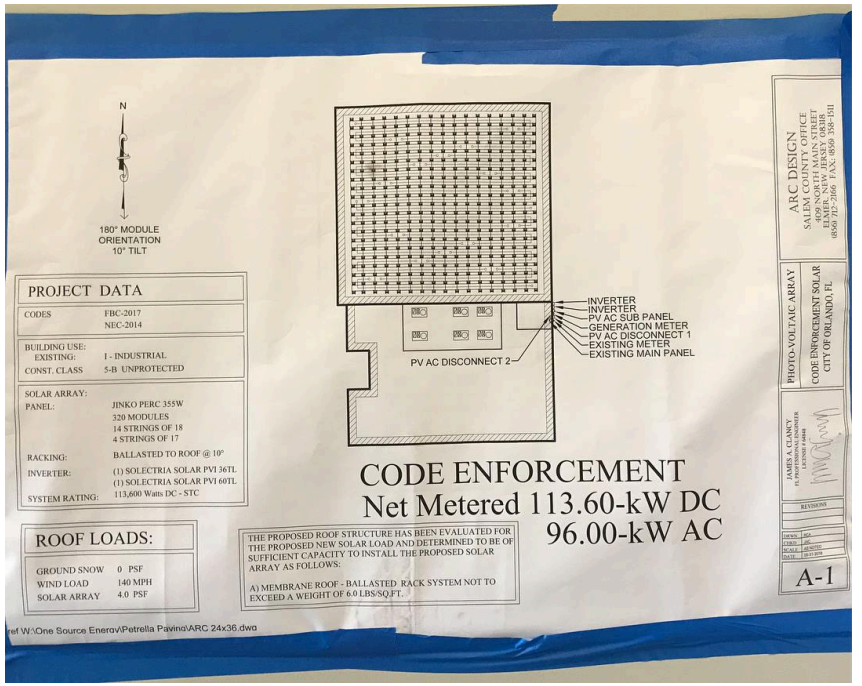
CIRIS Building Emissions, 2016 – 5,492,192*
CIRIS Transport Emissions ♯, 2016 – 1,459,750

SIEMENS
Ingenuity for life



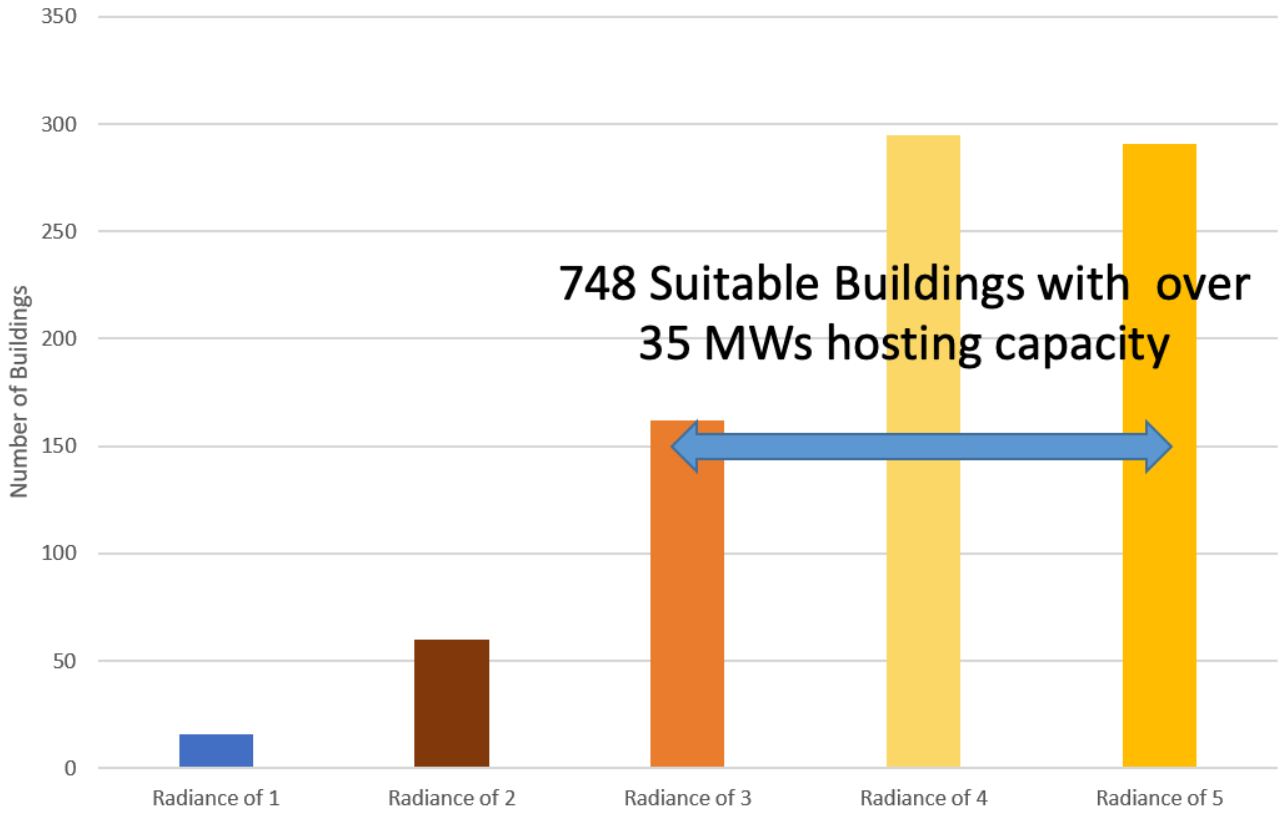
* Building emissions include Residential and commercial buildings excluding fugitive emissions and industrial emissions
♯ Transport Emissions include On-road transportation
Neither of the GPC emissions include scope 3

FLEET & FACILITIES COMPLEX

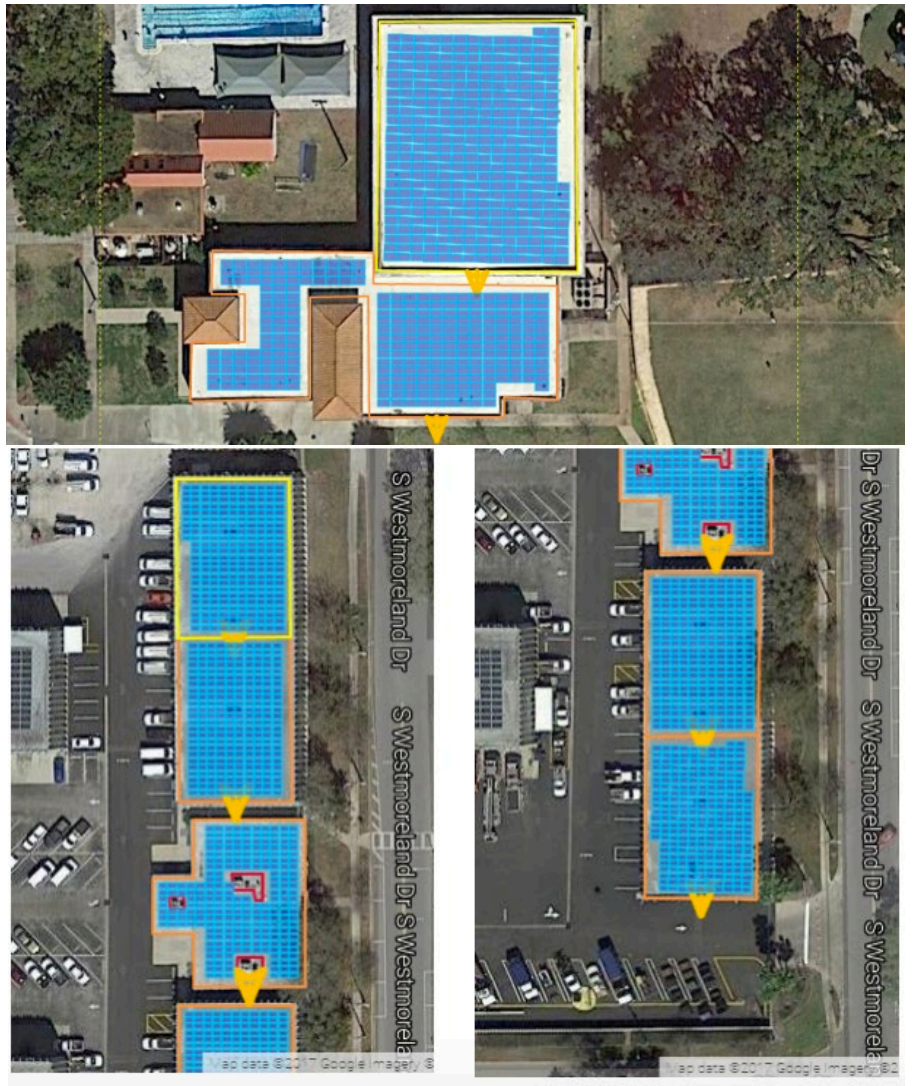


- New LEED-certified Records & Permit Building
- 114 KW solar PV
- First Net-Zero energy facility for Orlando
- $112,000 net savings over the lifetime

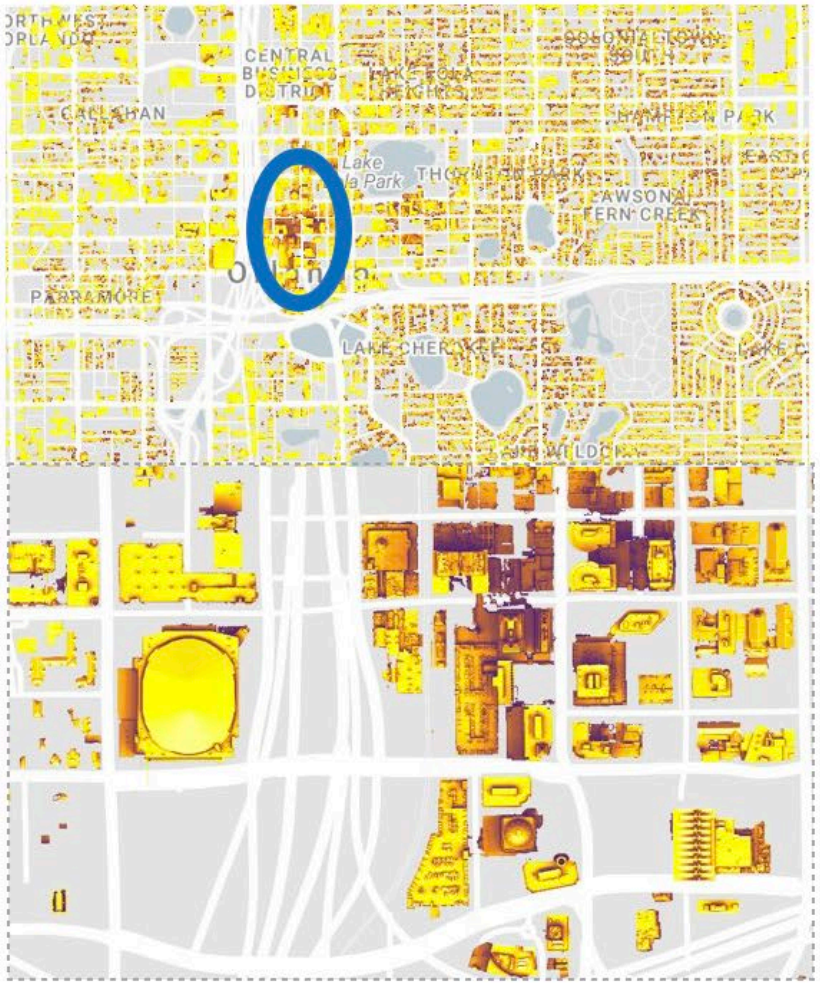
$2.3M in Solar Project in 2020 – City Ops

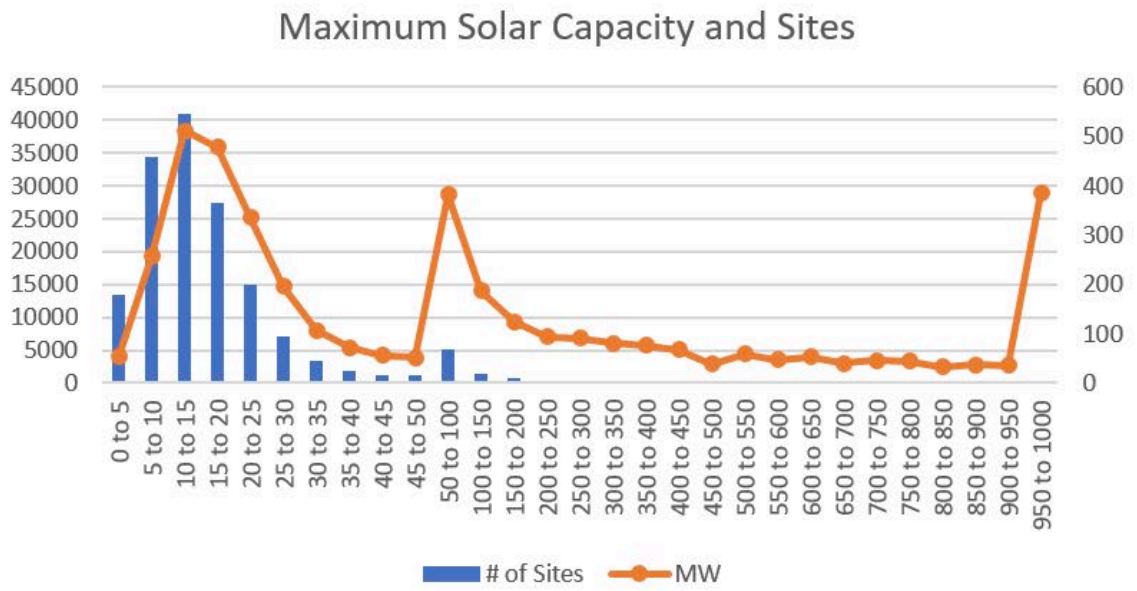


Radiance Score combines current unobstructed rooftop potential with the likelihood for future obstructions. Current potentials are obtained via LIDAR/Satellite data in combination with NREL's PVWatts and SAM tools. Likelihood for future obstructions assessed by the team by observations of recent development trends, site reviews, and City of Orlando staff. Ultimately, two reviews were produced: a technical maximum and a technical recommendation



Solar Potential Study – 4+ GW City-wide





Sectoral Splits	MW
R	822.1
C	3217.4

greenlink

SOLAR UNITED NEIGHBORS

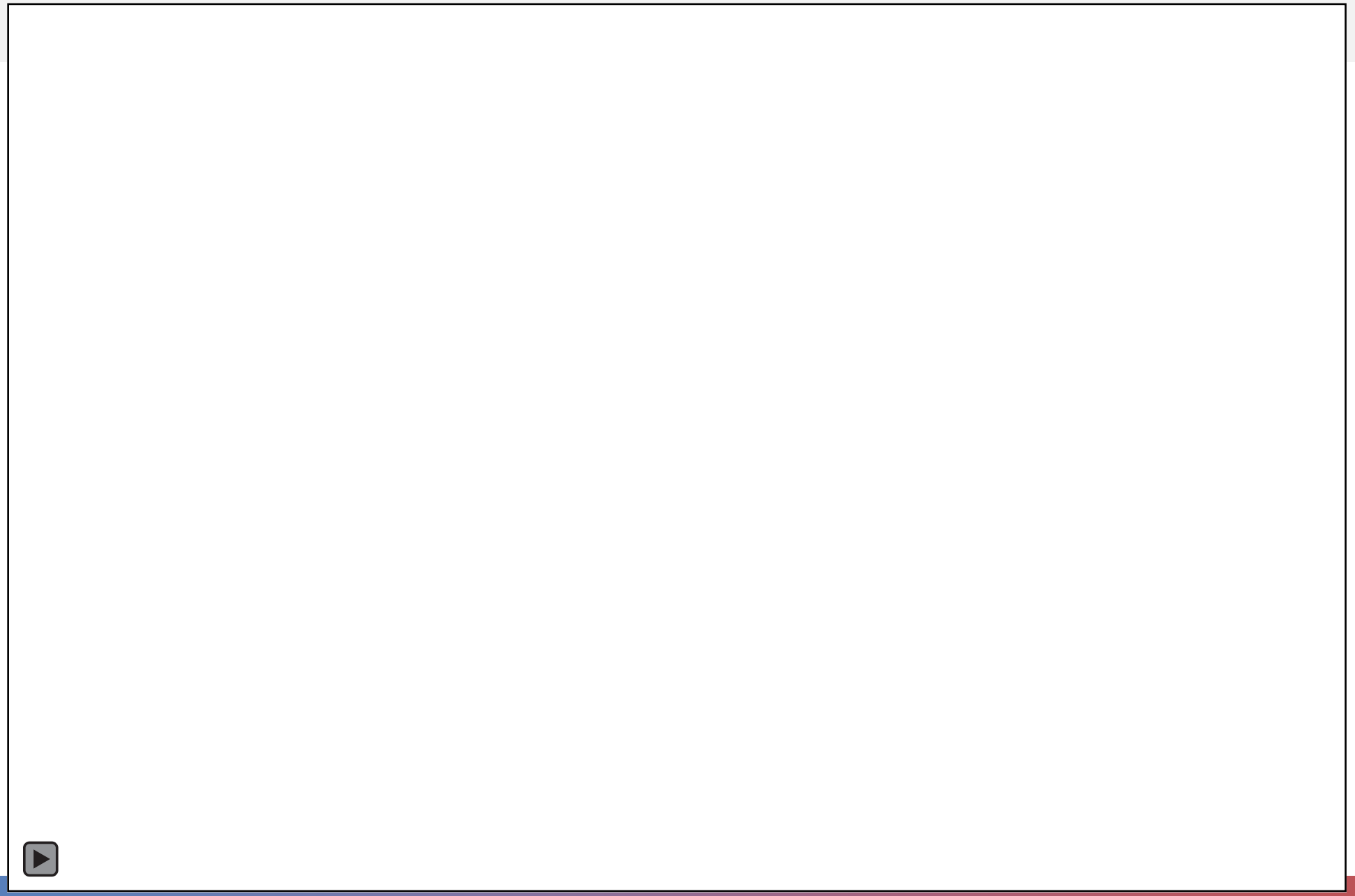
Established 2 solar co-ops (’19 / ’20)

Goal: 1 MW new rooftop solar by end of 2020

Avg. Price: $1.87/watt - $2.15/watt

250+ members

20MW+ Community Solar program — 250MW in pipeline



City Ops Currently Powered by 10% Renewable Energy

5.2 Megawatt solar energy procurement through OUC Solar Farm

Enough energy to power
- Orlando City Hall
- Orlando Police HQ
- 17 Fire stations

OACES

ABOUT THIS TOOL	This tool allows you to design 100% renewable energy pathways in the City of Orlando. It covers all sectors of the Orlando economy, including the residential, commercial, transportation and power utility sectors. The tool is powered by The Greenlink Group's ATHENIA model, which is translating clean energy actions into energy, carbon, economic, and social impacts for Orlando.
USERS' GUIDE	You can create your own low-carbon vision for Orlando by inputting the values in the ACTION cells. After entering your target values, your report card will give a deeper breakdown of the impacts.

Powered by greenlink

Actions and Impacts

ENERGY EFFICIENCY

Residential Energy Efficiency		Commercial Energy Efficiency	
	ACTION		ACTION
Residential Potential Achieved	100%	Commercial Potential Achieved	100%
	IMPACT		IMPACT
# of homes cutting electricity by half	162,859	kWh-saved per sqft	23.1

SOLAR POWER

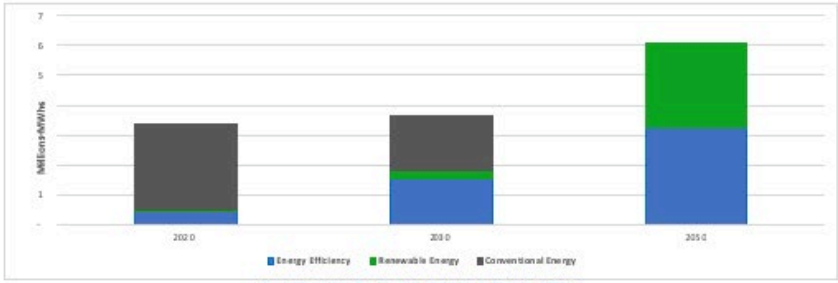
Residential Solar Power		Commercial Solar Power	
	ACTION		ACTION
Residential Solar Potential Achieved	100%	Commercial Solar Potential Achieved	100%
	IMPACT		IMPACT
Homes adding solar	18,600	Buildings adding solar	35,521

Utility Scale PV	
	ACTION
Utility Scale PV Potential	100%
	IMPACT
Number of homes powered by greenspace solar	122,800

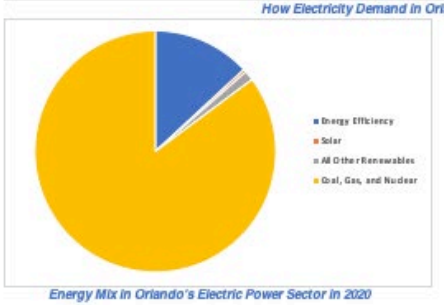
Electric Vehicles Adoption

Electric Vehicle	
	ACTION
EV Potential Achived	100%
	IMPACT
# of Electric Vehicles in Orlando	442,373

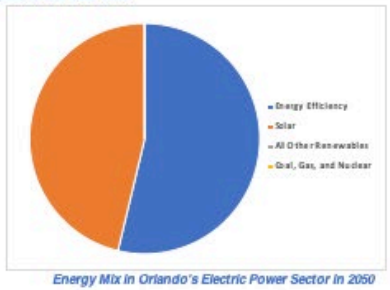
ORLANDO'S ENERGY USE AND CARBON EMISSIONS UNDER THE LOW CARBON PATHWAY



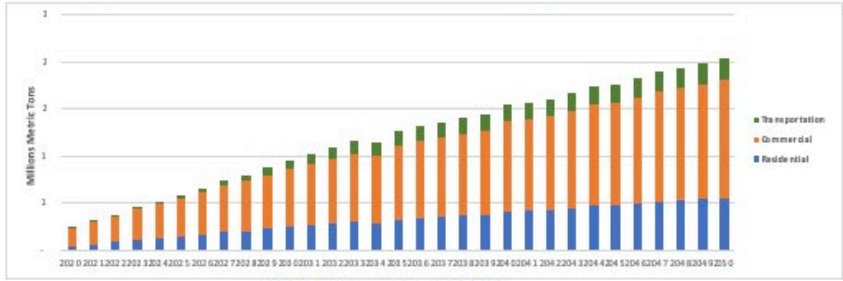
How Electricity Demand in Orlando is Met Over Time



Energy Mix in Orlando's Electric Power Sector in 2020



Energy Mix in Orlando's Electric Power Sector in 2050



CO_2 Reduction in Orlando, 2020 - 2050

Orlando utility to launch $9 million hydrogen system double solar energy

By KEVIN SPEAR
ORLANDO SENTINEL | OCT 07, 2019 | 5:17 PM

Orlando Utilities Commission will install a hydrogen system that uses electricity from its solar plants, such the floating solar system at OUC's Gardenia Center, to extract hydrogen from water that can later be used to generate electricity or power equipment. (Kevin Spear / Orlando Sentinel)

Smart Street lighting

- **GOAL: 100% LED streetlight by 2020**

- OUC working to retrofit 25,000+ streetlights to LED
  - 18,000 currently retrofitted

- Exploring test of new “Smart Streetlights” in Downtown
  - LED technology
  - Video surveillance
  - Environmental monitoring
  - Traffic analytics
  - Wi-fi / DAS systems
  - Gun shot detection

OUC The Reliable One®

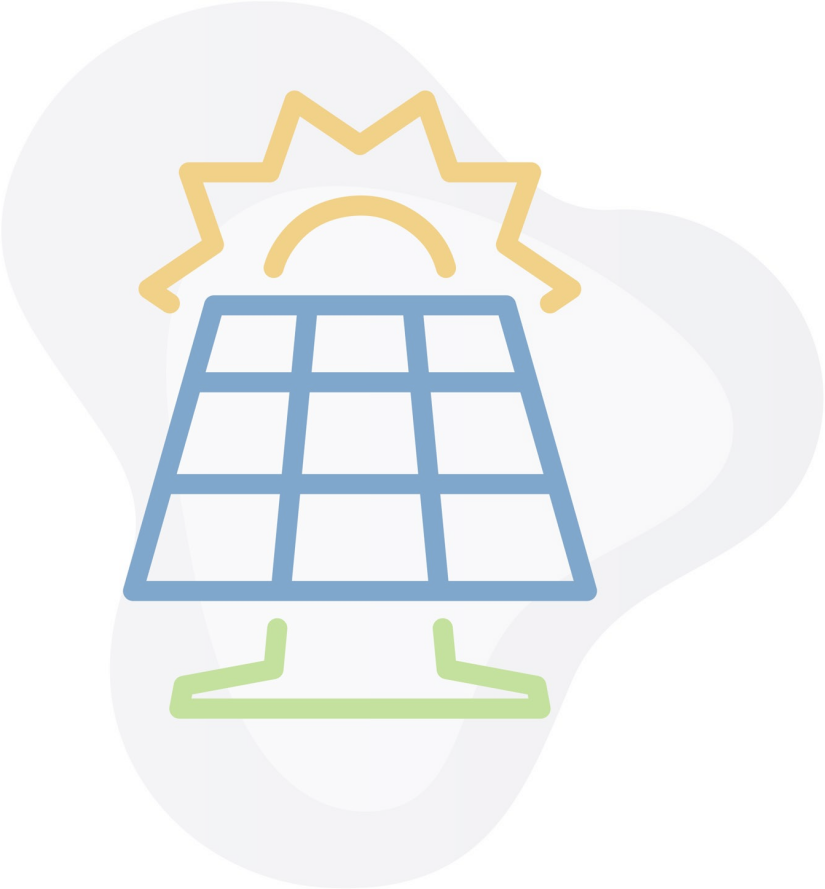
OUC Electric Integrated Resources Plan (E-IRP)

Goals

- Reach the greatest number of customers while allowing for control over the sample size
- Create relationships to hold conversations with community advocates and influencers that represent the community

http://oucroadmap.com

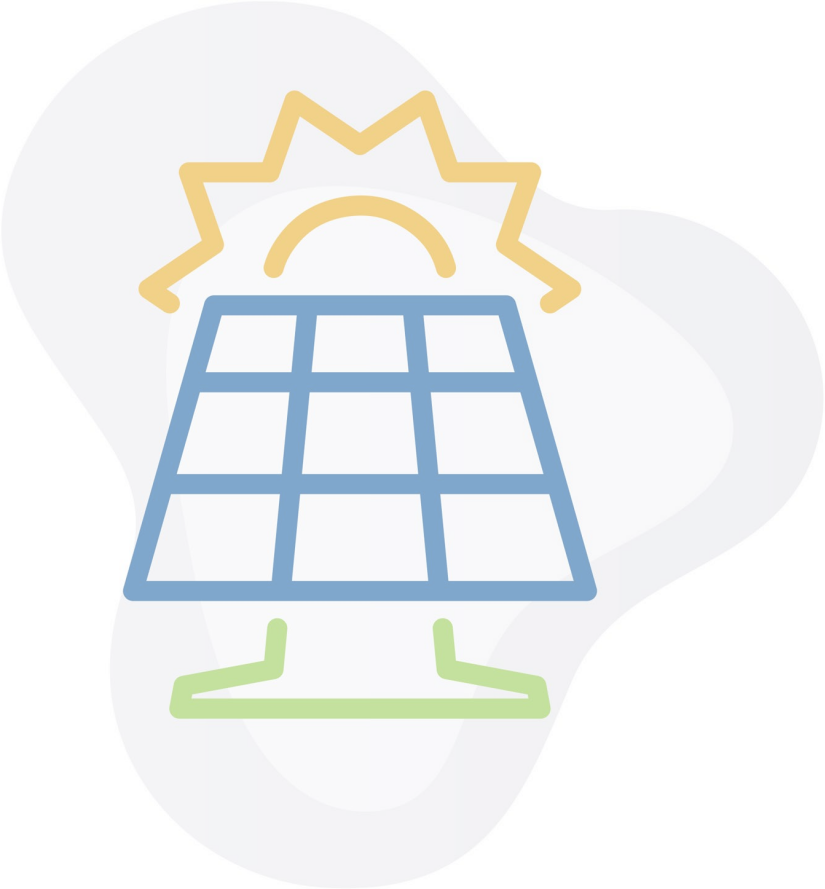
What are the top challenges that a Future-Ready City must solve?



GROUP DISCUSSION

Identify 5 short term & 5 long term solutions

- Key performance indicators
- Implementers/Partners
- Funding

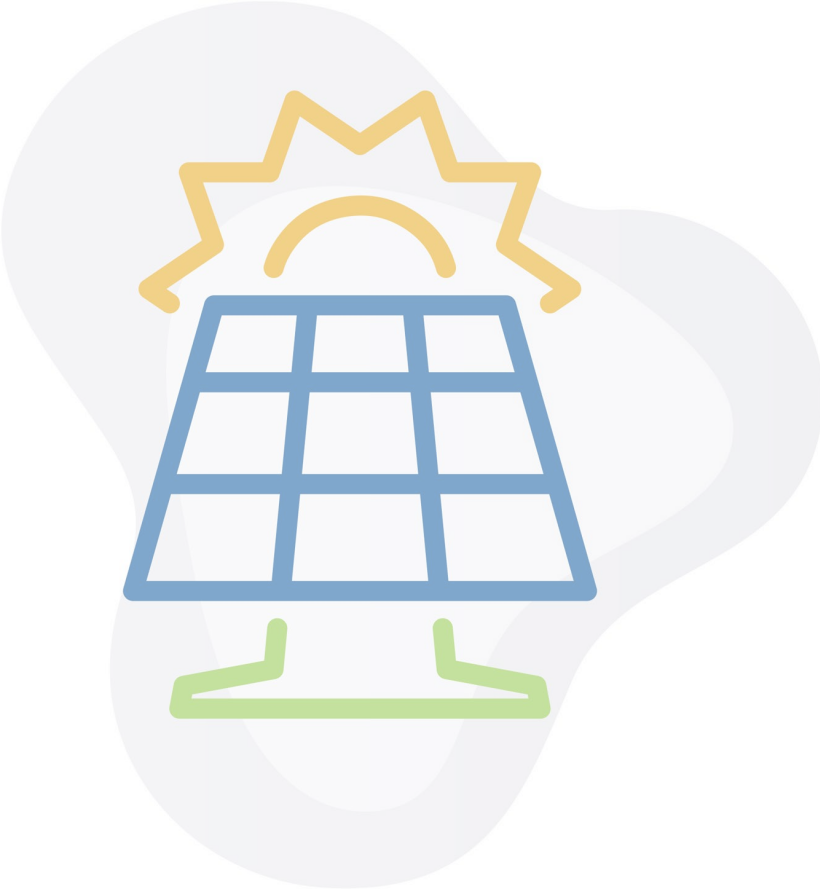


Future-Ready Best Practices

Energy / Utilities

Street Lighting:

- Street Poles with LED and controls
- Multiple solutions using Smart Street Poles including safety and security cameras, environmental monitoring, gun-shot detection, traffic detection, parking space monitoring, and other features
- Leverage to deploy Public Wi-Fi

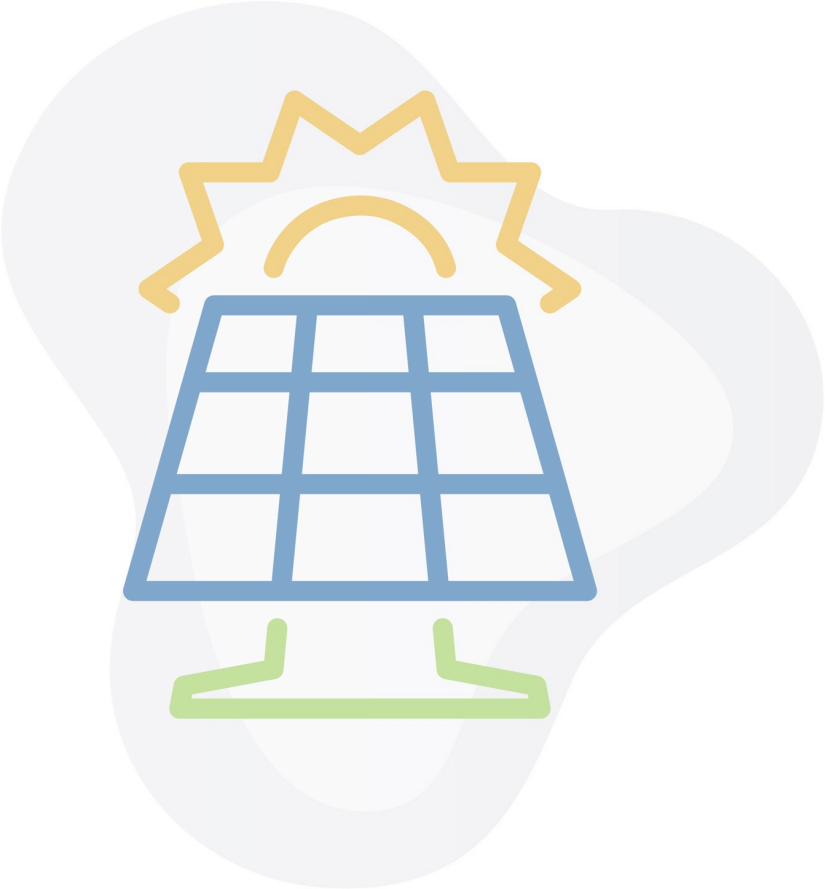


Future-Ready Best Practices

Energy / Utilities

EV Charging:

- Charging stations for electric vehicles
- Potential as Wi-Fi hotspots
- Increased energy efficient vehicles
- Reduction in carbon footprint

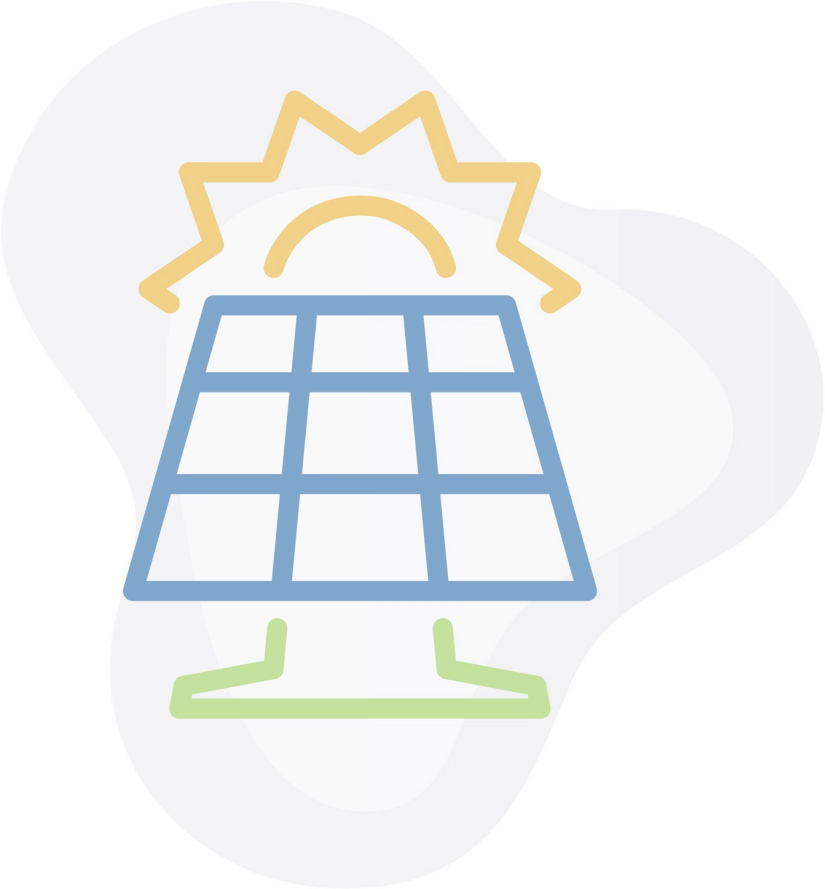


Future-Ready Best Practices

Energy / Utilities

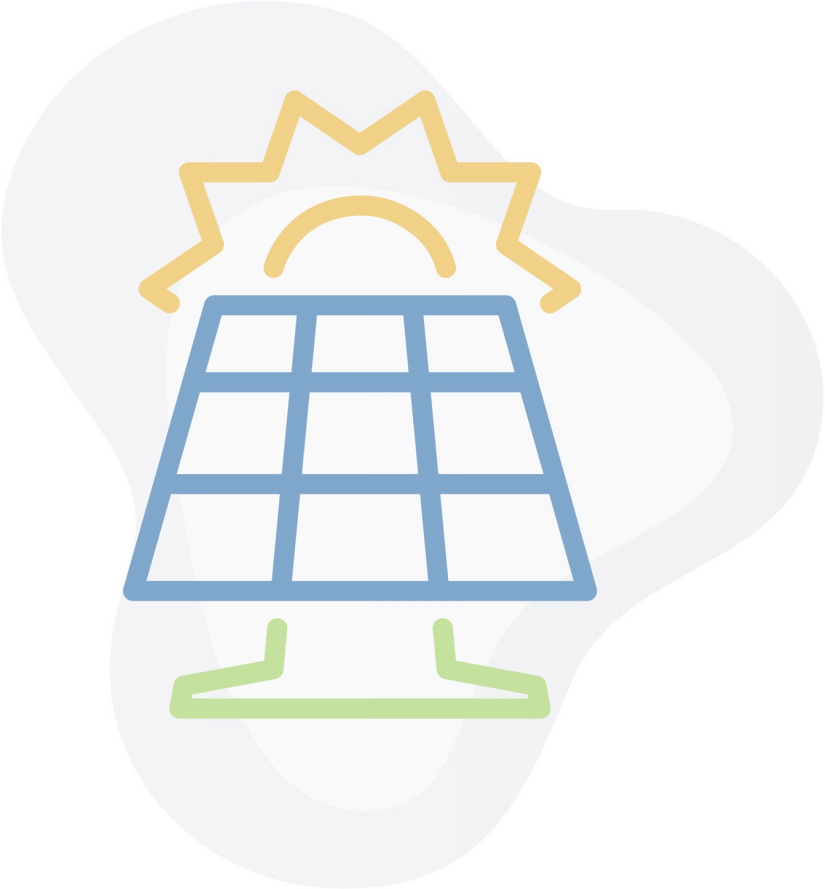
Smart Buildings:

- Management of HVAC
- Building energy and water data benchmarked to influence conservation/resource savings
- Security access
- Remote sign in for building facilities
- Home energy automation systems
- Home energy consumption tracking
- Dynamic electricity pricing

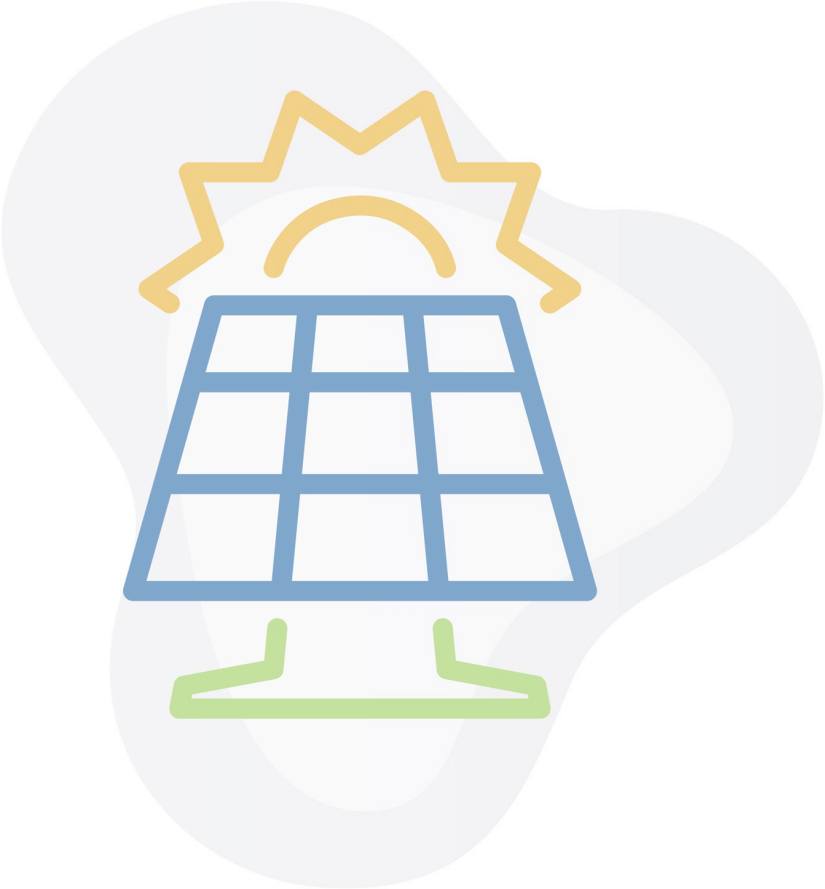


PRIORITIZATION

What short term solutions should be prioritized?



What governance & policy changes are needed for implementation?



Next Steps

- Focus Area Roundtable Meetings
- 1st Public Workshop – February 4
- Online Survey
- Strategy Development
- June 2020 City Council Presentation

ORLANDO FUTURE-READY CITY MASTER PLAN

CITY OF ORLANDO

Meeting Notes

Place: Orlando City Hall
1st Floor
Rogers-Kiene
Conference Room
Date: January 22, 2020
Project #: 63588.00

Notes Taken by: C. Macintosh
Re: Energy and Utilities Focus Area Roundtable Meeting Summary

ATTENDEES

Mike Hess
Corey Knight
Jacques Coulon
Duane Stephens
Charles Ramdatt
Ivan Aron
Amy Westwood
Luis Moros
Kelly Stevens
Madeline Almodovar (Jacobs)
Jeff Chobon
Doug Dierlich
Philip Tinsley
Andres Hoyos
Kelly Cohen
Gail Johnson
Pete Westlake
Dave Mulholland (VHB)
Dan Kirby (Jacobs)
Justin Kramer
Tim Gross
Erik Suarez
Alexa Stone
Aaron Schneider
Bill Bradford
Crystal Chubeck
Chris Macintosh (Jacobs)
Curt Ostrodka (VHB)

MEETING SUMMARY

All participants introduced themselves and described their role at the City or with the VHB team. Dave Mulholland opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the Focus Area Roundtable Meeting was to bring subject matter experts from the private sector, public sector, and academia together to discuss issues related to Energy and Utilities and brainstorm potential solutions. The agenda for the roundtable was as follows:

- History of the Smart Orlando program
- Draft Vision, Mission, and Guiding Principles of the Future-Ready Master Plan
- Description of what it means to be "Future Ready"
- Stakeholder Engagement process
- Summary of Internal Stakeholder Interviews
- City's Progress to Date
- Group Discussion

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Landmark Center Two
Orlando, FL 32801-4326
P 407.839.4006

Meeting Notes

- Challenges that must be addressed
- Identification of five (5) potential short term and long-term solutions
- Identification of key performance indicators, partners, and funding sources
- Prioritization of short-term solutions
- Discussion on governance and policy issues.

Curt Ostrodka described the community engagement process. The project team has met with each internal City department to understand challenges, and opportunities. He noted that the Roundtable Meeting represented one of six focus areas that the City is studying to become more future-ready. The six focus areas are:

- Solid waste
- Energy and utilities
- Public safety and health
- Water and wastewater
- Transportation
- Built environment

There will be a series of public workshops in each City Commissioner District so that the public can learn about the project and comment on the potential solutions that are identified by Roundtable participants.

Chris Castro, City of Orlando "champion" for the Energy and Utilities roundtable, then provided an overview of the goals, activities and projects that the City has in progress and what a high-level clean energy plan (Green Works 2040) includes:

- Goals:
  - Reduce greenhouse gas emissions by 90% from 2007 levels 2040.
  - Obtain 100% of electricity from clean, renewable sources.
  - 100% LED streetlights by 2020.
  - OUC Electric Integrated Resources Plan (E-IRP) to be able to reach the greatest number of customers while allowing for control over sample size.

- Ongoing activities and projects:
  - 60% of energy produced is rejected according to a Lawrence Livermore National Laboratories (2018 numbers).
  - All data from BIM from 5,000 buildings within the City of Orlando have been collected.
  - Solar-ready design guide has been produced for city buildings.

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Meeting Notes

- The Building Energy and Water Efficiency Strategy (BEWES) is used for building benchmarking, energy audits, and transparency policy.
- PACE - Property Assessed Clean Energy program offers low interest loans to qualified applicants.
- City wide performance tool produced by Siemens is being used to monitor progress of energy reduction.
- City operations are currently being powered by 10% renewable energy.
- The city is expanding solar energy plans to 748 buildings / 35MW.
- There are 2 existing co-ops for purchasing solar energy for residential homes.
- Smart street lighting is already being implemented.
- OUC electric has established an integrated resource plan.
- Connectivity is considered a utility, with Spectrum and Verizon participating in this focus area roundtable.

Group Discussion

Curt led a discussion among the group to identify the top challenges that a future-ready city must solve. The challenges identified by the group were:

- Set up an educational program to help bridge the digital divide
- Connectivity using wired or wireless connection with redundancy
- Stranded assets
- Funding
- Limited roadway right of way for all the utilities to share
- Grid resiliency/equitable resiliency
- Find an appropriate use for recycling of batteries that include such things as bus batteries
- Acceptance by the community (not in my backyard issues), ensuring it is equitable
- Data analytics and interconnection
- Roll-out of programs
- Local energy controls
- Rate impacts (especially for low-income residents)

Curt then divided the Roundtable attendees into small groups for a brainstorming exercise. Each group was responsible for identifying at least five short-term solutions for energy and utilities, including key performance indicators, partners, and funding sources. At the conclusion of the exercise, each small group presented their ideas back to the entire roundtable for comments and questions.

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Meeting Notes

Attendees in Group 1 identified short-term solution strategies including the following:

- Provide education to bridge the digital divide.
- Data sharing (data stores) from agencies such as OUC and property appraiser's department.
- Create equity with a green tap tariff to fund low income residents.
- Provide free public Wi-Fi.
- Tackle the digital divide using key performance indicators.
- Make Property Assessed Clean Energy (PACE) and similar funding sources available to everyone.
- Create a Distributed Energy Resources Management System (DERMS) which provides a smart system that works on a community basis.

Attendees in Group 1 identified long-term strategies including the following:

- Develop solutions to relieve congested roadways.
- Make our infrastructure more resilient by undergrounding our utilities.

Attendees in Group 2 identified short-term solution strategies including the following:

- Create more energy efficient buildings through alternative construction materials.
- Create an economic based incentive program to provide lower income households the ability to install solar energy.
- Incremental growth in programs (starting small).
- Incentivize LEED certification of buildings.

Attendees in Group 2 identified long-term solution strategies including the following:

- Invest in alternative energy sources such as wind energy while still investing in solar energy.
- Work with key partners and establish relationships with new partners.
- Establish a scalable fee based on size of the house.

Attendees in Group 3 identified short-term solution strategies including the following:

- Notify consumers of where there is high energy use so that they can make improvements.
- Create the platform for data analytics which creates a report card for when a house is for sale.
- Push notifications customized to the user demographic.

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Meeting Notes

- Provide services such as solar and battery. Need to find ways to improve solar capabilities with OUC. Currently the city is having to subsidize the program as they can't support more solar than there is now because of lack of battery storage.

Attendees identified their top overall key points to consider for a Future-Ready and Smart City approach.

- Education
- Free public Wi-Fi
- Battery storage
- Data store
- Governance and policies
- Models for net metering or other things – developing a funding source for growth that is equitable

Next Steps:

Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in summer 2020.

Mike Hess adjourned the meeting at 3:50 PM

PRIORITIZED STRATEGIES

After further synthesis, the project team organized the findings of this meeting and previous internal stakeholder meetings into the following:

- Promote educational programs for energy efficiency and conservation
- Improve efficiency with Demand Side Management, including distributed energy resource management system (DERMS)
- Pursue creative energy production and storage solutions
- Create energy as a service programs: solar and batteries as a service
- Combine energy and WiFi services to help manage home energy use and save money
- Provide real-time information about citizen energy usage
- Provide information on availability of Electric Vehicle (EV) charging stations
- Increase availability of alternative energy use (solar)
- Improve reliability for power during and after storms

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Meeting Notes

Place: Orlando City Hall
1st Floor
Rogers-Kiene
Conference Room
Date: January 23, 2020
Project #: 63588.00

Notes Taken by: C. Macintosh
Re: Public Safety and Health Focus Area Roundtable Meeting Summary

ATTENDEES

Hezedean Smith	John Slot	Benjamin Barksdall
Duane Stephens	Steven Thorp	Jason Kuhlan
Jay Draisin	Christopher Kemp	Surabhi Singh
Doug Goerke	Doug Jamison	Jennifer Cicia
Charles Ramdatt	Andres Hoyos	Doug Dierlich
Manuel Soto	Jeff Chabon	Philip Tinsley
April Taylor	Gail Johnson	Greg Curtain
Cole Blake	Jeff Pridmore	Jordan Crandall (VHB)
Mike Hess	Dan Kirby (Jacobs)	Chris Macintosh (Jacobs)
Madeline Almodovar (Jacobs)	Dave Mulholland (VHB)	Curt Ostrodka (VHB)

MEETING SUMMARY

All participants introduced themselves and described their role at the City or with the VHB team. Dave Mulholland opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the Focus Area Roundtable Meeting was to bring subject matter experts from the private sector, public sector, and academia together to discuss issues related to Public Safety and Health and brainstorm potential solutions. The agenda for the roundtable was as follows:

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Meeting Notes

- Group Discussion
    - Challenges that must be addressed
    - Identification of five (5) potential short term and long-term solutions
    - Identification of key performance indicators, partners, and funding sources
    - Prioritization of short-term solutions
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Curt Ostrodka described the community engagement process. The project team has met with each internal City department to understand challenges, and opportunities. He noted that the Roundtable Meeting represented one of six focus areas that the City is studying to become more future-ready. The six focus areas are:

- Solid waste
- Energy and utilities
- Public safety and health
- Water and wastewater
- Transportation
- Built environment

There will be a series of public workshops in each City Commissioner District so that the public can learn about the project and comment on the potential solutions that are identified by Roundtable participants.

Deputy Chief Doug Goerke, City of Orlando "champion" for Public Safety and Health roundtable, provided an overview of goals, activities and projects that the City has in progress regarding Public Safety and Health:

- Goals:
    - Eliminate all pedestrian and bike facilities.
    - Ensure access to affordable, healthy food options such as community gardens, grocery stores or farmers markets within ½ mile of every resident.
    - Reduce obesity and diabetes rates.

- Ongoing activities and projects:
    - Orlando had 78 million visitors in 2018.
    - The City currently has 17 security cameras in the city where police may not be present that focus on violent crime. The police are working with commercial building managers and others to allow access to their camera feeds. This is being considered as part of the requirement for building permits.

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Meeting Notes

- Video analytics can be used to detect actions such as running (that might indicate a situation people are fleeing from), stagnant items (such as packages left behind), slowdown in traffic flow (that might indicate a crash).
- To support incident management for natural and man-made disasters – Web EOC is used for sharing situational awareness and the common operational picture and to track resources across the state.
- The Joint Police-Fire Computer Aided Dispatch is operational and allows the operator to merge calls together to improve interoperation and situational awareness.
- A public safety dashboard to view all public safety information at one time is in progress.

Group Discussion

Curt led a discussion among the group to identify the top challenges that a future-ready city must solve. The challenges identified by the group were:

- Wealth and income equality
- Mental health
- Privacy vs public safety
- Access to community centers
- Growing aging population
- Good understanding of the built environment for first responders
- Pedestrian safety design
- Better information for travel options
- Better process for use of information
- Access to data, sharing internally and how to educate the public on how to access it
- Build in the concept for future growth and adjustments – there is no endpoint to future ready
- Culture for preparedness at all levels in the community
- Influence of tourism
- Using platforms to protect first responders
- Data security
- Funding to education and more educational programs (help with crime)

Curt then divided the Roundtable attendees into small groups for a brainstorming exercise. Each group was responsible for identifying at least five short-term solutions for public safety and health, including key performance indicators, partners, and funding sources. At the conclusion of the exercise, each small group presented their ideas back to the entire roundtable for comments and questions.

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Meeting Notes

Attendees in Group 1 identified short-term solution strategies including the following:

- Develop an educational campaign that is geared to the public and can be easily transferable to the tourism industry.
- Integrate data across all sources in the region for a common language. This can include emergency buttons on kiosks.
- Strengthen partnerships with different agencies to provide for opportunities for investment and permitting.
- Provide resources for mental health that is available 24/7.
- Provide permanent housing solutions for all residents.
- Ensure pedestrian safety throughout the city. Consider smart crosswalks as an application for a safer pedestrian environment.
- Consider working with key partners such as vendors, UCF and various school districts and creating a proactive media campaign.

Key Performance Indicators include:

- Surveys
- Participation
- Number of kiosks installed
- Users of kiosks and Wi-Fi
- Number of bankruptcies
- Frequent homelessness

Attendees in Group 2 identified short-term solution strategies including the following:

- Seek to serve vulnerable populations and create a plan that is age friendly, autism friendly, inclusive and expands the 311 program.
- Create a message that delivers and communicates to all demographics.
- Create an effective emergency response and awareness system throughout the city. This can include:
    - Video feed and analytics for crowd sourcing and predictive analytics,
    - Crowd sourcing for operational positioning.
    - Wi-Fi access for emergency response.

Attendees in Group 3 identified short-term solution strategies including the following:

- A city-wide information platform (or regional) for communication on all things like public safety, incidents, etc.
- Provide city-wide public Wi-Fi.

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Orlando, FL 32801-4326
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Meeting Notes

- Develop a collaborative multi discipline outreach to deal with mental health, public safety, homelessness.
- Provide a digital twin that supports public safety and public works.
- Provide digital kiosks throughout the city.

Key Performance Indicators for Public Health and Safety include:

- Well cities and neighborhoods
- LEED
- Blue zones
- PICSA – prosperity and inclusive cities seal awards
- Technical standards (such as V2X)

Attendees identified long-term solution strategies including the following:

- Next generation 911 texts and social media – to map in order to support first responders.
- Install digital twin technology within the city.
- Develop stronger land development codes for new development.
- Improve partnerships among related agencies.
- Analyze and adjust everything to social services.
- Make longer term mental health treatment available to those in need.

The three top solutions generated for Public Safety and Health include the following:

1. Provide a centralized data clearing house for information.
2. Serving vulnerable groups of people such as the elderly and mentally and physically challenged people.
3. Provide Wi-Fi accessibility throughout the city.

Attendees identified Governance and Policies Suggestions for Public Safety and Health:

- Incentivize or require data to be made available during the permitting process.
- Determine who is the custodian of data and making sharing data easier.
- Ensure that all data is private and secure.
- Consider changing record retention time (i.e. for video data) due to the high cost.

Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in summer 2020.

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Orlando, FL 32801-4326
P 407.839.4006

Meeting Notes

PRIORITIZED STRATEGIES

After further synthesis, the project team organized the findings of this meeting and previous internal stakeholder meetings into the following:

- Enhance processes to connect vulnerable populations, including those experiencing homelessness, to the appropriate resources
- Improve emergency communications and message delivery systems
- Improve public safety and security warnings via mobile alerts
- Better integrate available data in pursuit of public safety
- Enhance emergency response and awareness (including message delivery)
- Employ technology solutions for law enforcement and surveillance
- Use sensors to improve accessibility of buildings
- More sophisticated crowd management strategies for large venues and events

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ORLANDO
FUTURE-
READY
CITY
MASTER PLAN

PUBLIC SAFETY ROUNDTABLE

JANUARY 23, 2020

CITY OF ORLANDO

Agenda

1. **INTRODUCTION**
2. **INSPIRATION**

   Where are we now?
3. **EXPLORATION**

   Where do we want to go?
4. **FEEDBACK**

   How do we get ready?
5. **NEXT STEPS**

   How do we get there?

History of Smart ORL program

FEBRUARY 2007
Created Green Works Orlando

SPRING 2016
Open Data website

JANUARY 2016
Applied to US DOT Smart Cities Challenge

MAY 2016
Smart Cities Orlando Forum @ EPCOT

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"Autonomous Vehicle Mobility Initiative (AVMI)"

ORLANDO FUTURE-READY CITY MASTER PLAN

Purpose of the Future-Ready Action Plan

Vision Statement:

For Orlando to become America's premier Future Ready City through continual advancement, embracing new opportunities to help address community challenges and ensure our city remains one of the best places in America to live, work, visit and raise a family.

Mission Statement:

The City of Orlando desires to enhance its ability to deliver efficient and secure human-centered public services through the development and use of interconnected data systems, communication, sensor technology, and Internet of Things (IoT) solutions

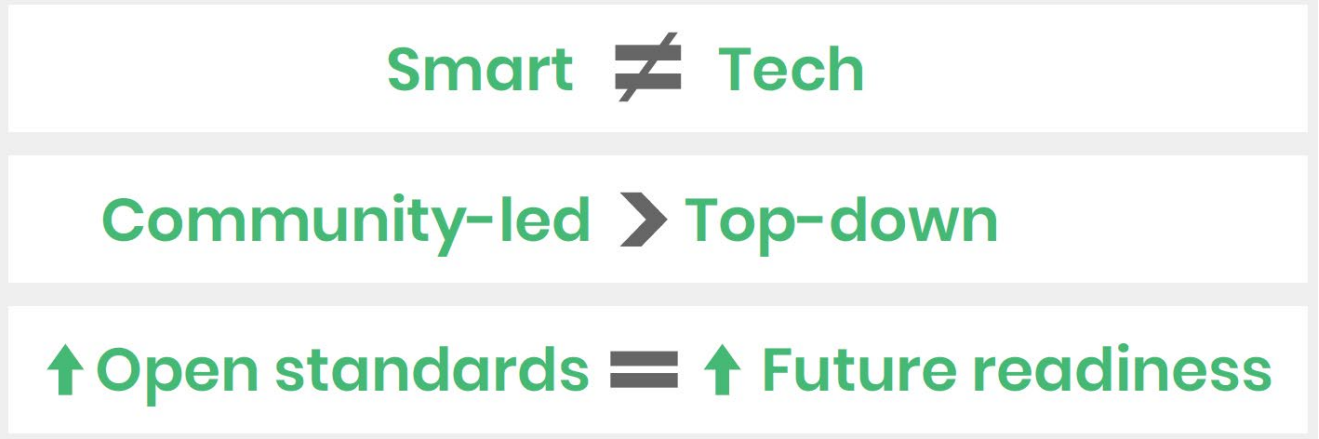
Purpose of the Future-Ready Action Plan

Guiding Principles

- ✓ Security focused - Informational and physical
- ✓ People first - culture of safety
- ✓ Sustainable, reliable, and resilient solutions
- ✓ Responsible (financially, morally, etc.)
- ✓ Relevant and timely
- ✓ Equitable and inclusive
- ✓ Transparent
- ✓ Collaborative

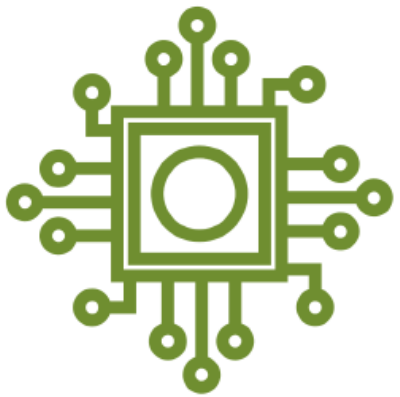
What is Future-Ready?

- A place where residents are empowered to **cocreate opportunities using technology**
- A place that maximizes the urban form's benefits while minimizing its challenges
- A place of prosperity, safety, equity, sustainability, resiliency, diversity, and serendipity



Credit: David Gilford

Smart Cities (1.0)



Technology-led,
City-procured

Responsive Cities (2.0)

City-led,
Technology-enabled

Future Cities? (3.0+)

Citizen-led,
co-created

Credit: David Gilford

Stakeholder Engagement Touchpoints

Summary of Internal Stakeholder Interviews

- ✓ 11 of 12 complete
- ✓ Describe a Future-Ready city
- ✓ Top challenges of a Future-Ready city
- ✓ Identify barriers that prevent Department from being Future-Ready
- ✓ What innovation and technological advances help do job better?
- ✓ Actions to serve City citizens better
- ✓ Feedback regarding data privacy principles
- ✓ Refining data / assets survey

What is a Successful Future-Ready City?

What is a Successful Future-Ready City?

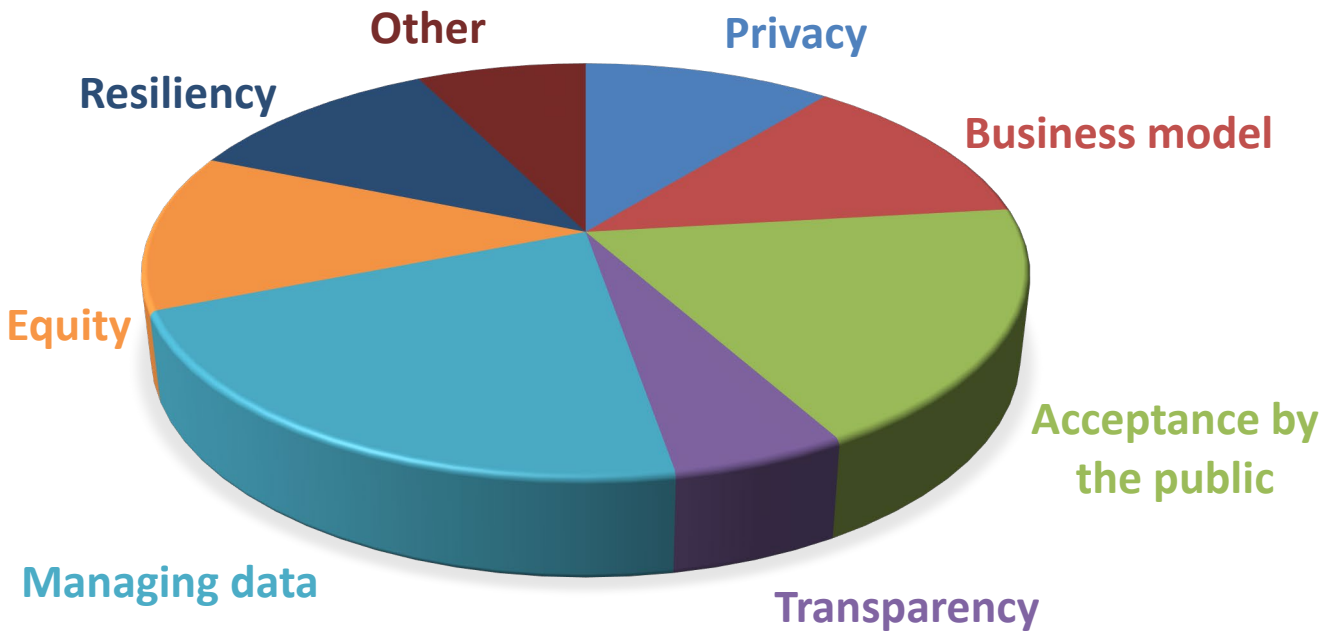
Summary of Internal Stakeholder Interviews

Top departmental barriers to being a Future-Ready city

- Prioritize, procure and/or fund solutions and strategies
- Staff resources and time
- Technical expertise
- Training or educational
- Legislative, legal and political constraints
- Inter-agency, department and private sector collaboration
- Change management (culture)
- Availability of technology
- Standard governance and operating protocol
- Common goals and visions

Summary of Internal Stakeholder Interviews

Top challenges of a Future-Ready city



Pillar Focus Areas

ENERGY / UTILITIES

PUBLIC SAFETY

TRANSPORTATION

BUILT ENVIRONMENT

SOLID WASTE

WATER / WASTEWATER

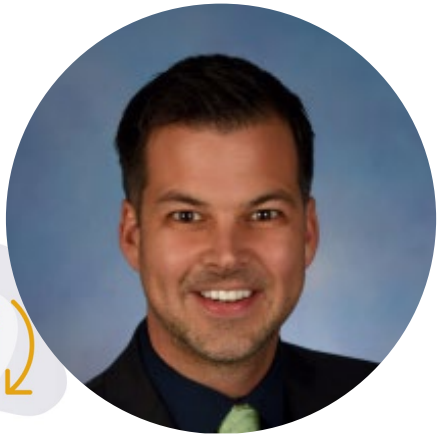
Pillar Focus Areas | **City Champions**

ENERGY / UTILITIES
Chris Castro

PUBLIC SAFETY
Deputy Chief Doug Goerke

TRANSPORTATION
Claudia Korobkoff

BUILT ENVIRONMENT
Ian LaHiff



SOLID WASTE
Joe England

WATER / WASTEWATER
Brittany Sellers

2040 City Goals

- Eliminate pedestrian and bike fatalities (Transportation)
  - Including Vision Zero Action Plan
- Ensure access to affordable, healthy food options (community gardens, grocery stores or farmers markets) within ½ mile of every resident (Local Food)
- Reduce obesity and diabetes rates (Livability)

Applications	Typical Features	City Key Features	Status	Existing Partners	Partnership Opportunities
Video & Predictive Analytics	Use existing assets such as IRIS, Transportation, Drone, Body-worn camera and business partner footage to support response, investigation, plan ning and prevention	Live stream and batch video analysis using aggregated data	In Planning. Array of existing Transportation/ Event Management edge and management center analytic tools	FDOT & LYNX	Event Managers
Incident Management – Natural & Man-Made Disasters	Geographically based system to efficiently manage post incident response	System including citizen reported issues, code enforcement activities, permitting activities, power outages, debris removal, shelter locations, support for special needs populations, etc.	Implemented & Continually Upgraded		Possibly CISCO, State of Florida, FEMA

Applications	Typical Features	City Key Features	Status	Existing Partners	Partnership Opportunities
Joint Police-Fire Computer Aided Dispatch (CAD)	Implement a new Joint Police Fire, Mobile and AVL system	Enabled efficiency and Police/Fire data sharing. GPS enabled AVL sensor information to support other Smart City initiatives. System designed to use non-public safety datasets such as digital plans, traffic video stream etc.	Implemented & Continually Upgraded		Regional Sheriffs and Fire Departments, FDLE
Public Safety Dashboard	Single pan to view all City related Public safety information	Situational awareness	Planning		Orange County, State of Florida,
Video Cameras & Surveillance	Cameras placed on light poles, street lights, kiosks in areas with high crime rates, etc.	IRIS camera system / Real Time Crime Center	Implemented & Continually Upgraded	Orange County Sheriff	FDLE

What are the top challenges that a Future-Ready City must solve?

GROUP DISCUSSION

Identify 5 short term & 5 long term solutions

- Key performance indicators
- Implementers/Partners
- Funding

Future-Ready Best Practices

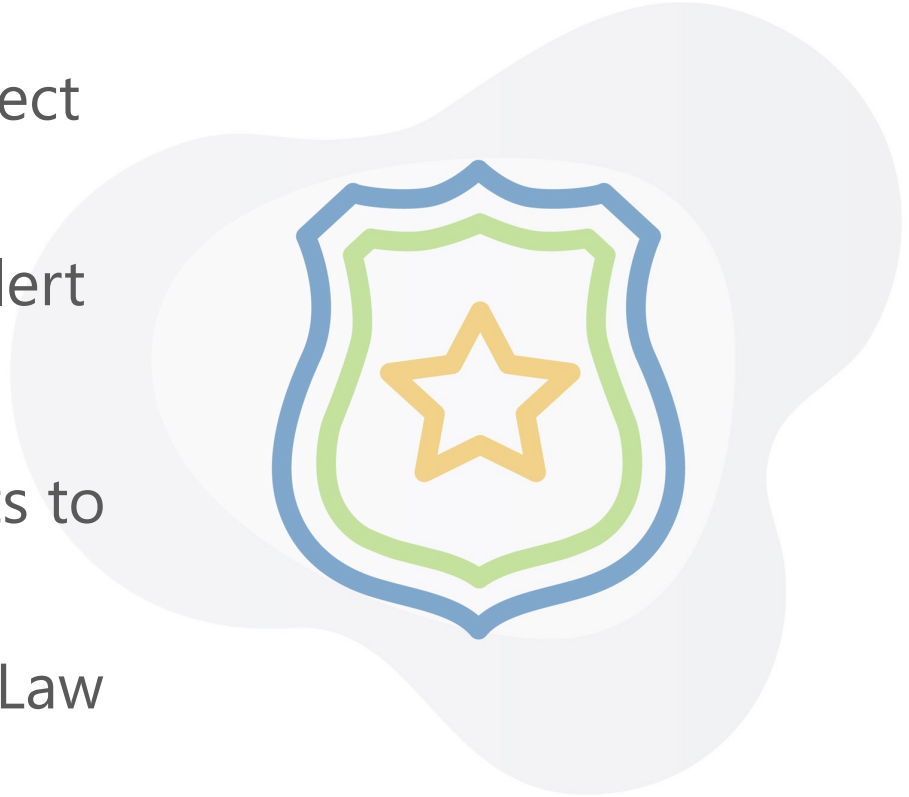
Public Safety

Gunshot Detection:

- Sensor on light poles and traffic systems to detect gunshots and notify police
- Public safety and security warning via Amber Alert

Cameras:

- Monitor and report safety and security incidents to police
- Early warning based on Biometrics available to Law Enforcement



Future-Ready Best Practices

Public Safety

Safety and Security Solutions:

- Predictive policing
- Real-time crime mapping
- Smart surveillance
- Emergency response optimization
- Body-worn cameras
- Disaster early-warning systems
- Personal alert applications
- Home security systems
- Data-driven building inspections,
- Crowd management

PRIORITIZATION

What short term solutions should be prioritized?

What governance & policy changes are needed for implementation?

Next Steps

- Focus Area Roundtable Meetings
- 1st Public Workshop – February 4
- Online Survey
- Strategy Development
- June 2020 City Council Presentation

ORLANDO FUTURE-READY CITY MASTER PLAN

CITY OF ORLANDO

Meeting Notes

Place: Orlando City Hall
1st Floor
Rogers-Kiene
Conference Room
Date: January 17, 2020
Project #: 63588.00

Notes Taken by: C. Macintosh
Re: Solid Waste Focus Area Roundtable Meeting Summary

ATTENDEES

Mike Hess	Chris Castro	Joe England
Andres Hoyos	Everton Johnson	Philip Tinsley
Mike Carroll	Kory Keith	Duane Stephens
Jeff Chabon	Kelly Cohen	Sarah Nemes
Dave Mulholland	Curt Ostrodka	Dale Cody
Matt Honold		

MEETING SUMMARY

All participants introduced themselves and described their role at the City or with the VHB team. Dave Mulholland opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the Roundtable Meeting was to bring subject matter experts from the private sector, public sector, and academia together to discuss issues related to Solid Waste and brainstorm potential solutions. The agenda for the roundtable was as follows:

- History of the Smart Orlando program
- Draft Vision, Mission, and Guiding Principles of the Future-Ready Master Plan
- Description of what it means to be "Future Ready"
- Stakeholder Engagement process
- Summary of Internal Stakeholder Interviews
- City's Progress to Date
- Group Discussion
    - Challenges that must be addressed
    - Identification of five (5) potential short term and long-term solutions
    - Identification of key performance indicators, partners, and funding sources

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Meeting Notes

- Prioritization of short-term solutions
- Discussion on governance and policy issues.

Curt Ostrodka described the community engagement process. The project team has met with each internal City department to understand challenges, and opportunities. He noted that the Roundtable Meeting represented one of six focus areas that the City is studying to become more future-ready. The six focus areas are:

- Solid waste
- Energy and utilities
- Public safety and health
- Water and wastewater
- Transportation
- Built environment

There will be a series of public workshops in each City Commissioner District so that the public can learn about the project and comment on the potential solutions that are identified by Roundtable participants.

Joe England, City of Orlando "champion" for the solid waste roundtable, provided an overview of goals, activities and projects that the City has in progress:

- Goals:
  - Creating a "Zero Waste" community.
  - Elimination of solid waste to landfills and incinerators such as encourage businesses to find alternatives sources of waste.
  - Make Solid Waste a resource rather than a liability.
  - Improve quality of life for all citizens.

- Ongoing activities and projects:
  - Improve Truck Routing Efficiency for recycling and waste management by reducing service time, optimizing truck routes and maintaining vehicles to helps with environmental emissions
  - Improve Food Waste Collection by diverting organic food waste from restaurants, catering services and other food service industries.
  - Tier the collection (example" events at Amway – Second Harvest then other partners.

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Meeting Notes

- Convert to Commercial Smart Dumpsters to track real-time volumetric information.
- Convert to Public Space Trash Cans to track real-time volumetric information for public trash and recycling bins. This will help increase the time between pickups.

Group Discussion

Attendees identified the top challenges for the city to solve:

- Private Companies will need to create better packaging of products in order to reduce waste.
- Determine what strategies need to be set up for residents to reduce the flow of garbage?
- Need to establish policies and governance for reducing solid waste.
- A lack of a carbon tax makes landfills less expensive.
- Challenges with availability of after-market technologies and how to boost these industries.
- Issues with shifting behaviors and perception of what recycling currently looks like.
- Invest in new specialized equipment that allows the separation of organic material.
- Solve challenges with reducing waste at its source.
- Infrastructure for overall Regional Approach (Outside of the City) to solid waste needs to be set up.
- Nearby places to put solid waste

Curt then divided the Roundtable attendees into small groups for a brainstorming exercise. Each group was responsible for identifying at least five short term solutions for solid waste, including key performance indicators, partners, and funding sources. At the conclusion of the exercise, each small group presented their ideas back to the entire roundtable for comments and questions.

Attendees identified short-term solution strategies including the following:

- Create a comprehensive program to educate residents and commercial users' ways to reduce their solid waste footprint.
- Create an incentive program to reduce household waste. This may be tested on a sample of homes to determine its effectiveness.

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Meeting Notes

- Research counties that have implemented successful programs to reduce their solid waste footprint.
- Create a public uniform data program that that tracks how much each city and county is producing.

Attendees identified long-term solutions strategies including the following:

- Create zero waste in landfills by 2040.
- Create a new recycling facility for the region that will be jointly funded by participating counties.
- Invest in long term education to create a culture shift on the importance of minimizing our solid waste and how our citizens can be part of the solution.
- Take lessons learned from other countries by gathering data that had already been compiled on a large scale.
- Implement a bottle tax to reduce waste and encourage recycling.
- Create facilities to separate hazard waste and electronic waste.
- Develop a procedure to predict trends.
- Decentralize waste streams by eliminating home trash collection and create the means for homes to process their own waste.
- Create incentives to reduce solid waste which can be measured by volume and weight of waste.
- Contribute to energy production which allow users to apply to a savings on their utility bill.
- Incentivize new developments to have central pick up locations for waste and the ability to separate and measure recycled material vs energized waste.
- Devise a plan that processes waste in a way that is efficient, cost effective and profitable.
- Create an alternative use for solid waste landfills.

Short-term solutions synthesized from all break-out groups include the following:

Develop an efficient data collection program that achieves the following:

- Ask the right questions
- Make working programs and policies
- Determines what is actually happening on the ground
- Missed collections
- Measure household/neighborhood contributions
- Open source
- Make the data available to everyone

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Meeting Notes

- Measures waste streams
- Creates funding for startups and incubators
- Education/PSA
- Hauler Contract Requirements
- Sustainable purchasing policy
- Have places that use recycling
- Optimize current programs
- County collects E-Waste at transfer stations
- Implement Beyond 34
- App – What goes where?
- Research ability in Central Florida such as meal worms
- Citizen engagement
- Food recovery/tax incentives/liability and protection
- Create market demand such as selling compost and providing recycled mulch
- Consistent messaging across the region
    - Awareness of existing programs
    - Amway
    - Incentivize venue/owner operators
- Regional facilities
- Incentivize waste reduction to encourage a behavior change at home
- Identify contamination at recycling centers and take that message to who is creating the stream
- Budget for sensor installers

Following the presentation of all potential solutions, attendees prioritized their top short-term solutions through "green dot" voting:

1. New intelligent materials recovery facility (MRF) to increase amount of processing of solid waste.
2. Reduce waste at the source, educational outreach, coordination of existing partners and programs, marketing and collaboration with Beyond 34 program stakeholders?
3. Generate policy changes for recommendations through interlocal agreements with cities and counties.
4. Determine the best funding mechanism for each proposal and solution.

Next Steps:

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Meeting Notes

Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in Summer 2020.

PRIORITIZED STRATEGIES

After further synthesis, the project team organized the findings of this meeting and previous internal stakeholder meetings into the following:

- Create a regional partnership to build an Intelligent Materials Recovery Facility (MRF) for Recycling
- Leverage innovation from the city's incubators to make recycling easier
- Promote educational programs to reduce waste at the source
- Pursue food waste and recovery solutions with community partners
- Collect more data on recycling and waste disposal
- Promote clear guidelines about what can be recycled
- Pursue optimized energy-efficient routes for trucks picking up waste
- Market information on composting and food recovery programs

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ORLANDO
FUTURE-
READY
CITY
MASTER PLAN

SOLID WASTE ROUNDTABLE

JANUARY 17, 2020

CITY OF ORLANDO

Agenda

1. **INTRODUCTION**
2. **INSPIRATION**

   Where are we now?
3. **EXPLORATION**

   Where do we want to go?
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   How do we get ready?
5. **NEXT STEPS**

   How do we get there?

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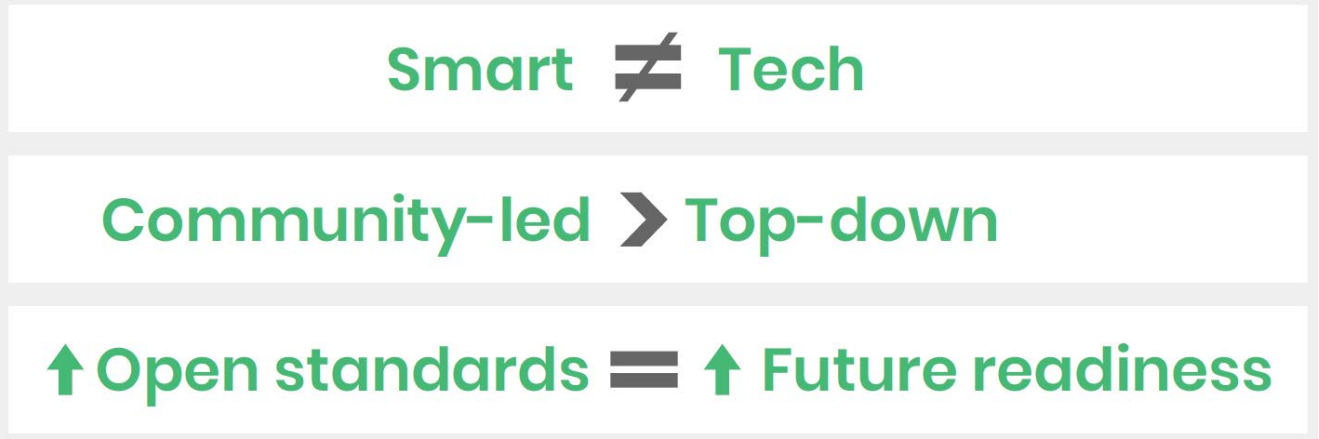
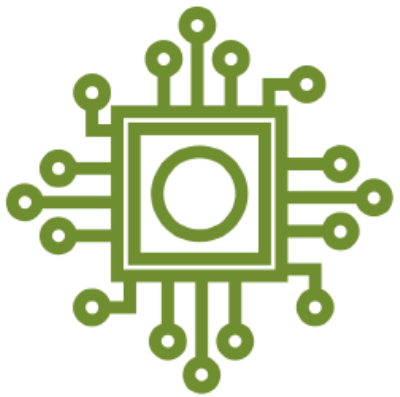


Credit: David Gilford

Smart Cities (1.0)



Technology-led,
City-procured

Responsive Cities (2.0)

City-led,
Technology-enabled

Future Cities? (3.0+)

Citizen-led,
co-created

Credit: David Gilford

Stakeholder Engagement Touchpoints

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- ✓ Describe a Future-Ready city
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What is a Successful Future-Ready City?

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Top departmental barriers to being a Future-Ready city

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- Technical expertise
- Training or educational
- Legislative, legal and political constraints
- Inter-agency, department and private sector collaboration
- Change management (culture)
- Availability of technology
- Standard governance and operating protocol
- Common goals and visions

Summary of Internal Stakeholder Interviews

Top challenges of a Future-Ready city

- Managing data
- Acceptance by the public
- Business model
- Equity
- Resiliency
- Privacy
- Transparency
- Other

Pillar Focus Areas

ENERGY / UTILITIES

PUBLIC SAFETY

TRANSPORTATION

BUILT ENVIRONMENT

SOLID WASTE

WATER / WASTEWATER

Pillar Focus Areas | **City Champions**

ENERGY / UTILITIES
Chris Castro

PUBLIC SAFETY
Deputy Chief Doug Goerke

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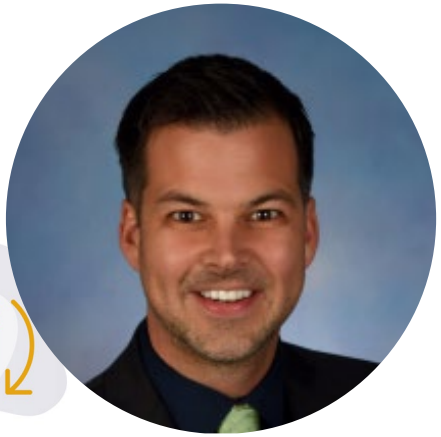

SOLID WASTE
Joe England

WATER / WASTEWATER
Brittany Sellers

SOLID WASTE

- Elimination of solid waste sent to landfills and incinerators
- Becoming a “zero waste” community
- Making resource rather than an environmental liability; an opportunity for economic growth
- Improving quality of life in Orlando

Applications	Typical Features	City Key Features	Status	Existing Partners	Partnership Opportunities
Recycling & Waste Management	Optimized trash routes; reduced service time; analyzed recycling habits of residents, reduced fuel consumption of fleet vehicles, better management of fleet vehicles, CO2 emissions.	Comprehensive City recycling management program	Implemented (piloted)	Rubicon Global; Easy Route (Routeware)	
Food Waste Collection	Divert organic food waste from restaurants, catering services, and other food service industries	City Commercial food waste collection program	Implemented	Harvest Power; Second Harvest	Recovery Agencies

Applications	Typical Features	City Key Features	Status	Existing Partners	Partnership Opportunities
Commercial Smart Dumpsters	Real-time volumetric information for commercial dumpsters	The City is planning to test smart dumpster technology to provide real-time volumetric information for dumpsters in commercial routes throughout the City	Implemented (piloted)	Netbin (CSI); Nordsense	
Public Space Trash Cans	Real-time volumetric information for public trash and recycling bins	Provides solar power to compact waste to minimize frequency of collection, and provides real-time volumetric information about how full the bins are	Implemented	Big Belly Solar	Expand infrastructure

What are the top challenges that a Future-Ready City must solve?

GROUP DISCUSSION

Identify 5 short term & 5 long term solutions

- Key performance indicators
- Implementers/Partners
- Funding

Potential Future-Ready Best Practices

Solid Waste

- Optimized trash routes, better management of fleet
- Reduced service time for customers
- Analyze recycling habits of residents
- Reduce fuel consumption of fleet vehicle
- Evaluate options for Waste to Energy
- Reduction in Carbon Footprint

PRIORITIZATION

What short term & long term solutions should be prioritized?

What governance & policy changes are needed for implementation?

Next Steps

- Focus Area Roundtable Meetings
- 1st Public Workshop – February 4
- Online Survey
- Strategy Development
- June 2020 City Council Presentation

ORLANDO FUTURE-READY CITY MASTER PLAN

CITY OF ORLANDO

Meeting Notes

Place: Orlando City Hall
8th Floor
Crossroads
Conference Room
Date: January 23, 2020
Project #: 63588.00

Notes Taken by: C. Storey
Re: Transportation Focus Area
Roundtable Meeting Summary

ATTENDEES

Ed Bryant
Johnathon Ford
Mark Tobin
Evan Magley
Charles Ramdatt
Michelle Robinson
Jeff Benavides
Jen Foote
Joanna Cruch
Adam Zubritsky
Brian Sanders
Luz Aviles
Greg Curtain
Doug Dierlich
Ryan Fetchko (VHB)
Dan Kirby (Jacobs)
Stephanie Neves
Chris Cairns
Benton Bonney
Claudia Korobkoff
Duane Stephnes
Sara Sullivan
Juan Santos
David Thomas Moran
Paul Lewis
Tushar Patel
Andres Hoyos
Harmonie Wilson
Jeff Pridmore
Dale Cody (Metric)
Chris Macintosh (Jacobs)
Dave Mulholland (VHB)
Lisa Rain
Cade Braud
Steve Jones
Chris Castro
Jason Burton
Jim Greer
Eric Hill
Doug Jamison
Jennifer Cicia
Alissa Barber Torres
Alex Sorondo
Bernadette Mural
Naveen Eluru
Mathhew Honold (Metric)
Madeline Almodovar (Jacobs)
Curt Ostrodka (VHB)

MEETING SUMMARY

All participants introduced themselves and described their role at the City or with the VHB team. Dave Mulholland opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the Roundtable

225 E. Robinson Street, Suite 300
Landmark Center Two
Orlando, FL 32801-4326
P 407.839.4006

Meeting Notes

Meeting was to bring subject matter experts from the private sector, public sector, and academia together to discuss issues related to Transportation and brainstorm potential solutions. The agenda for the roundtable was as follows:

- History of the Smart Orlando program
- Draft Vision, Mission, and Guiding Principles of the Future-Ready Master Plan
- Description of what it means to be "Future Ready"
- Stakeholder Engagement process
- Summary of Internal Stakeholder Interviews
- City's Progress to Date
- Group Discussion
    - Challenges that must be addressed
    - Identification of five (5) potential short term and long-term solutions
    - Identification of key performance indicators, partners, and funding sources
    - Prioritization of short-term solutions
    - Discussion on governance and policy issues.

Curt Ostrodka described the community engagement process. The project team has met with each internal City department to understand challenges, and opportunities. He noted that the Roundtable Meeting represented one of six focus areas that the City is studying to become more future-ready. The six focus areas are:

- Solid waste
- Energy and utilities
- Public safety and health
- Water and wastewater
- Transportation
- Built environment

There will be a series of public workshops in each City Commissioner District so that the public can learn about the project and comment on the potential solutions that are identified by Roundtable participants.

Curt provided an overview of the goals, activities and projects that the City has in progress for transportation:

- Goals:
    - The majority of trips to be made by foot, bike, carpooling or transit.

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Meeting Notes

- Achieve a Gold ranking for the League of American Bicyclist Bicycle Friendly Community Score.
- Increase the number of miles of safe, sustainable transportation infrastructure, specifically bike lanes and paths, transit lines and sidewalks.
- Double the street miles within the city that meet the 'complete street' criteria.
- Eliminate pedestrian and bike fatalities.
- Increase the use of electric vehicles (EVs) and alternative fuel vehicles throughout the city.
- Attain a 'good' rating on the Air Quality Index (AQI) 365 day/year.

- Ongoing activities and projects:
  - Install traffic sensors to monitor traffic levels and the ability to adjust signal timings, assign repairs and communicate with traffic.
  - Install red light camera sensors to help increase traffic safety.
  - Install smart technology to locate parking spaces on the street and in garages for greater efficiency, reduction in congestions and provide for a variety of payment methods.
  - EV charging stations located throughout the city.
  - Autonomous and electric shuttle service to reduce air pollution throughout the city.
  - Bike and scooter sharing program provides alternative modes of transportation.
  - Multimodal transportation dashboard provides real-time transportation options.

Group Discussion

Attendees identified the top transportation challenges and barriers of a Future Ready City:

- Connectivity and data support infrastructure.
- Cross-system standards that are user friendly and integrated.
- Varying schedules for different modes of transportation.
- Perception of the public to accept alternative modes of travel.
- Maintenance of higher levels of service and operations.
- Funding for existing transit and improvements.
- The ability to get ahead of electric vehicle infrastructure.
- Accessibility for a wide range of disabilities.
- Providing mass transit for the elderly.

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Meeting Notes

- What will the funding will be used for (existing vs. future)?
- City is built for single car travel, which increases the amount of travel time for delivery vehicles with online shopping habits.
- Orlando has heavy tourism and may not be used to the variety and types of transportation available.
- The location of affordable housing compared to workspaces may not be conveniently located.

Curt then divided the Roundtable attendees into small groups for a brainstorming exercise. Each group was responsible for identifying at least five short-term solutions for transportation, including key performance indicators, partners, and funding sources. At the conclusion of the exercise, each small group presented their ideas back to the entire roundtable for comments and questions.

Attendees identified short-term strategies by category for transportation including the following:

Safety

- Safety is a priority and several key issues were discussed including the Vision Zero, Complete Streets, code enforcement, better notification for special needs and maintenance during construction.
- Develop, enhance and continue relationships with various partners like Metroplan Orlando, DOT, various municipalities, schools, and City Councils.
- Key performance indicators for safety is the number of injuries and fatalities and the number of reductions of traffic violations.

Intermodal Transportation and Reliable Connectivity

- Solutions include the expansion and integration of cyber safety, an integrated/consolidated app with various transportation methods, the expansion of BRT and cycle tracks and TDM Value.
- Partners include – LYNX, City, County, Schools, Parks, Airport, Vendors (tech companies), SunRail, CFX and the Turnpike.
- Key performance indicators include the number of incursions, the adoption of applications, the number of trips, on time transportation and the reduction of gap times between types of transportation.
- Funding sources include enforcement agencies, federal grants, City and State, partnerships, user fees and vehicle miles traveled.

Operations and Maintenance Solutions

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Meeting Notes

- Solutions include dropping obsolete programs and increasing funding where appropriate. Foster innovation expand work force education and develop a regional and data sharing platform.
- Partners include – LYNX, City, County, Schools, Parks, Airport, Vendors (tech companies), SunRail, CFX and the Turnpike.
- Key performance indicators include the amount of usage, uptime and ROI.
- Funding sources include enforcement agencies, federal grants, City and State, partnerships, user fees and vehicle miles traveled.

Land Use

- Solutions include increasing the density, ensuring people are not displaced and making affordable housing close to the workplace.
- Partners include – LYNX, City, County, Schools, Parks, Airport, Vendors (tech companies), SunRail, CFX and the Turnpike.
- Funding sources include enforcement agencies, federal grants, City and State, partnerships, user fees, vehicle miles traveled and workplace benefits.

Education and Transition Plan Solutions

- Develop education programs for people with special needs.
- Change management
- Outreach to colleges and universities throughout the state.
- Great American Teaching such as teach-ins and PSA's.
- Hire a PIO – Public information officer to oversee the program.
- Work with local champions to help lead the city into the future.
- Partners include – LYNX, City, County, Schools, Parks, Airport, Vendors (tech companies), SunRail, CFX and the Turnpike.
- Funding sources include enforcement agencies, federal grants, City and State, partnerships, user fees and vehicle miles traveled.

Short-term solutions synthesized from all break-out groups for transportation include the following:

- "Make riding the bus cool" through amenities (such as Starbucks onboard).
- Create unified data incentives and policies that is related to other systems of data.
- Work with a wide variety of partners.
- Develop policies from the federal level to the local level that support accessibility for all.
- Develop a unified fare collection system that is tied to a mobile app.
- Monetize assets.

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Meeting Notes

- Provide the infrastructure for Autonomous Vehicles.
- Develop partnerships with private industries.
- Develop the infrastructure for Electric Vehicle in parking lots and along roadways.
- Create a multimodal transportation system that provide connections to the intercity.
- Allow Electronic Benefit Transfer (EBT) to be accepted with transportation fares.
- Create a comprehensive transportation-oriented infrastructure plan. This could include utilizing the empty space at malls.
- Create an educational outreach campaign.
- Get people to want to take public transportation and provide incentives for public transportation.

Attendees identified the three top short-term strategies for transportation:

1. Create a unified fare collection program such as a mobile app.
2. Develop a marketing and education campaign to make riding the bus a more desirable mode of transportation. This can include benefits such as Wi-Fi capability and working on the bus on your way to work.
3. Link land uses to the types of roadways and transportation networks.

Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussion and public workshops. Final results will be presented to the City Council in June 2020.

PRIORITIZED STRATEGIES

After further synthesis, the project team organized the findings of this meeting and previous internal stakeholder meetings into the following:

- Pursue a single payment system for transportation (transit, ride-share, bike-share, parking), including Electronic Benefit Transfer (EBT)
- Make riding transit a great experience
- Detailed information about transit services
- Create a Frequent Flyer program to increase ridership and transit use
- Make efficient use of available data streams through open data management
- Coordinate transportation and land use priorities to better consider livability and affordable housing
- Take advantage of local research partnerships
- Provide up-to-date information on roadway conditions

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Meeting Notes

- Make parking and electric vehicle charging stations easy to find

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ORLANDO FUTURE-READY CITY MASTER PLAN

TRANSPORTATION ROUNDTABLE

JANUARY 22, 2020

CITY OF ORLANDO

Agenda

1. **INTRODUCTION**
2. **INSPIRATION**

   Where are we now?
3. **EXPLORATION**

   Where do we want to go?
4. **FEEDBACK**

   How do we get ready?
5. **NEXT STEPS**

   How do we get there?

History of Smart ORL program

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Open Data website

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"Autonomous Vehicle Mobility Initiative (AVMI)"

ORLANDO FUTURE-READY CITY MASTER PLAN

Purpose of the Future-Ready Master Plan

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For Orlando to become America's premier Future Ready City through continual advancement, embracing new opportunities to help address community challenges and ensure our city remains one of the best places in America to live, work, visit and raise a family.

Mission Statement:

The City of Orlando desires to enhance its ability to deliver efficient and secure human-centered public services through the development and use of interconnected data systems, communication, sensor technology, and Internet of Things (IoT) solutions

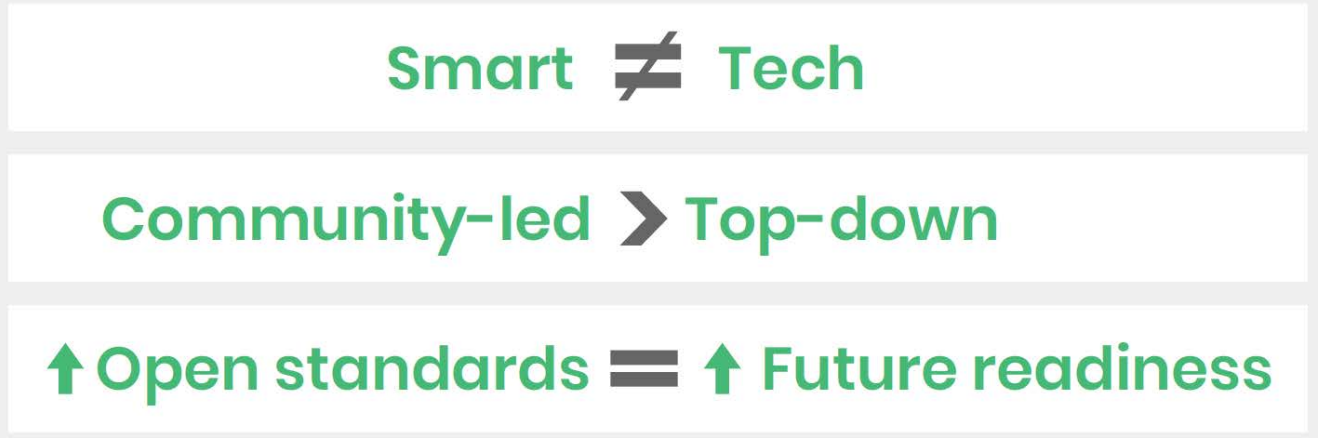
Purpose of the Future-Ready Master Plan

Guiding Principles

- ✓ Security focused - Informational and physical
- ✓ People first - culture of safety
- ✓ Sustainable, reliable, and resilient solutions
- ✓ Responsible (financially, morally, etc.)
- ✓ Relevant and timely
- ✓ Equitable and inclusive
- ✓ Transparent
- ✓ Collaborative

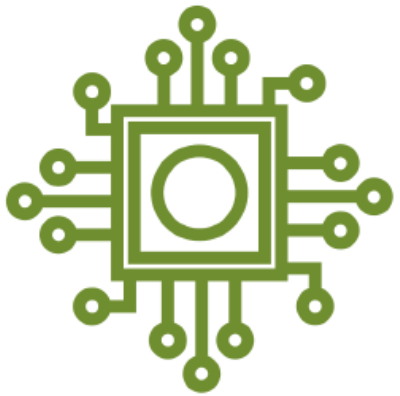
What is Future-Ready?

- A place where residents are empowered to **cocreate opportunities using technology**
- A place that maximizes the urban form's benefits while minimizing its challenges
- A place of prosperity, safety, equity, sustainability, resiliency, diversity, and serendipity



Credit: David Gilford
UCF Distinguished Lecture Series – 11/13/19

Smart Cities (1.0)



Technology-led,
City-procured

Responsive Cities (2.0)

City-led,
Technology-enabled

Future Cities? (3.0+)

Citizen-led,
co-created

Credit: David Gilford

Stakeholder Engagement Touchpoints

Summary of Internal Stakeholder Interviews

- ✓ 11 of 12 complete
- ✓ Describe a Future-Ready city
- ✓ Top challenges of a Future-Ready city
- ✓ Identify barriers that prevent Department from being Future-Ready
- ✓ What innovation and technological advances help do job better?
- ✓ Actions to serve City citizens better
- ✓ Feedback regarding data privacy principles
- ✓ Refining data / assets survey

What is a Successful Future-Ready City?

What is a Successful Future-Ready City?

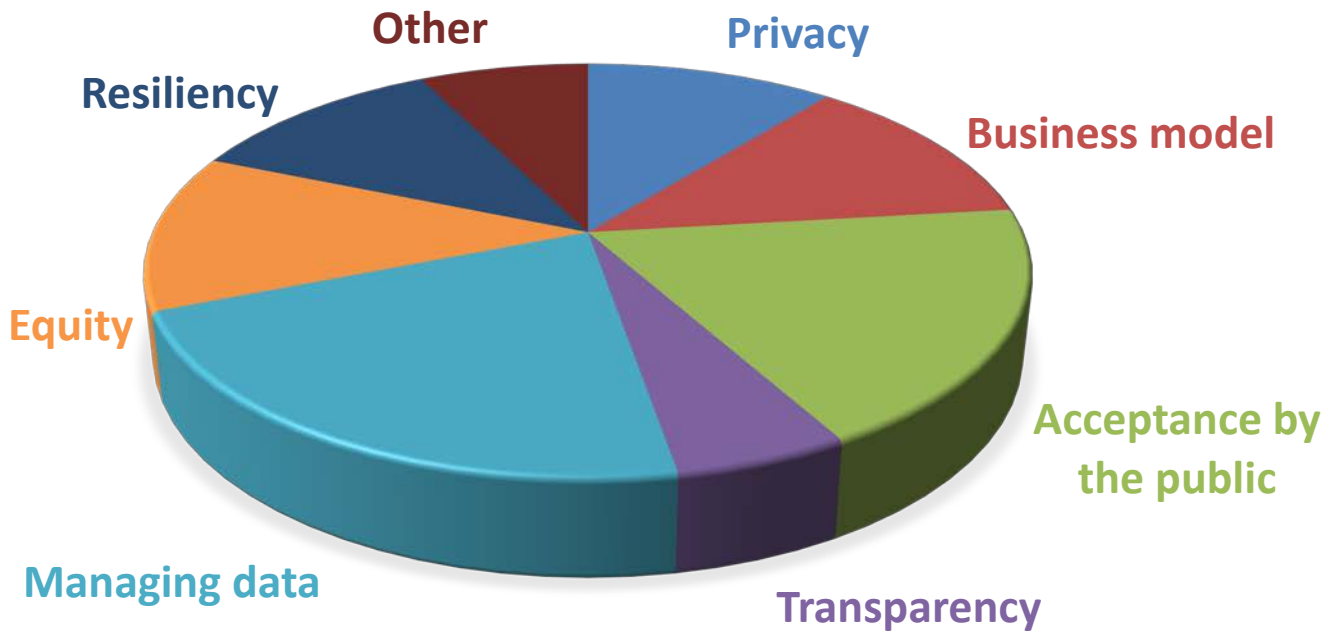
Summary of Internal Stakeholder Interviews

Top departmental barriers to being a Future-Ready city

- Prioritize, procure and/or fund solutions and strategies
- Staff resources and time
- Technical expertise
- Training or educational
- Legislative, legal and political constraints
- Inter-agency, department and private sector collaboration
- Change management (culture)
- Availability of technology
- Standard governance and operating protocol
- Common goals and visions

Summary of Internal Stakeholder Interviews

Top challenges of a Future-Ready city



Pillar Focus Areas

ENERGY / UTILITIES

PUBLIC SAFETY

TRANSPORTATION

BUILT ENVIRONMENT

SOLID WASTE

WATER / WASTEWATER

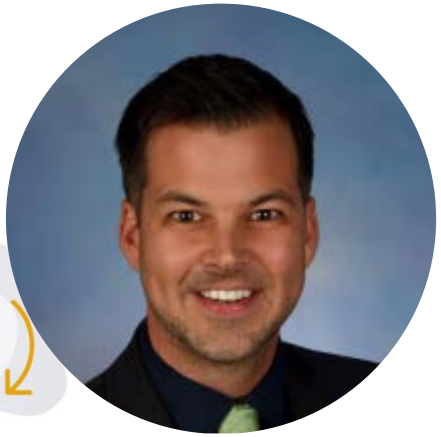
Pillar Focus Areas | **City Champions**

ENERGY / UTILITIES
Chris Castro

PUBLIC SAFETY
Deputy Chief Doug Goerke

TRANSPORTATION
Claudia Korobkoff

BUILT ENVIRONMENT
Ian LaHiff



SOLID WASTE
Joe England

WATER / WASTEWATER
Brittany Sellers

2040 City Goals

- Majority of trips made by foot, bike, carpooling, or transit
- Achieve a Gold ranking for the League of American Bicyclists Bicycle Friendly Community Score
- Increase miles of safe, sustainable transportation infrastructure (bike lanes and paths, transit lines and sidewalks)

2040 City Goals

- Double street miles within the city that meet “complete streets” criteria
- Eliminate pedestrian and bike fatalities
- Increase the use of electric vehicles (EVs) and alternative fuel vehicles throughout the city
- Attain a “good” rating on the Air Quality Index (AQI) 365 days/year

Transportation

Applications	Definition	Features	Existing Partners
Traffic Sensors	• Monitor traffic levels and ability to adjust signal timings, assign repairs, communicate with traffic	• Fiber optic network • Interconnected signals • Traffic management center • Traffic cameras • Transit priority	FDOT, CFX, Lynx, UCF, Orange County, Seminole County
Red Light Camera	• Increase Traffic safety	• Electronic sensors	
Parking	• Traffic circulation congestion reduction • Real-time availability data • Mobile payments variable rate	• On-street system to locate spaces • Multiple payment methods • Electronic notifications • Smart Garages • Meter-less parking	ParkMobile
EV Charging Infrastructure	• Robust network of EV charging stations (Electric vehicles and shuttles)	• OUC Charge It program is available	OUC

Transportation

Applications	Definition	Features	Existing Partners
Autonomous Shuttle	• Autonomous & electric vehicle technology • Air pollution reduction	• Transit Autonomous Vehicle Mobility Initiative (AVMI)	Lynx, FDOT, MetroPlan Orlando, BEEP
Live-Feed Bus Stops	• Real time info • Current bus location • Traffic signals systems • Smartphone apps		LYNX

Bike/Scooter Sharing	• Provide access to:
	  • Bike sharing
	  • Scooter sharing
		• Micro-mobility Parking Areas within public ROW
		• Multiple payments method
		• Completes the last mile
			Downtown Orlando CRA
			Populus / Ride Report

Multimodal Transportation Dashboard	• Real-Time Multimodal transportation outlook options	• Real time Feed • Performance measures	Omnimodal

What are the top challenges that a Future-Ready City must solve?

GROUP DISCUSSION

Identify 5 short term & long term solutions

- Key performance indicators
- Implementers/Partners
- Funding

Future-Ready Best Practices

Transportation Systems

Parking:

- Mobile payment
- Variable rate times
- Real-time availability of Parking Spots
- Reserve parking using City APP

Future-Ready Best Practices

Transportation Systems

Traffic Sensors:

- Monitor traffic levels on streets & highways
- Traffic management operations systems
- Diverting traffic and avoiding bottle necks
- Cameras for traffic management
- Vehicle tracking for providing road side assistance
- Real-time road navigation

Future-Ready Best Practices

Transportation Systems

Live Feed Bus Stops

- Real time info on schedule changes,
- Current bus location,
- Bus mechanical failure feed on City APP
- Advertising at Bus Stops

Future-Ready Best Practices

Transportation Systems

EV Charging:

- Charging stations for electric vehicles
- Potential as Wi-Fi hotspots,
- Increases Energy efficient vehicles
- Reduction in Carbon Footprint

Bike Sharing:

- Solve First and Last Mile Issue
- Rental stations where residents can check out/return bikes
- Reducing traffic congestion
- Reduction in Carbon Footprint

Future-Ready Best Practices

Transportation Systems

Mobility Solutions:

- Autonomous vehicles
- Predictive maintenance of vehicles
- Congestion pricing
- Demand-based micro transit
- Integrated multimodal information for infrastructure planning

PRIORITIZATION

What short term solutions should be prioritized?

What governance & policy changes are needed for implementation?

Next Steps

- Focus Area Roundtable Meetings
- 1st Public Workshop – February 4
- Online Survey
- Strategy Development
- June 2020 City Council Presentation

ORLANDO FUTURE-READY CITY MASTER PLAN

CITY OF ORLANDO

Meeting Notes

Place: Orlando City Hall
8th Floor
Crossroads
Conference Room
Date: January 22, 2020
Project #: 63588.00

Notes Taken by: C. Storey
Re: Water & Wastewater Focus Area
Roundtable Meeting

ATTENDEES

Kristi Fries	Brittany Sellers	David Bass
Paul Deuel	Rick Suggs	Aaron Green
Guy Mecabe	Chuck Shultz	David Mayer
Brad Jewell	Elizabeth Dang	Daisy Morales
Marc Cannata	Alyson Byrne	Luis Moros
Willie Thomas	Andres Salced	Woo Hyoung Lee
Richard Levey	Jeff Chabon	Doug Dierlich
Andres Hoyos	Philip Tinsley	Kelly Cohen
Curt Ostrodka (VHB)	Sarah Nemes	

MEETING SUMMARY

All participants introduced themselves and described their role at the City or with the VHB team. Dave Mulholland opened the meeting by providing a brief description of the Orlando Future-Ready City Master Plan project goals and objectives. The purpose of the Roundtable Meeting was to bring subject matter experts from the private sector, public sector, and academia together to discuss issues related to Water and Wastewater and brainstorm potential solutions. The agenda for the roundtable was as follows:

- History of the Smart Orlando program
- Draft Vision, Mission, and Guiding Principles of the Future-Ready Master Plan
- Description of what it means to be "Future Ready"
- Stakeholder Engagement process
- Summary of Internal Stakeholder Interviews
- City's Progress to Date

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Meeting Notes

- Group Discussion
    - Challenges that must be addressed
    - Identification of five (5) potential short term and long-term solutions
    - Identification of key performance indicators, partners, and funding sources
    - Prioritization of short-term solutions
    - Discussion on governance and policy issues.

Curt Ostrodka described the community engagement process. The project team has met with each internal City department to understand challenges, and opportunities. He noted that the Roundtable Meeting represented one of six focus areas that the City is studying to become more future-ready. The six focus areas are:

- Solid waste
- Energy and utilities
- Public safety and health
- Water and wastewater
- Transportation
- Built environment

There will be a series of public workshops in each City Commissioner District so that the public can learn about the project and comment on the potential solutions that are identified by Roundtable participants.

Brittany Sellers, City of Orlando "champion" for the Water and Wastewater roundtable, provided an overview of goals, activities and projects that the City has in progress for water and wastewater:

- Goals:
    - Expand education and outreach efforts to increase understanding of how to manage water resources and pollution prevention.
    - Ensure Orlando mitigates inland flooding during future extreme weather events.

- Ongoing activities and projects:
    - Implementation of smart water meters to detect leaks, provide automatic readings and reduce water loss.
    - Implementation of rain gauge sensors to detect flooding events in real time.

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Meeting Notes

- Installation of rain barrels to encourage water conservation, prevent stormwater runoff and provide water source for gardening.

Group Discussion

Curt then divided the Roundtable attendees into small groups for a brainstorming exercise. Each group was responsible for identifying at least five short-term solutions for water and wastewater, including key performance indicators, partners, and funding sources. At the conclusion of the exercise, each small group presented their ideas back to the entire roundtable for comments and questions.

Attendees identified short-term solution strategies including the following:

- Create a data base system and automated alert systems to measure usage of potable and reclaimed water and which monitors water quality.
- Create a tiered payment structure for potable and reclaimed water. Include drought rates in a tiered structure.
- Re-evaluate and update landscape codes and enforcement to include types of lawns and mandatory irrigation days that is area specific.
- Retrofit existing infrastructure with sensors and gauges and expand rain barrels and cisterns for stormwater.
- Create educational material for HOA associations to include information on restricted watering days and water reclamation.
- Create stricter code enforcement for over irrigating, septic failures and reclaimed water usage. Consider the need to tie into the city's infrastructure for failed septic systems. If reclaimed water is available, tie into the existing infrastructure.

Attendees identified long-term solutions strategies which include the following:

- Increase data space and technological abilities for collecting from smart meters.
- Provide on-site re-use facilities for potable and reclaimed water.
- Evaluate all stormwater systems for excess storage and the re-use of stored stormwater.
- Create direct potable water re-use system to include educating the public on the safety of this practice.

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Meeting Notes

- Implement GIS data collection for overuse of water systems and create a data base for the location of re-use reclaimed water and the expansion of reclaimed water lines.
- Explore PACE financing for septic and separate reclaimed water lines.
- Tie system into existing FOC infrastructure for better communications.

The prioritized short-term results from all break-out groups include the following:

- Create a tiered payment structure for potable and reclaimed water. Include drought rates in the structure. This will promote efficiency of use and can tie back to tax incentives.
- Create educational material for HOA associations, city and county businesses and residents on ways to conserve and eliminate the overuse of water and wastewater.
- Create a data base system and automated alert systems to measure usage of potable and reclaimed water and which monitors water quality.

Next steps:
Curt Ostrodka outlined the six-month process with updates on roundtable discussions and public workshops. Final results will be presented to the City Council in summer 2020.

PRIORITIZED STRATEGIES

After further synthesis, the project team organized the findings of this meeting and previous internal stakeholder meetings into the following:

- Better align pricing and incentives with the cost of providing services
- Educate the community on ways to conserve resources
- Provide real-time usage alerts
- Pursue conservation and reuse strategies through policy and incentives
- Create digital twin systems to simulate and model water and wastewater use
- Provide more robust water line leak detection systems
- Provide real-time information on water consumption
- Provide alerts and updates on water quality
- Capture treated wastewater and stormwater and use it for another purpose

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ORLANDO
FUTURE-
READY
CITY
MASTER PLAN

WATER/WASTEWATER ROUNDTABLE

JANUARY 22, 2020

CITY OF ORLANDO

Agenda

1. **INTRODUCTION**
2. **INSPIRATION**

   Where are we now?
3. **EXPLORATION**

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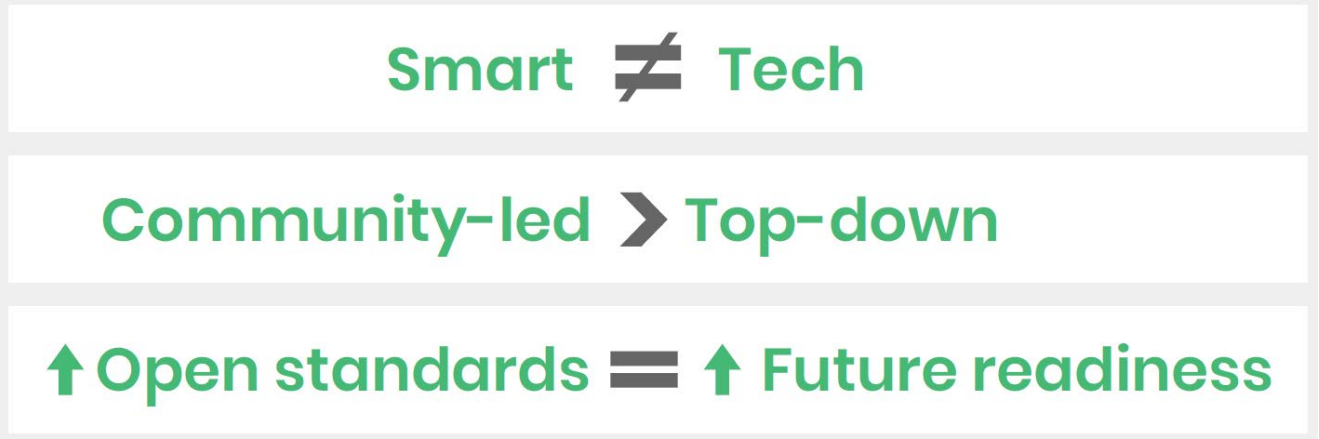
What is Future-Ready?

- A place where residents are empowered to **cocreate opportunities using technology**
- A place that maximizes the urban form's benefits while minimizing its challenges
- A place of prosperity, safety, equity, sustainability, resiliency, diversity, and serendipity



Credit: David Gilford

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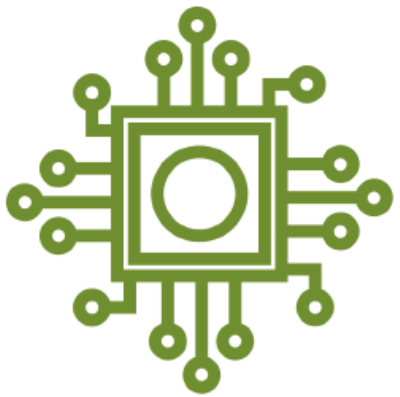
Smart ≠ Tech

Community-Led > Top-Down

▲ Open Standards = ↑ Future Ready

Credit: David Gilford
UCF Distinguished Lecture Series – 11/13/19

Smart Cities (1.0)



Technology-led,
City-procured

Responsive Cities (2.0)

City-led,
Technology-enabled

Future Cities? (3.0+)

Citizen-led,
co-created

Credit: David Gilford

1.0
Smart City

2.0
Responsive City

3.0
Future-City

Credit: David Gilford

Stakeholder Engagement Touchpoints

Summary of Internal Stakeholder Interviews

- ✓ 11 of 12 complete
- ✓ Describe a Future-Ready city
- ✓ Top challenges of a Future-Ready city
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What is a Successful Future-Ready City?

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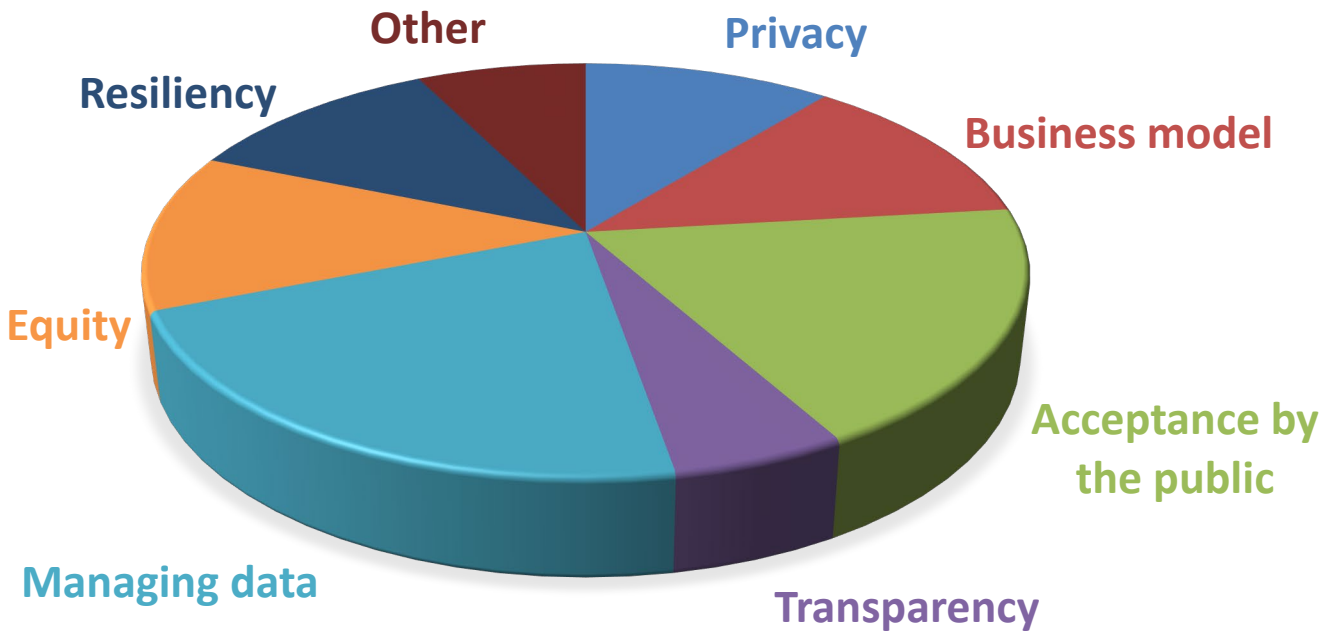
Summary of Internal Stakeholder Interviews

Top departmental barriers to being a Future-Ready city

- Prioritize, procure and/or fund solutions and strategies
- Staff resources and time
- Technical expertise
- Training or educational
- Legislative, legal and political constraints
- Inter-agency, department and private sector collaboration
- Change management (culture)
- Availability of technology
- Standard governance and operating protocol
- Common goals and visions

Summary of Internal Stakeholder Interviews

Top challenges of a Future-Ready city



Pillar Focus Areas

ENERGY / UTILITIES

PUBLIC SAFETY

TRANSPORTATION

BUILT ENVIRONMENT

SOLID WASTE

WATER / WASTEWATER

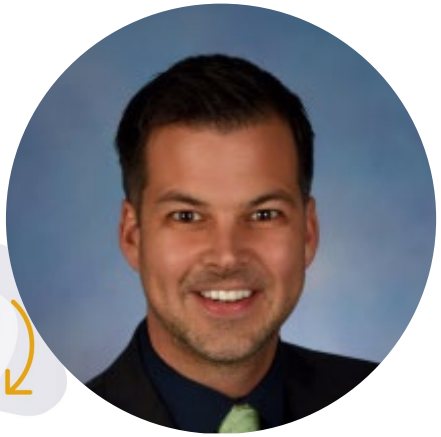
Pillar Focus Areas | **City Champions**

ENERGY / UTILITIES
Chris Castro

PUBLIC SAFETY
Deputy Chief Doug Goerke

TRANSPORTATION
Claudia Korobkoff

BUILT ENVIRONMENT
Ian LaHiff

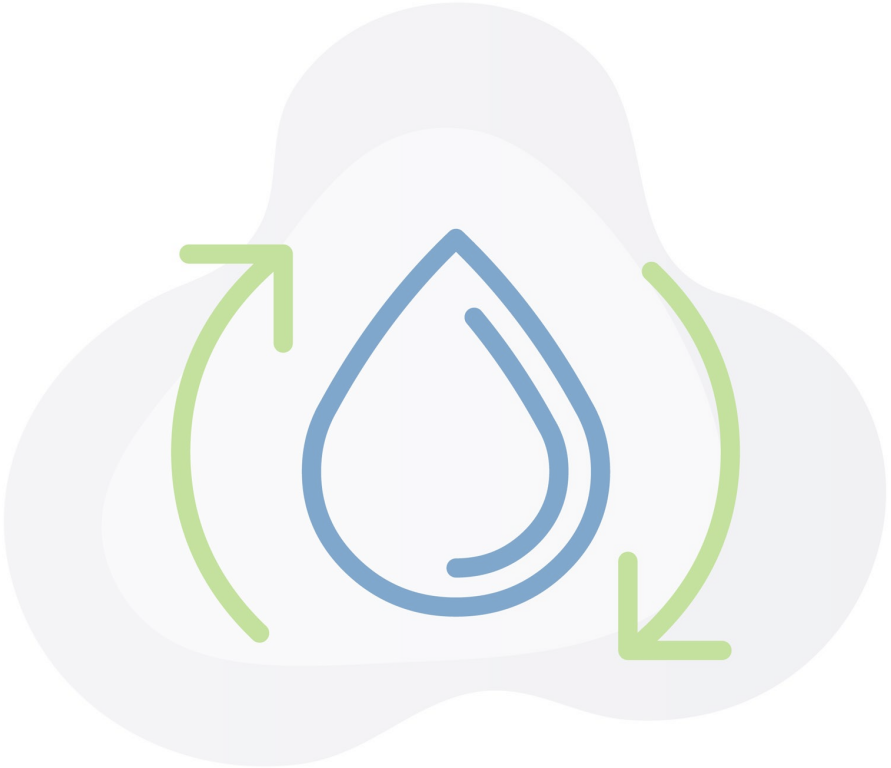


SOLID WASTE
Joe England

WATER / WASTEWATER
Brittany Sellers

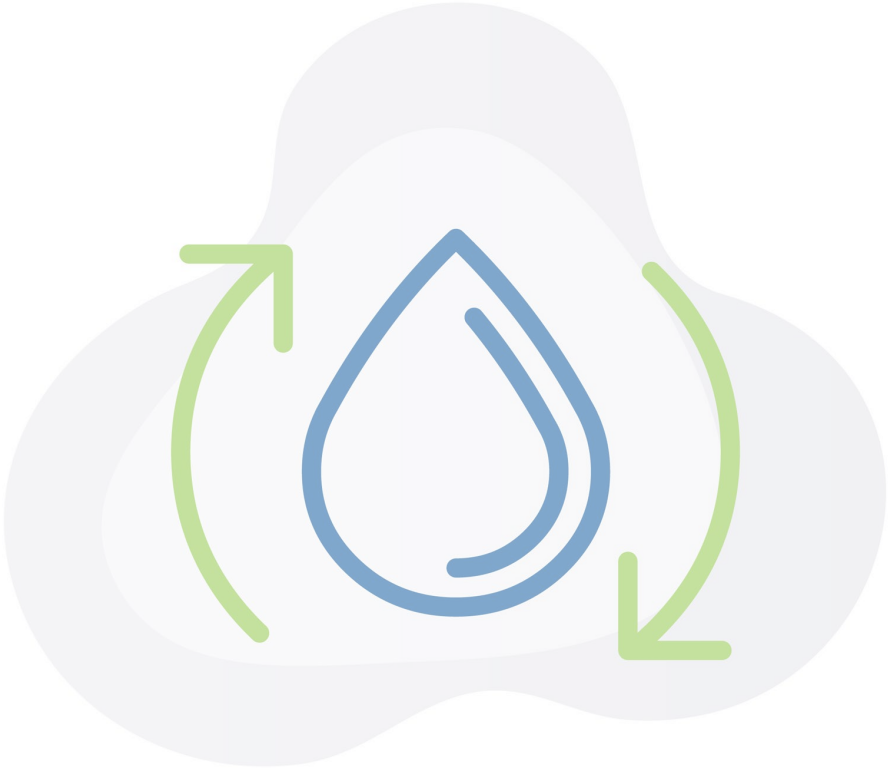
City Goals

- Enhance Orlando's reputation as "The City Beautiful" by promoting sustainable landscaping practices
- Reduce gross potable water consumption:
  - 50% municipal use by 2030
  - 20% per capita city-wide by 2050
- Increase number of lakes meeting good water quality standards (Trophic State Index less than 61)



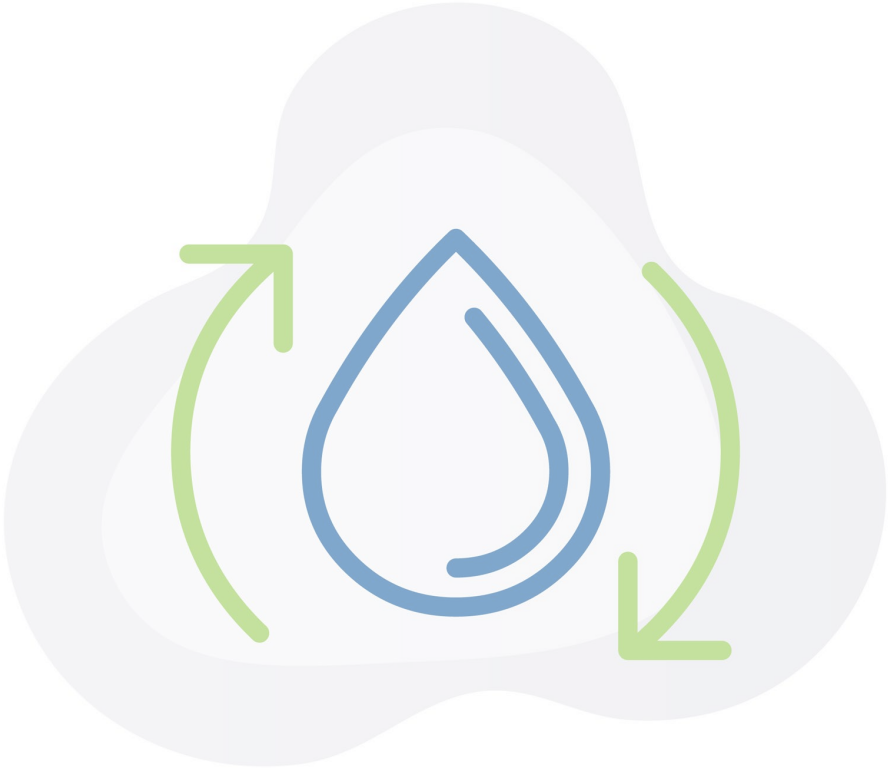
City Goals

- Expand education and outreach efforts to increase understanding of how to manage water resources and pollution prevention
- Ensure Orlando mitigates inland flooding during future extreme weather events



Applications	Typical Features	City Key Features	Status	Existing Partners	Partnership Opportunities
Smart Water Meters	Leak detection, automatic reading; thus reducing water loss and unnecessary utility.	All water meters use digital advanced metering infrastructure (AMI). OUC monitors the meters for unusual activity providing warning on leak detection.	Implemented	OUC	Developers, property owners, neighborhoods and special districts
Rain Gauge Sensors	Detect flooding events in real-time to provide alerts to Downtown & Public Works managers, residents, businesses, & visitors.	Lake, pond and storm sewer instrumentation, modeling and monitoring.	In progress	DEP, SJRWMD & SFWMD	Developers, property owners, neighborhoods and special districts
Rain Barrels	Large enclosed soda syrup canisters cleaned and repurposed for rain collection.	Encourage water conservation, prevent stormwater runoff, and provide water source for gardening	Implemented	Barrels by the Bay, Coca Cola, Disney, OCPS, Girl Scouts, local churches and gardens	Community centers, neighborhoods, special districts

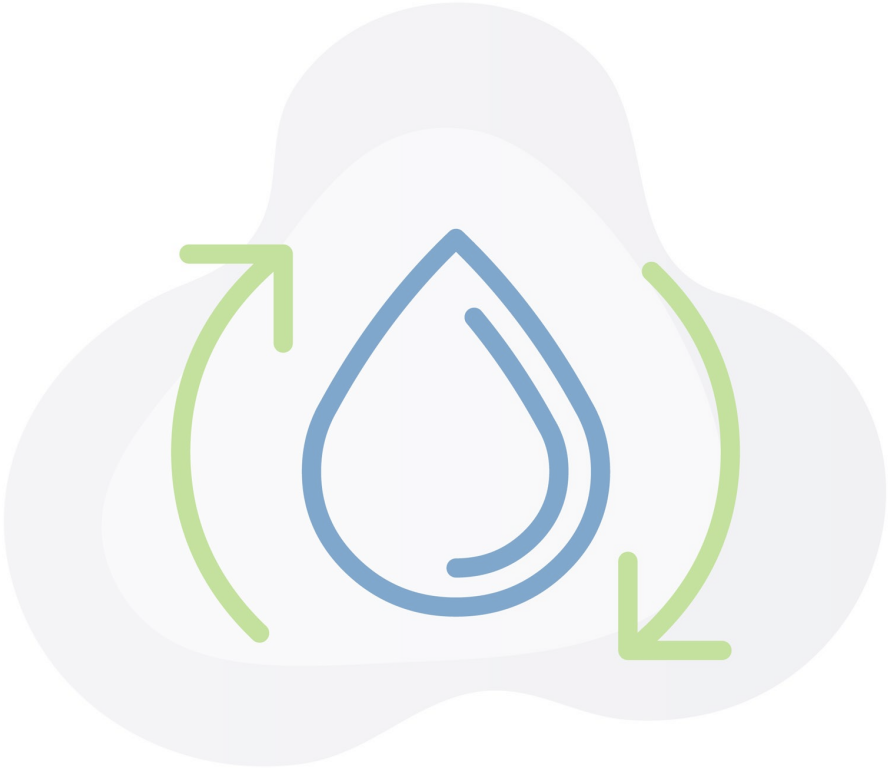
What are the top challenges that a Future-Ready City must solve?



GROUP DISCUSSION

Identify 5 short term & 5 long term solutions

- Key performance indicators
- Implementers/Partners
- Funding



Future-Ready Best Practices

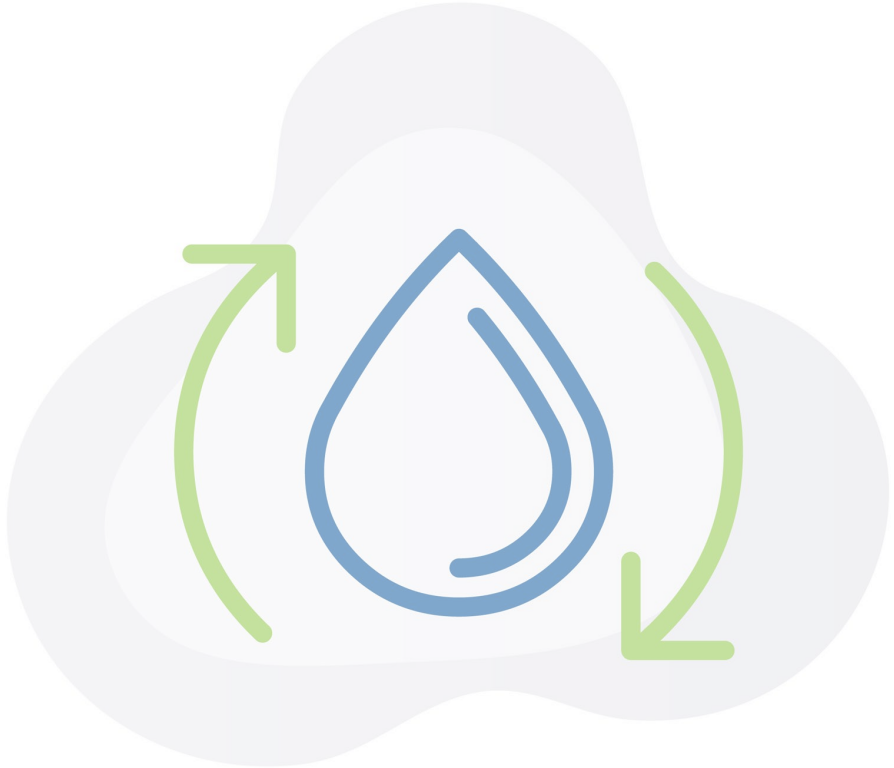
Water / Wastewater

Water:

- Leak detection
- Automatic Meter reading
- Water consumption Tracking
- Smart Irrigation
- Water conservation

Water Distribution Systems:

- Monitoring of water quality in distribution systems
- Monitoring of pressure in water distribution systems
- Real Time Asset Management of Pumps, Valves etc.



Future-Ready Best Practices

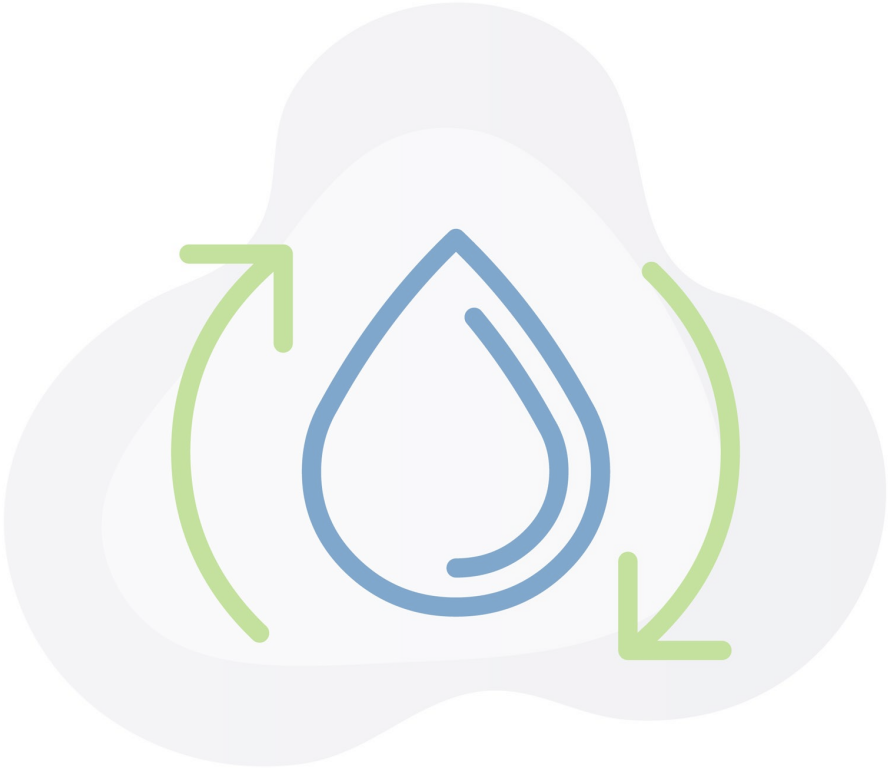
Water / Wastewater

Waste Water Collection Systems:

- Monitoring of level and flow in collection systems
- Real Time Asset Management of Pump, Valves, etc.
- Real Time Pressure Monitoring.

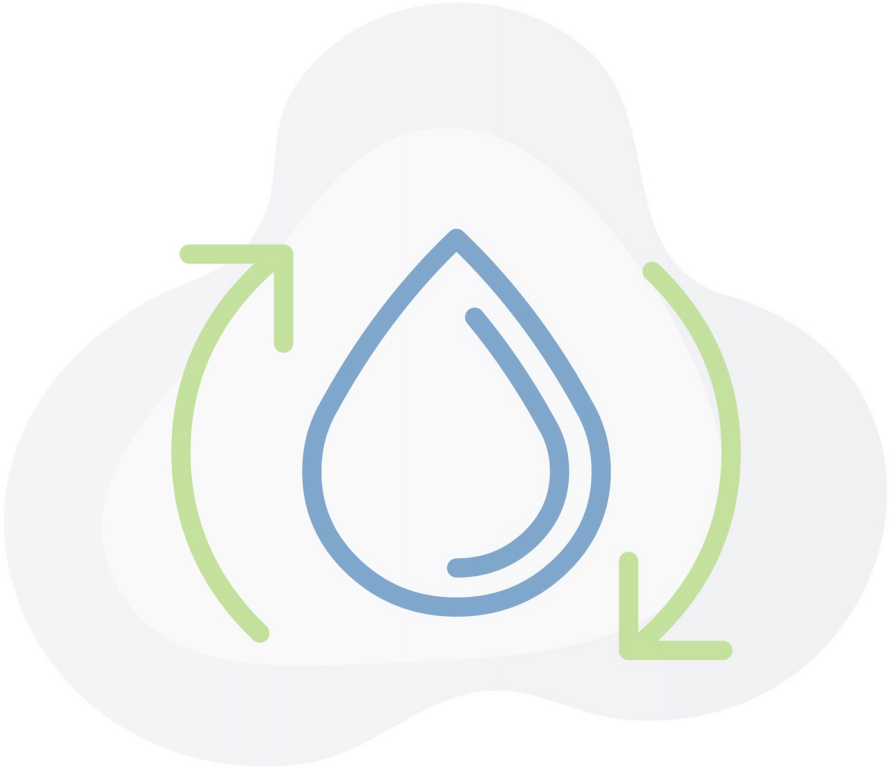
Water Quality Monitoring:

- Real Time Water Quality Monitoring of Water Bodies for recreation
- Real time monitoring of water quality in source water
- Real Time Water Quality Monitoring of Hospitals and Buildings

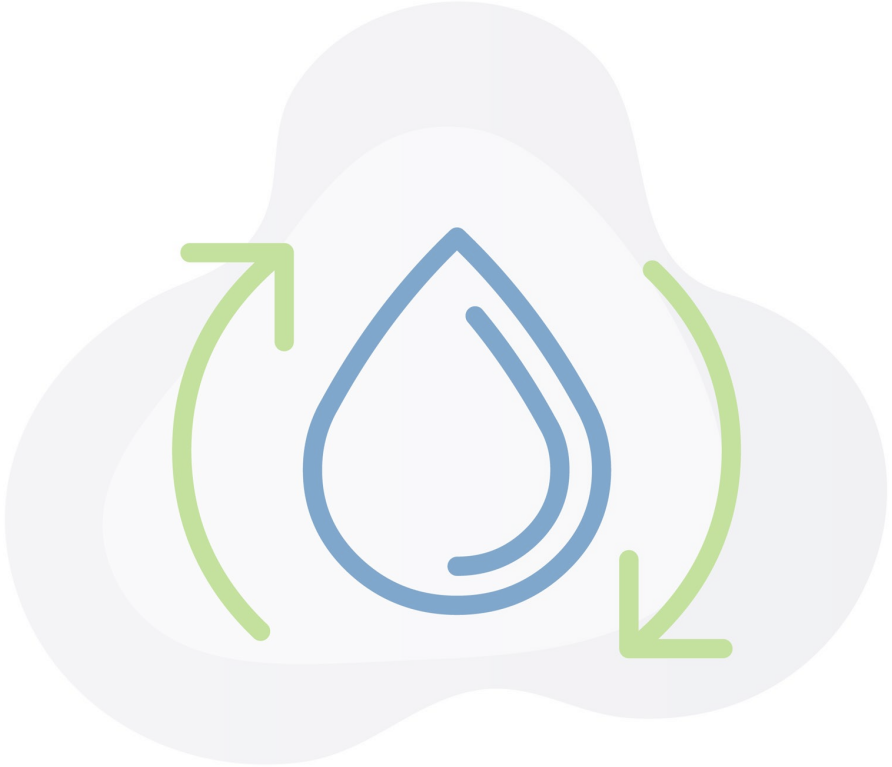


PRIORITIZATION

What short term solutions should be prioritized?



What governance & policy changes are needed for implementation?



Next Steps

- Focus Area Roundtable Meetings
- 1st Public Workshop – February 4
- Online Survey
- Strategy Development
- June 2020 City Council Presentation

ORLANDO FUTURE-READY CITY MASTER PLAN

CITY OF ORLANDO

ORLANDO

FUTURE-READY CITY

MASTER PLAN

CITY OF ORLANDO

PUBLIC INVOLVEMENT SUMMARY BOOK

vhb

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ORLANDO FUTURE-READY CITY MASTER PLAN

Public Involvement Summary Book

Prepared by VHB

Public Involvement Summary Book

Introduction

The Orlando Future-Ready City Public Involvement Summary Book outlines the City of Orlando's first formal steps in pursuit of a resilient city that takes advantage of cultural and technological innovation and is prepared to thrive for generations to come.

The final result of this work effort will be the adoption of the Orlando Future-Ready City Master Plan, a document which will provide specific guidance in pursuit of the vision and mission statements of the project.

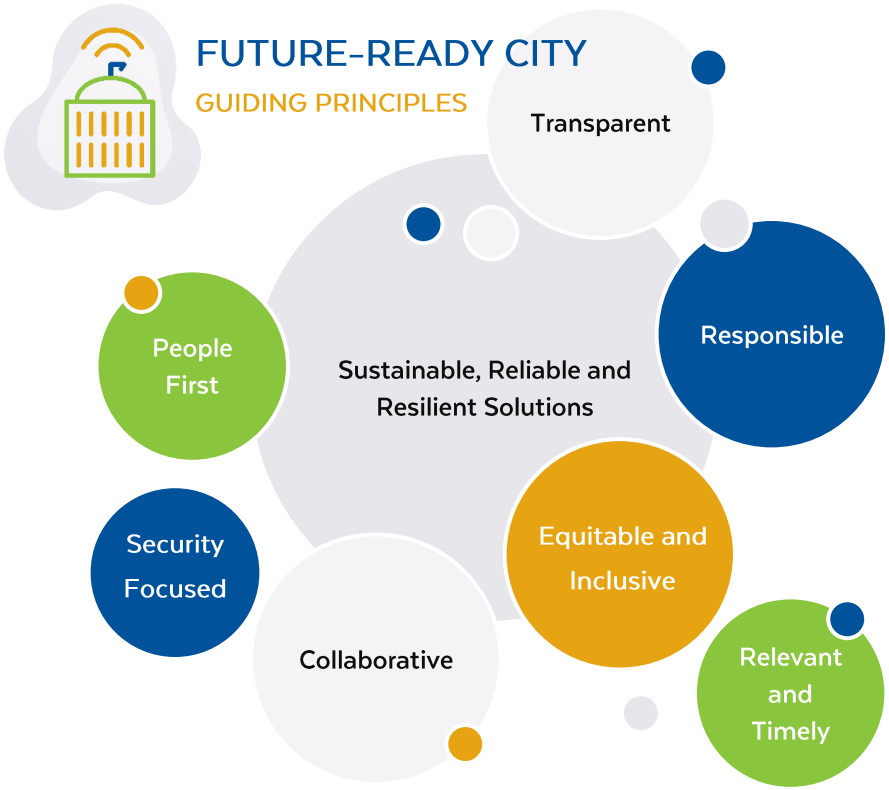
The Orlando Future-Ready City Master Plan **vision statement** is:

> *For Orlando to become America's premier Future-Ready City through continual advancement, embracing new opportunities to help address community challenges and ensure our city remains one of the best places in America to live, work, play, visit and raise a family.*

The City of Orlando's **mission** for the Orlando Future-Ready City Master Plan is:

> *To enhance its ability to deliver efficient and secure human-centered public services through the pursuit of innovative approaches and improved processes.*

In addition to the guiding vision and mission statements, the Orlando Future-Ready City Master Plan will be shaped by eight guiding principles.



Guidance from internal city and industry experts and local community members is integral in guiding the direction of the Orlando Future-Ready City Master Plan. Through a series of focused meetings with city staff, roundtable meetings with local experts and finally, publicly facing

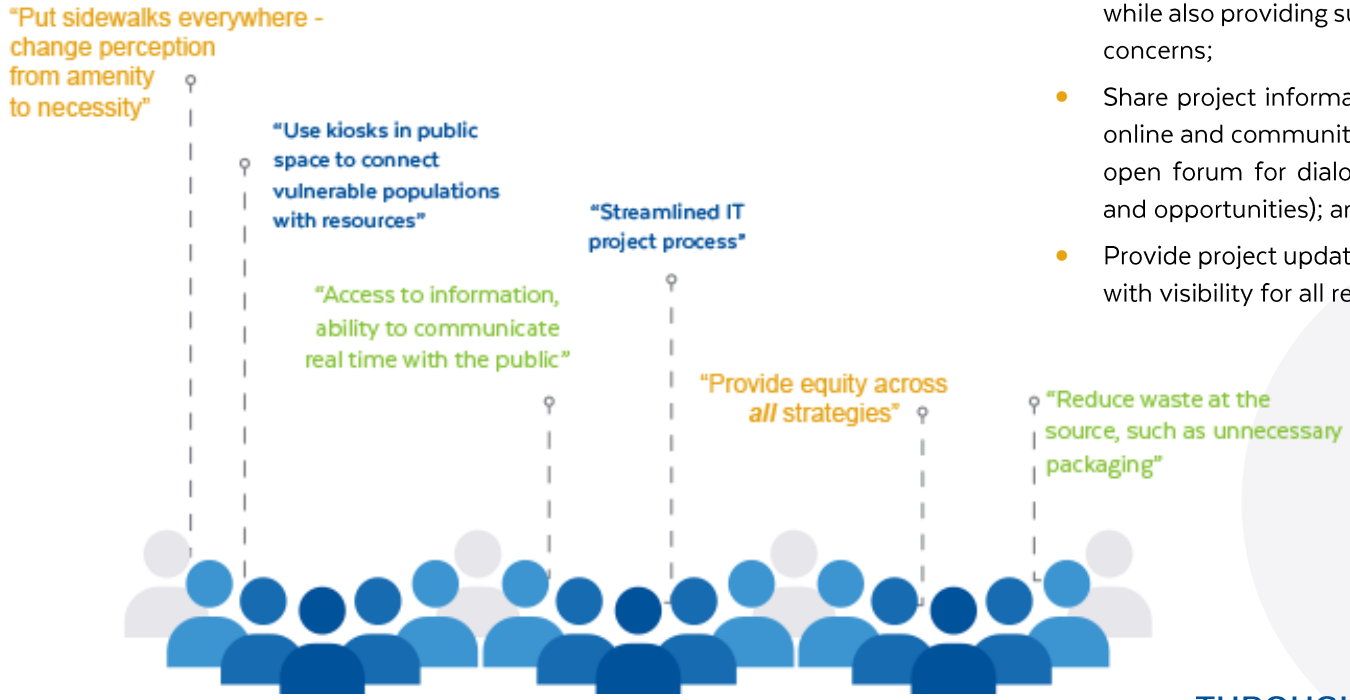
meetings, a diverse group of hundreds of people have played a role in formulating the objectives and strategies presented in this document.

Inclusive public involvement has helped create a clearer vision for the adoption and implementation of Future-Ready City initiatives and their citywide promotion.

Community Outreach Objectives

A series of community outreach objectives were established for the Orlando Future-Ready City Master Plan to help guide the public involvement process. These include:

- Identify and establish relationships with key stakeholders to establish clear, thoughtful expectations and strategies for the implementation of the Orlando Future-Ready City Master Plan;
- Hold internal city stakeholder meetings where staff can begin to identify challenges and opportunities for the city to be Future-Ready;
- Hold focus area roundtable meetings where city staff, partner agencies, and external stakeholders identify opportunities based on the six chosen pillar focus areas;
- Hold community meetings where stakeholders can learn about the goals for the Future-Ready City Master Plan while also providing suggestions on how to address specific concerns;
- Share project information transparently across an array of online and community-based platforms which allow for an open forum for dialogue (including the sharing of issues and opportunities); and
- Provide project updates and information on a public forum with visibility for all residents.



A SAMPLING OF WHAT WE HEARD THROUGHOUT THE PROCESS

Timeline of Stakeholder Outreach Developments

Formal Visual Branding
January 2020

Internal City Staff
Stakeholder Meetings
December 2019 - January 2020

12 meetings

Pillar Focus Area
Roundtable Meetings
January 2020

6 meetings

Draft Strategies Shared on Boards at Public Workshops

Public Workshops
February - March 2020

6 workshops

Common Themes

Prioritize Strategies

Internal Stakeholder Meetings

94 attendees

Purpose

The project team facilitated internal stakeholder meetings with strategic city departments and/or representatives to discuss the overall Orlando Future-Ready City program. To be a Future-Ready city, Orlando must work to integrate its current processes and apply proven best practices from across the country and other city departments.

Meeting Content

Overall, these meetings:

- Introduced staff to the vision and purpose of the Orlando Future-Ready City Master Plan
- Discussed best practices
- Worked to identify existing city-owned assets and infrastructure for evaluation
- Discussed future opportunities
- Outlined department operating protocols
- Introduced draft internal data principles for the City

The internal stakeholder meetings took place in December 2019 and January 2020 and involved numerous city departments.

There were 12 total department meetings with 94 total attendees, with between 5 and 15 city staff attending each meeting. City departments that participated in the Future-Ready included:

- Sustainability and Resiliency | December 11, 2019
- Public Works | January 6, 2020
- Information Technology | January 6, 2020
- Business and Financial | January 7, 2020
- Venues | January 7, 2020
- Fleet and Facilities | January 7, 2020
- Housing and Community Development | January 8, 2020
- Fire Department | January 8, 2020
- Economic Development | January 8, 2020
- Families, Parks and Recreation | January 10, 2020
- Transportation | January 10, 2020
- Police Department | January 29, 2020

What is a Future-Ready City?

In order to gain a preliminary understanding of what the term "Future-Ready" meant to city staff and the types of projects and programs that make up Future-Ready cities, several questions were asked of meeting participants using PollEverywhere, an interactive live polling software.

When asked to describe a successful Future-Ready City, across all internal meetings, the following words emerged.

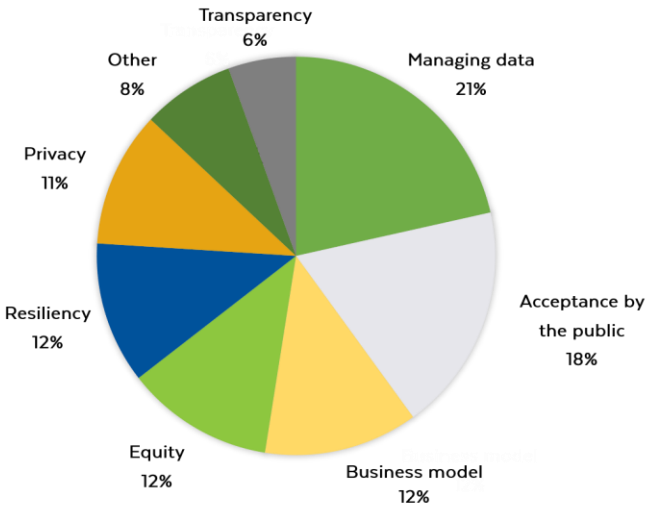
Key Takeaways

Feedback heard during the internal stakeholder meetings was used to shape content provided in both the subsequent Pillar Focus Area Roundtable meetings and the Public Workshops that followed.

When asked what Future-Ready/Smart City approaches each department was already taking, it was found that:

- City staff are familiar with some new technologies and are pursuing them as small teams for their own specific purposes
- Some of these pursuits include:
  - data management & sharing
  - communication technology
  - sensors and hardware

When asked to think about the challenges of a Future-Ready city, city staff replied with:



A FUTURE-READY CITY PROVIDES...

When asked, 'What innovative and technological advances help you to do your job better?' These common themes emerged:

- Opportunities for collaboration across department
- Better tools for accessing and using data
- Better tools for communicating with the public

When asked, 'What actions could the City implement to serve its citizens more efficiently?' These common themes emerged:

- Improved Communication – both digitally and in public space
- Public transit improvements – including technology on busses and apps to interact with transit services
- One point of payment – and other technologies to make essential city services more simple

Pillar Focus Area Roundtable Meetings

Purpose

In addition to the internal department meetings held with city staff, six roundtable meetings were held with partner agencies and community members. In these meetings, the project team solicited this feedback and leveraged input for further refinement of the Orlando Future-Ready City Master Plan.

Figure 1.Water & Water Pillar Focus Area Roundtable Meeting

133 attendees

The Project Team facilitated roundtable meetings for each of the six pillar focus areas to identify best practices that should be presented at the public workshops and considered for inclusion in the Orlando Future-Ready City Master Plan.

Figure 2. Roundtable Session Discussion on Potential Short-Term Solutions

Meeting Content

Led by designated subject matter experts for each pillar focus area, attendees discussed:

- Goals and objectives for each of the six focus areas
- Overview of City of Orlando work for each of the six focus areas
- Future Ready best practices
- Strategies for each of the six focus areas
- Range of return on investments for focus area strategies
- Potential policy implications with focus area strategies
- Expected or desired outcomes
- Prioritized a timeline for future activities

Meeting Format

At each roundtable meeting, attendees participated in the following interactive discussion, meant to engage them in a specific dialogue that would help guide the development of goals, objectives, strategies and timeline for implementation of the Orlando Future-Ready City Master Plan.

- Full group discussion, led by a city champion
  - Relevant regional goals and ongoing activities and projects within the pillar focus area
  - Challenges that must be addressed
- Small group discussion
  - Identification of five (5) potential short-term solutions
  - Discussion of long-term solutions
  - Identification of key performance indicators, partners, and funding sources
  - Discussion on governance and policy issues
- Full group discussion
  - Prioritization of potential short-term solutions with each small group presenting their results and then the full group voting with stickers on which should be prioritized

Roundtable Outcomes

Through the collection of input and guidance received in these roundtable discussions, the Project Team was able to generate a short list of strategies for each pillar focus area and challenges in their adoption or implementation, which were presented at public workshops. The top foreseeable challenges are presented on page 10.

Solid Waste City Champion
Joe England, Sustainability Project Manager
January 17, 2020

Energy & Utilities City Champion
Chris Castro, Director of Sustainability
January 22, 2020

Water & Wastewater City Champion
Brittany Sellers, Sustainability Project Manager
January 22, 2020

Public Safety City Champion
Deputy Chief Doug Goerke, Orlando Police Department
January 23, 2020

Transportation City Champion
Claudia Korobkoff, Transportation Manager
January 23, 2020

Built Environment City Champion
Ian Lahiff, Energy Project Manager
January 28, 2020

Top Challenges of a Future-Ready City

Attendees at the pillar focus area roundtable discussions brought up the following challenges for implementing potential Future-Ready City strategies.

Environment

- Access to community centers
- Designing for pedestrian safety
- Location of affordable housing to workspaces
- Right of way limitations (5G/utility placement, street furniture, etc.)
- Opportunities and alternatives for sources without rooftops
- Indoor air quality
- Balance ofnatural and built environment

Education

- Shifting behaviors and perceptions of recycling practices
- Education to help bridge the digital divide
- Culture for preparedness at all levels in the community
- Perception of the public to accept alternative modes of travel

Funding

- A lack of a carbon tax makes landfills less expensive
- Ultility rate impacts (especially for low-income populations)
- Staff Resources
- Cost effectiveness of Future Ready solutions

Demographic

- Wealth and income equality
- Mental health
- Growing aging population
- Affordability and the homeless
- Influence of tourism

Technology and Data

- Technical expertise
- Availability of technology
- Managing data
- Operation and maintenance of applications and tools
- Use of platforms to protect first responders
- Data security
- Access to data, sharing internally and education to the public on access

Partnerships (Internal/ External)

- Infrastructure for partnerships to produce a regional approach to waste (outside Orlando)
- Inter-agency, department and private sector collaboration
- Change of management
- Local energy controls

Governance

- Privacy
- Creating strategies and policies that produce less waste
- Standard governess and operating protocol
- Regional planning for future applications llike solar, water and air quality sensors, etc.

Top Strategies Identified in Pillar Focus Area Roundtable Sessions

Energy and Utilities

1. Notify consumers of when and where there is high energy use so that they can make improvements.
2. Create a platform to share utility data analytics such as a report card for buildings on the market.
3. Find ways to improve solar capabilities with OUC, especially battery storage capabilities.

Water and Wastewater

1. Create a tiered payment structure for potable and reclaimed water use. Include drought rates in the structure. This will promote efficiency of use and can tie back to tax incentives.
2. Create educational materials for HOA associations, city and county businesses and residents on ways to conserve and eliminate the overuse of water and wastewater.
3. Create a database and automated alert system to measure usage of potable and reclaimed water and which monitors water quality.

Public Health and Safety

1. Provide a central dashboard for public safety information accessible to the public.
2. Focus technology on serving vulnerable groups of people such as the elderly or mentally and physically challenged people.
3. Provide Wi-Fi accessibility throughout the city.

Solid Waste

1. Support the development of intelligent Materials Recovery Facility (MRF) to increase recycling processing opportunities.
2. Reduce waste at the source through educational outreach, coordination with existing partners, marketing, and collaboration with the “Beyond 34” program stakeholders.
3. Generate recommendations for policy changes through interlocal agreements with cities and counties.

Built Environment

1. Update the land development code and other codes to create better incentives, especially for green infrastructure and low impact development.
2. Create greater requirements for green space and open space.
3. Plan for the use of a digital twin platform to support simulations of changes to the built environment, model the relationships and interactions between people, places, and devices, and create a digital asset management system.

Transportation

1. Create a unified fare collection program such as a mobile application.
2. Develop a marketing and education campaign to make riding the bus a more desirable mode of transportation, including benefits such as Wi-Fi capability and working on the bus on your way to work.
3. Update the City of Orlando Engineering Standards Manual (ESM) to link land uses to the types of roadways and transportation networks.

Public Workshops

Purpose

225 attendees

The general public was also presented with the opportunity to learn about the Orlando Future-Ready City Master Plan and share their ideas and concerns.

Six public workshops were held, using an informal, open house setting so that individuals were able to review project displays at their own pace. Project team members were also available to hold "one-on-one" conversations and to respond to individual questions.

Each meeting included:

- A welcome table where attendees were greeted and given 12 dot stickers with which to vote on potential strategies they prefer
- An introductory, looping video that explained the format of the meeting
- A table with tablets for participants to take an online survey
- A station for each pillar focus area with a facilitator and the following boards:
    - Current City of Orlando goals and progress of current strategies
    - Potential strategies for attendees to vote on
    - An easel for attendees to write additional comments

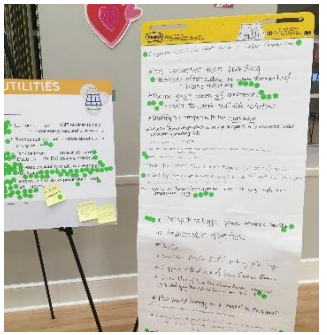


Figure 3. Images from the Orlando Future-Ready City Public Workshops

Future-Ready Public Workshop Locations

Spring 2020

Commissioner Regina I. Hill
March 3, 2020
Callahan Neighborhood Center

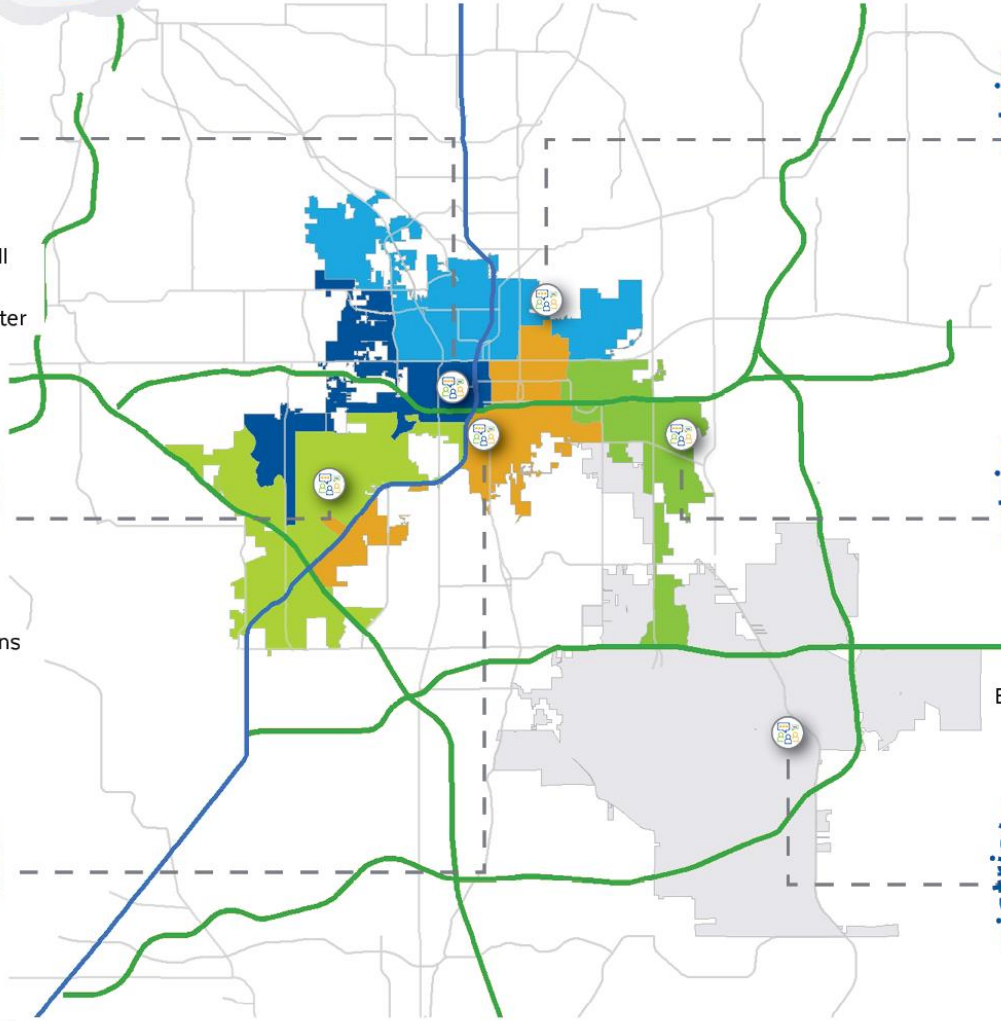
Commissioner Bakari F. Burns
March 5, 2020
L. Claudia Allen Center

Commissioner Patty Sheehan
February 4, 2020
Beardall Senior Center

Commissioner Robert F. Stuart
March 4, 2020
Leu Gardens

Commissioner Tony Ortiz
March 12, 2020
Englewood Community Center

Commissioner Jim Gray
February 26 and 27, 2020
Dockside Lake Nona and Conway United Methodist Church



District 1 | District 2 | District 3 | District 4 | District 5 | District 6

Public Workshop Materials and Activity Results

Several boards were shared at the public workshops which helped to guide conversation and facilitate idea-generation for the Orlando Future-Ready City Master Plan. Content placed on the boards was generated through input receieved in the internal city stakeholder meetings and pillar focus area roundtable disucssions

'What Are We Already Doing?' Boards

On these boards, workshop attendees were able to learn about the City of Orlando's existing goals that support a Future-Ready City, as well as updates on projects and programs the city is working on to advance these goals within each pillar focus area.

Potential Strategies Boards

On these boards, the draft strategies developed for each pillar focus area were shared for workshop attendees to "vote" by placing dot stickers next to the strategies they thought were the best for the project to pursue. The votes were then collected, and additional input was analyzed to create a set of prioritized results for each pillar focus area and a set of common themes to help guide the goals, objectives and strategies adopted in the Orlando Future-Ready City Master Plan. The responses received during the six Commissioner District public workshops are shared in the Prioritized Results graphics, Summary of Written Input by Pillar Focus Area and Common Themes tables in this document on the following pages.

Figure 5. Collecting Votes and Additional Input on Potential Orlando Future-Ready City Strategies

ENERGY & UTILITIES PUBLIC WORKSHOP MATERIALS AND VOTES RECEIVED ON POTENTIAL STRATEGIES

WHAT ARE WE ALREADY DOING?

LED Retrofit of City Buildings

+ Works to decrease energy use as well as increase comfort and productivity

Solar and Electric Vehicle-Ready Policies

+ Tailored designs for the local market to speed installation

Building Benchmarking, Energy Audits, & Transparency Policy (BEWES)

+ Publicly viewable energy use benchmarking data for city-owned and commercial buildings

Sourcing Energy from Renewable Sources

+ 10% of city operations are powered by renewable energy
+ Continual implementation with OUC

CITY GOALS

» Reduce greenhouse gas emissions by 90% from 2007 levels by 2040

» Municipal operations to be greenhouse gas neutral by 2030

» Obtain 100% of electricity from clean, renewable sources

› Municipal Operations by 2030

› Citywide by 2050

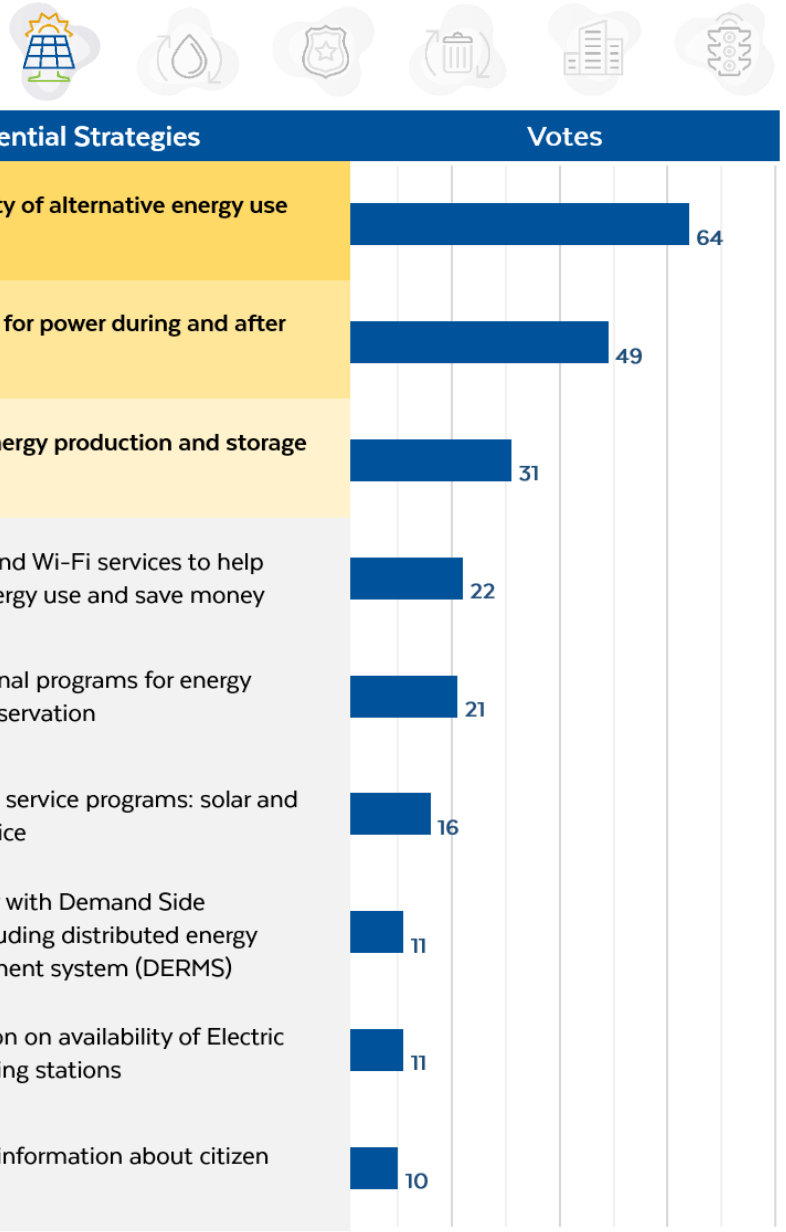
ENERGY & UTILITIES

ENERGY & UTILITIES

POTENTIAL STRATEGIES

+ Promote educational programs for energy efficiency and conservation
+ Improve efficiency with Demand Side Management, including distributed energy resource management system (DERMS)
+ Pursue creative energy production and storage solutions
+ Create energy as a service programs: solar and batteries as a service
+ Combine energy and WiFi services to help manage home energy use and save money
+ Provide real-time information about citizen energy usage
+ Provide information on availability of Electric Vehicle (EV) charging stations
+ Increase availability of alternative energy use (solar)
+ Improve reliability for power during and after storms

COMMENTS



WATER AND WASTEWATER PUBLIC WORKSHOP MATERIALS AND VOTES RECEIVED ON POTENTIAL STRATEGIES

WHAT ARE WE ALREADY DOING?

Smart Water Meters

- Leak detection and unusual activity monitoring
- Implemented in partnership with OUC

Rain Gauge Sensors

- To detect flooding events in real time and provide alerts to the public and public works managers
- In planning stage with local water management districts

Rain Collection Barrels

- Encourage water conservation, prevent stormwater runoff and provide water source for gardening
- Implemented in partnership with Barrels by the Bay, Coca Cola, Disney, OCPS, local churches and community gardens

CITY GOALS

- Enhance Orlando's reputation as "The City Beautiful" by promoting sustainable landscaping practices
- Reduce gross potable water consumption:
  - 50% municipal use by 2030
  - 20% per capita city-wide by 2050
- Increase number of lakes meeting good water quality standards (Trophic State Index less than 61)
- Expand education and outreach efforts to increase understanding of how to manage water resources and pollution prevention
- Ensure Orlando mitigates inland flooding during future extreme weather events

ORLANDO FUTURE-READY CITY

WATER & WASTEWATER

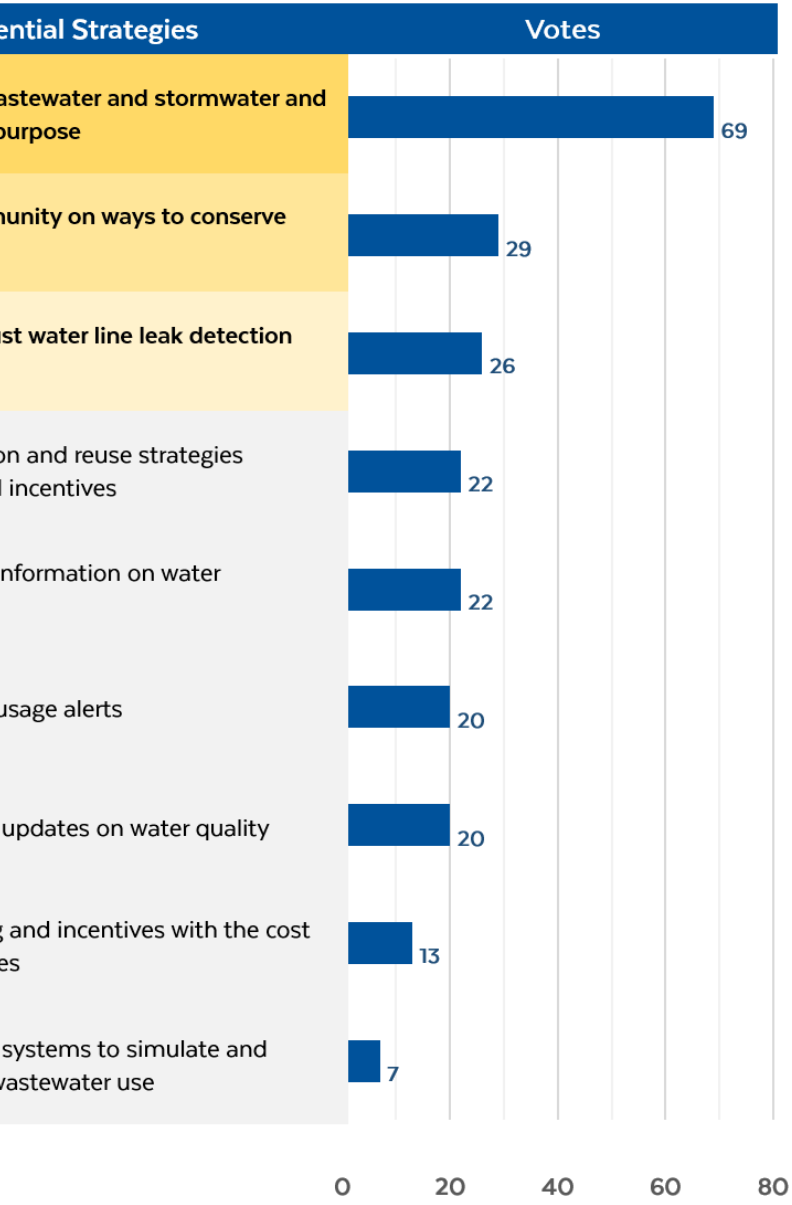
ORLANDO FUTURE-READY CITY

WATER & WASTEWATER

POTENTIAL STRATEGIES

- Better align pricing and incentives with the cost of providing services
- Educate the community on ways to conserve resources
- Provide real-time usage alerts
- Pursue conservation and reuse strategies through policy and incentives
- Create digital twin systems to simulate and model water and wastewater use
- Provide more robust water line leak detection systems
- Provide real-time information on water consumption
- Provide alerts and updates on water quality
- Capture treated wastewater and stormwater and use it for another purpose

COMMENTS



PUBLIC SAFETY & HEALTH PUBLIC WORKSHOP MATERIALS AND VOTES RECEIVED ON POTENTIAL STRATEGIES

WHAT ARE WE ALREADY DOING?

Joint Police & Fire Computer Aided Dispatch

- Efficient police and fire data sharing, including vehicle location, public camera video streams and digital plans
- Currently implemented and continually upgraded

Video & Predictive Analytics

- Using existing assets such as body-worn cameras, drones and business partner footage
- In planning stage with key partners (FDOT and LYNX)

Public Safety Dashboard

- Single application to view all city related public safety information including citizen reported issues, power outages, shelter locations and other important resources
- In planning stage with key partners (Orange County)

CITY GOALS

- Eliminate pedestrian and bike fatalities (Vision Zero Action Plan)
- Ensure access to affordable, healthy food options (community gardens, grocery stores or farmers markets) within ½ mile of every resident
- Reduce obesity and diabetes rates

ORLANDO FUTURE-READY CITY

PUBLIC SAFETY & HEALTH

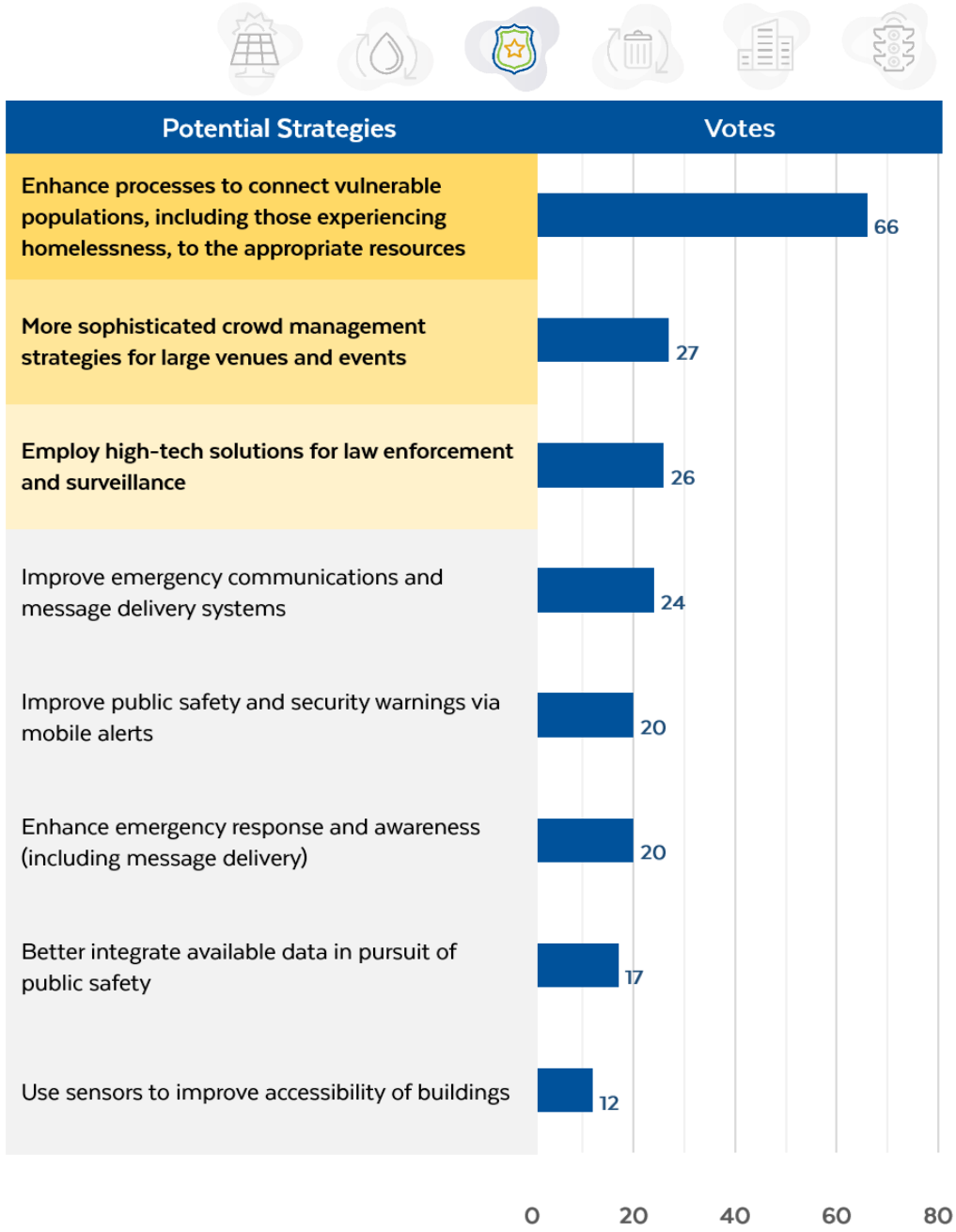
ORLANDO FUTURE-READY CITY

PUBLIC SAFETY & HEALTH

POTENTIAL STRATEGIES

- Enhance processes to connect vulnerable populations, including those experiencing homelessness, to the appropriate resources
- Improve emergency communications and message delivery systems
- Improve public safety and security warnings via mobile alerts
- Better integrate available data in pursuit of public safety
- Enhance emergency response and awareness (including message delivery)
- Employ technology solutions for law enforcement and surveillance
- Use sensors to improve accessibility of buildings
- More sophisticated crowd management strategies for large venues and events

COMMENTS



SOLID WASTE MANAGEMENT PUBLIC WORKSHOP MATERIALS AND VOTES RECEIVED ON POTENTIAL STRATEGIES

WHAT ARE WE ALREADY DOING?

Smarter Recycling & Waste Management

- Optimized trash routes, reduced service time, analyzed recycling habits of residents and reduced fuel consumption of fleet vehicles
- Currently being piloted with key partners (Rubicon, Easy Route)

Food Waste Collection

- Divert organic food waste from the food service industry
- Currently implemented with key partners (Harvest Power, Second Harvest)

Solar Public Space Trash Cans

- Provides solar power to compact waste and provides real-time information on how full the bins are
- Currently implemented with key partners (Big Belly Solar)

CITY GOALS

- Elimination of solid waste sent to landfills and incinerators
- Becoming a "zero waste" community
- Make waste a resource rather than an environmental liability; an opportunity for economic growth
- Improving quality of life in Orlando

ORLANDO FUTURE-READY CITY

SOLID WASTE MANAGEMENT

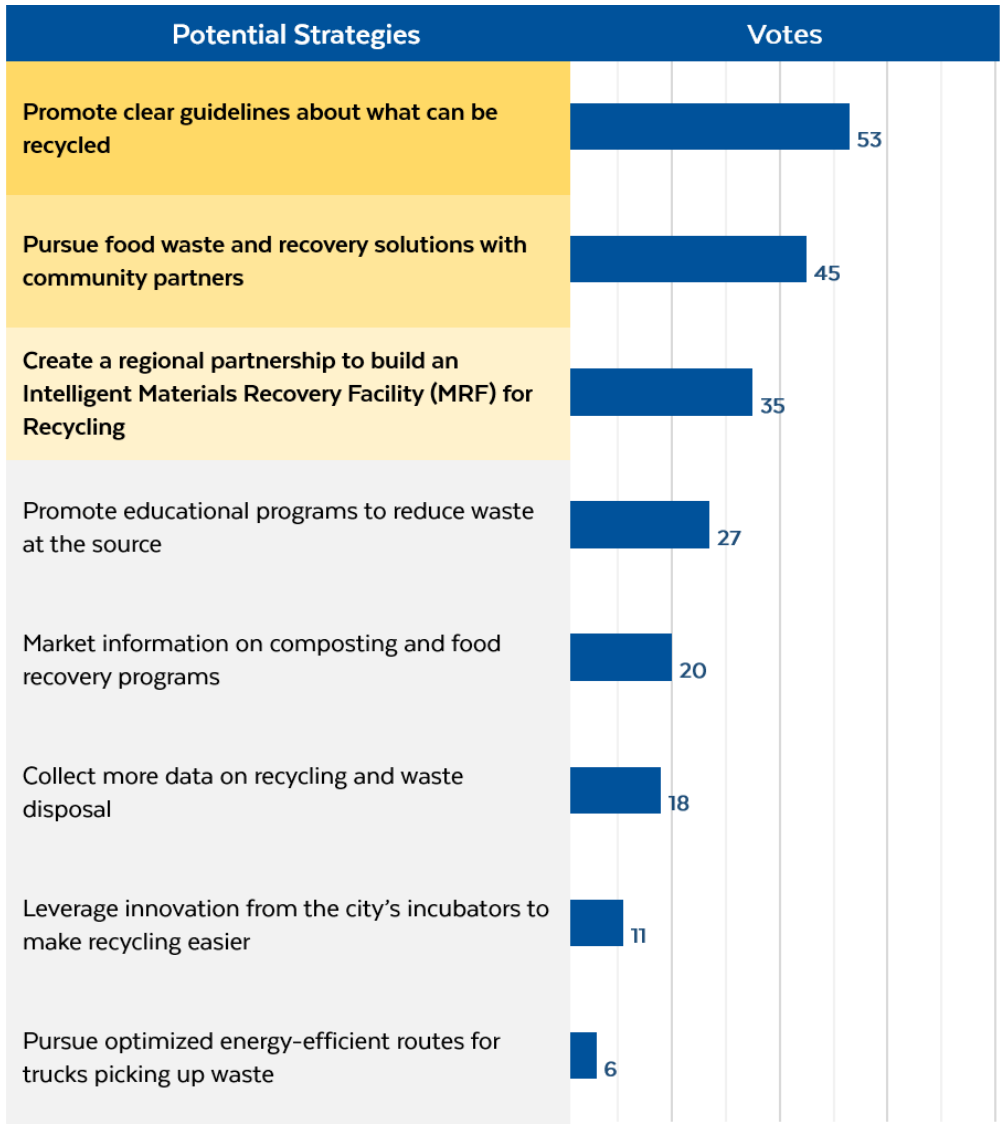
ORLANDO FUTURE-READY CITY

SOLID WASTE MANAGEMENT

POTENTIAL STRATEGIES

- Create a regional partnership to build an Intelligent Materials Recovery Facility (MRF) for Recycling
- Leverage innovation from the city's incubators to make recycling easier
- Promote educational programs to reduce waste at the source
- Pursue food waste and recovery solutions with community partners
- Collect more data on recycling and waste disposal
- Promote clear guidelines about what can be recycled
- Pursue optimized energy-efficient routes for trucks picking up waste
- Market information on composting and food recovery programs

COMMENTS



BUILT ENVIRONMENT PUBLIC WORKSHOP MATERIALS AND VOTES RECEIVED ON POTENTIAL STRATEGIES

WHAT ARE WE ALREADY DOING?

Building Automation & Controls

- Real-time information and control for energy and water use
- Implemented with key partners (Building OS, WebCTRL)

Smart Street Lighting

- 18,000 street lights retrofitted to LED
- Partnership opportunities for pilot programs with OUC, special districts and property owners

Demand-Side Management

- Control and manage loads during peak times of day by controlling non-essential assets (hot water heaters, HVAC)

Grid Energy Storage

- Asset that provides a resiliency back-up power generator for future extreme weather events

CITY GOALS

- 100% of municipal electricity from renewable sources by 2030
  - 50% reduction in municipal electricity consumption by 2030
  - Run city fleet vehicles on 100% renewable sources by 2030
- LEED requirement for all new municipal buildings
  - 15 new LEED certified buildings since 2010
- 100% LED streetlights by 2020
- 27% of city operations powered by Solar in 2020

ORLANDO FUTURE-READY CITY MASTER PLAN

BUILT ENVIRONMENT

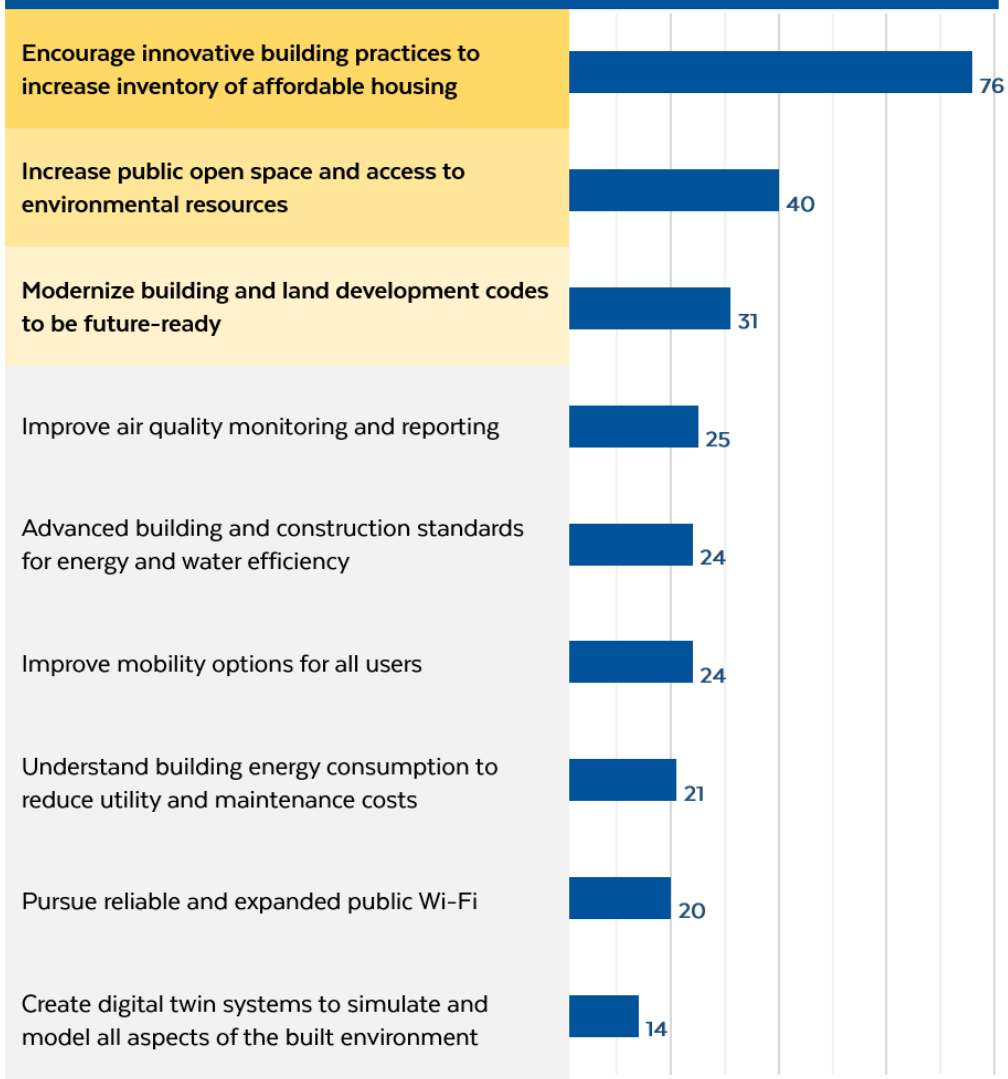
ORLANDO FUTURE-READY CITY MASTER PLAN

BUILT ENVIRONMENT

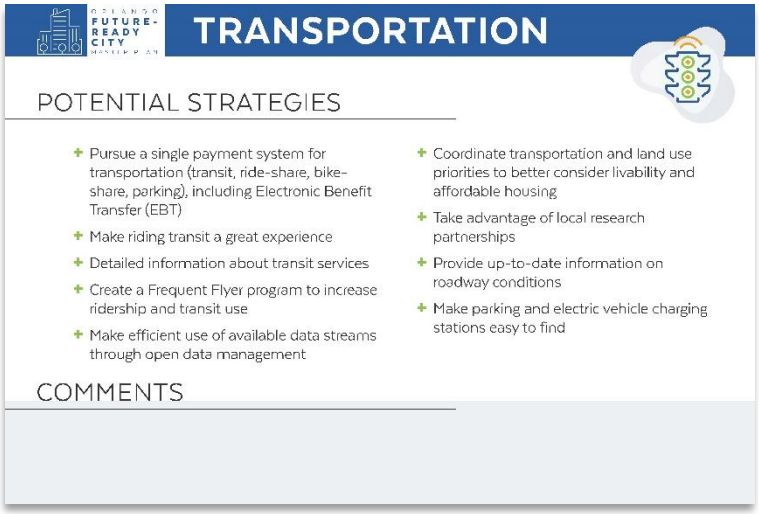
POTENTIAL STRATEGIES

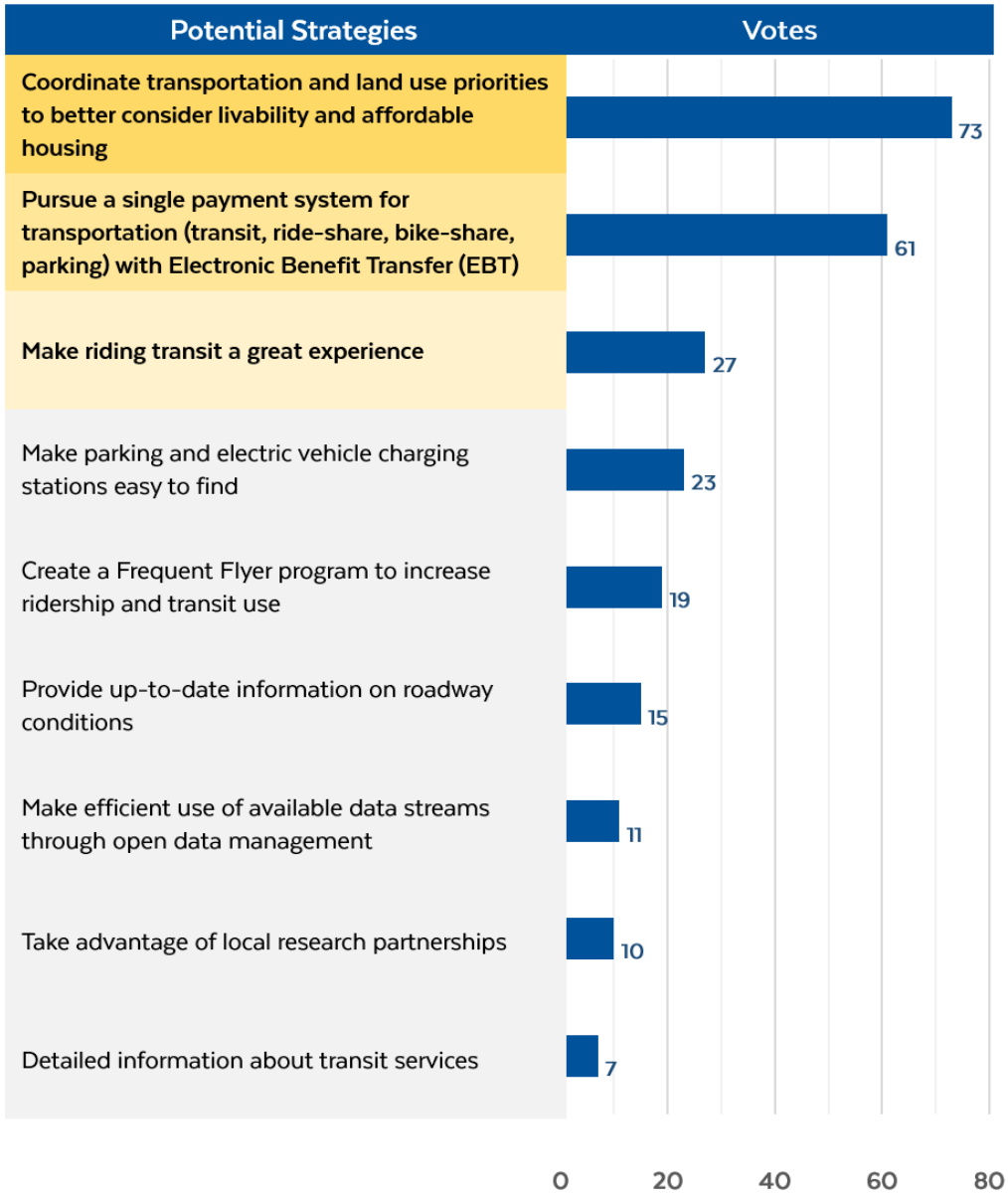
- Modernize building and land development codes to be future-ready
- Advanced building and construction standards for energy and water efficiency
- Increase public open space and access to environmental resources
- Improve mobility options for all users
- Create digital twin systems to simulate and model all aspects of the built environment
- Encourage innovative building practices to increase inventory of affordable housing
- Understand building energy consumption to reduce utility and maintenance costs
- Pursue reliable and expanded public Wi-Fi
- Improve air quality monitoring and reporting

COMMENTS



TRANSPORTATION PUBLIC WORKSHOP MATERIALS AND VOTES RECEIVED ON POTENTIAL STRATEGIES





Summary of Written Input by Pillar Focus Area

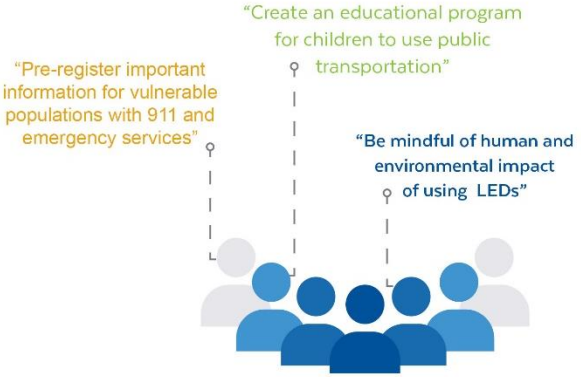
Energy and Utilities

- **Alternative Energy Sources** - support of increasing availability of alternative energy sources, such as solar.
- **Equity** in dealing with people and natural systems was also a main topic of conversation.
- **User-Focused** - Being mindful of the end consumer in the implementation and communication of technologies was discussed by several attendees.

Public Safety and Health

- **Vulnerable populations** were the most discussed topic during every meeting for this pillar. Citizens recognized the responsibility to protect the homeless, elderly and other vulnerable populations and discussed several specific and unique solutions that could involve technology.
- **Health** of the population was also discussed often, especially the need to create some priorities that address health.
- **Public Spaces** - The safety of public spaces was another topic of heavy discussion. Residents were keen making dangerous places in their neighborhoods safer through lighting, security cameras, and other means of monitoring.

POSSIBLE STRATEGIES FOR ORLANDO FUTURE-READY CITY



Transportation

- **Culture** - There was much discussion around the culture of transportation, with a shift towards one that prioritizes pedestrians and bicyclists by closing down streets for transit and adding more bike lanes.
- **Education** - There was also discussion around educating people, both on rules of the road as well as how to take transit.
- **Vulnerable Populations** were a topic of discussion. Attendees were thoughtful about how all people take transit and access daily essentials.
- **Transit Frequency** and improved transit stops were popular suggestions for improving transit quality, which many attendees recognized as vital to the future of Orlando.

Built Environment

- **Permitting** – There was a strong interest in encouraging creative solutions to problems through incentives and enforcement of permitting processes.
- **Attainable Housing** was another topic discussion at every meeting, including ways to make Orlando denser.
- **Public Space** - Several attendees expressed the desire for more greenspace, more parks and overall more vibrant public spaces to encourage social cohesion.

Solid Waste

- **Shared Community Facilities** – Many attendees spoke about a need for more community facilities that would help improve proper disposal of waste including recyclables, hard to dispose of items, and compostable waste.
- **Reduced Consumption** - Several attendees provided input communicating their desire to see not just waste but consumption that leads to waste reduced. Ideas included manufacturers paying a fee when they produce hard to dispose of products, incentives to reduce packaging, and/or waste at the source, as well as programs for community members to rent share goods instead of purchasing for a one-time use.
- **Education** - Many community members shared their desire for improved education when it comes to solid waste reduction and disposal.
- **Commercial waste** was another topic of conversation, as attendees saw the importance of improving processes for facilities that create the most waste.

POSSIBLE STRATEGIES FOR ORLANDO FUTURE-READY CITY

Water and Wastewater

- **Natural Systems** – A heavy topic of conversation for Water and Wastewater was falling more in line with natural systems and acknowledging our role in them as we seek to make our water systems better. This included the use of bioswales, xeriscapes, better integrating wetlands into development and the use of native vegetation.
- **Reduce Use** - Reducing water use, through incentives, education, or enforcement was another topic of conversation. Examples include the discussion of reduced commercial irrigation and rain barrels.

Themes Common to all Pillar Focus Area Discussion

Across all of the conversations had through the internal stakeholder meetings, pillar focus area roundtable meetings and the six public workshops, several common themes began to emerge that are applicable across all six pillar focus areas. These themes are listed in the table below.

Topic	Discussion
Vulnerable Populations	Community members discussed vulnerable populations at every meeting, at every pillar board. They expressed a desire for equity and respect in everything from public transportation, attainable housing, access to public resources, community connection and safe public spaces.
Education and Communication	Community members repeatedly brought up their desire for access to information and training to create meaningful cultural shifts in the city. This included discussions on the creation of a dashboard to share valuable information and educational opportunities, with special emphasis on public safety, alternative energy and home ownership. Supplement with a partnership with the public school system.
Permitting, Incentives and Regulatory Processes	Community members recognize permitting, regulatory processes and incentives as a powerful tool to steer the City towards a brighter future. This included mandating sustainable building practices and incentivizing behavior that benefits the long-term health of the community. Use technology to streamline these processes and track the impact of incentive-based programs.
Partnerships	Community members want to create partnerships with Orange County, other local governments and/or innovative technology companies to make sure its investments were in line with best practices and would continue to be valuable well into the future and move the community forward in a sustainable way.
Natural Systems	Community members reiterated that if the City is to lead the way in resilient planning for the future, it should consider natural systems thinking, including discussions of alternative energy, energy efficiency, composting, native plants in drainage systems and 'zeroscaping'. Working well with the natural world will ensure the City of Orlando continues to be a beautiful place to live with all the appropriate resources citizens need to thrive.
Enforcement	Community members want to guide the future through education and regulatory processes and better enforcement of existing rules. This was of particular concern for those discussing pedestrian and vehicle interactions but was also applicable to the built environment and permitting, waste management and wastewater. In addition to technologies that can improve ease of enforcement, this topic points to the desire for improved methods of communication and education between citizens and the city.

Appendix

Section 1.

List of Participants in Pillar Focus Area Roundtable Sessions

ORLANDO
FUTURE-READY CITY
MASTER PLAN

Pillar Focus Area Roundtable Meeting Attendees

Solid Waste
1/17/20 - 11 attendees

Department/Company	Name
Public Works	Joe England
Public Works	Everton Johnson
Public Works	Mike Carroll
Code Enforcement	Kory Keith
GIS	Duane Stephens
Sustainability	Chris Castro
Orlando SED	Andres Hoyos
Orlando SED	Philip Tinsley
Orlando SED	Jeff Chabon
Orlando SED	Kelly Cohen
Orlando SED	Sarah Nemes
VHB	Dave Mulholland
VHB	Curt Ostrodka
Jacobs	Dan Kirby
Metric	Dale Cody
Metric	Matt Honold

Water and Wastewater
1/22/20 - 24 attendees

Department/ Company	Name
Public Works	Kristi Fries
Public Works	Rick Suggs
Public Works	David Bass
Public Works	Paul Deuel
Public Works	Chuck Shultz
Public Works	Aaron Green
Public Works	Guy Mecabe
Planning	Elisabeth Dang
OUC	David Mayer
OUC	Brad Jewell
OUC	Alyson Byrne
Orange County Soil& Water District	Daisy Morales
Orange County Utilities	Marc Cannata
Orange County Utilities	Andres Salcedo
Orlando Machine Learning and Data Science Meetup	Luis Moros
UCF	Woo Hyoung Lee
BFA Environmental	Willie Thomas
Orlando SED	Jeff Chabon
Orlando SED	Doug Dierlich
Orlando SED	Richard Levey
Orlando SED	Philip Tinsley
Orlando SED	Andres Hoyos
Orlando SED	Sarah Nemes
Orlando SED	Kelly Cohen
VHB	Dave Mulholland
VHB	Curt Ostrodka
VHB	Ryan Fetchko
Metric	Dale Cody
Metric	Matt Honold

Transportation
1/23/20 - 42 attendees

Department/Company	Name
Public Works	Ed Bryant
Housing	Stephanie Neves
Economic Development	Lisa Rain
Transportation	Jonathon Ford
Transportation	Chris Cairns
Transportation	Cade Braud
Transportation	Mark Tobin
Transportation	Benton Bonney
Transportation	Steve Jones
Transportation	Evan Magley
Transportation	Claudia Korobkoff
Sustainability	Chris Castro
Public Works	Charles Ramdatt
GIS	Duane Stephnes
City Planning	Jason Burton
City of Orlando	Michelle Robinson
Montgomery Consulting Group	Sara Sullivan
CFX	Jim Greer
Orange County	Jeff Benavides
UCF Center for Autism & Related Disabilities	Joanna Cruch
Metroplan	Eric Hill
Beep	Jen Foote
David Thomas Moran	Omnimodal
Lynx	Doug Jamison
Tavistock	Juan Santos
City Planning	Paul Lewis
Orange County	Alan Marshall
Southern Group	Kelly Cohen
OUC	Bernadette Mural
OCPS Transportation	Adam Zubritsky
FDOT D5	Tushar Patel
Orange County Transportation Planning	Alissa Barber Torres
Orange County Transportation Planning	Brian Sanders
Orlando SED	Andres Hoyos
GOAA (HNTB)	Alex Sorondo
OUC	Luz Aviles
OUC	Harmonie Wilson
UCF Center for Autism & Related Disabilities	Jennifer Cicia
Orlando SED	Greg Curtain
UCF / Orlando SED	Jeff Pridmore
UCF / Orlando SED	Naveen Eluru
Orlando SED	Doug Dierlich
VHB	Dave Mulholland
VHB	Curt Ostrodka
VHB	Ryan Fetchko
Metric	Dale Cody
Metric	Matthew Honold
Jacobs	Dan Kirby
Jacobs	Chris Macintosh
Jacobs	Madeline Almodovar

Public Safety
1/23/20 - 23 attendees

Department/Company	Name
Fire Dept	Hezedean Smith
GIS	Duane Stephens
Police Dept	Jay Draisin
Police Dept	Doug Goerke
Future Ready	Charles Ramdatt
Emergency Management	Manuel Soto
Emergency Management	April Taylor
GIS	Cole Blake
Fire Dept	Benjamin Barksdall
IT	Jason Kuhlman
LYNX	John Slot
OCPS	Steven Thorp
Orlando Machine Learning & Data Science Meetup	Chirstopher Kemp
Lynx	Doug Jamison
Orlando SED	Andres Hoyos
Orlando SED	Jeff Chabon
Orlando SED	Gail Johnson
UCF / Orlando SED	Jeff Pridmore
Orlando SED	Surabhi Singh
UCF Center for Autism & Related Disabilities	Jennifer Cicia
Orlando SED	Doug Dierlich
Orlando SED	Phillip Tinsley
Orlando SED	Greg Curtain
VHB	Dave Mulholland
VHB	Curt Ostrodka
VHB	Jordan Crandall
Jacobs	Dan Kirby
Jacobs	Chris Macintosh
Jacobs	Madeline Almodovar

Energy and Utilities
1/22/20 - 23 attendees

Department/ Company	Name
Public Works	Corey Knight
Planning	Jacques Coulon
GIS	Duane Stephens
Sustainability	Chris Castro
Future Ready	Charles Ramdatt
Orlando SED	Jeff Chabon
Orlando SED	Doug Dierlich
Orlando SED	Philip Tinsley
Orlando SED	Andres Hoyos
Orlando SED	Kelly Cohen
Orlando SED	Gail Johnson
OUC	Pete Westlake
OUC	Justin Kramer
OUC	Tim Gross
Charter	Erik Suarez
Ecopreserve	Alexa Stone
Charter	Aaron Schneider
Hanson	Bill Bradford
Verizon	Crystal Chubeck
Siemens	Ivan Aron
Celebration Communities	Amy Westwood
Orlando Machine Learning and Data Science Meetup	Luis Moros
UCF	Kelly Stevens
Jacobs	Dan Kirby
Jacobs	Chris Macintosh
Jacobs	Madeline Almodovar
VHB	Dave Mulholland
VHB	Curt Ostrodka

Built Environment
1/28/20- 33 attendees

Department/Company	Name
Public Works	Michael Melzer
Permitting	Lillian Scott-Payne
Planning	Elisabeth Dang
Fleet & Facilities	Ian Lahiff
Sustainability	Chris Castro
Planning	Doug Metzger
GIS	Cole Blake
EDV	Timothy Johnson
Facilities	Alex Gaggoro
Planning	Paul Lewis
Lighthouse Central Florida	Benjamin Bossley
LYNX	John Slot
Seimens Smart Infrastructure / SED	Ian Brown
ESRI	Will Meyers
ESRI	Robyn Garrett
Tesla	Chris O'Bannon
Lynx	Doug Jamison
Orlando SED	Andres Hoyos
Orlando SED	Jeff Chabon
Orlando SED / Baker Barrios	Richard Jones
Orlando SED	Gail Johnson
Orlando SED	Sarah Nemes
Orlando SED	Dino Antzoulis
Orlando SED	Greg Curtain
UCF / Orlando SED	Jeff Pridmore
UCF / Orlando SED	Roberta Fennessy
UCF	Y Gurt Ge
Florida Citrus Sports	Shannon Clark
OUC	Melissa Lucas
OUC	Natalia Paredes
TLC Engineering	Kirsty Walson
JP Morgan	James Cook
Epic Engineering	Bob McQueen
VHB	Dave Mulholland
VHB	Curt Ostrodka
VHB	Tyler Johnson
Jacobs	Dan Kirby
Jacobs	Chris Macintosh
Jacobs	Madeline Almodovar

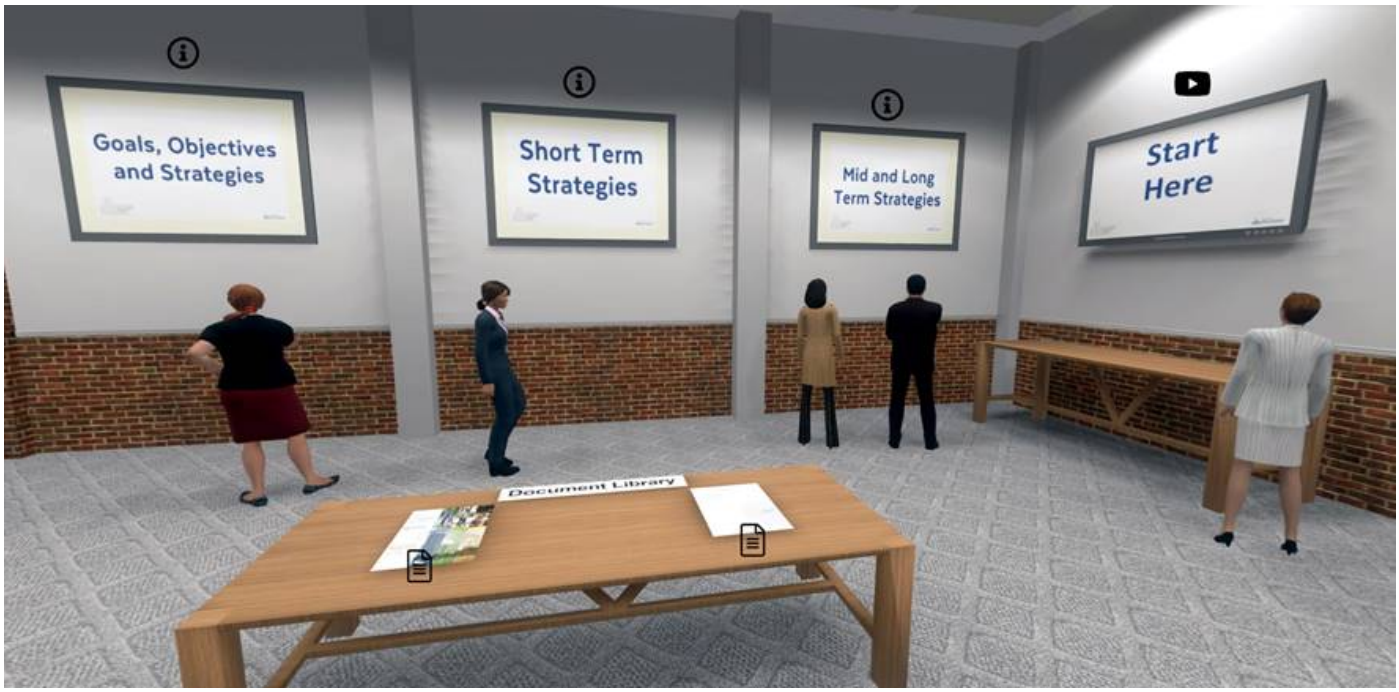
Meeting Notes

Place: Virtual Workshop
Date: November 5, 2020
Project #: 63588.00

Notes Taken by: J. Crandall
Re: Virtual Workshop Meeting Summary

MEETING SUMMARY

The project team held a virtual workshop to present the final draft of key elements of the Orlando Future-Ready City Master Plan including: a summary video, contact information, project vision and mission, foundational elements, pillar focus areas, goals and objectives and short-, mid- and long-term strategies This workshop was open for public comment from October 5th to November 5th, 2020. During this time, the room received more than 1700 unique viewers, with traffic coming directly from the city website as well as social media posts. A summary of the 12 public comments received can be found in the on the following page. Below is an image of the interactive virtual meeting room.



225 E. Robinson Street, Suite 300
Landmark Center Two
Orlando, FL 32801-4326
P 407.839.4006

Future Ready Orlando Virtual Workshop Comments

Name	Zip Code	Comment
Juliana Toyloy-Stanton	32821	**1.** How will this future-ready city plan help the homeless? -Possible solution: building more proactive homeless shelters that help them get back on their feet rather than just giving them a place to stay. -Possible solution: building a specific area for them to grow and learn rather than just lazing about the streets or sleeping in the park Use technology, creativity and other out of the box solutions to help them earn work. Let them build things around the city(i.e. murals, sculptures, help upkeep the parks). Make them feel useful in their time of need. **2**. The plan lacks the use of certain technologies we see being used in Japanese, Korean, and other European cities. The use of a "soda like machine" where you can input your recycling or trash and it puts it into the correct area of collection. That way you are helping not only the trash/recycling crew, but also the world. Or even more bus stops that are more interactive with a map instead of using paper maps. **3**. The talk of transportation in the city needs to be more eco-friendly and efficient. The use of the current buses are slow, ineffective schedules and harmful to the environment. If we found better ways to power the buses with the help of electric car technology. I think that is a better solution. **4.** Finding ways to help our aqueducts and water ways clean instead of creating more issues. **5.** using more foliage when creating high rises and other buildings. That way we are growing things for ourselves, but also creating better air quality throughout our city. **6.** Helping the library system to become what it used to be. The hubs of information at your fingertips. Let the libraries be a greater source of learning and fun for kids by providing them with more technologies and books. **7**. Open more public or privately owned internet cafés. These in Japan provide not only a place for youth to gather, play or study but also a place for the elderly or homeless to use the computers for a small regulated fee. **8.** Thinking about microgrids to help distribute electricity and energy.
Charles Major	N/A	Downtown Orlando requires well maintained accessibility and walkability sidewalks and roadways Downtown Orlando should adhere to LEED Neighborhood Development (ND) Version 4
Daniel Friedline	32801	I have noticed there is no mention of ensuring food access and distribution resiliency for the City of Orlando. Is this an area that was considered.
Mital Hall	N/A	The energy goal says that you will analyze data for vulnerable populations related to climate...what is the action to help these populations beyond analysis alone. Needs to include more direction.
N/A	N/A	The documents loaded on this site are hard to read even when I expand the view to full screen.
N/A	N/A	Airtrac transportation can help Orlando to become a primer destination, it is not great to be fully dependent on cars and expensive roads.
Mira Tanna	32808	The Future Ready plan is exciting and has many strengths! Some suggestions: 1). Regional Policy Recommendations for Mobility - include an extension of Sunrail from downtown to Eustis using existing CSX rail line to connect the Packing District, Rosemont, Lockhart, Apopka and Golden Triangle, and to implement TOD incentives for affordable housing along the corridor. This will improve regional equity in transportation opportunities for more African Americans. 2). Integrated Transportation App (p. 92): This could include bike rack availability on buses and commuter station amenities like showers (Lake Nona Mobility Station, and fitness centers that will provide reduced membership for shower only to commuters). When employees have access to a shower, bicycle commuting increases 5-fold. 3). Placemaking (p. 58): The objectives and strategies in this section don't match the placemaking goal. I would suggest adopting the following strategy: engage in neighborhood-based planning process to identify one unique characteristic that either currently or prospectively identifies the neighborhood. No two neighborhoods would have the same characteristic. This would expand on efforts of Main Street districts to include funky, unique and community-building features in every neighborhood. Examples: neighborhood known for its houseboats on the lake, a food forest, community beach, outdoor movie walls, warehouse district, pedestrian mall, ziplines, food truck parking, public beach, nature preserve, colorfully painted windmills, treehouses, tree swings, antique shops, market, boat dock/boat rentals, cultural festivals, lanterns, railyard, murals, historic district, community farm, tiny home community, bilingual signs, public art, ephemera, museum. Each neighborhood would be branded with an icon to represent the feature. Matching Grants would be made available for neighborhoods to implement their community feature. 4). Placemaking - VR/AR app. While the plan makes a good case for the benefits of technology for use in energy conservation, resilience planning, transparency in government, and more, I think it's important to also be aware of the limits of technology, and the need for tech-free zones and disconnection. The VR/AR wayfinding to me seems particularly unnecessary. Google maps already exist if people are lost. Let them open their eyes and enjoy our parks and green spaces unimpeded by technology.
		5). Privacy Considerations - I feel similar ambivalence about the internet of things use in smart homes and the public safety surveillance systems. Throughout the plan, there needs to be greater discussion about privacy, about which corporations might have access to data gathered through cameras or smart devices, how to ensure data is not compromised, and how to prevent abuse. 6). Municipal Wifi - I gather there are some legal challenges with creating a public wifi system that users can pay into rather than using a private company for secured internet service, and that can also be used for a non-secure public wifi network available to all. This is what I would like to see, and other cities like Leesburg and Lakeland have municipal wireless systems. If it's no longer an option, it would be nice to know why (in the challenges section perhaps). Also, a natural partner for public wifi would be the Orange County Library System which currently offers free public wifi in all branches. 7). Regional Housing Plan - I would suggest including both a mandatory inclusionary zoning ordinance (developers required to produce a certain percentage of affordable units in any new development) and a restriction of new single family developments on existing natural, undeveloped lands.
Beau Dangerfield	32801	I would like to see city founder Aaron Jernigan honored with a park located on his original homestead on Lake Holden.
N/A	32827	southeast Orlando needs More parks, nature trails, and green spaces More children's museum/science discovery community center Community food gardens and initiatives
N/A	N/A	A city's accomplishments are only achieved by the amenities and it's treatment of its most vulnerable citizens.
Nicholas Teague	32714	Hello I am founder of Automunge, a local startup offering an open source platform for use to prepare data for machine learning. I came across this initiative through the Digital Orlando conference. If you guys have any initiatives for machine learning and data science please feel free to reach out for further discussion. Additional information available at automunge.com.
N/A	N/A	I live downtown. Would love to see more shopping and fewer bars. We need safety net options for homeless

Short Term Strategies

- Digital Twin
- IDEA Lab
- Community Outreach and Engagement Plan
- Resilience Plan
- Define the Digital Divide
- Community Wi-Fi
- Wi-Fi Hotspot/Mobile Tablet checkout program
- Social Services Optimization
- Integrated Public Alert and Warning System (IPAWS)
- Smart Buildings with Advanced Sensor Network
- Food Recovery Network
- Materials Resource System Study
- Smart Parking
- Integrated Transportation Application
- Alternative Transportation Mobility Program
- Resilience Hub

ORLANDO
FUTURE-READY CITY
MASTER PLAN

Strategy Name:
Integrated Transportation Application

Pillar Focus Area(s): Mobility

City Department Owner: Transportation Department

Strategy Description:

Problem statement: Transportation across the major cities of the world and the U.S.A is being rapidly affected by a dramatic increase of urbanization and population. This causes a significant strain on existing infrastructure and land resources. As the City of Orlando grows to become a Future-Ready City, the City's current transportation departments and providers need to take advantage of the latest emerging intelligent mobility efforts and partnership opportunities to better meet the needs of the public.

State of the Industry: In the past five years, agencies across North America have started to explore options beyond conventional services to meet the needs of customers by implementing mobility-on-demand (MOD) or mobility as a service (MaaS) concepts. Both MOD and MaaS refer to same basic concept of on-demand mobility where customers can discover/plan travel options, request, and pay for a door-to-door service using a smartphone or a web application. In some cases, customers can also contact a call center, which addresses Title VI and Equity concerns. This service is typically provided in partnership with third-party technology platform providers such as RouteMatch, RideCo, Ecolane, Via, Pantonimum EverRun, and others. Transportation Network Companies (TNCs) such as Uber and Lyft have also started to partner with transit agencies or departments of transportation (DOTs) to provide such services. These services can be setup as follows:

- First/Last mile connectivity to an existing transit service, focused on regional or long-distance travel needs;
- A new service operating in an unserved/underserved area, focused on on-demand local travel needs; or
- Complementing paratransit/demand response service through a more efficient same day service; this may be accomplished using single ride services (e.g., equivalent of a taxi service) or sometimes this may involve implementing dynamically routes rideshare services (e.g., Uber Pool).

These services can be implemented for both driver-operated and driver-less vehicles, depending on the service area and existing roadside communications infrastructure. Costs vary widely between the various services depending on whether a consumer-off-the-shelf solution with minimal configurations is used or there is significant customization. As well, costs for services from TNCs such as Uber and Lyft have not yet stabilized and have wide ranges depending on where they have been implemented.

Implementation Strategy

The Integrated Transportation Application Strategy aims to implement a mobility guidance tool to offer on-demand transportation information and service to the residents and visitors of the City of Orlando. The strategy consists of providing users and visitors of the City of Orlando the ability to plan multi-modal trips; a combination of transit, ridesharing, walking and biking, all in one centralized location through the use of a mobile application designed to run on smartphones/smart devices and transit kiosks. The Integrated Transportation Application strategy as part of the Future-Ready City Master Plan is comprised of the following features:

- Expand on the efforts currently in place by the Florida Department of Transportation (FDOT) – District 5 (D5) by developing a separately designed and maintained front-end user interface

(e.g. application) of the District's multi-modal trip planning engine called the Route and Mode Choice Engine.

- Strategically install solar powered transit kiosks in underserved communities, bus stops and City Hall, by leveraging the information provided by FDOT-D5 on their transit kiosk pilot program in the University of Central Florida (UCF).
- Provide FDOT-D5 the City's relevant transportation data to better serve the multi-modal platform.
- Support a single payment system effort.

Phase I: Development and design of a customized City owned front-end single user interface (application) of the FDOT Route Choice Mode Engine (RCME). The development of the mobile application will consist of the following:

- Consideration of Title VI/Equity needs. It is a principle concern to ensure that all mobility services meet all requirements related to equity.
- Collection of information on case studies developed around the world to better understand the business eco-system of the MOD concept.
- Determine whether the City of Orlando will develop the mobile application internally or outsource development and design to a third party.
- Determine a look and design of the application that matches the City's marketing solutions.
- Assess the City's organization ability to develop and support mobile application development.
- Define security concerns, such as the need for mobile application management and encryption and location of data assets.
- Define the elements of the application's architecture.
- Define a deployment strategy for the application.
- Determine what tools will be needed to analyze the effectiveness of the application.

Phase II: Strategically install a total of ten (10) solar powered transit kiosks with Wi-Fi connection around bus stops in underserved communities and City Hall. These kiosks are meant to provide users who don't have access to smartphones/smart devices and who don't own cars, access to the multi-modal trip planning application.

Benefits:

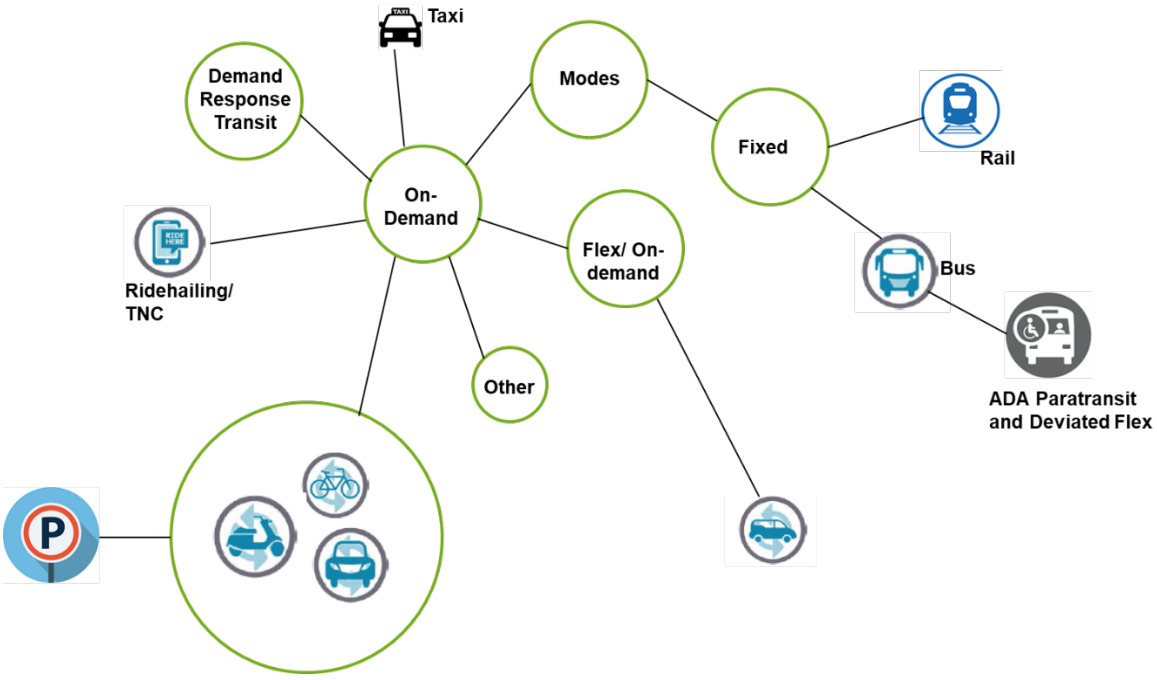
The implementation of the Integrated Transportation Application strategy will provide the residents and visitors of the City of Orlando with all options for mobility to support their daily needs such as getting to work, school, appointments, events and any place they need to go in the Orlando metro area. Providing users with real-time traveler information that can be personalized to specific needs will promote the continuous use of public and private transportation systems, it will promote sustainable solutions that will benefit the environment and it will promote the inter-operability and strong partnerships between transportation organizations.

Metrics / Key Performance Indicators:

- Increasing trend of generated revenue in the public and private transportation agencies.
- Continuous service reliability that will depend on performance of time and level of quality.
- Ensure all residents and users have accessibility to the services provided.

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: Phase 1. Strategy Development $200,000	Example 1: Central Florida has explored and implemented similar concepts in the past**.** In 2015, the City of Altamonte Springs implemented an on-demand service by forming Municipal Mobility Working Group (MMWG) with neighboring cities in partnership with Uber. The main purpose of the TNC partnership is to provide feeder service to Sun Rail stations, but riders can travel anywhere within city limits and areas that are part of the MMWG agreement. The first phase of the program involved discounts by cities for rides originating and ending in their jurisdiction. The second phase involved discounts on rides which originate in any other city but end in theirs. Cities paid 20 percent of the ride ending in their jurisdiction and 25 percent of the cost of rides that begin or end at the SunRail station inside of the city. This program ended in 2018.
Phase 2: $529,000 for installation of 10 kiosks. Recurring/O&M: $62,694/year	**Example 2** Central Contra Costa Transit Authority (CCCTA), backed by a combination of private companies, public transit, and air quality authorities, has launched a driverless shuttle service. Two 12-seat shuttles, provided by EasyMile, are being tested to offer service in the area. CCTA plans to operate nearly 100 shuttles by 2020. The majority of funding is provided by owners of Bishop Ranch, a Sunset Development Company. Bishop Ranch is a 585-acre office park that includes 550 tenants and an employment population of 30,000. Shuttles provide service in the office park area and provide first and last mile connectivity to a nearby BART

	station. The shuttle is meant to transform first/last mile connections in the area and fill gaps in the current transit system. The shuttle is the first driverless shuttle that California Department of Motor Vehicles has granted permission for operations. Bishop Ranch offers an ideal location for autonomous vehicles, where employees need a shuttle to commute from the nearest BART station to the office park. A hub-and-spoke model is planned for these services to facilitate use of mass transit as backbone and the autonomous shuttles as a first/last mile solution.
Funding Type (General Fund/P3/Other)	Most MOD concepts in the US have been implemented using USDOT funds in the form of MOD Sandbox for pilots or other sources (e.g., Innovate 680 grant for CCCTA). In cases where agencies have implemented long-term programs, agencies have started allocating operating funds that are available due to cutbacks on an existing fixed-route or on-demand service. In Some cases (e.g., Central Florida Uber partnership), Cities jointly funded the program.
Photographs/Graphics *See below graphic of customer mobility options*	**Photographs/Graphics**


Taxi
Demand Response Transit
Modes
Fixed
Rail
On-Demand
Flex/ On-demand
Bus
Ridehailing/ TNC
Other
ADA Paratransit and Deviated Flex
P

Strategy Name: Community WiFi

Pillar Focus Area(s): Connectivity

City Department Owner: Information Technology

Strategy Description:

As the advancement of technology progresses, readily accessible internet access is becoming a critical service. A reality for the City of Orlando is that some underserved communities do not all have a reliable source of internet access due to various economic and societal constraints. Readily accessible internet would also help the City become more resilient during natural disasters and other unforeseen circumstances, where government services, businesses, educators, and students may be required to work from home.

The concept of the Community Wi-Fi strategy is to implement a system that will allow the City of Orlando to become a hyper-connected city through the development of connected infrastructure by advancing the implementation of fiber Public Wi-Fi in areas currently deficient from this connectivity. This will provide residents and visitors with enhanced opportunities for education, communications, and community services. A pilot project in 2021 could provide Wi-Fi to one or more underserved communities and serve as a starting point to begin adding internet access to underserved areas in a phased manner, potentially block by block. The infrastructure could be placed on existing city infrastructure (e.g. light/utility poles, buildings) that would allow for point-to-point communications to create rings of network availability that could be expanded/scaled over time. The infrastructure could be fed using the City's existing fiber optic network.

In the future, this service could be supplemented with fiber networks, 5G Communications, and widespread implementation of a public safety Distributed Antenna Systems (DAS) for city services use. Recent changes to Florida fire codes for buildings mandate a two-way radio communication enhancement/signal booster system to be installed by 2022 with some multi-family properties eligible for extensions through 2025. Compliance with this requirement in existing buildings represent a critical means of in-building communication for first responders and a challenge for building owners.

- Create Master Inventory of Existing Fiber Facilities and develop a coordinated master plan for additional fiber
- Work with carriers to develop standards and policy to address efficient installation of 5G communications infrastructure
- Identify and prioritize installation of Distributed Antenna Systems within the most vulnerable city facilities and existing buildings

Benefits:

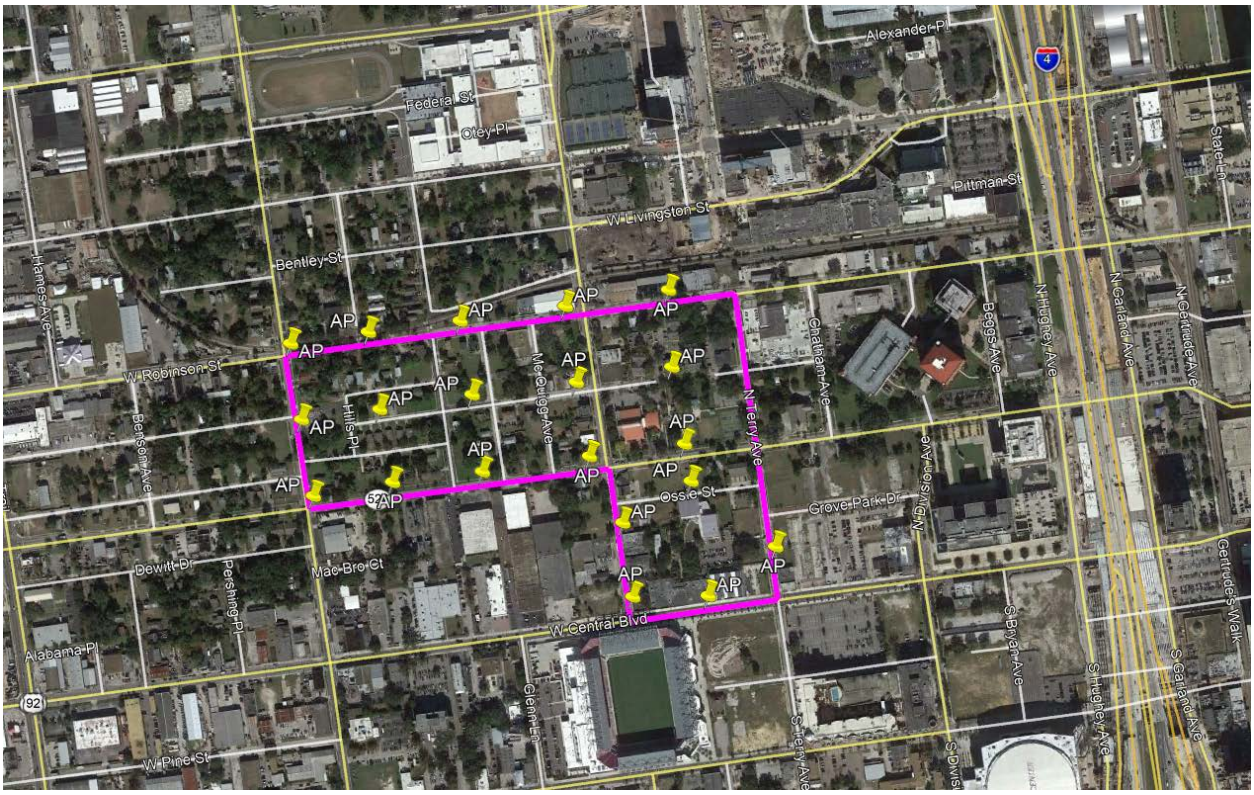
- Reduces the digital divide
- Provides critical infrastructure needed by to support IoT
- Encourages private investment
- Supports rollout of connected and autonomous vehicles
- Promotes enhanced opportunities for communication, education, and community

Metrics / Key Performance Indicators:

- Reliable publicly available Wi-Fi rendered to one (1) or more community(ies).
- Network uptime is no less than 99%.
- Reliable and effective network speed.
- Available and functional network bandwidth.
- Continuous increase in Wi-Fi service utilization by the residents and visitors of the City of Orlando.

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: • City Funded Pilot: $150,000	Wireless Island Project (Sunny Isles Beach, FL) https://www.sibfl.net/wifi/
Recurring/O&M: $1200-$2000/month for pilot (Scalable)	Downtown Alliance (New York City) https://www.downtownny.com/wifi
Funding Type: (General Fund/P3/Other) Opportunities with PPP, or Utility Partnership to reduce costs	Chicago WiFi (Chicago, IL) https://www.chicago.gov/city/en/depts/doit/supp_info/wireless_internetzones.html

Callahan Pilot Area Sample:



Strategy Name: Community Outreach and Engagement Plan

Pillar Focus Area(s): All Pillar Focus Areas

City Department Owner: Office of Communications and Neighborhood Relations

Strategy Description:

Collaboration and transparency with the public are foundational elements of the Future-Ready City Master Plan, including a robust participation plan consisting of internal city stakeholder interviews; roundtable meetings with public, private, and non-profit experts; a series of public workshops throughout the city; an online survey; and City Commissioner briefings. However, community outreach for the Future-Ready program must extend beyond the initial six-month project timeframe, and the City's customer base (residents, business owners, visitors) will need continuous information about the City's initiatives and technology investments. The need for education was commonly cited during internal stakeholder and roundtable meetings as a means of reducing waste and improving efficiencies.

The City should continuously update the Community Outreach and Engagement Plan to educate the public about how the Future-Ready program affects their lives and how they can have a voice in the process. This Plan may include the following tactics:

- Speakers Bureau service for neighborhoods/HOAs/business associations
- Quarterly public meetings for residents
- Social media engagement ("Did you know?" post)
- Online surveys using Qualtrics
- Active participation in professional associations and trade shows
- Media kit

Benefits:

- Customers will have awareness of the vision, goals, and benefits of the Orlando Future-Ready programs and actions
- Customers will use investments made by the City, which may include as Digital City Hall, open data dashboarding, mobility improvements (smart parking, rideshare hubs) and programs (energy financing, food recovery, etc.).
- A more educated community may have better personal habits for energy and water use, solid waste, and transportation choices; which could result in conservation of resources and reduced waste.

Metrics / Key Performance Indicators:

- Number of surveys completed
- Social media impressions
- Number of people signed into public workshops
- Number of meetings requested by neighborhoods/HOAs/business groups

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: $50,000 - $75,000	Almost all cities with Future Ready (Smart City) programs publish information for the public.
Recurring/O&M: $25,000 - $50,000	
Funding Type: General Fund	

Photographs/Graphics	

Strategy Name: Digital Twin

Pillar Focus Area(s): All Pillar Focus Areas

City Department Owner: Information Technology, Public Works, Economic Development

Strategy Description:

As City of Orlando services and operations become increasingly complex, there is a growing need to analyze and understand interactions across the resources of the City, partner agencies, community groups, and local businesses. Connectivity of the City of Orlando's physical assets, infrastructure, and people will become increasingly important to support critical public safety, planning, resilience, facility management, and economic development functions. Development of a Digital Twin provides an unprecedented opportunity for the City to realize significant benefits; utilizing data and information to provide better asset management, increase operations efficiency, support public safety, and enhance customer experience.

By linking and analyzing digital information, the City can be safer, more fiscally efficient, create better policy, become more resilient, and be more energy efficient. A Digital Twin is an exact digital replica of real-world buildings, physical assets, processes, places, systems, and devices.

The potential for applications of Digital Twins to be leveraged to benefit the citizens of Orlando is unlimited. The geospatial data in Orlando's Digital Twin will become the underpinning infrastructure of many future-ready applications. The Digital Twin provide insight into the existing built environment and simulations to provide for analysis of potential scenarios by organizing information gathered in intelligent 3D models and geographic information systems(GIS) together with real-world information collected via sensors, drones and other wireless technology, continuously learns from these and other sources, and uses advanced analytics, machine-learning algorithms, and artificial intelligence to gain valuable insights about the performance, operation, or profitability of the buildings.

It has been predicted that 500 cities will have digital twins by 2025.[i]

Digital Twins

- Set policies for handling of digital information
- Set protocols for submittal of building information models
- Develop pilot program targets

Benefits:

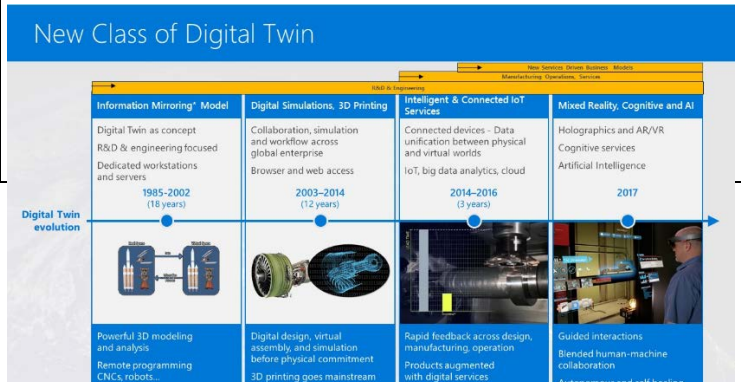
Digital twins can be used to conduct tests, gain insight or record events and experiences without impacting the built object. A digital twin can also integrate historical data from past usage to compare deviation to a baseline.
The digital twin can be used to:

- Test proof-of-concept in a safe, low-cost environment
- Provide a quick understanding of the impacts of design choices on capital and operating costs
- Improve system understanding and communication by many stakeholders
- Develop more robust solutions

- Reduce operational risks
- Increase system performance efficiency

Metrics / Key Performance Indicators:

- Payback time of asset management and placemaking-related Digital Twins developed: around 5 to 10 years
- Enhanced public health and safety for mobility and health and safety-related Digital Twins: Decrease of pedestrian and biking accidents at selected location up to 20 percent; increase pedestrian and biking traffic up to 5 percent at selected location
- Improved visitor experience at selected event venue or location by reduced traffic congestion and increased public attendance from previous year
- Decrease in downtime and maintenance costs for public works infrastructure by implementing an asset management system that tracks lifecycle costs and increases the number of preventive maintenance actions
- Agile deployment of smart building technology to track building performance and achieve targets for reduction in energy usage and reduction in loss of life and property from predictable events

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: $250k - $500k – target 25 pilot buildings in the database	Amaravati (India) https://newcities.org/the-big-picture-digital-twins-for-greenfield-smart-cities/ Fire or police use of the 3D model to identify areas of the building to be investigated.
Recurring/O&M: >$500k per year to continue adding buildings to the database and converting to digital twins.	Boston (Massachusetts, USA) https://www.esri.com/about/newsroom/blog/3d-gis-boston-digital-twin/
Funding Type (General Fund/P3/Other)	Newcastle (UK) https://www.newcivilengineer.com/latest/new-digital-twin-for-newcastle-to-stress-test-infrastructure-02-01-2019/ https://www.theguardian.com/cities/2018/dec/30/newcastles-digital-twin-to-help-city-plan-for-disasters
Photographs/Graphics https://www.challenge.org/wp-content/uploads/2019/01/Digital-Twin-evolution-sm_pic.jpg	**Photographs/Graphics** 

[i] Enterprise IoT Insights https://enterpriseiotinsights.com/20190919/channels/news/500-smart-cities-will-have-digital-twins-by-2025

Strategy Name: Establish Food Recovery Network (FRN) Program

Pillar Focus Area(s): Materials

City Department Owner: Solid Waste Division, Office of Sustainability and Resiliency

Strategy Description:

40% of the United States food supply goes uneaten each year. This equates to Americans throwing out as much as $218 billion each year. Despite these discoveries, forty-one (41) million people are considered to have a lack of access to food (e.g food insecure); and in Central Florida alone, one (1) in seven (7) people are food insecure.

Food recovery programs have been around for decades leveraging partnerships between various food donors, distribution centers and nonprofit organizations. The food recovery program requires the collection of food and grocery products that can be distributed to people in need or the vulnerable community that may not have the opportunity for meals. The intent of this solution is to leverage partnerships between businesses, distribution centers and the nonprofit organizations that fight against hunger to create a Food Recovery Network (FRN).

The FRN would establish the regional partners within the community that would participate on the donation of food and grocery products that would otherwise be disposed of. The network of partners, distribution centers and nonprofit organizations would be identified and would be approved based on the criteria outlined in the Bill Emerson Good Samaritan Food Donation Act.

The FRN would provide services for food banks and other qualifying programs that would reduce the processing cost and increase the efficient distribution of food to the nonprofit organizations. The FRN would quantify during the process the amount of food distributed each of the nonprofit organizations. This FRN program would be documented in an annual report to outline the effectiveness of the Food Recovery Network.

Benefits:

The benefits associated with a Food Recovery Network would include, at a minimum:

- Reduce cost for nonprofit organizations;
- Reduction of food waste in the landfills;
- Improving business cultures within the community;
- Reduction of hunger and food insecurity for the vulnerable communities;
- Reduction of carbon footprint by reducing waste in landfills;

Metrics / Key Performance Indicators:

- Quantity of food or grocery products distributed to nonprofit organizations;
- Annual volume / weight of food or grocery products that would have been disposed of to landfills;

Estimated Cost:	**Use Examples (case studies)**
FY 2021/22 cost: Development of Food Recovery Network Program ($150,000) Preparation of application to monitor the quantify of food or grocery products ($50,000)	Coordination between City food areas and Second Harvest. Quantify the amount of food collected and distributed.
Recurring/O&M: Program management, oversight and reporting ($30,000)	Coordination between a 3rd party food provider and Second Harvest. Quantify the amount of food collected and distributed.
Funding Type (General Fund/P3/Other) General funds Public private partnerships	
Photographs/Graphics	**Photographs/Graphics**

Strategy Name: IDEA Lab

Pillar Focus Area(s): Open for all seven pillar Focus Areas

City Department Owner: N/A

Strategy Description:

The IDEA Lab a city-driven incubator that will be open to industry subject matter experts, guiding the local technology community to help solve specific challenges identified by the City. The IDEA program will develop Request for Information (RFI) related topics that applicants will submit responses, supported by research, industry information and strategies to support the advancement of new solutions for Orlando Future Ready. A collaborative working group will be identified that will include City of Orlando staff and external partners that will a) provide oversight to the incubator program, identify focus area topics, evaluate the IDEA program submittals from applicants and track the return on investments of the selected solutions. Other partners may include the UCF Incubator and Starter Studio

The IDEA Lab is expected to open to advancing each of the Future Ready Pillars and will provide a standardized approach for the City to consider new innovations. As an incubator program, the IDEA Lab will promote the connection with local innovative providers, establish partnerships with new start up organizations and expand the localized living labs. The IDEA Lab will evaluate the benefits of conducting community engagement opportunities including hack-a-thons, developmental conferences or roundtable sharing. In addition, the IDEA Lab will consider leveraging City owned infrastructure and assets for pilot programs (where applicable).

Benefits:

- Establishes a formal Request for Information/Research program
- Provides an incubator program for considering new ideas within the City
- Combines internal and external efforts to enrich quality of life
- Serves as an industry portal providing an open forum innovation
- Promotes enhanced opportunities for communication, education, and community

Metrics / Key Performance Indicators:

- Establish and implement a City-driven Request for Information (RFI) program
- Quantity of implementable strategies per year

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: • Direct Labor: $25K/Year o Admin, Content Development	Columbus Partnership (Columbus, OH) https://www.columbuspartnership.com/
Recurring/O&M: TBD based on strategy selected	Austin CityUP (Austin, TX) https://www.austincityup.org/ Austin Innovation Office (Austin, TX) http://austintexas.gov/department/innovation-office-programs

Strategy Name: Resilience Hubs

Pillar Focus Area(s): Connectivity, Health and Safety, Placemaking, Energy, Water

City Department Owner: Office of Sustainability and Resilience, Fleet and Facilities, Public Works,

Strategy Description:

Storm events put many day-to-day resident and business activities as risk due to the potential for: extended power outages, communication disruptions, interrupted access to water, interrupted networks for food distribution, and confusion about where to go to seek assistance or temporary shelter. "Resilience Hubs are community-serving facilities augmented to: support residents and coordinate resource distribution and services before, during, or after a natural hazard event"[1]

Following Hurricane Irma in Miami in September 2017, climate activist and community organizers created ad-hoc "community emergency operations centers" (C-EOCs). The Resilience Hub is the formalization of this idea as a permanent infrastructure in traditionally underserved neighborhoods, near centers of employment, near transit centers, of other public spaces.

Resilience hubs can be created within existing neighborhood community facilities that are used year-round as centers for community-building activities, or hubs designed into new developments —such as a new public facility, a new multi-model mobility center, or a new public/privately developed partnership. With the right design, a resilience hub can meet a variety of community needs, including, but not limited to, emergency planning, response, and recovery; access to public health information and services, access to job training and childcare, and serving as a trusted source of information and foster community building. Additional benefits include reducing greenhouse gas emissions, improving local quality of life, neighborhood revitalization, and neighborhood empowerment.

Hubs are hyper local and designed to meet the needs of a community; therefore, no two hubs are identical. While there is an established process to establish a hub as described below, hubs are tailored to address a community's vulnerabilities, fit its cultural identity, and succeed in large part to the commitment of established trusted leaders, volunteers, and funding partners.

Resilience hubs serve a crucial role in disaster preparation and response, but they also operate year-round. Hubs have three operation modes—normal phase, preparation phase, and response/recovery phase—that follow the same flow as the four phases of emergency management, shown on Figure 1. Resilience hubs rely on trust, collaboration, and community respect. Successful hubs are not one dimensional; rather, they are equipped and staffed to operate day-to-day and are nimble enough to shift gears to address any sudden shock. In the true spirit of resilience, these hubs allow the community to adapt, thrive, and move forward from an event.

Implementation steps include the following:

1. Identify Hub Area and Key Stakeholders
2. Assess Community Vulnerabilities and Needs
3. Set Community Goals

[1] Resilience Hubs – Shifting Power to Communities and Increasing Community Capacity, Urban Sustainability Directors Network https://www.usdn.org/uploads/cms/documents/usdn_resiliencehubs_2018.pdf

4. Select the Site and Assess Facility Conditions
5. Identify and Secure Funding
6. Upgrade, Source and Operationalize
7. Activate, Monitor, Improve

Benefits:

- Increase preparedness, adaption, mitigation, and equity
- Provide temporary power and wireless communication backups
- Provide a focal point of food or water distribution
- Provide neighbors with an opportunity to serve other neighbors and organize for resiliency

Metrics / Key Performance Indicators:

- Operational:
  - Emergency services response time
  - Reduction in sustained power outages
- Financial:
  - Connectivity for residents and businesses
  - Impact on business revenue following a shock event
- Sustainability
  - Reduced vehicle miles traveled to access services
  - Percent of materials diverted from the landfill
  - Avoidance of energy transmission losses with renewable energy microgrid use
- Social
  - Reduction in housing displacements during recovery period
  - Number of residents accessing resilience hub services before a disruption (training, employment opportunities, etc.)
  - Reduction in food and water supply disruption for residents during activation

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: $60,000 - $250,000 (range for location specific planning services) (assumes largely volunteer program following Seattle model)	Catalyst Miami, Inc., has started to work with governments and community members to develop “resilience hubs” in five target communities: Hialeah, Homestead-Naranja, Little Haiti, Miami Gardens, and Overtown.
Recurring/O&M: $50,000	Seattle Emergency Hubs A Seattle Community Emergency Hub is a pre-determined location where neighbors and community members are likely to gather to begin exchanging information and resources among themselves without outside assistance from City services. It has a core of trained volunteers with additional skills who can collect information on local situations, needs,

	and resources and assist in the allocation of resources to needs. They can relay information between Hubs, the Auxiliary Communications Service, or other locations so that it reaches those in need. Hub volunteers also aid the City of Seattle in encouraging neighbors to be individually and collectively prepared for a disaster. The hub mission is accomplished SOLELY through community volunteers. http://seattleemergencyhubs.org/
Funding Type (General Fund/P3/Other)	
Photographs/Graphics	**Photographs/Graphics**

Strategy Name: Smart Parking and Operations

Pillar Focus Area(s): Mobility; Placemaking

City Department Owner: Transportation, Parking

Strategy Description:
Expand on the smart parking initiative that was developed by the City of Orlando, including ParkMobile app partnership. Over the past decade the Orlando Parking division has integrated additional sensor technology into parking garages to identify the quantity of open spaces within parking structures. As part of this solution, the City of Orlando desires to incorporate advanced technologies to easily facilitate parking in the downtown urban core. The smart parking solution would provide the following additional features:

- Identification of open parking spaces within a facility (public surface lots and parking structures) or on-street spaces. The initiative would provide route guidance to the open parking spaces within the downtown area. In addition, the program would identify the cost associated with the available spaces.

- The system would include additional features for priority reserved parking. The reserved parking spaces would be identified, payment reserved and geo-located within the application. Upon reservation, the user would be route guided to the specified parking space for the time period identified.

- The smart parking application would require a unified fare collection backend to enable users to pre-pay for parking in the downtown area. The user interface would receive payments from pre-paid cash, credit or debit options.

Benefits:
The development of a smart parking system would provide several benefits to the users:

- Easy identification of available parking spaces would reduce the vehicle emissions, reduce driver frustration and enhance the user-experience. With the increased efficiency in parking, it is anticipated that the smart parking system would increase usage of the parking system

- Provide detailed data / analytics for identifying parking demands within the downtown urban core. This would enable the expansion into variable pricing for event or high demand parking periods.

- With the installation of sensors in specified preferred parking spaces, users would be able to reserve specific spaces within garages for a minimal cost. The user-convenience fee would increase the revenue to the City of Orlando.

- Provides real-time utilization of parking spaces and optimizes operations. Therefore, manages the flow of traffic and congestion levels by leveraging IOT.

Metrics / Key Performance Indicators:

- Increased parking revenues within identified downtown parking facilities by 15%.
- Improve occupancy rates of existing parking facilities.
- A decrease in corridor congestions and reduced vehicle emissions.
- Daily usage of mobile parking application.

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: **Phase I (2020/21)** Parking management application $200,000 **Phase II (2021/22)** Initial gates for reserved parking stalls: $792,000	Example 1 Advancement of smart parking management and operations within 3 parking garages downtown (2,549 spaces) in 2019. Minimum of 25% of the spaces will have reservation capability at preferred locations; remaining will be able to be identified for vacancy with mobility app.
Recurring/O&M: Maintenance of sensors and equipment: $597,417 over a 10-year period	Example 2
Funding Type (General Fund/P3/Other) **Options for:** Local funds Public-private partnerships Additional revenue generation	

Strategy Name: Social Services Optimization

Pillar Focus Area(s): Health and Safety

City Department Owner: Orlando Police Department

Strategy Description:

Some of the most vulnerable citizens access social services almost exclusively through 911 calls, emergency room visits, or encounters with law enforcement. This means of accessing services does not always result in the appropriate services being provided, is costly to taxpayers and also puts a strain on first responders reducing their capacity to respond to other community needs. Through this initiative, we would harness the power of data analysis to identify those who need services and incentivize proper use and access.

This program will optimize multi-agency coordination of social services to vulnerable populations beginning with a multi-agency pilot program to identify appropriate potential clients for these services. Initially, the program would be targeted towards reducing repeat emergency room visits and repeat calls to 911 for non-emergency chronic problems. At the June 1, 2020, the City Commissioners were presented a proposed amendment to the Downtown Ambassador program which included adding a social service component to the program, including new positions for caseworkers.
At the July 20, 2020 City Commission budget presentation, proposed FY2020/21 budget items included funding for Mental Health co-responders to assist Orlando Police Department. The final budget will be approved in September 2020.

The Social Service Optimization Program would include time of client services coordinator/caseworker, inter-agency training, data tracking and analysis. These include addressing age-specific needs, mental health support services, substance abuse, healthcare access in a responsible way that empowers citizens and helps ensure that limited public resources are properly accessed and used most effectively.

- Conduct data analysis for case management for prioritized client groups
- Create opt-in services protocols and develop inter-agency cooperation agreements
- Develop incentive programs
- Provide agency staff with training on community resources across agencies (Police, Fire, Transportation, social service agency partners)
- Outreach for specific actions around case management for people with chronic problems
- Leverage existing non-profit agency partner and departmental resources

Benefits:

- Engage mental health and social service professionals on calls involving individuals experiencing mental crisis or homelessness, instead of police resources.
- Reduce ongoing systematic costs that arise when ER, 911, and first responder services are overused or improperly accessed.
- Efficient use of law enforcement resources due to reduced calls to 911 that can be addressed through social service providers.

- Provide a sense of home to the citizens and the sense that they are well cared for.
- Improve safety and the perception of safety for residents and visitors
- Increase number of participants with Real ID compliant identification
- Reduce cases of homelessness as social services can assist in obtaining and maintain permanent housing

Metrics / Key Performance Indicators:

- Reduction in 911 calls and ER visit across population of repeat non-emergency users
- Reduced reoccurrence of cases of homeless or otherwise system-dependent persons through the public system by at least 20 percent (e.g. hospitals, shelters, police stations), persons have a plan to manage their wellbeing.
- Reduced cases of homelessness throughout the city by at least 20 percent every year.
- Established points of service throughout the city that are well known by all residents. Residents can reach any service through at least one point of service by 2025.

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: $750,000	City of Philadelphia: https://dbhids.org/about/organization/strategic-planning-division/
Recurring/O&M: $220,000	
Funding Type (General Fund/P3/Other): General Fund, Orange County 911 and 311, Healthcare Systems	
Photographs/Graphics	**Photographs/Graphics**

Strategy Name: Alternative Transportation Rewards Program

Pillar Focus Area(s): Mobility

City Department Owner: Transportation

Strategy Description: Partner with a technology company that provides rewards programs for alternative transportation. This should include walking, biking, bus, train, and carpooling. It should also provide rewards for single car riders, so we can connect with them and encourage them to use alternative forms of transportation. To allow for broad usage, the system utilized should work automatically through a smart phone to record trips and provide rewards, the participants should not have to manually enter their trips. The City could provide challenges through this system, to encourage users to utilize alternative forms of transportation. i.e. The City could provide a $5 gift card to users that ride their bike to work 3 times in a week.

The system should also integrate with the City's existing Mobile Eye transportation data platform during the pilot phase. If a pilot is successful and this is implemented longer term, the system should integrate with the Florida Department of Transportation (FDOT) Sun Store. The system should provide data on distance travelled, mode, etc. It should break down multi-modal trips, so the City can understand first and last mile separately. i.e. if a person rides a scooter to a bus stop, then rides the bus, then walks to their final destination, this system should be able to determine all 3 of these modes of transit and the distances. The City should receive data at a less granular scale to align with data privacy policies, and receive higher level information about modes, first / last mile, etc.

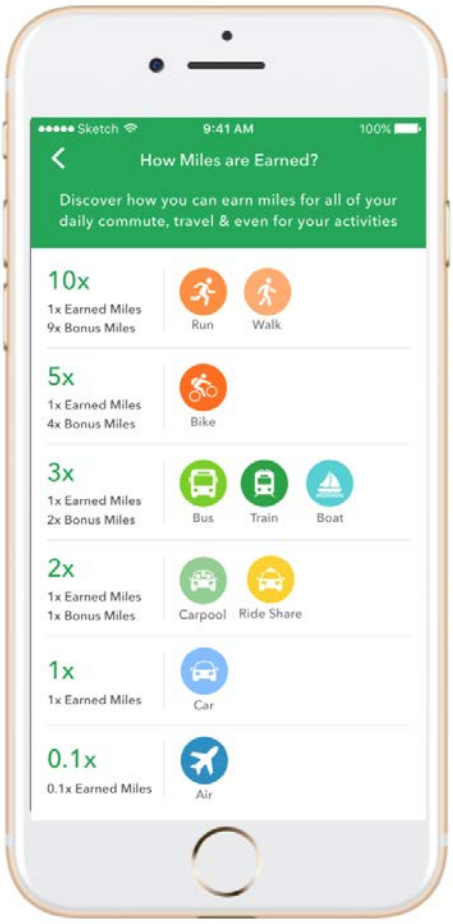
Benefits: As part of the future-ready stakeholder engagement, the community expressed a desire to improve the experience of alternative transportation and to make it more rewarding. This strategy will test a potential rewards system.

The City will have a tool to connect with our community and encourage alternative forms of transit. Or during a pandemic, this could be a tool to encourage people to stay home. The City will also receive more comprehensive transportation data about modes, distances, and first / last mile for different sections of our community.

Metrics / Key Performance Indicators: Depending on the challenges issues, an increase in the use of alternative transportation should be measured. i.e. if the City creates a challenge encouraging bike usage, this system should measure the actual increase in bike usage over a previous week.

- Number of users
- Number of rewards redeemed
- Increase in users year over year

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: $75,000	Sacramento, CA
Recurring/O&M: TBD	Caltrain
Funding Type (General Fund/P3/Other)	Capital Improvement
Photographs/Graphics	**Photographs/Graphics**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How Miles are Earned?
Discover how you can earn miles for all of your daily commute, travel & even for your activities
10x
1x Earned Miles
9x Bonus Miles
Run
Walk
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Bike
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2x Bonus Miles
Bus
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Boat
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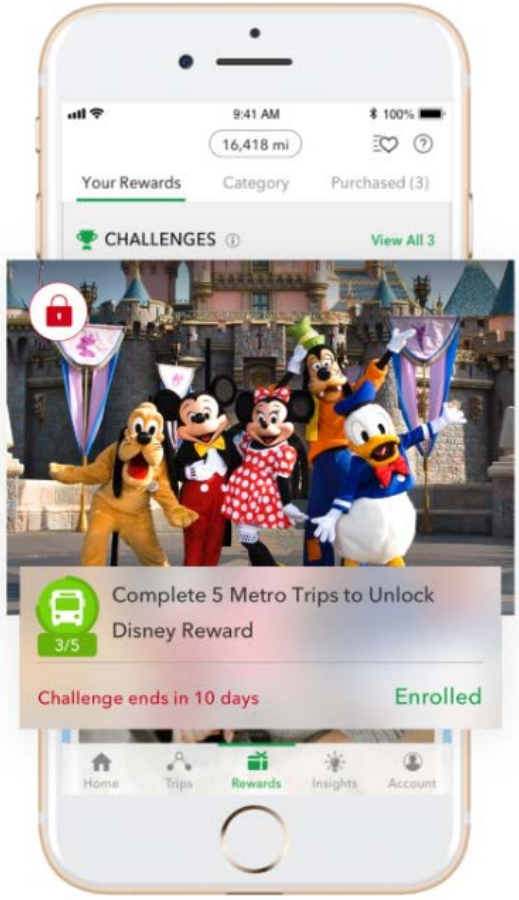
9:41 AM
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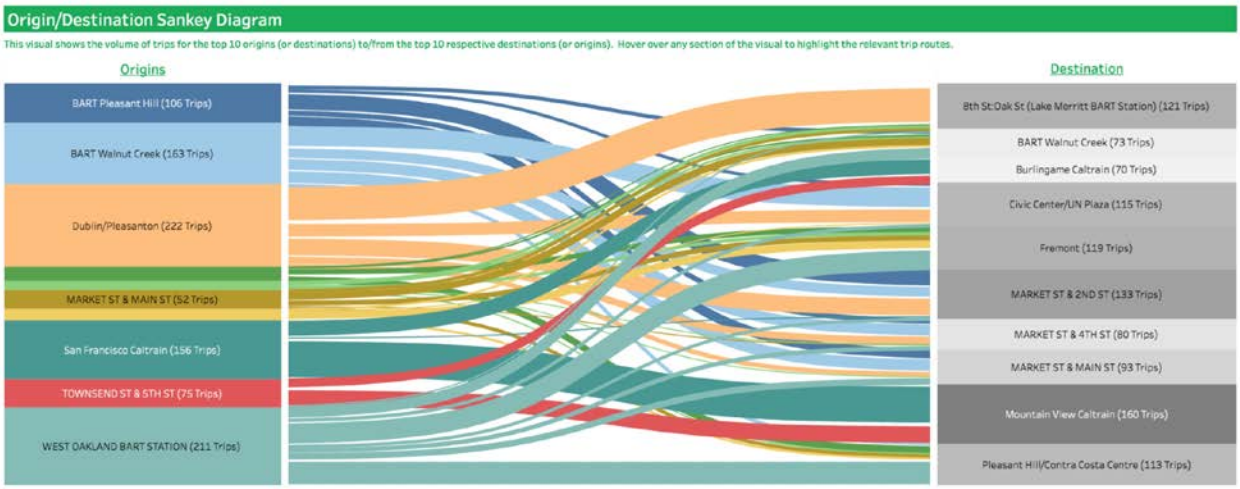
16,418 mi
Your Rewards
Category
Purchased (3)
CHALLENGES
View All 3
Complete 5 Metro Trips to Unlock Disney Reward
3/5
Challenge ends in 10 days
Enrolled
Home
Trips
Rewards
Insights
Account


Origin/Destination Sankey Diagram
This visual shows the volume of trips for the top 10 origins (or destinations) to/from the top 10 respective destinations (or origins). Hover over any section of the visual to highlight the relevant trip routes.
Origins
Destination
BART Pleasant Hill (106 Trips)
BART Walnut Creek (163 Trips)
Dublin/Pleasanton (222 Trips)
MARKET ST & MAIN ST (52 Trips)
San Francisco Caltrain (156 Trips)
TOWNSEND ST & 5TH ST (75 Trips)
WEST OAKLAND BART STATION (211 Trips)
8th St Oak St (Lake Merritt BART Station) (121 Trips)
BART Walnut Creek (73 Trips)
Burlingame Caltrain (70 Trips)
Civic Center/UN Plaza (115 Trips)
Fremont (119 Trips)
MARKET ST & 2ND ST (133 Trips)
MARKET ST & 4TH ST (80 Trips)
MARKET ST & MAIN ST (93 Trips)
Mountain View Caltrain (160 Trips)
Pleasant Hill/Contra Costa Centre (113 Trips)

Time Period
All Time
Start City
(All)
End City
(All)
Start Zipcode
(All)
End Zipcode
(Multiple values)
First Mile Trip
Last Mile Trip
1,627
First Mile Trips
1,622
Last Mile Trips
3,249
First & Last Mile Trips
1%
First Mile %
1%
Last Mile %
1%
First & Last Mile %
First and Last Mile Trips by Trip Mode
BOAT
3
6
CAR
784
754
RUN
5
2
WALK
835
860
% First Mile Green Trips
52% of total first mile trips were green
100%
50%
0%
Apr 24
May 9
May 24
Jun 8
Jun 23
Jul 8
Jul 23
Aug 7
Aug 22
Sep 6
% Last Mile Green Trips
54% of total last mile trips were green
100%
50%
0%
Apr 24
May 9
May 24
Jun 8
Jun 23
Jul 8
Jul 23
Aug 7
Aug 22
Sep 6
% First Mile Trips by Distance
34% (560 Trips)
< 0.5 Miles
18% (285 Trips)
0.5 - 1 Mile
17% (269 Trips)
1 - 2 Miles
14% (233 Trips)
2 - 5 Miles
17% (280 Trips)
> 5 Miles
% Last Mile Trips by Distance
35% (561 Trips)
< 0.5 Miles
17% (270 Trips)
0.5 - 1 Mile
16% (263 Trips)
1 - 2 Miles
13% (208 Trips)
2 - 5 Miles
20% (320 Trips)
> 5 Miles

Strategy Name: Define the Digital Divide

Pillar Focus Area(s): Connectivity

City Department Owner: Future-ready (Chief Administrative Office)

Strategy Description: To help define the digital divide in Orlando, partner with a speed test company that tracks Internet and cell connectivity. This includes entering into a pilot agreement, to gain access to a data portal showing location and speed of both Internet and cell connectivity for various providers. This data could be used to show gaps in coverage and speed in the City, to help define where and how prevalent the digital divide is in Orlando. This data could also be used to analyze cell connectivity issues during large events, which can impact public safety.

Partner with Orange County Public Schools (OCPS) and Orlando Economic Partnership (OEP) to leverage research conducted on this topic.

Benefits: During our future-ready stakeholder engagement, the digital divide was a common theme. However, the City does not have data to actually define its digital divide. This strategy will help determine the location and prevalence of Orlando's digital divide. It could also utilize this data to analyze cell connectivity during large events and potential public safety impacts.

This strategy will help the City to target potential public Wi-Fi, hotspot or mobile tablet checkout areas of need, prioritizing senior citizens and disadvantaged communities.

This strategy will make the City more resilient during remote learning and work-from-home situations during natural disasters, pandemics, and other unexpected events.

Metrics / Key Performance Indicators: Create a map / graphic defining the digital divide in Orlando.

- Percentage of the City without home internet access
- Increase in percentage of home internet access (year over year)
- Broadband connectivity speed
-

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: $0	N/A – this is a new approach for a City and speedtest company to partner
Recurring/O&M: TBD	
Funding Type (General Fund/P3/Other)	N/A
Photographs/Graphics	**Photographs/Graphics**

Strategy Name: Hotspot or Tablet Checkout Program

Pillar Focus Area(s): Connectivity

City Department Owner: Future-Ready and Families, Parks and Recreation

Strategy Description: This strategy includes providing portable hotspots or tablets with cellular connectivity via a checkout program at Orlando neighborhood centers. The pilot phase includes 2 or 3 neighborhood centers, with 10 to 15 devices available at each center.

Benefits: As part of our future-ready stakeholder engagement, our community expressed an interest in solving the digital divide. Not everyone has access to reliable Internet connectivity. Due to COVID 19 and virtual schooling, Orange County Public Schools (OCPS) utilized hotspot and laptop checkout programs. They provided thousands of hotspots and laptops to students who lacked reliable Internet and computers, allowing them to complete their school work. This program only covered some OCPS students, though, and not the broader community. There are other residents who lack connectivity, which can leave them further behind. This could include senior citizens, adults who lost their job due to COVID 19 and can no longer afford Internet but need it to find a job, etc. The benefit of this program is to mitigate the digital divide, and provide connectivity to those in need.

Metrics / Key Performance Indicators:

- Utilization rate of devices
- Data consumption
- Demand/waiting list for additional devices
- Reduction in digital divide (as measured in pilot study)

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: $15,000	OCPS virtual school
Recurring/O&M: Included above	East Orange Housing Authority, New Jersey
Funding Type (General Fund/P3/Other)	Capital Improvement
Photographs/Graphics	**Photographs/Graphics**

Strategy Name: Integrated Public Alert and Warning System (IPAWS)

Pillar Focus Area(s): Health & Safety

City Department Owner: Police & Fire

Strategy Description: IPAWS is a national alert and warning infrastructure, which can be used to quickly provide life-saving information to the public. It is typically used for AMBER alerts but can be leveraged for other warnings. As an example, Seminole County, FL recently used IPAWS for a COVID 19 alert. Orange County and the Greater Orlando Aviation Authority also have the ability to utilize IPAWS.

The Orlando Fire Department currently uses the Everbridge Platform to send out alerts to City staff. It appears the Everbridge platform is also compatible with IPAWS, so it could be integrated to provide alerts and warnings beyond City staff. Similar to an AMBER alert, a warning could be pushed to all mobile devices throughout the City of Orlando.

This strategy includes the City better integrating with IPAWS. This could be direct or through the County, allowing the City to quickly inform residents about urgent life-threatening situations such as a shooting, or missing disabled person.

Benefits: During our focus area roundtables, several use cases for IPAWS were mentioned. This included alerts about a missing person with dementia or autism, to help locate them quicker and avoid a tragedy. This also included alerts of an active shooter, to keep people from travelling into a dangerous situation. These potential use cases would benefit Orlando residents and visitors by pushing out critical real time information and allow for immediate actions to take place.

Metrics / Key Performance Indicators:

- Decrease amount of time to locate a missing disabled person.
- Decrease amount of time to alert public to a public safety issue.

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: $10,000	Seminole County: Seminole County has received the Integrated Public Alert & Warning System Open Platform for Emergency Networks (IPAWS-OPEN) certifications. After a lengthy process with the State of Florida and FEMA, IPAWS was approved and certification given. IPAWS is an IP based network that has integrated the different emergency alert systems of the United States. The IPAWS system allows local emergency managers to send emergency

	message to cellular phones and broadcast media directly through the Emergency Broadcast System. Messages can be targeted to certain cellular phone towers for specific areas of alerting.[1]
Recurring/O&M: TBD	GOAA
Funding Type (General Fund/P3/Other)	Capital Improvement
Photographs/Graphics	**Photographs/Graphics**

[1] https://www.seminolecountyfl.gov/core/fileparse.php/3333/urlt/2015-2017-Strategic-Plan.pdf

Strategy Name: Resilience Plan

Pillar Focus Area(s): All

City Department Owner: Office of Sustainability & Resilience

Strategy Description: In 2017, the City of Orlando created a Climate Vulnerability Assessment. After analyzing vulnerabilities, the next step is to create a Resilience Plan. A Resilience Plan should address chronic stressors, such as economics and healthcare, as well as acute shocks such as hurricanes and cyber-attacks.

With the preliminary assessment conducted of the probabilities of these hazards, current vulnerabilities, magnitude of their impacts, and factors for adaptation, the next steps include the following:

- Review of these hazards and consequences with the Green Works Task Force, Office of Emergency Management, stakeholders and subject matter experts, and community members to prioritize concerns, direct risk analyses, and identify vulnerabilities.
- Work with partners in academia, public and private sector to conduct Orlando specific asset and service vulnerability analyses, such as:
    - Extreme heat: Electricity demand projections, required additional capacity and cost impacts on energy affordability for Orlando's Low to Moderate Income households.
    - Sea level rise and hurricanes: Mass migration (long and short-term) into Orlando, known as "climate refugees," and impacts on housing demand, affordability and other infrastructure demands (e.g. water supply and treatment).
    - Inland flooding: Road impact projections under extreme precipitation events restricting travel of residents and visitors participating in employment, education, tourism, etc.
- Following a similar stakeholder engagement process, develop climate adaptation goals, targets, and strategies as they pertain to these hazards, vulnerabilities, and opportunities to accelerate growth in Orlando's climate adaptive capacity.
- Review these suggestions in terms of their ability to also address economic, equity, and other locally relevant considerations, utilizing resources such as the U.S. Climate Resilience Toolkit, "Risky Business: From Risk to Return" report, Adaptation Clearinghouse, EPA, *States at Risk* Project, and Covenant of Mayors resources.

Orlando has also been exploring various resilience strategies. The Resilience Plan would help pull all of these issues and strategies together into a more comprehensive plan.

Benefits: Equity and resilience were common themes during our future-ready stakeholder engagement meetings. Some examples that came up include:

- More than 50% of Orange County residents lost power due to Hurricane Irma a few years ago, with some losing power for more than a week. Not everyone can afford a back-up generator to address this type of challenge.
- Hurricane Michael had significant impacts on connectivity in Mexico Beach, FL.

A resilience plan could identify ways to improve resilience for the City and its most vulnerable populations.

Metrics / Key Performance Indicators:

- To be defined in the resilience plan. Key metrics/indicators should address issues identified in the Climate Vulnerability Assessment.

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: $100,000 - $200,000	Washington, DC, Boston, Seattle and New Orleans
Recurring/O&M: TBD in plan	
Funding Type (General Fund/P3/Other)	General Fund

Photographs/Graphics

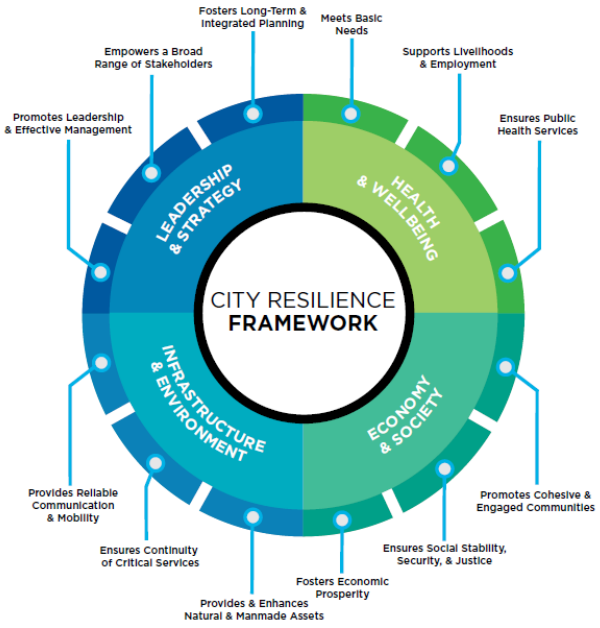
THE CITY RESILIENCE FRAMEWORK

The City Resilience Framework (CRF) is a unique framework, developed by Arup with support from the Rockefeller Foundation, that provides a lens to understand the complexity of cities and the drivers that contribute to their resilience.

Looking at these drivers can help cities to assess the extent of their resilience, to identify critical areas of weakness, and to identify actions and programs to improve the city's resilience.

The CRF is based on four dimensions essential to the urban resilience of any city: (1) Health and Well-Being, (2) Economy and Society, (3) Infrastructure and Environment, and (4) Leadership and Strategy. Each of the four dimensions is further defined by additional drivers of resilience.

In developing *Resilient Chicago*, the CRF was used to assess Chicago's relative strengths and weaknesses and identify areas of focus to improve the city's overall resilience.



Strategy Name: Smart Building Pilot

Pillar Focus Area(s): Placemaking

City Department Owner: Fleet & Facilities

Strategy Description: The smart building industry may shift to more distributed Internet of Things (IOT) platforms. In lieu of a couple sensors in a space, which lack granularity and can have calibration issues, this potential shift includes lots of smaller IOT sensors. A use case of this strategy is sensors being embedded into lights. Below are some of the functions being embedded into these sensor networks:

- Light
- Advanced motion (detecting quantity of people, ability to identify credentials)
- Temperature
- Bluetooth and / or WiFi
- Acoustic

This strategy includes selecting several use cases based on the potential benefits below and implementing a distributed smart building IOT pilot at a public-facing City building or portion of a City building. The proposed area for this pilot is approximately 15,000 square feet.

Benefits: As part of the future-ready stakeholder engagement process, our community expressed interest in improving indoor environmental quality, protecting and assisting first responders, and helping vulnerable groups. Had the stakeholder engagement occurred later in the year, we likely would have heard concern buildings and COVID 19.

The sensor networks described above can lead to various benefits, such as:

- Indoor Environmental Quality
    - More granular temperature readings for better control, avoiding stratification and comfort complaints, etc.
    - Self-calibrating temperature sensor network to minimize maintenance
    - Improved ventilation control, via more accurate sensing of people counts instead of CO2
    - Wrapping preferred settings around a person, to temp and light automatically match their preferences
- Contextual information for First Responders
    - Find the location of people in a building during emergencies
    - Crowd analytics
    - Identify unauthorized people in specific locations
    - Wayfinding during an emergency
    - Location based info to fully enable Augmented and Virtual Reality technologies
- Assist vulnerable populations
    - Find the location of vulnerable people in a building during emergencies
    - Wayfinding for visually impaired
    - Voice command
- Pandemic and natural disaster response
    - Touch-free operation
    - Validate social distancing
    - Contact tracing

<table>
<tr><td colspan="2">

- Other
  - Space utilization
  - Asset management

</td></tr>
<tr><td colspan="2">Metrics / Key Performance Indicators:
TBD, based on the use cases / benefits that are prioritized for the pilot.</td></tr>
<tr><td>Estimated Cost:</td><td>Use Examples (case studies)</td></tr>
<tr><td>FY2021 cost: $100,000</td><td>San Jose City Hall
San Jose’s Smart City Vision includes directives to become a Demonstration City (“Reimagine the City as a laboratory and platform for the most impactful, transformative technologies that will shape how we live and work in the future”).[1]</td></tr>
<tr><td>Recurring/O&M: TBD</td><td>Siemens Orlando office</td></tr>
<tr><td>Funding Type (General Fund/P3/Other)</td><td>Capital Improvement</td></tr>
<tr><td>Photographs/Graphics</td><td>Photographs/Graphics</td></tr>
</table>

[1] https://www.sanjoseca.gov/your-government/departments/information-technology/smart-city-vision#demonstration

Strategy Name: Regional Partnership for Materials Resource System Study

Pillar Focus Area(s): Materials

City Department Owner: Solid Waste, Office of Sustainability and Resiliency

Strategy Description:

In 2019, Orange County released a Request for Information (RFI) to help the County plan to design, construct and operate a new Materials Recovery Facility (MRF)[1]. This action was related to the Orange County Sustainability and Smart Growth Task Force short term action to "Collaborate with the City of Orlando and other jurisdictions on the upcoming Materials Recovery Facility (MRF) Request for Proposals (RFP) with a goal of partnering with a private entity to significantly improve recycling and waste diversion processes and equipment."

This strategy will research and provide new innovative ideas to improve solid waste management regionally with partners such as Orange County. It will support a regional partnership to build an Intelligent Materials Recovery Facility that services materials recycling as well as food waste/organics recycling. The strategy will result in a study documenting recommendations as well as strategic partnerships.

Benefits:

- Reduced usage of traditional landfills
- Identification of new methods and technology that will help with the process of waste management that have not already been implemented. In addition, there is the potential for cost savings by consolidating resources between agencies.
- Increased recycling rate because "it is easy".
- Progress the City's Green Works goals for solid waste management.

Metrics / Key Performance Indicators:

- Increased recycling rates
- Increased construction and food waste diversion from the landfill
- Progress towards Green Works Orlando solid waste goals.

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: $100K - $200K	Spokane Materials and Recyling Technology (SMaRT) Center: Spokane Materials and Recycling Technology (SMaRT) Center opened in 2012, paving the way for convenient, efficient collection of mixed recyclables from tens of thousands of businesses and residences in Washington, Idaho and British Columbia. Waste Management invested $18 million in its single stream recycling facility

[1] https://newsroom.ocfl.net/media-advisories/press-releases/2019/05/orange-county-fla-announces-beginning-steps-for-a-new-recycling-facility/

	located on an 8-acre site in the City of Spokane. The SMaRT Center can process 100,000 tons of recyclables per year and is the centerpiece of a regional strategy aimed at dramatically reducing waste and boosting recycling in the area. The 62,000-square-foot, "single stream" facility allows residents and businesses to recycle a broader assortment of materials, resulting in dramatically higher recycling and diversion rates.[2]
Recurring/O&M:	NA
Funding Type (General Fund/P3/Other)	General Fund

[2] http://wmnorthwest.com/smartrecycling/

Mid to Long-Term Strategies

- Air Quality Monitoring
- Anaerobic Digester
- Analytic Solutions
- Connected and Autonomous Vehicle (CAV) Infrastructure Readiness
- CAV Pilot Project Downtown
- Centralized Recycling Drop-off Locations
- Neighborhood/School Compost Kit
- Consolidated Property Information
- Design Competition for Station and Onboard Amenities
- Digital Community Engagement Application and Virtual Public meetings
- Digital Curbside Management
- Energy Microgrid
- Expanded Fiber Infrastructure
- Fast Charging EV Infrastructure
- Net Zero Water Building Pilot
- On-site Rainwater and Greywater Harvesting
- Open Data and Enterprise Performance Dashboard
- Placemaking - Augmented Reality (AR) or Virtual Reality (VR) Wayfinding
- Residential Energy/Water Consumption Monitoring
- Single Payment System for Transportation
- Smart Street Lighting
- Optimized Waste Collection
- Traffic Optimization
- Land Development Code and Building Code updates

ORLANDO FUTURE-READY CITY MASTER PLAN

Strategy Name: Air Quality Monitoring

Pillar Focus Area(s): Health & Safety, Placemaking

City Department Owner: Future-Ready, Office of Sustainability and Resiliency

Strategy Description:
Through the establishment of partnerships with Orange County Air Quality Management, the Florida Department of Health, and higher educational systems such as the University of Central Florida, the City will increase opportunities to monitor outdoor air and implement indoor air quality monitoring solutions. The City will continue to receive, track and analyze data collected from Orange County air quality monitoring stations, through the Florida Department of Health's Environmental Public Health Tracking Platform[1] and expand opportunities for the installation of new air quality monitoring stations. As an example, the UCF School of Public Health recently received a grant to create an air sensor prototype and collect air quality data in the communities of Parramore, Lake Eola, Lake Dot and Carter Street. UCF is currently using 100 air sensors to monitor fine particulate matter and carbon dioxide levels. All air quality data collected can be overlaid with basic land use and transportation data (annual average daily traffic (AADT), impervious surface ratios, building density, percentage of land use types, tree canopy density, etc.) to address air quality impacts associated with these factors.

For this strategy, the City would establish a pilot project to monitor air quality in vulnerable communities that are more susceptible to asthma, diabetes and other chronic diseases. This will require the identification of vulnerable communities through a social vulnerability index or community health risk assessment using readily available health indicator data from the ACS, US Census, CDC, etc. Data collected should be stored in the City Data Fusion Center.

In addition to exterior air quality, the City would like to support healthy indoor air quality (IAQ) for residents and visitors alike. In coordination with the Florida Department of Health of Orange County, the City will promote best management practices that support IAQ and protect the health, safety and wellbeing of residents. This can occur through the creation of a toolkit or guide[2] that can be shared through the City's communication outlets that addresses some of the most common household pollutants such as VOCs and mold. This toolkit will outline simple strategies to improve IAQ through proper ventilation, mitigation and source reduction.

Overall, the following strategies will help to improve exterior and interior air quality:

- Develop partnerships to monitor IAQ and implement IAQ projects in neighborhoods disproportionately vulnerable to the urban heat island effect, poor water quality, and poor air quality due to health risk factors.
- Create an Air Quality Monitoring Methodology and Assessment Manual
- Collect, store and analyze air quality data from Orange County, the FL Department of Health, and UCF.

[1] https://www.floridatracking.com/healthtracking/Topic.htm?i=18#Opens%20in%20a%20new%20window
[2] https://www.epa.gov/indoor-air-quality-iaq/publications-about-indoor-air-quality

- Develop a database of environmental, land use and transportation data that can contribute to poor air quality or improve air quality.
- Create a toolkit or guide for residents and commercial property owners to share best management practices on how to improve and monitor indoor air quality. Offer trainings at neighborhood centers and connect people to IAQ BMPs through city communication outlets
- Review and provide revisions to the land development code and building codes to promote good IAQ

Benefits:
The development of an Air Quality Monitoring program will provide several benefits to Orlando:

- Improve public health and wellness
- Reduce exposure to particulate matter that contributes to poor health
- Reduction in pollutants and emissions that contribute to poor air quality
- Establishment of community-wide goals that bolster a culture of safety

Metrics / Key Performance Indicators:

- Reduction in criteria air pollutants including carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (PM) and sulfur dioxide
- Number of air quality monitoring stations installed by partners
- Number of residents who receive IAQ training or use the IAQ toolkit

Estimated Cost:	**Use Examples (case studies)**
FY2024 cost: **Phase I (2024/25)** Vulnerable Community Analysis, Resident IAQ Toolkit or Guide, and Air Quality Monitoring Methodology and Assessment Manual TBD **Phase II (per FY thereafter)** Continued Air Quality Performance Tracking and IAQ Trainings (10 per year) TBD	There are several case examples in which cities have established partnerships with local health departments and other critical stakeholder agencies to provide innovative programs for city residents to improve both exterior and interior air quality. Several cities have even received national grant opportunities to provide necessary equipment to residents such as inhalers and educational programming to support community health. The following air quality programs in the cities of Louisville and Pittsburgh in particular provide strategies and data-driven solutions to improve public health through air quality initiatives that fit the vision of Orlando Future-Ready City. **Air Louisville** – In this program, supported through funding by the Robert Wood Johnson Foundation, the City of Louisville has been able to provide residents with inhalers affixed with sensors that track

	public health outcomes and environmental conditions that impact asthma attacks in the community. Through the data collection process, the City has been able to monitor the influx of asthma attacks and even hospital visits due to impaired air quality; thereby creating an invaluable record of data that can help the City to provide solutions to improve air quality and reduce asthma attacks for everyone. https://www.airlouisville.com/ **Pittsburgh Breath Project -** The Breathe Collaborative is a coalition of citizens, environmental advocates, public health professionals and academics working to improve air quality, eliminate climate pollution and make our region a healthy and prosperous place to live. The Collaborative powers the Breathe Project through science-based work and a community outreach platform. https://breatheproject.org/
Recurring/O&M: Maintenance of sensors and equipment: TBD Processing of data analytics	
Funding Type (General Fund/P3/Other) **Options for:** Local funds Public-private partnerships Additional revenue generation	
Photographs/Graphics	**Photographs/Graphics**

Strategy Name: Anaerobic Digester

Pillar Focus Area(s): Materials

City Department Owner: Solid Waste, Public Works, Sustainability and Resiliency

Strategy Description:

Anaerobic digesters are a mature, proven technology which involves the use of sludge, manure, and other organic waste materials and produce methane (natural gas) fuel. Anaerobic digestion is a naturally occurring process that can be harnessed to transform organic waste into a mix of methane gas and carbon dioxide (usually referred to as "biogas") utilizing several types of bacteria. The bacteria takes turns during the process with the first types preparing the way for successor microorganisms. First-stage bacteria break down carbohydrates during bacterial hydrolysis to produce soluble materials such as sugars and amino acids that can be consumed by the next set of microorganisms, the acidogenic bacteria. These consume the biomass and convert it into carbon dioxide, hydrogen, ammonia, and miscellaneous organic acids which are then converted into acetic acid. The last step involves anaerobic bacteria, which is used to convert these residual products into methane and carbon dioxide (biogas). In addition to biogas, digesters produce a condensate liquid (referred to as "digestate") consisting of water, minerals, and the bulk of the residual carbon from the original organic material. Digestate is often used as high-quality liquid fertilizer. This biogas can then be used as an energy source.

Benefits:

The implementation of an Anaerobic Digester would result in the following benefits:

- Reduce conventional waste in the landfill
- Protect animal and human health by reducing pathogens.
- Convert nutrients in waste into more accessible forms for plants to use compared to raw manure, thereby increasing crop productivity and yield.
- Recycle nutrients, creating an economically and environmentally sustainable food production system.
- Produce heat, electricity, or fuel from biogas which can be used onsite, lessening the agriculture sector's dependence on fossil fuel energy.
- Utilize food waste from places like restaurants and grocery stores which in turn increases the efficiency of farm digesters.
- Mitigate climate change.
- Create job opportunities for local contractors, skilled laborers to keep the system functioning at optimal levels, businesses specializing in nutrients, manure solids and energy markets.

Metrics / Key Performance Indicators:

- Reduced greenhouse gas emissions
- Reduced water pollution
- Reliable non-stop energy source for critical city infrastructure
- Reduced energy costs via onsite power production at wastewater treatment facilities
- Increased lifespan of existing landfill facilities

Estimated Cost:	Use Examples (case studies)
According to EPA Ag Star, the capital cost of an on-farm anaerobic digester ranges from approximately $400,000 to $5,000,000 depending upon the size of the operation and technology used. The typical on-farm anaerobic digestion unit costs approximately $1.2 million. It should also be noted that costs vary, depending upon the size of the unit, design, and features. https://e3a4u.info/wp-content/uploads/Digester-step3.pdf	*Example 1* Yabu City, Japan: This project is being led by a Canadian organization (Anaergia Inc.) to convert organic waste into biogas. The new plant will deploy advanced solid waste processing and wastewater treatment equipment. https://www.renewableenergymagazine.com/biogas/new-facility-in-japan-will-convert-farm-20180202 *Example 2* Wildpoldsried, Germany: Over the past 18 years, a village of approximately 2,600 residents have invested in a holistic range of renewable energy projects that include five biogas facilities. As a result, the village has gone beyond energy independence and now produces 500% more energy than it needs and profits from sales of the surplus power back to the grid. https://inhabitat.com/german-village-produces-500-of-its-energy-from-renewable-sources/
Recurring/O&M: $5,000 /month https://e3a4u.info/wp-content/uploads/Digester-step3.pdf	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants Local funds Public-private partnerships Additional revenue generation	
Photographs/Graphics	

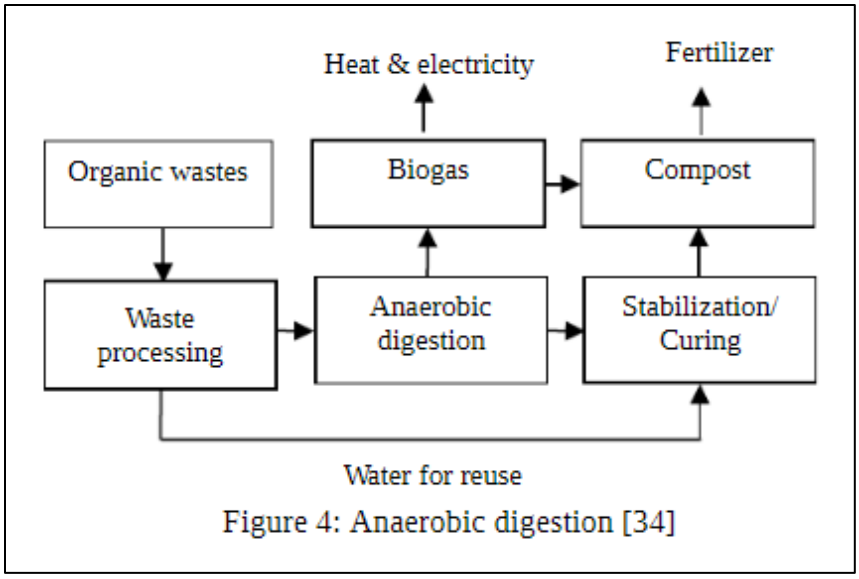


Figure 4: Anaerobic digestion [34]

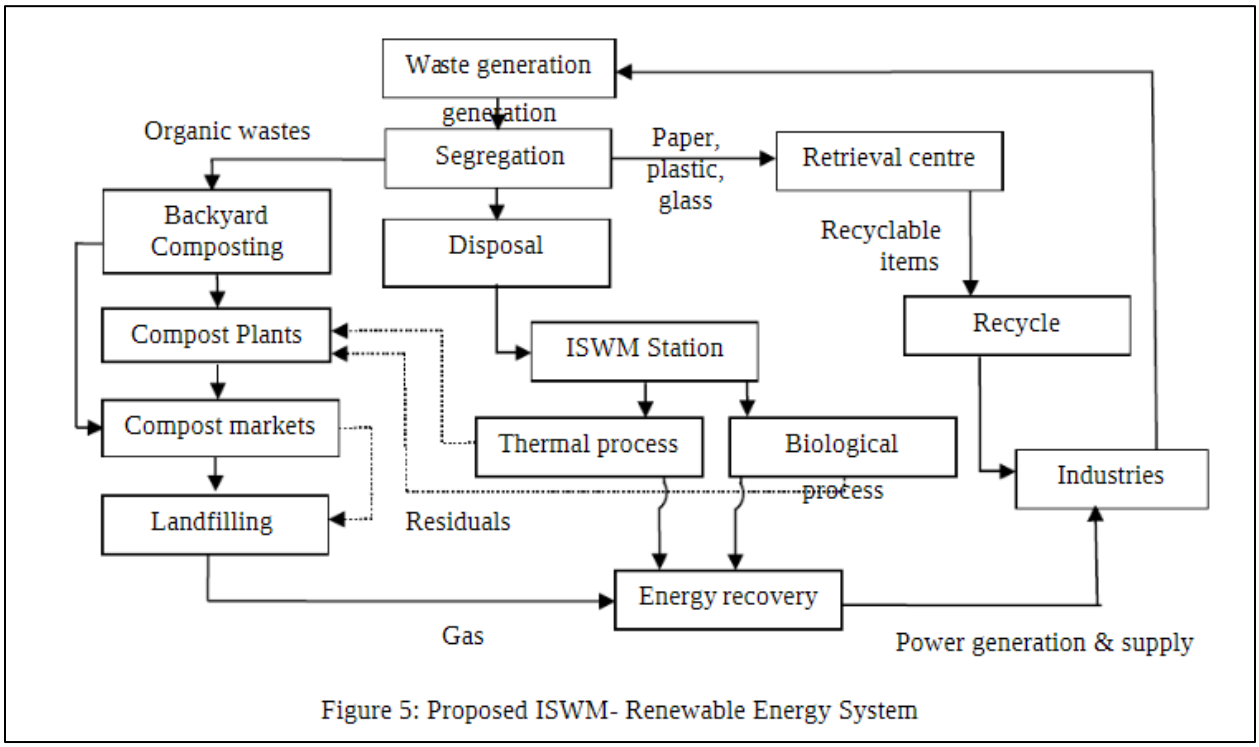


Figure 5: Proposed ISWM- Renewable Energy System

Strategy Name: Analytic Solutions

Pillar Focus Area(s): Health and Safety, Mobility

City Department Owner: Transportation , Police Department

Strategy Description:

Analytics uses data and software to distinguish individual object and events in camera feeds. This application can allow for the automation of the review of countless hours of camera surveillance in real time, freeing up human personnel to actively fix any issues that have been detected. There are several different applications for camera analytics including but not limited to motion detection, tamper detection, line crossing, object abandonment/removal, travel in the wrong direction, and object counting. These applications show that a video analytics strategy has both transportation and public safety uses. These applications can be performed through edge computing (software integrated within the cameras themselves; requires purchase of new cameras) or via third party software that can be either server or cloud based.

Software can be used to analyze feeds generated by existing cameras (traffic, security, etc.) to detect events that would require swift detection and action. City resources can be preserved as productivity of operations personnel can be bolstered through the use of active analytics that are both automated and accurate. Changes in traffic conditions (recurring and non-recurring congestion, vehicle speeds dropping below acceptable thresholds, wrong way drivers/pedestrians, etc.) as well as public safety concerns (individuals entering restricted areas, suspicious packages, etc.) can be detected with a higher level of accuracy and reliability when used in conjunction with well trained personnel. Note – facial recognition is not a desired use of this technology.

Benefits:

The implementation of a city-wide Analytics system would result in the following benefits:

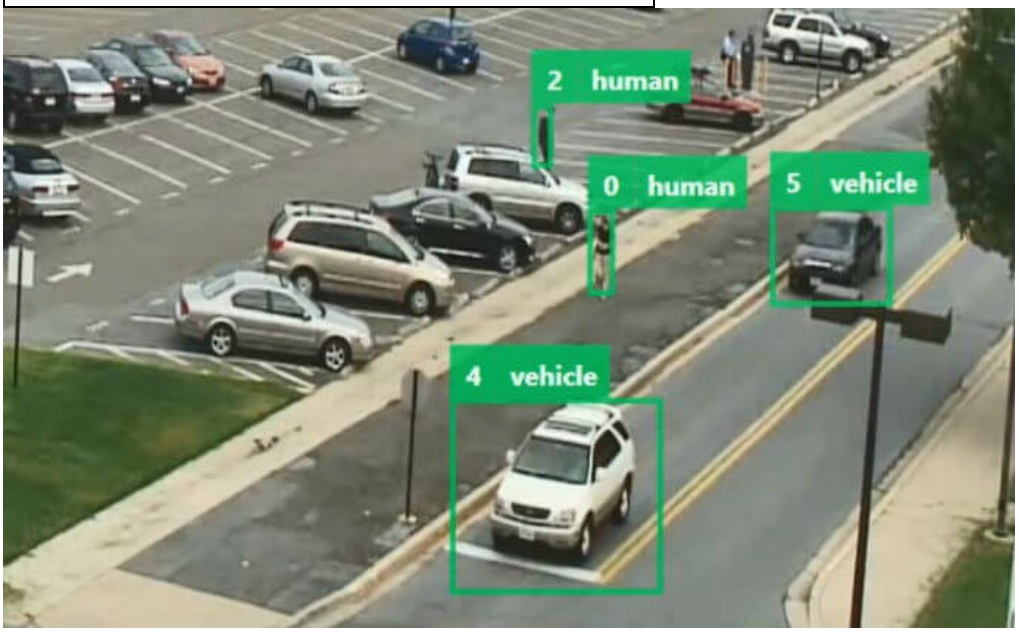
- Improved traffic incident response times
- Improved security capabilities
- Preservation of City resources by allowing automated detection of events that have been deemed noteworthy by City personnel
- Customizable to City needs when strategy is put into effect
- Can be implemented while utilizing existing City infrastructure
- Can be used to identify and log hot spots for future system improvements
- Wide range of potential applications past small scale transportation needs including public safety and public health
- Scalable
- Can generate data that would support performance reporting to quantify system effectiveness
- Data can be archived for analysis of effectiveness over time

Metrics / Key Performance Indicators:

- Accuracy of alerts generated by automated system above 95%
- Improved incident (both transportation and public safety) response times
- Expanded amount of types of incidents that can be actively monitored

Estimated Cost:	Use Examples (case studies)
https://azure.microsoft.com/en-us/pricing/calculator/?service=media-services $80-$1500 per video stream per month (Depends upon level of analytics capabilities desired)	*Example 1* New York City, New York: The New York City Department of Transportation is using video analytics to better understand major traffic events. https://www.govtech.com/opinion/Transform-Your-City-With-Image-Recognition.html *Example 2* Normandy Coast, France: Several municipalities along the Normandy coast in France use video analytics to bolster traffic monitoring and traffic violation detection. https://www.briefcam.com/resources/case-studies/briefcam-helps-maximize-operational-efficiency/ *Example 3* Austin Texas: Austin-Bergstrom International Airport (ABIA) uses video analytics to improve airport safety and operations. https://www.briefcam.com/resources/case-studies/briefcam-boosts-security-efficiency-international-us-airport/
Recurring/O&M: See above, support is included with monthly cost	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants for camera analytics deployments Local funds Public-private partnerships Additional revenue generation	

Photographs/Graphics



Strategy Name: CAV Infrastructure Readiness

Pillar Focus Area(s): Mobility

City Department Owner: Transportation Division, Planning Division

Strategy Description:

One of the most significant changes that could be made in transportation over the next 15-20 years is the introduction of Connected and Autonomous Vehicles (CAV). While there are still technologies being developed and a timeline hasn't been made clear, it is important to acknowledge that CAVs and their accompanying technology will transform transportation and mobility behavior. A document published by the Governors Highway Safety Association (GHSA) in 2017 suggests that by the year 2040, 20%-40% of the vehicles in the U.S could be autonomous vehicles. While CAVs are not yet mainstream, as they could be potentially in the year 2040, there are key steps and decisions that the City of Orlando and its government can make now to prepare for the global transcendental change to mobility that is to come.

CAVs offer a variety of benefits such as efficient and safe travel, and less vehicle emission and traffic congestion. Nonetheless, with this technology comes the potential for a variety of large-scale changes that if left unchecked, could lead to negative impacts to our City, its residents and the environment. Such potential large-scale changes include changes to residential preferences, the labor market, the auto-oriented supply chain, vehicle ownership, traffic safety, access to mobility, transportation costs, need for parking, vehicle form, traffic congestion and public transportation. These issues highlight the need for the City of Orlando to be proactive in their consideration of CAV infrastructure readiness. Proactive steps include conducting studies that will lead to building policies, goals and objectives that can reap the rewards of the CAV technology and best serve the long-term needs of the City of Orlando as part of the plan to become Future-Ready.

The CAV Infrastructure Readiness Strategy proposes to prepare the City of Orlando and its infrastructure for CAV deployment by drawing upon various research and assisting in CAV preparedness studies. It is recommended that the City of Orlando draw upon the following documents:

- NACTO guide to Autonomous Urbanism: https://nacto.org/publication/bau2/
- AMPO National Framework for Regional Vehicle Connectivity and Automation Planning: https://www.ampo.org/wp-content/uploads/2019/04/2019-AMPO-Framework-11.pdf
- MetroPlan CAV Readiness Study: https://metroplanorlando.org/wp-content/uploads/CAV-Readiness-Workshop-for-website.pdf ; https://metroplanorlando.org/programs-resources/transportation-system-management-operations/cav-readiness-study/ ; https://metroplanorlando.org/wp-content/uploads/MetroPlan-Task-2-Memo-FINAL-Updated-12.3.19.pdf
- AASHTO Connected Vehicle Field Infrastructure Footprint Analysis: https://www.its.dot.gov/itspac/Dec2014/AASHTO_FootprintAnalysis.pdf

Drawing upon the above-mentioned documents will help the City of Orlando to amend its Land Development Code (LDC) as the CAV Infrastructure Readiness Strategy has as an ultimate goal to prepare the City's infrastructure and communications needs to support CAV piloting, testing and deployment opportunities.

Benefits:

The implementation of the CAV Infrastructure Readiness Strategy would result in the following benefits:

- Improved safety and privacy
- Improved mobility and travel
- Open opportunities for the piloting and deployment of CAVs in the City of Orlando
- Resilient transportation infrastructure
- Transportation technology growth
- Enhanced policies, laws and codes

Metrics / Key Performance Indicators:

- Effective changes to policies, laws and motor vehicle codes that will protect and ensure the safety and comfort of City of Orlando residents
- Education to the public on CAV technology
- Prepared City infrastructure that will allow for CAV pilots and ultimately deployments

Estimated Cost:	**Use Examples (case studies)**
Research studies are estimated to cost between $15k-$100k https://www.marketconnectionsinc.com/lets-talk-price-how-much-does-research-cost/	***Example 1*** Omaha, Nebraska, USA: *Connected and Autonomous Vehicles Working Group White Paper*; a white paper developed for the Heartland 2050; a long-term vision of the future for the greater Omaha-Council Bluffs metro region. Purpose of the white paper is to identify 5 initiative areas to help position Omaha as a leader in CAV technologies http://heartland2050.org/wp-content/uploads/2018/01/Connected-Autonomous-Vehicles.pdf ***Example 2*** Rhode Island, USA: *State of the Practice – Connected/Automated Vehicles*; a paper developed for the Rhode Island Division of Planning with the purpose to review the state of the practice for CAVs including a brief technical background, deployment projections, public opinion, potential applications, planning level policy and strategy needs and opportunities for the state. http://www.planri.com/pdf/lrtp/04-%20CAV%20White%20Paper%20-%20draft%20March%202018.pdf ***Example 3*** North Carolina, USA: *NC Readiness for Connected and Autonomous Vehicles Final Report*; a report led by the NCDOT and MCDMV that provides an activities roadmap for the State of North Carolina (NC) with two primary goals: identify the wide range of

	questions raise by CAV technology and define an approach, or Activities Roadmap, for how NC should prepare for CAV technology. http://www.ncav.org/wp-content/uploads/2016/03/NC-Roadmap-for-CAV_Final_ALL.pdf
Recurring/O&M: N/A	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants Local funds Public-private partnerships Additional revenue generation	
Photographs/Graphics	

Figure 1. Opportunities and Impacts of CAV Technologies

Figure 1http://www.ncav.org/wp-content/uploads/2016/03/NC-Roadmap-for-CAV_Final_ALL.pdf

Table 1. Federal and State Responsibilities for CAV Readiness

Federal Responsibilities	State Responsibilities
Setting safety standards for new motor vehicles and motor vehicle equipment, including CAV technologies	Licensing (human) drivers and registering motor vehicles in their jurisdictions
Enforcing compliance with safety standards	Enacting and enforcing traffic laws and regulations, including provisions for CAV
Investigating and managing the recall and remedy of non-compliances and safety-related motor vehicle defects on a nationwide basis	Conducting safety inspections, when states choose to do so
Communicating with and educating the public about motor vehicle safety issues	Regulating motor vehicle insurance and liability, including provisions for CAV
When necessary, issuing guidance to achieve national safety goals	

Figure 2http://www.ncav.org/wp-content/uploads/2016/03/NC-Roadmap-for-CAV_Final_ALL.pdf

Strategy Name: CAV Pilot Project Downtown

Pillar Focus Area(s): Mobility

City Department Owner: City of Orlando Transportation Department

Strategy Description:

Connected and Autonomous Vehicle technologies are emerging technologies with the potential to revolutionize the transportation industry from both safety and efficiency perspectives. Several CAV pilot projects of various size and scope are currently either being designed, constructed, or tested. A CAV pilot project in Downtown Orlando could showcase these capabilities at both a user and operator level. This would allow traffic operators the ability to send road conditions directly into to vehicles utilizing the City transportation network. The CAV communications are usually in one of two formats, DSRC and CV2X.

The most common type of CAV pilot project involves the deployment of Road-Side Units (RSUs) installed at traffic signals and On-Board Units (OBUs). The RSUs connect to the existing ITS network and have the ability to send out a variety of messages (travel times, incident reports, weather alerts, etc.) to the OBUs. The OBUs are typically provided by vendors and installed within vehicles (note it is anticipated in the future all new vehicles from manufacturers will have OBUs installed automatically). These technologies are currently being implemented in tested in several locations in Florida, including the Tampa-Hillsborough Expressway Authority Pilot and the Seminole County CV Test Bed.

Benefits:

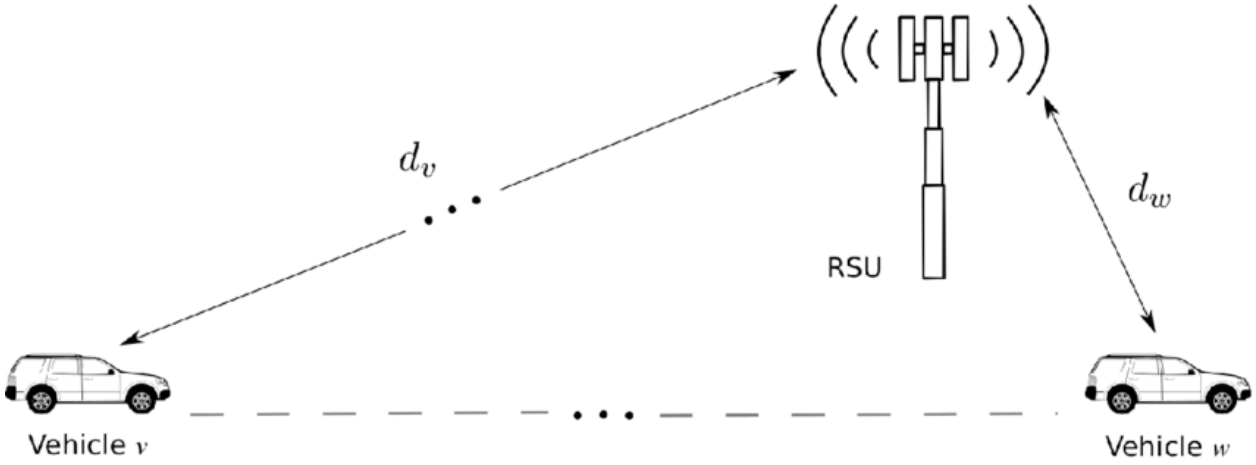
The implementation of CAV Pilot Project in Downtown Orlando would result in the following benefits:

- Increased information dissemination capabilities
    - Traffic incidents
    - Weather alerts
    - Diversion routes
    - Road closures
    - Special event information
    - Pedestrian warnings
- Decreased amount of secondary vehicle incidents
- Improved traffic congestion
- Improved vehicle throughput
- Decreased carbon emissions due to lower amounts of idling in traffic
- Creation of strategic partnerships with vendors for future CAV expansion
- Can be implemented on fleet vehicles as well as multimodal transportation options
- In line with what other transportation operators in the area are deploying
- Typically, a high ROI

Metrics / Key Performance Indicators:

- Increased information dissemination capabilities
- Reduced peak travel times
- Reduced pedestrian crashes
- Improved vehicle throughput
- Reduced emissions due to idling

Estimated Cost:	Use Examples (case studies)
$50-$75K in capital costs per intersection including RSU equipment, communications upgrades, and traffic signal upgrades	*Example 1* Alberta, Canada: There is a CV Test bed in Alberta Canada that is used to test RSUs in differing roadway conditions (urban, rural, inclement weather conditions) https://www.stantec.com/en/projects/canada-projects/a/active-aurora-cv-testbed-network Tampa, Florida: There is a CV test bed in Tampa Florida that the Tampa-Hillsborough Expressway Authority is using to test CV applications to test several CV applications including wrong way driving and pedestrian safety. https://theacvpilot.com/
Recurring/O&M: $3-$5K per intersection	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants for CAV expansion LAP funding Safety grants Prioritized MPO funding Additional revenue generation	
Photographs/Graphics	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Strategy Name: Centralized Recycling Drop-off Locations

Pillar Focus Area(s): Materials

City Department Owner: Solid Waste Division, Sustainability and Resilience

Strategy Description:

There are limited recycling opportunities for multifamily housing in the City of Orlando. The City is currently expanding recycling pick-up to multifamily housing, however this process will not be complete until the spring of 2023 (https://www.orlando.gov/Initiatives/Commercial-and-Multifamily-Recycling). To service those that do not have recycling pick-up, the City of Orlando has established several recycling drop-off locations including the Dover Shore Community Center, Englewood Neighborhood Center, Lake Fairview Park, Northwest Community Center, Orlando Skate Park, the Solid Waste Management Division, and the Beardall Center. It is recommended that the City of Orlando expand the number of drop-off locations to service residents not close to the existing centers and continue the expansion of multifamily housing recycling pick up. In addition, it is recommended that the City form partnerships for large-scale waste producers such as grocery stores.

There are several methods through which the City could expand recycling capabilities including coordinating with apartment building owners to implement recycling space in existing buildings (potential for sharing between apartment buildings), coordinating with businesses in urban areas to implement additional recycling space, and constructing new recycling centers on vacant land. Another opportunity would be to partner with grocery stores to organize and incentivize the recycling of waste products and to organize a program that would encourage the return of plastic grocery bags as they are used.

Benefits:

The implementation of city-wide Centralized Recycling Drop-off Locations would result in the following benefits:

- Reduction of waste from both organic and inorganic materials that is sent to landfills
- Reduced carbon emissions from landfills
- Reduced pollution from improperly disposed of items
- Preservation of resources that have already been used to create new products and materials by furnishing their re-use
- Expansion of services to residents without methods to recycle currently
- New facilities can be constructed at existing City facilities
- Opportunities for facilities can be expanded into existing and new apartment buildings as well as businesses in urban areas
- Opportunities to provide facilities that implement recycling drop-off areas financial benefits
- Creation of additional jobs to operate new facilities
- Provides opportunities for private-public partnerships with large scale waste generators such as grocery stores

Metrics / Key Performance Indicators:

- Increase in waste and product recycling rates
- Less strain on landfills
- Decreased carbon emissions from landfills

Estimated Cost:	Use Examples (case studies)
TBD as facilities are introduced	*Example 1* Orlando, Florida: Beyond 34 is a pilot project from the US Chamber of Commerce Foundation that aims to increase the current recycling rate. https://www.uschamberfoundation.org/sites/default/files/media-uploads/B34CaseStudy_Layout_June20.pdf *Example 2* Fresno, California: The City of Fresno, California implemented a zero waste policy that led to phased in recycling to 2,500 multi-family complexes (approximately 30,000 units) and 4,000 businesses. https://www.epa.gov/transforming-waste-tool/zero-waste-case-study-fresno *Example 3* Austin, Texas: The City of Austin, Texas created a resource recovery master plan that led to several initiatives and partnerships that increased resource re-use. https://www.epa.gov/transforming-waste-tool/zero-waste-case-study-austin
Recurring/O&M: TBD as facilities are introduced	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants for new recycling centers Local funds Public-private partnerships (potentially with grocery stores) Additional revenue generation	
Photographs/Graphics	

Strategy Name: Neighborhood / School Compost Kit

Pillar Focus Area(s): Materials

City Department Owner: Office of Sustainability and Resiliency, Solid Waste

Strategy Description:
This strategy will expand the City's free backyard composter program offered to City residents and residential composting opportunities located at community gardens. Through the distribution of a kit that can be distributed at community centers and schools, the City can simultaneously reduce the amount of waste that enters our landfills and create nutrient rich soil for use at community sites. The kit would include educational materials on composting basics, and basic composting materials which may include items such as a kitchen compost collection bin and soil sifter, all of which could facilitate the decomposition process of organics in backyard composters and providing an enriched, organic soil to support biodiversity. The distribution of these materials would require:

- The identification of vendors to purchase compost materials to create the composting sites and/or kits. Ideas for materials to include basic items such as large compost bins to collect organics at community centers and schools, receptacles for the collection of food scraps in neighborhood centers / schools, kitchen compost collection bin, a small shovel to turn compost, composting worms or "red wigglers", gloves or sifters.
- The creation of simple, easy-to-read educational materials based off of existing composting education already created by the city. Educational materials should provide basic information on what can and cannot be composted, as well as a description on the necessary addition of carbon-rich content to facilitate the decomposition process. Information should also be provided to help participants understand when compost might be ready for use and how compost might be used.
- The identification of neighborhood centers and schools to pilot the program, as well as key local partners such as IFAS, Orange County Solid Waste Division, Fleet Farming, and other urban agriculture businesses or non-profits to help disseminate information on educational opportunities. This includes staff training on "right-sizing" organic collection bins and compost bins for community center / school composting programs.
- The training of key city staff to host compost education opportunities.
- The creation of a landing page on the City's website to promote the distribution of compost kits, composting education, and to create a place where residents can request classes or the installation of collection bins and compost bins at community centers / schools.
- Coordination with the city's Communications Department to create social media content to share through the city's communication outlets to bring awareness of the compost kit program.
- The creation of an internal tracking sheet of materials shared and basic estimates on food scraps and other compostables collected through the distribution of these kits for the purpose of ongoing benchmarking. City staff should record the amount of organics diverted from the landfill, along with associated reduction in GHG emissions. Data generated should be shared in the City Data Fusion Center.

Benefits:

The development of a neighborhood / school composting kit would provide the following benefits:

- Reduction in solid waste collected in landfills to support the city's Zero Waste by 2040 goal.
- Reduction of GHG emissions associated with the transportation of waste to the landfill and reduction in methane released from organics collected in landfilled materials.
- Reduction of leachate that percolates through landfilled waste and creates a harmful pollutant that enters our aquifer.
- Increased sense of community through sustainability initiatives.
- Reduction in the quantity of contaminants that end up in recycling streams, thereby increasing the waste diversion rate.
- Increased understanding of how to properly compost organic materials and create a nutrient-rich amendment for use in gardens, indoor plants, etc.
- Increased awareness about organic gardening practices and benefits to support biodiversity.

Metrics / Key Performance Indicators:

- Number of compost kits given out.
- Number or trainings provided to schools / neighborhood organizations.
- Estimate on tons of organics diverted from the landfill (average number of pounds collected per kit distributed).
- Estimates on GHG emission reductions.

Estimated Cost:	**Use Examples (case studies)**
FY2024 cost: **Phase I (2024/25)** Compost kit pilot project at 20 schools or community centers $100,000	School Compost Partnerships: Northeast Recycling County School Pilot Project, VT https://nerc.org/documents/schools/SchoolCompostingOptionsPresentation.pdf Charlotte-Mecklenberg School System, NC https://www.biocycle.net/composting-pilot-expands-in-north-carolina-school-district/ CDEP Mansfiled School System, CT https://portal.ct.gov/DEEP/Waste-Management-and-Disposal/Organics-Recycling/School-Composting-Bins-School-Composting-Manual-and-Website
Recurring/O&M: • Staff trainings • Labor for outreach • Processing of data analytics	
Funding Type (General Fund/P3/Other)	

Options for: Local funds Public-private partnerships Additional revenue generation	
Photographs/Graphics	**Photographs/Graphics**

Strategy Name: Consolidated Property Database and Digital Story Map

Pillar Focus Area(s): Connectivity, Placemaking

City Department Owner: Economic Development, Information Technology

Strategy Description:

This strategy will provide the city with a digital database of property data to inform internal review of the existing conditions of City of Orlando properties, what uses are legally permissible on each property and what is physically possible to develop on each property given concurrency and necessary permitting considerations. The creation of an online digital story map tool will provide equitable access to all data collected and regulations that guide the planning and visioning process. This database will create a historic record of all properties in Orlando through the collection of prior annexations, development approvals, plats, development agreements, easements, staff reports and building permits. The database and digital story map will provide a tool that projects the future development potential of Orlando properties through the collection and projection of zoning and future land use regulations, and will balance this development potential with available environmental data such as wetland boundaries and brownfield information. The database and digital story map will also include links to forms available through the city Permitting Services Division and applications available through the Planning Division to expedite the development approval process.

As a part of this strategy, the City may consider using 3D modelling tools to visualize the massing of buildings in strategic planning areas such as the Downtown Core, SODO, and the Mills/50 District given different scenarios including the approval of density/intensity bonuses and other development incentives. This will allow city staff and residents to visualize future development potential and check for consistency and compatibility with existing land uses.

All data will be collected in the City Data Fusion Center and Digital Twin.

More specifically, the Consolidated Property Database would contain the following property data, as available through either :

- Existing Conditions
    - Orange County Property Appraiser Data
        - Property Owner
        - Property Address
        - Size
        - Improvements
        - Year Built
        - Appraised Value
    - Orange County Clerk of Court Official Records
        - Plats
        - Easements
        - Shared Use Agreements
    - City of Orlando

        - City boundary
        - Commissioner District
        - Orlando neighborhoods
        - Existing land use
        - Proximity to parks / community gardens
        - Landmarks
        - Community centers
    - Transportation
        - Bike and pedestrian facilities
        - Transit facilities
        - Crash Data
        - ROW width
        - EV charging stations
- Conformance with Land Development Code
    - Zoning regulations and development standards (setbacks, min/max height, min/max density, min/max intensity, etc).
    - Landscaping requirements
    - Urban design standards
    - Transportation and parking requirements
    - Variance and conditional use requirements
- Entitlements / Opportunity Districts
    - Growth Management Plan (Future Land Use)
    - Special Area / Sector Plans
    - Opportunity Zones
    - Community Redevelopment Areas
    - Main Street Program Areas
    - Neighborhood Stabilization Areas
    - Downtown Development Board Area
    - Orlando Enterprise Zones
    - Orlando Minority Enterprise Business Assistance Program Boundaries
- Environmental Conditions
    - Wetlands/surface waters
    - FEMA FIRM
    - Elevations/drainage
    - Soil Types
    - Endangered Species
    - Brownfield areas
    - SJWMD FLUCCS
    - Conservation easements
- Concurrency / Utilities
    - School zoning and concurrency review process
    - Reclaimed water facilities
    - Potable water facilities
    - Sanitary sewer facilities
    - Roadway capacity and access
    - Fire

- Police
- Solid Waste – recycling and waste collection routes
- Energy Star Portfolio Manager Tool energy and water consumption data collected in the City Building Energy & Water Efficiency Strategy (BEWES)

Benefits:

The development of the Consolidated Property Database and Digital Story Map tool will provide the following benefits:

- Transparency on prior development approvals and history of Orlando
- Equitable access to all data collected and regulations that guide the planning and visioning process
- Expedited process for internal review of property data
- Potential for an interactive story map of the history and future of Orlando
- Availability to quickly run different scenario planning analyses
- Increased transparency on land use decisions

Metrics / Key Performance Indicators:

- User satisfaction survey
- Reduced time to permit
- Reduced number of code enforcement violations
-

Estimated Cost:	**Use Examples (case studies)**
FY2024 cost: **Phase I (2024/25)** Storymap Visioning $100,000 **Phase II (2021/22)** Creation of GIS based story map tool $200,000	Cities are utilizing applied technologies to create accessible and interactive digital records of city regulations and visioning processes in the form of dashboards and story mapping tools. As access to data becomes more prevalent, cities are making investments in technologies and data storage systems to create dynamic platforms that support citizen engagement, create a means to share both historic records and changes to existing policies and plans, provide better access to operational governance, and permitting processes and tackle a diverse set of other issues. There are several great local examples of the mapping platforms that may help to inform an Orlando Future-Ready City digital dashboard. These include the Brevard County Geographic Information Systems Online Services, the Broward County Resiliency Story Map, and the East Central Florida Regional Planning Council's GIS Platform.
Recurring/O&M: Update of database as development approvals / strategic plans adopted	

Funding Type (General Fund/P3/Other) **Options for:** Local funds Public-private partnerships Additional revenue generation	
Photographs/Graphics	**Photographs/Graphics**

Strategy Name: Design Competition for Transit Station and Onboard Amenities

Pillar Focus Area(s): Mobility

City Department Owner: Transportation, LYNX

Strategy Description:
This strategy is specifically addressed in the Future-Ready City Master Plan in the objective: "Increase transit ridership". Stakeholders throughout the engagement process acknowledged the need to improve mobility for modes beyond single occupancy vehicles, and perhaps even more than other modes, transit ridership can be increased by changes in perception in local culture. Part of changing local culture is to engage residents and other local stakeholders in co-creating the transit amenities they will use. This Competition will focus on engaging populations and communities with high transit ridership in order to best produce relevant solutions.

The strategy proposes holding a design competition for specific transit stations and onboard amenities for transit vehicles. This will act to engage and form relationships with key resident populations and other relevant organizations in the City, as well as to source the best local understanding of how transit is used today. The experience of transit varies block to block and route to route and this competition offers the opportunity to acknowledge the invaluable input local people are able to offer local places. Other similar design competitions have also integrated local universities, so there may be opportunity to partner with the University of Central Florida (UCF), including with the UCF Department of Urban and Regional Planning. This design competition can act as a model for other similar design competitions throughout the City. Expected results from the design competition may include:

- Specific designs for key transit hubs in the City, including how they will relate physically to their neighborhood. This may include display of real time data, public art, park space, benches and shelter
- Modes of connecting technology infrastructure such as Wi-Fi and lighting to station areas
- Simple and cost-effective transit stop designs for stops with minimal infrastructure today
- Designing simple onboard amenities and experiences that will engage riders and improve efficiency of the system and quality of life for riders. This may include real time route information, art in and on vehicles, concessions, and driving training to create bonds and relationships with riders.
- Designs for multimodal stations including integrating ride-share, micromobility and other last-mile solutions

Benefits:
The development of a Design Competition for Transit Station and Onboard Amenities would provide several benefits to the community:

- Engaging residents and local groups to build relationships and help stakeholders solve their own problems
- Listen to design input from those who are most familiar with the system
- Gather diverse input from diverse user-groups in the City

- This specific design competition could serve as a pilot for other design competitions held in other categories of City services

Metrics / Key Performance Indicators:

- Increase transit ridership
- Increase diversity of thought and diversity of people engaged in design projects
- Increase visibility of transit routes and stations

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: **Phase I (2021/22)** Solicit feedback and offer staff resources to engage with interested parties $30,000 **Phase II (2022/23)** Select winning design and work with them to implement their design $200,000 - $1 million	Example 1 Design Your Own Coral Gables: Smart City Solutions Competition – Competition hosted in cooperation with the University of Miami and the City of Coral Gables. Teams were able to choose from sub-problems, including commercial trucks, parking, environmental sustainability, and pedestrian and bicycle safety. Competition allowed space for teams to discuss and present ideas publicly. Prizes were awarded for the top 3 teams.
Recurring/O&M: Maintenance of whatever design or amenities are chosen	Example 2 Alternatively, and more formally, a competition was held to design the Transbay Transit Center in Downtown San Francisco. Qualified architects were solicited and then selected based on their designs. (link)
Funding Type (General Fund/P3/Other) **Options for:** Local funds Public-private partnerships	
Photographs/Graphics	**Photographs/Graphics**

Strategy Name: Digital Community Engagement Application and Virtual Public meetings

Pillar Focus Area(s): Connectivity

City Department Owner: Office of Communications and Neighborhood Relations, Information Technology

Strategy Description:
This strategy is an extension of the proposed Community Outreach and Engagement plan. Being 'People First', 'Transparent' and 'Collaborative' are Foundational Elements of the Future-Ready City Master Plan; this application would serve as a platform to pursue these. Such a digital platform was discussed at nearly every level of stakeholder engagement, including becoming a central discussion point during the Public Safety and Health roundtable discussion. 'Education and Communication' was identified as one of six major themes common to the input given at public meetings.

The engagement platform is proposed to provide a simple digital location for citizens to receive valuable information and digital resources, as well as to provide feedback and input to the City. This platform would also link to virtual public meetings, creating new ways for citizens to interact with each other and the city.

A holistic digital community engagement platform has the opportunity to fill the following roles:

- A simple and well-known single location for **distributing relevant information** to citizens. This information could be denominated by neighborhood and by category of information. This could include real-time updates in emergency situations and long-term methods of tracking progress for the city.
- A platform for **educating citizens**. This education would relate to city programs and help build a common culture. Topics of education would include methods for conserving resources, methods of reusing waste at home, methods of local community building
- A forum for **listening to citizens** and for citizens to **collaborate with each other**. This function of the platform would be used as a single catchment area for receiving and organizing citizen engagement. This would also create an opportunity for citizens to build consensus with each other and with city staff. Specific methods of listening could be through interactive feedback maps or group problem-solving forums.
- A method for citizens to access and **engage in live meetings**. This is especially important since communities have had to deal with COVID-19. This role for the platform will allow new populations of residents to have a voice in the most relevant projects around the City.

Benefits:
The development of a Digital Community Engagement Application would provide several benefits to the users:

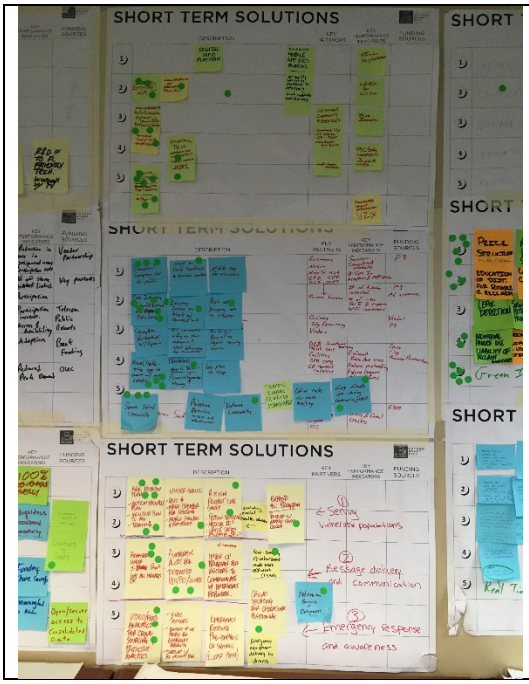
- Build a community culture of openness, allowing for much greater avenues for effective listening and genuine action in response
- Allow new populations of residents to engage with specific project meetings

- Educate citizens and help them to build skills that benefit the community and help the City meet its goals

Metrics / Key Performance Indicators:

- Increase the number of citizens providing feedback and engaging with City projects
- Increase visibility of major announcements coming from the City
- Measure and display project progress transparently

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: **Phase I (2021/22)** Build out platform to distribute basic news and information, as well as hold live public meetings $100,000 **Phase II (2022/23)** Further build out platform to provide methods of listing to feedback and allowing collaboration between citizens $200,000	Example 1 Coral Gables Smart City Hub The City of Coral Gables has established a Smart City Hub platform which allows residents to access valuable data, maps, financial data and public input interfacing.
Recurring/O&M: Maintenance and operation of site Staff resources to engage with citizens and manage input	Example 2 San Jose 311 The San Jose 311 program is an digital interface and application built to receive resident input and assign staff to respond to concerns in a timely manner. This streamlined approach to citizen engagement could be integrated into the City of Orlando's broader vision of a digital engagement application.
Funding Type (General Fund/P3/Other) **Options for:** Local funds Public-private partnerships	
Photographs/Graphics	**Photographs/Graphics**

 SHORT TERM SOLUTIONS SHORT SHORT SHORT SHORT TERM SOLUTIONS SHORT Service Emergency Response and awareness	

Strategy Name: Digital Curbside Management

Pillar Focus Area(s): Mobility

City Department Owner: Transportation

Strategy Description:

A digital curbside management program is a modern approach to use of curbs in dense urban areas for parking, passenger drop-off, deliveries, and emergency services. This initiative proposes the use of video recognition as a low-cost method to detect and respond to curbside use characteristics. High-use curbsides could be monitored for detection of use type by categorizing objects entering zones of interest. This data could be used to dynamically adjust use-restrictions, fees, and enforcement to best meet city objectives. Examples of functions include:

- Identification of locations that frequently receive deliveries but are not designated delivery zones
- Predictive timing of delivery windows to allow dynamic curbside use assignment based on anticipated needs. For example, a mixed-use zone could be indicated for deliveries during common package delivery hours and reverted to parking outside those times.
- Targeted signage in location where pedestrian volume or behavior warrants management
- Rapid enforcement of emergency zone use-restrictions

This strategy recommends a phased approach to curbside management beginning with a pilot program at a few priority locations, ideally where CCTV connections are present or require minimal effort.

Benefits:

Active curbside management provides a much more granular and responsive method to promote desired use characteristics in city streets.

- Users benefit from improved communication. Real-time data can inform dynamic signage and smartphone GIS data to inform user selection of mode of transportation and entry/exit points for major events. This will encourage dynamic user behavior that can be influenced using feedback from planners, vendors, and law enforcement.
- The city can benefit from strategies that optimize revenue, volume, user satisfaction, and efficient operation of the transportation network. This can be periodically adjusted to best meet the latest needs and respond to public feedback.
- Local businesses can benefit by the improved capacity and pedestrian traffic enabled by a dynamic curbside management approach that encourages exposure to their place of business. This includes events like farmer's markets and festivals which can have improved accessibility for foot traffic to drive sales and encourage economic activity.

Metrics / Key Performance Indicators:

- Increase in revenue generation from curbside meters
- Curbside traffic volume by mode of transportation

Estimated Cost:	Use Examples (case studies)
FY2021 cost: **Phase I (2020/21)** Installation of connected CCTV cameras and software licensing CCTV Installation (where needed): $1,000 per location	Example 1 The City of San Francisco Is managing its curbsides using demand-responsive parking pricing, geofencing, and Transportation Network Companies (TNCs) data https://www.ite.org/pub/?id=C2D66E96-FF01-0BA8-68C3-65CC9116A5AE
Recurring/O&M: Software License: $1,500 - $3,500 per location per month	Example 2 The District of Columbia is using dynamic management strategies for parking, loading, and TNC traffic in peak hours https://www.ite.org/pub/?id=C29F4D5E-FE34-2037-3B96-DE312E1DBBFF
Funding Type (General Fund/P3/Other) **Options for:** Local funds	

Photographs/Graphics

Parking Meter Rate Schedule in Penn Quarter/Chinatown (Source: DDOT, https://ddot.dc.gov/page/parkdc).

Strategy Name: Energy Microgrid

Pillar Focus Area(s): Energy

City Department Owner: Collaboration with OUC, Fleet and Facilities, Sustainability and Resiliency

Strategy Description:

Energy microgrids are building blocks of sustainable and resilient Smart Cities, providing the opportunity to achieve sustainable and reliable energy delivery systems. A microgrid is a localized group of electricity sources and loads that normally operates connected to and synchronous with the traditional wide area synchronous grid but can also disconnect and function autonomously as physical or economic conditions dictate. In other words, a microgrid is a local energy grid with its own control capability which means it can disconnect from the main power grid, through a switch, to operate autonomously and function as an island. A microgrid generates and stores energy that can power buildings, communities and even cities in the event of a power outage/shortage caused by a disaster. A microgrid can be powered by batteries, distributed generators and/or most preferably by renewable resources like solar panels and wind turbines; depending on how a microgrid is managed, it might be able to run indefinitely.

Power outages in an automated future-ready city shouldn't be a cause of concern if there exists an energy microgrid implemented as part of the city's resiliency plan. The Energy Microgrid strategy will ensure that back-up resilient power source is present at all critical infrastructure (i.e. solar + storage generators, city buildings) to ensure that smart city applications and general services remain up and running while also supporting the needs of the larger Utility Distribution Network (UDN) in the event of a disaster causing power outage/shortage. The microgrid solution will provide a platform to support critical services from hosting first responders and governmental functions to providing key services and emergency shelter.

Benefits:

The implementation of a city-wide Energy Microgrid system would result in the following benefits:

- Provide efficient, low-cost, clean energy by providing the opportunity to use renewable sources of energy generation such as solar photovoltaic devices that don't emit greenhouse gases and other pollutants and don't require transport of fuel that may be restricted in a disaster event.
- Improve the operation and stability of the regional electric grid.
- The "islanding" ability of the microgrid will strengthen the overall grid resiliency and optimize efficiency.
- Reduces grid "energy congestion" and peak loads.
- Enables highly-efficient Combined Heat and Power (CHP), reducing fuel use, line losses and carbon footprint.
- Provides the ability to integrate CHP, renewable energy, thermal electric storage, and advanced systems and building controls.
- Supports reliable energy delivery to places of refuge and to first responders in times of disaster events.
- Diversifies risk rather than concentrated risk.

<table>
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- Helps consumers and businesses save money by significantly reducing power outage costs by providing power in real-time using local power generation. Local power generation reduces the distance energy must travel resulting in fewer costs from transmission losses, congestion pricing and customer service overhead.

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Metrics / Key Performance Indicators:

- Decreased carbon footprint generated by power plants (assuming solar or another renewable power source is used for the microgrid)
- Fully independently operational in times of crisis like power outages and natural disasters
- Reliable non-stop energy source for critical city infrastructure

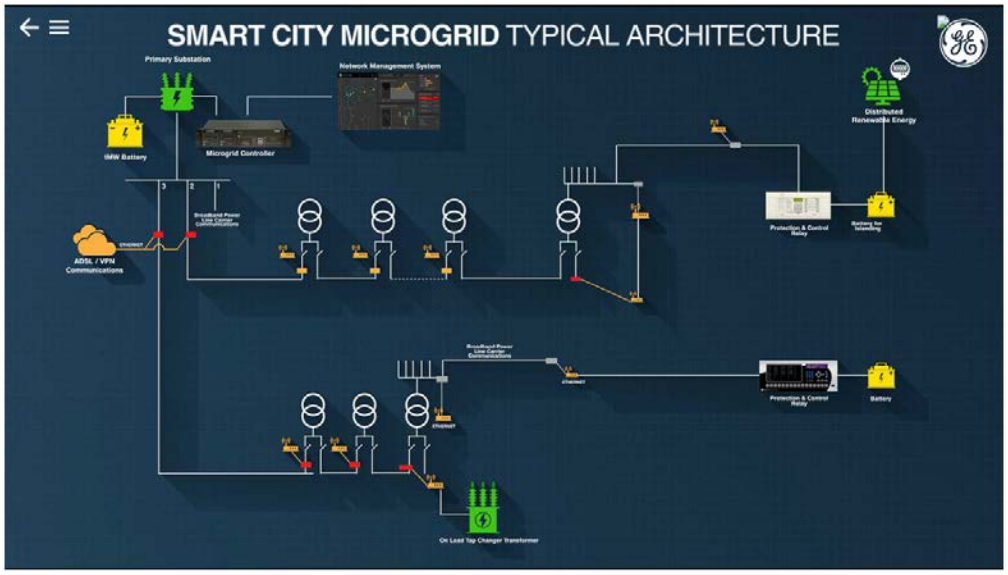
</td></tr>
<tr><td>Estimated Cost:</td><td>Use Examples (case studies)</td></tr>
<tr><td>DOE awarded approximately $1.2 million to Commonwealth Edison Co(ComEd) and its partners to develop and test a commercial-grade microgrid controller capable of managing two or more interconnected microgrids.
https://www.smartgridclimatechange.org/wp-content/uploads/2013/10/Bahramirad-Shay-4-B.pdf

A study done in the state of NY, came up with a planning cost (includes initial design) of $3,021,888.
https://www.nyserda.ny.gov/-/media/NYPrize/files/Cost-Benefit-Analysis-Tool-User-Guide.pdf</td><td>Example 1
Fort Collins, Colorado:
The Fort Collins Microgrid in Colorado is part of a larger project known as the Fort Collins Zero Energy District (FortZED), where the district plans to create as much thermal and electrical energy locally as it uses.
https://microgrid-symposiums.org/microgrid-examples-and-demonstrations/fort-collins-microgrid/

Example 2
Nice Grid, France:
Grid modernization solutions delivering a community based microgrid.
https://www.socomec.com/reference-nice-grid_en.html

Example 3
Sendai, Japan:
Perhaps the most well-known microgrid demonstration on this planet. While already highly successful, the project achieved microgrid superstardom because of its excellent performance during the 2011 earthquake and tsunami.
https://microgrid-symposiums.org/microgrid-examples-and-demonstrations/sendai-microgrid/</td></tr>
<tr><td>Recurring/O&M:
$100,000 /year
https://www.nyserda.ny.gov/-/media/NYPrize/files/Cost-Benefit-Analysis-Tool-User-Guide.pdf</td><td>More cases studies and examples can be found through the following links:
https://microgrid-symposiums.org/</td></tr>
</table>

	https://www.energy.gov/oe/services/technology-development/smart-grid/role-microgrids-helping-advance-nation-s-energy-syst-0
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants for microgrid deployments Local funds Public-private partnerships Additional revenue generation	
Photographs/Graphics	



Strategy Name: Continue to expand City Fiber Infrastructure

Pillar Focus Area(s): Connectivity

City Department Owner: Information Technology, Transportation Department

Strategy Description:

Fiber optic cable is an essential communications backbone of advanced traffic management systems. Fiber optic cable uses thick flexible fibers with glass cores that transmit light pulses with very little signal degradation over distances. Light pulses are converted to electrical signals at the end of fiber optic links. Traffic signals can be connected via fiber back to a central traffic management center for both active management and data collection purposes. In addition, traffic devices such as cameras, dynamic message signs, speed/occupancy detectors, and travel time detectors can be connected to an overall traffic network, allowing for robust active management.

Traveler safety and transportation network efficiency are both potentially elevated through the use of fiber optic interconnection. The previously described devices allow transportation network operators and maintainers the ability to actively monitor intersections and roadway corridors for congestion and incidents, gather travel times and speeds in real time, adjust traffic signal timings as necessary, and gather data to report on system performance. In addition, proper incident responders can be dispatched in a timely fashion to aid in the clearing of incident scenes and the swift transportation of any injured parties. When taking these ideas into consideration along with the reliability of a hard-wired connection that is resistant to inclement weather conditions, a fiber connected transportation network can prove to be a powerful transportation management tool.

Benefits:

The expansion of the City of Orlando Fiber infrastructure would result in the following benefits:

- Improved traffic signal interconnection to signals that are currently not connected to the fiber network
- Expanded traffic monitoring capabilities
- Expanded traveler information sharing capabilities
- Improved redundancy through the potential creation of additional fiber rings
- Increased bandwidth for expansion of number of devices on traffic network
- Expanded incident management capabilities
- Potential for expanded interagency interconnection
- Fiber sharing opportunities among other public agencies (should a high enough fiber count be installed)
- Decreased reliance on wireless interconnection which can be affected by inclement weather conditions
- Increased readiness for technology advances such as connected vehicle deployments

Metrics / Key Performance Indicators:

- Improved congestion relief on corridors connected by fiber
- Increased travel time reliability
- Improved incident response/clearance times and decreased secondary incidents

Estimated Cost:	Use Examples (case studies)
≈$100-150K construction cost per mile of fiber (includes cost of fiber infrastructure, traffic signal interconnection costs, and communication device installation). Scale of project (i.e. quantity of miles) to be determined.	*Example 1* City of Lancaster, California: The City of Lancaster in California expanded their fiber network capabilities and migrated away from legacy systems. https://www.cityoflancasterca.org/home/showdocument?id=41901 *Example 2* Iowa DOT: The Iowa DOT performed a gap analysis in ITS infrastructure including fiber and monitoring devices. https://iowadot.gov/TSMO/ServiceLayerPlan3.pdf
Recurring/O&M: ≈$10-15K per mile of fiber	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants for fiber LAP funding Safety grants Prioritized MPO funding Additional revenue generation	
Photographs/Graphics - NA	

Strategy Name: Fast Charging EV infrastructure

Pillar Focus Area(s): Mobility

City Department Owner: Fleet and Facilities, Parking Division

Strategy Description:
Electric vehicles (EV) are poised to play a crucial role in decreasing our reliance on fossil fuels. According to a 2017 report by the US Department of Energy, the United States will require around 600,000 non-residential EV charging stations to meet the demand of a projected 15 million on-road EV's by 2030. Today, there are only 27,191 public EV charging stations in the U.S. which establishes a charging to capacity gap that needs to be met within the next 10 years. This technological advancement is expected to be integrated into concepts within the smart cities similar to how gas stations are established within a short driving distance.

The future-ready initiative will need to incorporate a well-planned grid of EV charging stations throughout their infrastructure. The most important criteria here would be to make sure that the distance between any two charging stations must be less than the range of the popular EVs today. The City of Orlando currently has ten Level 2 EV charging stations downtown, two in particular are located in the parking garages on Jefferson Street (1st Floor) and Liberty Avenue (2nd Floor) for convenience. It is also anticipated the number of locations will be increased with pilot projects possibly being installed at Orlando City Hall and Community Centers within the vicinity.

Benefits:
The implementation of a city-wide Electric Vehicle system would result in the following benefits:

- Decrease air pollution and reduce the impacts of climate change. The leading cause of air pollution is emissions from vehicles. EV's will improve the overall health of the population and reduce healthcare costs.
- Increase business, tourism and quality of life. Smart Cities can compete by offering a cleaner, greener and quieter environment
- Enhance economic development
- Create energy independence by minimizing the use of petrol and diesel, which are imported. Electricity can be generated from local energy sources and assist in boosting the local/national economy.
- Create networking opportunities where objects and infrastructure are networked and able to communicate with each other.

Metrics / Key Performance Indicators:

- Decreased carbon footprint with zero emission from electric mobility
- Increased level of utilization of the existing charging infrastructure
- Optimize capacity utilization

Estimated Cost:	Use Examples (case studies)
DOE awarded approximately $3.2 million the Electric Power Research Institute (EPRI) to scale an electric vehicle (EV) charging infrastructure. The 'extreme' fast-charging system is to be developed by technology partner Tritium which will receive a $400,000 share of the grant. https://www.smartcitiesworld.net/news/news/us-doe-helps-to-fund-high-powered-electric-charging-3342 Capital costs were evaluated and included the installation and hardware, for a scenario with 2.6 million new electric vehicle sales in the top 100 U.S. metropolitan areas between 2019–2025. Findings determined that at home charging costs to support these electric vehicles total $1.3 billion, whereas new workplace, public Level 2, and DC fast charging costs total $940 million. https://theicct.org/sites/default/files/publications/ICCT_EV_Charging_Cost_20190813.pdf For Unit Costs See Figures below. https://theicct.org/sites/default/files/publications/ICCT_EV_Charging_Cost_20190813.pdf	*Example 1* London, United Kingdom: London is proactively expanding its rapid charge points. The city partnered with the private sector to expand charging for taxis, private-hire vehicles (PHVs), and others. In consultation with the power sector and charging providers, the EV Infrastructure Delivery Plan specifies policies to deploy rapid charging at public hubs, commercial hubs, and semi-public depots. It also identifies priority locations in a mapping exercise based on taxi driving patterns and electricity grid capacity. https://theicct.org/sites/default/files/publications/EV_charging_guide_02262020.pdf *Example 2* Stockholm, Sweden: Stockholm is currently developing a Charging Master Plan, which aims to deliver 4,000 public charge points by 2022. The goal is to make it as easy as possible for companies to install charging stations, while also ensuring high utilization of each station. https://theicct.org/sites/default/files/publications/EV_charging_guide_02262020.pdf *Example 3* San Francisco, California: San Francisco developed EV-ready building codes in the United States with its 2017 update. The regulation requires that 100% of parking spaces in all new commercial and residential buildings be "EV ready." San Francisco remains the largest city in the United States with a 100% EV-ready ordinance, but many other cities have adopted codes that go even further by requiring energized outlets or actual charging points. This includes Vancouver, British Columbia and nearby cities, where 100% of residential spaces are required to have outlets and panel capacity.

	https://theicct.org/sites/default/files/publications/EV_charging_guide_02262020.pdf
Recurring/O&M: Vary depending on the type and quantity of charging equipment, station utilization, and ownership structure. Ongoing O&M costs include electricity charges, station management and maintenance, and network fees which are approximately $100-$900/year (depending of the type of unit). https://www.sccgov.org/sites/dnz/Documents/Task4B-Deploying-EV-Charging-Infrastructure.pdf	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants Local funds Public-private partnerships Additional revenue generation	
Photographs/Graphics	

Table 2. Per charger public and workplace charger hardware cost.

Level	Type	Chargers per pedestal	Per-charger cost
Level 1	Non-networked	One	$813
Level 1	Non-networked	Two	$596
Level 2	Non-networked	One	$1,182
Level 2	Non-networked	Two	$938
Level 2	Networked	One	$3,127
Level 2	Networked	Two	$2,793
DC fast	Networked 50 kW	One	$28,401
DC fast	Networked 150 kW	One	$75,000
DC fast	Networked 350 kW	One	$140,000

Table 4. Installation costs per DC fast charger by power level and chargers per site.

	50 kW				150 kW				350 kW			
	1 charger per site	2 chargers per site	3-5 charger per site	6-50 chargers per site	1 charger per site	2 chargers per site	3-5 chargers per site	6-20 chargers per site	1 charger per site	2 chargers per site	3-5 chargers per site	6-10 chargers per site
Labor	$19,200	$15,200	$11,200	$7,200	$20,160	$15,960	$11,760	$7,560	$27,840	$22,040	$16,240	$10,440
Materials	$26,000	$20,800	$15,600	$10,400	$27,300	$21,840	$16,380	$10,920	$37,700	$30,160	$22,620	$15,080
Permit	$200	$150	$100	$50	$210	$158	$105	$53	$290	$218	$145	$73
Taxes	$106	$85	$64	$42	$111	$89	$67	$45	$154	$123	$92	$62
Total	$45,506	$36,235	$26,964	$17,692	$47,781	$38,047	$28,312	$18,577	$65,984	$52,541	$39,097	$25,654

Strategy Name: Net Zero Water Building Pilot

Pillar Focus Area(s): Water

City Department Owner: Fleet and Facilities, Sustainability and Resiliency, Partnership with OUC

Strategy Description:

A net zero water building is a facility that has been designed to minimize total water consumption, maximize alternative water sources, minimize wastewater discharge from the building, and return water to the original source. For example, a building would follow the following cycle: collect rainwater, treat the water so that it is potable, utilize the potable water at faucets, collect and treat the gray water as non-potable water for irrigation and toilet water use, collect the black water, collect via septic system, and drain back into the groundwater supply. This is an idealized scenario and would likely need to be supplemented by services from the City wastewater treatment facilities and potable water supplies.

To demonstrate the water conserving capabilities of a net zero water building, it is recommended that a City building be chosen as a pilot location. This facility should be in a location or campus that has the following characteristics: nearby to a natural freshwater source (the building should not divert resources from areas with higher priority freshwater needs) or in an area with ample rainfall, space for implementing potable and non-potable water treatment facilities, high-efficiency water fixtures and plumbing, and a plumbing system that will not leak harmful contaminants back into natural water sources. Should this pilot prove to improve the water conservation capabilities of the selected building, best practices can be developed, and the technology can be implemented in not only additional City facilities, but also additional private facilities can be encouraged to adopt the practices.

Benefits:

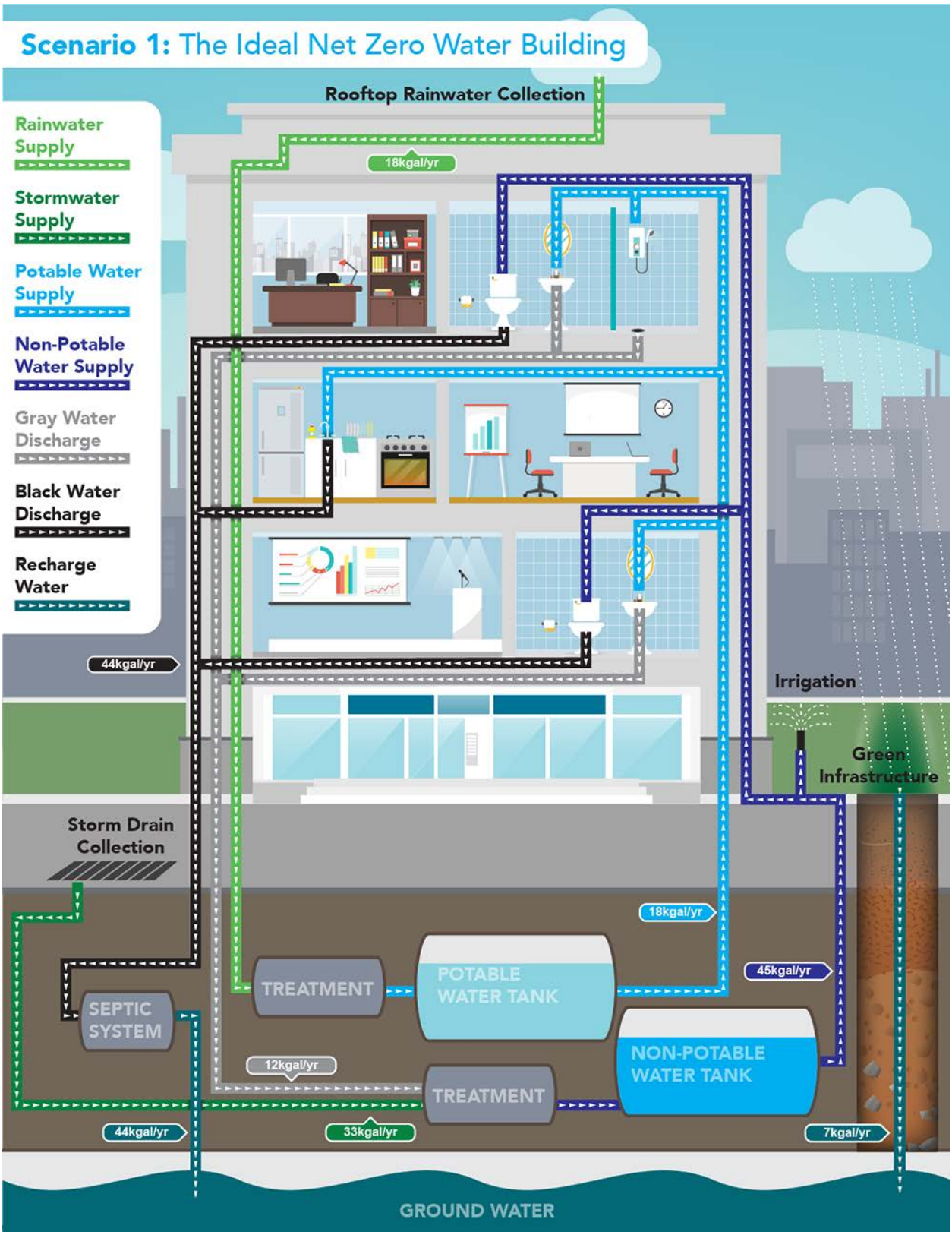
The implementation of a Net Zero Water Building Pilot would result in the following benefits:

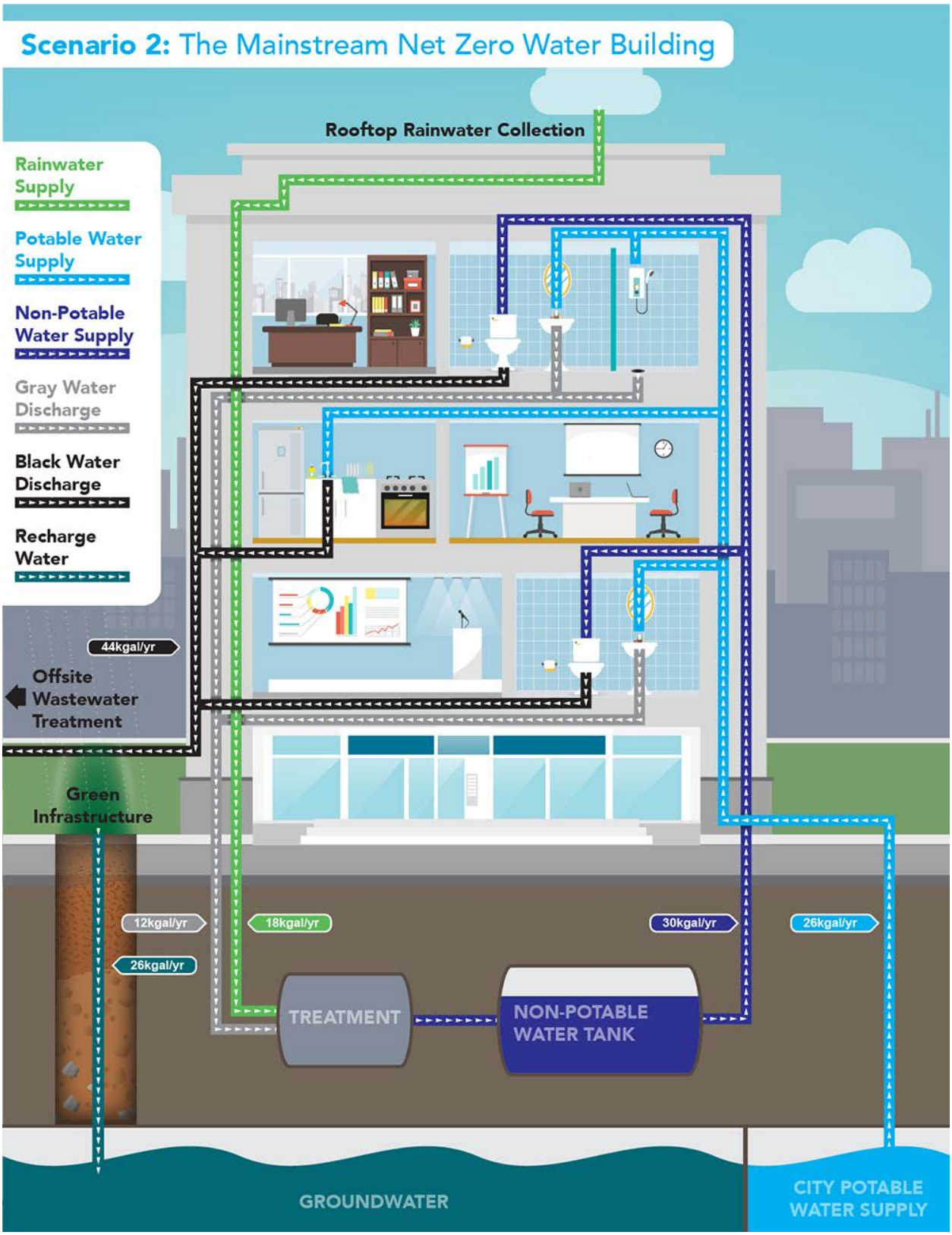
- Reduced water consumption costs due to ability to recycle water used within the building for secondary uses and the lowered need for fresh water to be provided by potentially overburdened water treatment facilities
- Reduced load on City water treatment facilities
- Reduced load on stormwater and sewer facilities
- Increased water conservation
- Reduced contaminants from buildings reintroduced into freshwater supplies due to increased water treatment on site
- Encouragement of higher efficiency plumbing infrastructure
- Improvements are easily measurable, therefore success of the project will be easily demonstrable
- Buildings can achieve higher LEED certifications
- Contributes to overall regional resource sustainability

Metrics / Key Performance Indicators:

- Decrease in amount of water provided by City resources used by building
- Increase in water treated on site and returned to freshwater source
- Decrease in water consumption costs for the building

Estimated Cost:	Use Examples (case studies)
$150-$200 per square foot of building depending on desired capabilities and condition of existing plumbing infrastructure https://newbuildings.org/sites/default/files/ZNECostComparisonBuildingsDC.pdf	*Example 1* Berlin, Germany: A project in Berlin Germany harvested rainwater to manage flooding, generate water for plumbing fixtures, and generate water for irrigation purposes. https://living-future.org/wp-content/uploads/2016/11/Toward_Net-Zero_Water.pdf Page 56 *Example 2* Los Angeles County, California: This case study details how a 49,000 square foot office facility performed in a drought prone area. https://www.sciencedirect.com/science/article/pii/S1877705816301072
Recurring/O&M: TBD depending on building and equipment chosen	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants for a net zero water pilot project Local funds Public-private partnerships Additional revenue generation	
Photographs/Graphics	


Scenario 1: The Ideal Net Zero Water Building
Rooftop Rainwater Collection
Rainwater Supply
Stormwater Supply
Potable Water Supply
Non-Potable Water Supply
Gray Water Discharge
Black Water Discharge
Recharge Water
18kgal/yr
44kgal/yr
Irrigation
Green Infrastructure
Storm Drain Collection
18kgal/yr
45kgal/yr
TREATMENT
POTABLE WATER TANK
SEPTIC SYSTEM
12kgal/yr
TREATMENT
NON-POTABLE WATER TANK
44kgal/yr
33kgal/yr
7kgal/yr
GROUND WATER


Scenario 2: The Mainstream Net Zero Water Building
Rooftop Rainwater Collection
Rainwater Supply
Potable Water Supply
Non-Potable Water Supply
Gray Water Discharge
Black Water Discharge
Recharge Water
44kgal/yr
Offsite Wastewater Treatment
Green Infrastructure
12kgal/yr
26kgal/yr
18kgal/yr
30kgal/yr
26kgal/yr
TREATMENT
NON-POTABLE WATER TANK
GROUNDWATER
CITY POTABLE WATER SUPPLY

Strategy Name: On-Site Rainwater and Greywater Harvesting

Pillar Focus Area(s): Water

City Department Owner: Public Works, Streets and Stormwater, Sustainability and Resilience

Strategy Description:

Urbanization and the impact of climate change requires a new approach to the urban water management system. The Water Smart City approach integrates sustainable urban planning and water management to minimize the hydrological impacts of urban development on the surrounding environment. This concept includes integration of stormwater, groundwater, waste-water management and water supply to cope with challenges such as climate change, resource efficiency and energy transition. It aims to minimize environmental degradation and to improve general aesthetic and recreational appeal. This approach develops integrative strategies for ecological, economic, social, and cultural sustainability.

Rainwater harvesting is the capture and storage of rainfall for subsequent use which is most often associated with the capture of rainwater from rooftops or other surfaces and held in rain barrels or cisterns. Greywater is wash water coming from showers, bathtubs, washing machines and bathroom sinks.

On-Site Rainwater and Greywater Harvesting will reduce the amount of potable water consumed and also change the way we recycle the water in order to repurpose it. This will greatly impact carbon emissions due to energy use. Rainwater and greywater harvesting specifically do this by using resources you already have onsite and using them for a purpose they are well suited to.

Benefits:

The implementation of a city-wide On-Site Rainwater and Greywater Harvesting system would result in the following benefits:

- Protect and enhance natural water systems in urban developments
- Integrate storm water treatment into landscape by incorporating multiple use corridors that maximize visual and recreational developments
- Protect water quality draining from urban development
- Reduce runoff and peak flows from urban developments by installing local detention measures and minimizing impervious areas
- Integrate solutions for flood reduction, drought and heat mitigation
- Add value while minimizing drainage infrastructure development costs
- Implement water conservation techniques
- Reduce the demand and supply on septic/treatment tanks
- Utilize less energy and chemical use

Metrics / Key Performance Indicators:

- Decreased carbon footprint
- Reliable and independent water supply
- Mitigation of flooding in low-lying areas

Estimated Cost:	Use Examples (case studies)
On-Site Rainwater and Greywater Harvesting: Costs Estimates were determined for several different scenarios and included the price of tanks, pumps, disinfection, pretreatment, plumbing and excavation. Costs for design, engineering and permitting, and landscaping and irrigation system installation were not included. Single Family Home Scenario: Expected cost $4,710 Apartment Cluster Scenario: Expected cost $97,574 http://www.jwsponline.com/uploadpic/Magazine/pp%2055-77%20JWS-A-12-002%20New.pdf Greywater Treatment: Greywater treatment systems which are marketed for single-family homes can vary between $6,000 and $13,000 for treatment capacity of 1.2 – 1.6 m^3 /day. It is expected that vertical wetland for greywater recycling would range of $1,500-$2,500 for a treatment capacity of up to 2.1 m^3/day. https://innovation.luskin.ucla.edu/wp-content/uploads/2019/03/Cost-Benefit_Analysis_of_Onsite_Residential_Graywater_Recycling.pdf	*Example 1* Los Angeles, California: The City of Los Angeles is located in an arid region in Southern California. Onsite greywater reuse has emerged as an important sector in water reuse and where water reuse capability is limited. In order to minimize human exposure to pathogens, greywater reuse without treatment is generally encouraged for subsurface irrigation. Aboveground water reuse is often only allowed when treatment is provided. https://innovation.luskin.ucla.edu/wp-content/uploads/2019/03/Cost-Benefit_Analysis_of_Onsite_Residential_Graywater_Recycling.pdf *Example 2* West Village, California West Village, California was built in partnership with the University of California, Davis. The development prototypes were analyzed to determine the viability of rainwater and greywater as a realistic future water supply for non-potable uses such as landscape irrigation and toilet flushing. http://www.jwsponline.com/uploadpic/Magazine/pp%2055-77%20JWS-A-12-002%20New.pdf
Recurring/O&M: On-Site Rainwater and Greywater Harvesting: Single Family Home Scenario: O&M for 20 years approximately $1,884 Apartment Cluster Scenario: O&M for 20 years approximately $39,029 http://www.jwsponline.com/uploadpic/Magazine/pp%2055-77%20JWS-A-12-002%20New.pdf	

Greywater Treatment: Ranges between $200 to $900/year. High treatment costs favors onsite greywater treatment in high density multifamily homes. https://innovation.luskin.ucla.edu/wp-content/uploads/2019/03/Cost-Benefit_Analysis_of_Onsite_Residential_Graywater_Recycling.pdf	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants Local funds Public-private partnerships Additional revenue generation	
Photographs/Graphics	

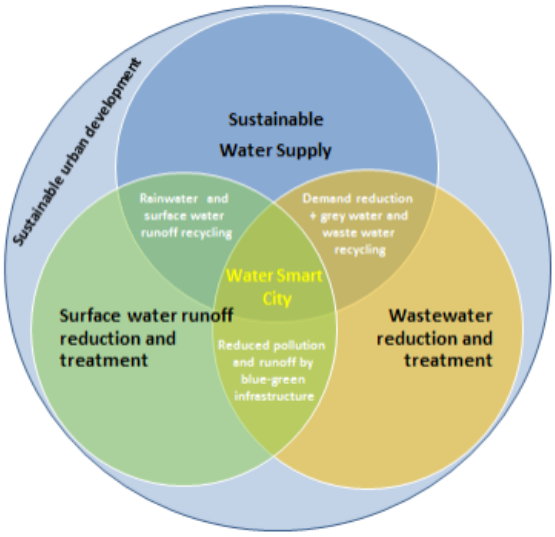


Figure 2.1: Water Smart City: integrating sustainable urban development and urban water management

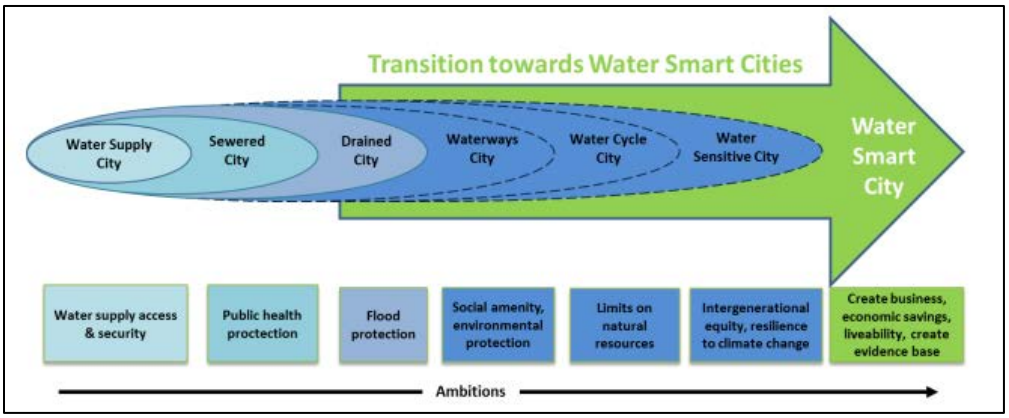


Figure 3 Single Family Home Scenario Illustrating a Combined Rainwater and Greywater Harvesting System (Graphic credit: Erik Gellerman)

Strategy Name: Support IT strategy for Open data and Enterprise Performance Dashboard

Pillar Focus Area(s): Connectivity

City Department Owner: Information Technology and stakeholders from all city departments, partnering agencies, and citizens

Strategy Description:
Over the past decade, advancements in technology have provided the City of Orlando with new opportunities to collect and analyze data. Much of this data is highly dynamic and contains the building blocks of valuable performance metrics that identify prior trends and assist in projecting future growth.

This strategy would further enhance and expand the efforts the city to continually provide information, engage citizens, and improve transparency to residents and visitors with the creation of a highly interactive and dynamically updating Open Data and Enterprise Performance Dashboard.

The Dashboard would leverage data from existing city systems and resources. Through this dashboard, users will interact directly with data and information to view city services such as public safety calls, speed and congestion within the city, safety alerts, locations of planned events, planned improvements availability of parking

Continue improvement of the city's Open data effort will increase transparency while providing community leaders and citizens with opportunities to engage either directly through grass roots efforts or to assist in enhancing provided information as the community could be utilized to help complete identified data gaps.

Benefits:
Through this dashboard, users would be able to explore:

- Awareness of city services details and trends
- Automated reporting of annual or quarterly insights that are data driven. Reports can be customized to meet reporting requirements
- Social Equity and transparency increase as citizens are able to view and explore available information. This can potentially be further expanded to encourage the community to provide additional information which can be added to the dashboard (community events or the completion of data gaps through city organized data collection apps)

Metrics / Key Performance Indicators:

- Dashboard usage (hits)
- User satisfaction
- Survey results

Strategy Name: Augmented Reality (AR) and/or Virtual Reality (VR) wayfinding

Pillar Focus Area(s): Placemaking

City Department Owner: Future Ready; Information Technology; Transportation Families, Parks and Recreation; and others

Strategy Description:

As technology evolves, new opportunities for citizens and governments to interact with data, systems and the environment around them are becoming more affordable and readily available. Augmented Reality (AR) and Virtual Reality (VR) solutions provide an intuitive and natural platform for users to access information, data and entertainment. For the City, AR/VR systems can provide users contextual information, history, wayfinding, scheduled events, and information about City parks, cultural amenities and events, and other City features and facilities. For City staff the technology can provide maintenance and operational efficiencies, along with new ways to reach the public and provide information through smart phone and web-based applications.

Key objectives and uses of this strategy are as follows:

- Establish an AR/VR platform for operating and maintaining a city-wide AR/VR content dataset. The AR/VR platform will include an interface for delivering content and interaction to the user through an AR/VR or traditional communications device. Users will be presented with content based on their context, either using their physical position or by simulating their position within the environment through a traditional user interface. The platform will allow users to filter content by its type, category, and other attributes to customize their experience.
- The platform will integrate with other real-time information systems to provide additional types of experiences and interactions, including:
    - contextual information, e.g. history and culture;
    - wayfinding including multi-mode options availability from the Florida Department of Transportation's Route and Mode Choice Engine, and other connected Mobility-as-a-Service providers;
    - scheduled events, information assistance, and social engagement; and
    - advertising and commerce with the City of Orlando and third-party vendors.
- The platform will establish governance and management features facilitating community-generated official content and social-media engagement.
    - Official content published with global scope for all users will be established by the City, where committees will be established to have content editing and publishing authority within their purview, i.e. Families, Parks and Recreation will have the authority to review, edit, and approve content having information related to city parks and within the geographical context of the city parks.
    - User-generated content will be availability and presented to the user within their personal experience but not immediately published to the general public. User-generated content can be shared with specific contacts or groups connected to the author. Third-party social media network platforms will be used to establish connections with other users and groups availability to send content.

- Users will be presented with content shared by friends and other users, and will have controls to report inappropriate content and block specific users to control the amount of socially-generated content with which they are presented.
- Users can submit content for global publishing to the official content editor having purview over the content based on its context. The editor will review and may approve content to be published as part of the official, globally published dataset.

- The platform will be promoted through city tourism channels to drive tourism to Orlando and to promote usage of the platform by users within Orlando to enhance the experience and increase the value of living and doing business in Orlando.

Benefits:

The development of an Augmented Reality (AR) or Virtual Reality (VR) platform with the user-generated content features would provide several benefits to the City of Orlando:

- Deliver an innovative experience for residents and visitors to Orlando's parks, cultural and entertainment centers, and live events (such as the Creative City Project).
- Deliver informational services to people within the appropriate context.
- Delegate content generation for the platform to appropriate offices without having to fund content development directly by the project.
- Allow users a new social experience to draw them to the platform.
- Enhance the experience living in and doing business within the City of Orlando, making it more competitive, appealing, and accessible to people within Orlando already and those outside of Orlando who are considering coming to Orlando.

Metrics / Key Performance Indicators:

- Business registration increase by 15%
- Tourism Increase by 15%
- AR/VR platform content creation of 100,000 officially published objects within 1 year of launch, and a 15% annual growth
- AR/VR user registration of 10,000 within 1 year of launch, and a 15% annual growth thereafter
- Average usage of 2 hours per user per week

Estimated Cost:	**Use Examples (case studies)**
Phase I Pilot AR/VR demonstration system: $300,000 **Phase II** Data governance and social media features: $650,000	**Phase I** Demonstrate usage capability using only limited, officially generated content produced as a pilot **Phase II** Establish the process of user-generated content, social media features and integration, and content review and publishing

Recurring/O&M: $150,00 / year for cloud-based infrastructure and platform support with 15% escalation	
Funding Type: (General Fund/P3/Other) Consider crowdsourcing the funding or partnership with social media platforms or advertising revenues from businesses.	

Strategy Name: Residential Energy/Water Consumption Monitoring

Pillar Focus Area(s): Energy

City Department Owner: Collaboration with OUC, Fleet and Facilities, Public Works, Sustainability and Resilience

Strategy Description:
This strategy proposes the use of Artificial Intelligence (AI) along with smart meters installed in the City of Orlando residents' homes to supplement the existing OUC Advanced Metering Infrastructure (AMI) meters. The current meters can detect leaks over several days, but do not provide real-time alerts, which leads to loss of revenue and resources for residents and the City. This strategy proposes to leverage new technologies as they become available in partnership with OUC to provide the residents of the City of Orlando more resilient and efficient solutions their utility needs.

There is a potential solution to real-time monitoring of water and energy when combining the use of smart meters and AI. Smart meters can be preinstalled in residences to help users make better daily water and energy choices. Digital water meters also referred to as "smart" water meters rely on solid-state technology in a compact, weatherproof housing, suitable for both commercial and residential applications. These meters could capture utility usage, leaks, etc. and then deploy that information for action, which is where AI steps in. AI technology could collect the data generated by the smart meters, interpret and share it for better decision making by multiple stakeholders (from residents and builders to OUC and the city governing department). The City of Orlando plans to support OUC in the implementation of this strategy as part of its goal to become a Future-Ready City.

Benefits:
The implementation of a strategy that promotes real-time monitoring of water and energy in residents' homes will provide the following benefits:

- Data from multiple homes could be gathered and analyzed for better conclusions on construction, energy policy, and efficient use of resources.
- Energy and water utilities will receive an increase in efficiency by the collection of usage data
- AI can optimize pump runtimes so that residents and utility companies are only using energy when they need to.
- Smart meters can serve as reminders and motivators for residents to monitor their usage of utilities, resulting in a minimum 5% in consumption peaks.
- Increase in comfort and cost efficiency for residents.
- Optimized resource consumption.

Metrics / Key Performance Indicators:

- Efficient real-time monitoring of water leaks and reliable data collection
- Improved energy and water management
- Efficient real-time monitoring of energy use and reliable data collection
- Improved utility policies
- Lower utility maintenance costs for residents and the City

Estimated Cost:	Use Examples (case studies)
$400,000 for a pilot program of 10,000 homes (this cost does not include the AI technology) https://www.edgebuildings.com/artificial-intelligence-and-the-future-for-smart-homes/	*Example 1* Loudon County, Virginia: Loudoun refocused its efforts on efficiency and customer service by eliminating manual meter reads. Now the utility remotely collects usage data from its 78,000 water meters, empowering customers with insights to become more mindful about their usage. https://sensus.com/resources/case-studies/loudoun-water-partners-sensus-sustainably-manage-water-resources/ Mexico: Vinte, a large-scale developer of affordable green homes in Mexico, has installed smart meters in each of its solar-powered residences so occupants can see utility usage on the fly. https://www.youtube.com/watch?v=cJWA0Hr75Pc&t= Washington D.C, USA: DC Water is launching a city-wide initiative to upgrade most water meters in the system, giving customers newer technology that will help them manage and track their water usage. https://www.dcwater.com/whats-going-on/news/dc-water-begins-high-tech-meter-upgrade-project
Recurring/O&M: $20,000 (based on 5% of capital cost mentioned above for pilot program)	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants Local funds Public-private partnerships Additional revenue generation	
Photographs/Graphics	

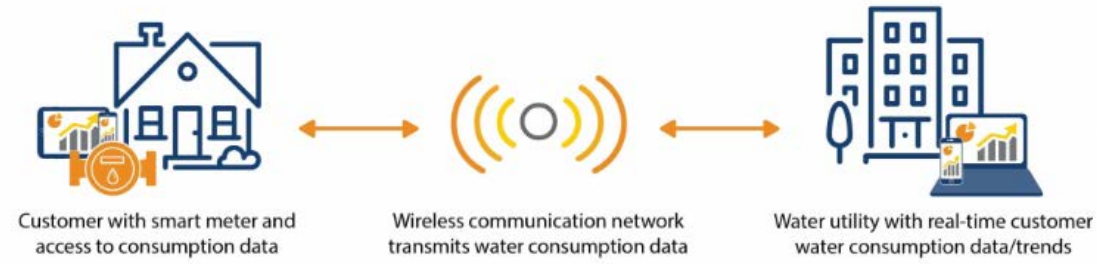


Figure 1https://www.performanceservices.com/resources/smart-water-meters-smarter-water-management-for-cities-and-towns#:~:text=Timely%20water%20usage%20data%3A%20Smart,control%20of%20their%20water%20consumption.

Strategy Name: Single Payment System for Transportation

Pillar Focus Area(s): Mobility

City Department Owner: Transportation Division, in collaboration with MetroPlan Orlando, LYNX, FDOT and others

Strategy Description:

As the City of Orlando grows, integrated mobility initiatives and solutions become more of a necessity. As a response to the resident's needs and as a resilience effort, the City proposes an Integrated Transportation Application (ITA) strategy. The development of an efficient front-end mobility application requires the accompaniment of a single payment system; that is why the Single Payment System for Transportation strategy goes hand in hand with the Integrated Transportation Application strategy as part of the City's plan to become Future-Ready. The Single Payment System for Transportation proposes to work with regional partners to develop a single payment system/integrated payment for multiple transit services including LYNX, SunRail, Transportation Network Companies and City of Orlando parking, to name a few. It also proposes that this single payment system be integrated into a single platform and mobile application (i.e. ITA). When building or promoting the development of a single payment system for transportation, it's important to look at five (5) components:

- Multimodal Compatibility: the more modes of transit that can be paid for under one place, the more seamless the journey can be.
- User Interface: there are many technologies for integrating payments across modes, the one being proposed is that the payment be part of the Integrated Transportation Application front-end user face being developed by the City.
- Unified Pricing Structures: users should pay the same way they plan for an entire trip from A to B. That may involve time or distance-based pricing and discounted fares.
- Geographic Reach: Users will receive the best result if payment systems are interoperable within an entire metro region.
- Beyond Transport: payment for City parking and EV charging stations can be added into the mobility service application.

This strategy will be development in collaboration with the City's regional partners, potentially championed by MetroPlan Orlando. The initiative proposes to develop a single payment system for transportation as part of their Intelligent Transportation System (ITS) Master Plan. The City's assistance with this effort will serve to bring forward a unified back-end fare collection system that will allow for residents and visitors to pay for their multi-modal trips chosen under the City's Integrated Transportation Application.

Benefits:

The support of a Single Payment System for Transportation would result in the following benefits:

- Provides greater consumer convenience for both the frequent commuter and the infrequent traveler.
- Reduces the use of more costly sales channels.
- Reduces the need for costly infrastructure (such as vending machines) and shrinking the supply chain and reducing the resources needed to support transit-only media.
- Facilitates the interoperability among other transit and non-transit entities.
- Connection protection the users' final destinations.

<table>
<tr><td colspan="2">

- Increases use of transit by reducing payment barriers to using public transportation.

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Metrics / Key Performance Indicators:

- Development of a single payment system
- Effective integration of the single payment system into the ITA
- Deployment of a single payment system
- Payment reliability
- Efficient interoperability between transit services

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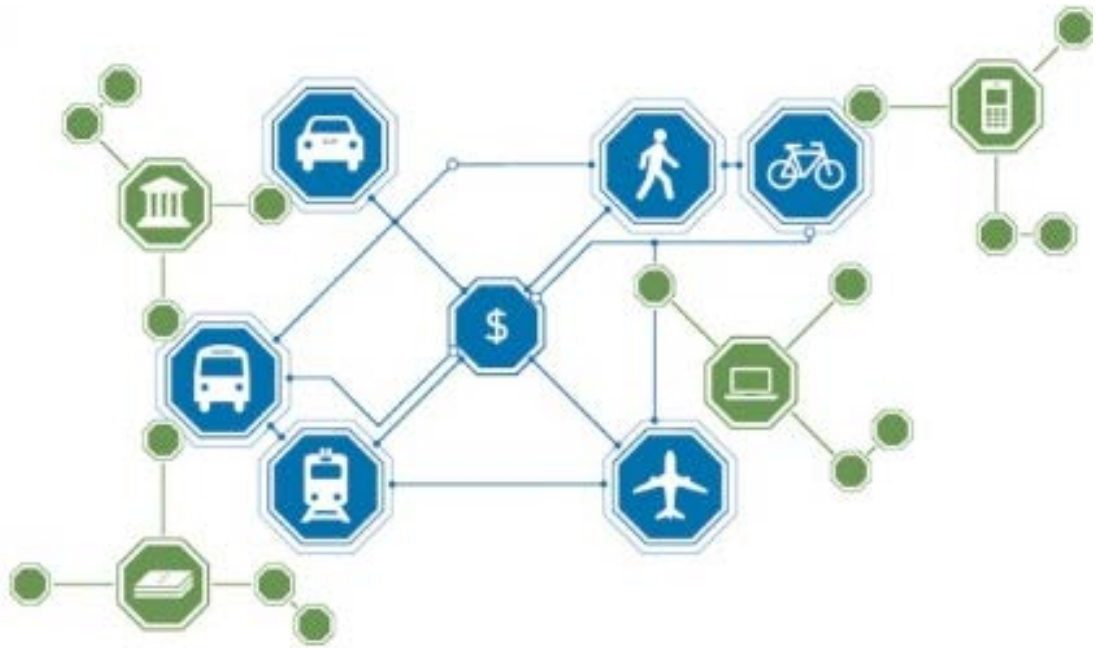
<tr><td>Estimated Cost:</td><td>Use Examples (case studies)</td></tr>
<tr><td>TriMet's MOD Sandbox Project budgeted approximately $99,800 for their Integrated Payment Plan.
https://trimet.org/mod/docs/QuarterlyReport2018Q3.pdf</td><td>Example 1
Portland, Oregon USA: TriMet FTA MOD Sandbox Project. A complete open platform for the integration of transit and shared-use mobility options into the OpenTripPlanner; it includes a mobile-friendly web interface with integrated real-time information and an integrated payment plan (partnership with Moovel)
https://trimet.org/mod/#project-overview
https://moovelus.com/

Example 2
Seattle, Washington, USA: Orca Card - a pilot project between King County Metro and Via provided on-demand first-mile-last-mile service to link riders with bus or light-rail train service. Riders can use their ORCA Card, an account-based fare payment system, to pay once when boarding a Via vehicle.
https://www.kingcounty.gov/depts/transportation/metro/fares-orca/orca-cards.aspx

Example 3
Los Angeles, California, USA: Multi-purpose mobility payment card - Riders will be able to use different modes of transport, from buses and trains to electric scooters and ride-shares, with a single payment system.
https://www.govtech.com/fs/data/LA-Metro-Readies-Launch-of-Multi-Purpose-Mobility-Payment-Card.html</td></tr>
</table>

Recurring/O&M: TBD - this depends on how much involvement and assistance the City will have in the development of the single payment system.	
Funding Type (General Fund/P3/Other) **Options for:** Direct government grants for Single Payment System for Transportation deployments Local funds Public-private partnerships Additional revenue generation	Links to other reports on mobility payment integration: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/134056/mobility-payment-integration-state-practice-scan-fta-report-no0143_1.pdf https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/payment-processors-mobility-ecosystem.html https://cleantechnica.com/2015/12/19/integrated-mobility-payments-are-the-future-of-transit/
Photographs/Graphics	



Strategy Name: Smart Lighting

Pillar Focus Area(s): Health and Safety, Mobility, Placemaking

City Department Owner: Collaboration with OUC

Strategy Description:

This concept proposes a gradual transition to smart lighting fixtures for roadway and pedestrian facilities. Traditional lighting technologies like high-pressure sodium (HPS) use more energy and burn out more frequently than their light-emitting diode (LED) equivalents. Smart lighting also provides the option to attach devices to each luminaire that provide intelligent features throughout the city lighting network. Many such devices communication in real-time via a cellular or wireless mesh network to a central data hub. Examples of devices that can be deployed in this fashion include:

- Sound detectors that report noises matching certain profiles of intensity and pattern
- Video detectors that can respond to movement within the line-of-sight
- Air quality detectors that record levels of pollutants
- Speakers to relay audio messages
- Controllers that allow the unit to be dimmed, switched off, or to report diagnostics
- WiFi repeaters to provide internet access to nearby devices

Recommended is a pilot project of approximately 250 lights. This would allow city decisionmakers to verify that the capital investment is justified based on the performance of the pilot region and make future funding decisions with the associated monitoring data.

An important step in this strategy will be reaching an agreement with OUC regarding capital and maintenance costs. This will be necessary before the plan may proceed and may affect the cost estimate on the next page.

Benefits:

The switch to LED from incandescent results in a large reduction in power use. It also reduces outages and maintenance effort required. This will support Orlando's Green Works initiative by greatly reducing energy use and light pollution.

The addition of smart lighting features is an efficient improvement to an LED retrofit project. Current LED models with 5-pin and 7-pin connections can support a variety of add-ons including those listed above. These allow the city to have a flexible solution to a variety of needs, such as:

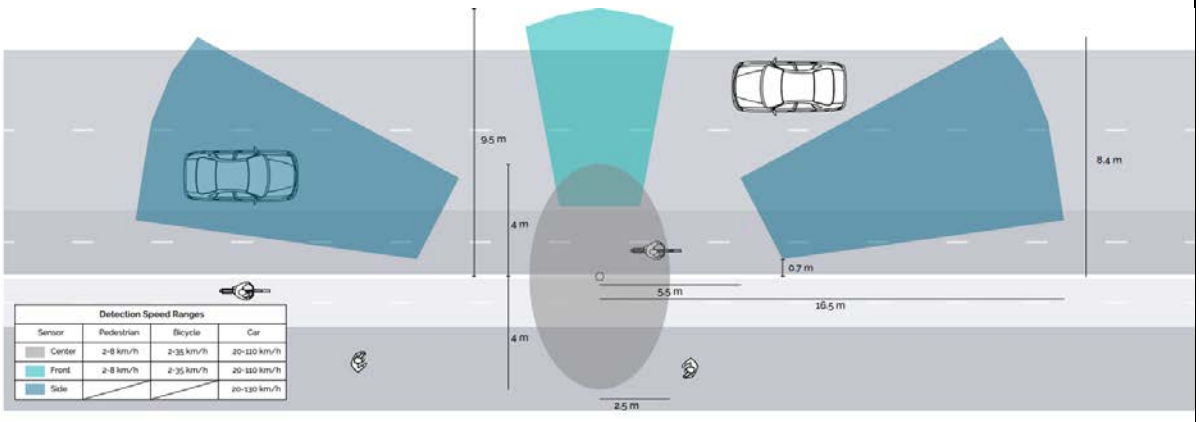
- Remote, real-time detection of incidents, gun shots, and other loud noises
- Video detectors could support detection and monitoring of multi-modal movement
- "in-use" detection which can dim or switch off lighting when no one is nearby
- Outage reporting to expedite maintenance effort
- Communication with the public during emergency situations
- Wireless connectivity for residents and visitors

Metrics / Key Performance Indicators:

- Decreased power use by at least 30%
- Reduced outages by 50%

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: **Phase I (2020/21)** Acquisition, installation, and initialization of approx. 250 smart lighting luminaires and networking hardware $400,000	Example 1 The City of Los Angeles remotely manages over 100,000 lights using a real-time, map-based solution using remote sensors https://www.usa.lighting.philips.com/cases/cases/road-and-street/los-angeles
Recurring/O&M: Reduced power use and maintenance investment: $40,000 / year	Example 2 The City of Miami installed 500,00 smart streetlights with control nodes for automated dimming https://www.itron.com/-/media/resources/case-studies/miamifloridacasestudy-(3).pdf
Funding Type (General Fund/P3/Other) **Options for:** Local funds	

Photographs/Graphics



Detection Zones Example (Source: tvilight.com)

Strategy Name: Video Analytics for Traffic Optimization

Pillar Focus Area(s): Mobility

City Department Owner: Transportation Department

Strategy Description:

Traffic optimization is a dynamic, system-oriented approach to improving roadway capacity and use characteristics by minimizing stopped vehicle time. This strategy begins the optimization process by providing passive detection and identification of freight, vehicles, buses, pedestrians, and bicycles by computer vision in real time. The data can be used for dynamic signal timing to optimize the flows of various traffic modes with existing CCTV feeds. This is a real-time approach to intersection management that can determine current demand on intersection movements and modify behavior to promote efficiency and safety. Examples of potential outcomes include:

- Freight prioritization via signal preemption - the algorithm detects large commercial vehicles and notifies the signal to provide them priority flow if possible. By doing so, the truck spends less time idling on city streets and is incentivized not to use residential street alternatives.
- Pedestrian and bicycle user detection – detection of pedestrian traffic can inform the signal controller if pedestrian has not yet cleared a crosswalk, preventing premature progression to additional movement phases.
- Continuous traffic data generation – data including turning movement counts and highway volume by vehicle type is collected and stored for future use. When a traffic study or design project is proposed at the site, this will provide vastly more data than a traditional count without the need for field efforts.

The proposed approach would leverage existing CCTV assets at intersections for a low-cost pilot program.

Benefits:

Being able to dynamically optimize traffic behavior can substantially improve the ability of the city's transportation network to meet performance goals, particularly in atypical conditions like flooding or incidents. The strategy proposed can have tangible benefits with little investment, including:

- Fewer large vehicles in residential streets
- Improved safety at pedestrian and bicycle roadway crossings
- Better data available for traffic analytics at priority intersections

An appropriate traffic optimization program can reduce travel time, intersection delay, quantity of vehicle stops, and vehicle emissions.

Metrics / Key Performance Indicators:

- Reduced queue length at targeted intersections
- Improved pedestrian safety

Estimated Cost:	Use Examples (case studies)
Phase I Installation of connected CCTV cameras and software licensing CCTV Installation (where needed): $1,000 per location Edge Device Installation: Unknown per signal cabinet	Example 1 The City of Portland Maine uses distributed real-time signal control AI to achieve reduction in delays at intersections https://www.govtech.com/fs/infrastructure/AI-Powered-Sensors-Improve-Traffic-in-Portland-Maine.html
Recurring/O&M: Software License: $1,500 - $3,500 per location per month	Example 2 The City of Pittsburgh achieved large improvements in travel time and safety using an adaptive signal control optimization system https://www.smartcitiesdive.com/news/this-ai-traffic-system-in-pittsburgh-has-reduced-travel-time-by-25/447494/
Funding Type (General Fund/P3/Other) **Options for:** Local funds	

Photographs/Graphics

Intersection Taxonomy Example (Source: InNovo Partners)

Strategy Name: Land Development Code and Building Code updates

Pillar Focus Area(s): Placemaking

City Department Owner: Economic Development

Strategy Description:

The Land Development Code guides the physical development of the City, including projects that will last well into the future. Updating the Code to align with the Future-Ready City Master Plan strategies and goals is vital to ensuring the long-term viability of the plan. More broadly, the city must be equipped to facilitate changes through openness to innovative practices that will help achieve resilient and livable land use patterns.

Specifically, it is important to monitor industry trends to identify innovative building materials and methods that are less expensive than conventional materials, and update the Land Development Code as appropriate.. It will also be important to update building and construction minimum standards as standards evolve for increased energy and water efficiency when possible.

Expected results from the Land Development Code update may include:

- More flexible building design that can be used for a variety of uses for decades to come
- A pre-approved pattern book for frictionless permitting and approval
- Improved sustainability standards that reduce waste and consumption
- Design that makes space for multimodal transportation
- Opportunities to pilot new construction techniques and land uses categories
- Density bonuses, expedited review, and other incentives to build more resiliently, including incentives for affordable housing

Benefits:

Updating the Land Development Code would provide several benefits to the community:

- Less barriers to affordable housing and resilient patterns of development
- Incentives to reduce waste and consumption
- More flexible regulation to accommodate innovative design in the future

Metrics / Key Performance Indicators:

- Increased instances of new affordable housing
- Increased instances of energy efficient development

Estimated Cost:	**Use Examples (case studies)**
FY2021 cost: **Phase I (2022/23)** Research best practices in land development codes, gain understanding	Example 1 Backyard Homes Project The City of Los Angeles is currently piloting a program that supports homeowners in securing the financing

of Future-Ready City Goals and amend the City's Land Development Code $80,000 **Phase I (2023/24)** Build dashboard for residents to understand and engage with the Land Development Code. $80,000	and permitting for an accessory dwelling unit on their property. This program helps supply affordable housing and supply a stream of income for low-income families. The West Denver Renaissance Collaborative is piloting a similar program in West Denver to help fight displacement in the neighborhood.
Recurring/O&M: Sstaff resources to process permitting If a dashboard is implemented, resources for maintenance	Example 2 In 2019 the City of Austin pursued a Land Development Code update specifically focused on affordable housing and density bonuses to support its creation.
Funding Type (General Fund/P3/Other) **Options for:** Local funds Public-private partnerships	Example 3 Chief Seattle Club King County (Seattle, WA) partnered to create an affordable housing pilot for at-risk Native American populations using modular housing.
Photographs/Graphics	**Photographs/Graphics**

Concepts of Exploration

- Community Wi-Fi
- Digital Twin
- Food Recovery Network
- Integrated Transportation Application
- Resilience Hub
- Smart Parking

ORLANDO
FUTURE-READY CITY
MASTER PLAN

Community Wi-Fi Concept of Exploration for the City of Orlando Future-Ready City Master Plan

Version: 1.0

Approval Date: [*Insert Approval Date*]

DOCUMENT CONTROL PANEL		
File Name:	Community Wi-Fi Concept of Exploration	
File Location:	R:\PROJECT\City of Orlando_Smart City Master Plan (Sub to VHB)\Phase II_Task c3\Community Wi-Fi Strategy	
Version Number:		
	Name	**Date**
Created By:	Shellby Rivas, Metric Engineering	3/31/2020
Reviewed By:	Dale Cody, P.E., Metric Engineering	4/2/2020
	Dale Cody, P.E., Metric Engineering	4/13/2020
	Curtis Ostrodka, AICP, LEED AP., VHB	4/13/2020
	Ryan Fetchko, P.E., VHB	4/13/2020
	Dale Cody, P.E., Metric Engineering	4/14/2020
	Dale Cody, P.E., Metric Engineering	4/16/2020
Modified By:	Dale Cody, P.E., Metric Engineering	4/2/2020
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	Dale Cody, P.E., Metric Engineering	4/13/2020
	Shellby Rivas, Metric Engineering	4/13/2020
	Shellby Rivas, Metric Engineering	4/14/2020
	Shellby Rivas, Metric Engineering	4/16/2020
	Dale Cody, P.E., Metric Engineering	4/16/2020
Approved By:		

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List of Acronyms and Abbreviations

ITS..... Intelligent Transportation Systems
IoT .....Internet of Things
DAS .....Distributed Antenna Systems
MOU .....Memorandum of Understanding
ISP ..... Internet Service Provider
MNO's ..... Mobile Network Operators
PM.....Preventative Maintenance
CWM ..... Community Wireless Network
AP ..... Access Points

1. Overview

This document will serve as part of the Primary Focus Area Concept Exploration for the City of Orlando Future-Ready City Master Plan Project. This document was developed with the intent of being a Concept Exploration of the Community Wi-Fi strategy, being one of the priority shortlisted strategies of the City of Orlando Future-Ready City Master Plan Project. This document discusses the existing system situation, the operational constraints, the proposed concepts, the risk assessments, the implementation, and the benefit cost analysis of the strategy.

1.1 Identification

Project Name: City of Orlando Future-Ready City Master Plan Project
Document Name: Community Wi-Fi strategy Concept of Exploration

The Community Wi-Fi strategy aims to implement advanced technologies as a solution to bring easily accessible Wi-Fi internet access to residents and visitors throughout the City, including communities that are currently underserved.

1.2 Focus Area

This initiative will address the two foundational elements of the Future-Ready City program:

- Communications Infrastructure and Connectivity
- Civic Engagement and Digital Services

The pillar focus areas that this strategy addresses are:

- Public Safety and Health
- Built Environment

1.3 Stakeholders

Table 1: Stakeholders

Stakeholder	Project Role
Orange County Government	Operator/maintainer
The City of Orlando	Operator/maintainer
Orlando Utilities Commission	Operator/maintainer
Internet Service Providers	Operator Maintainer
Public Safety Agencies	System users
City of Orlando Residents	System users
Visitors (including tourism)	System users

1.4 High-Level System Overview

As the advancement of technology progresses, readily accessible internet access is becoming a critical service. A reality for the City of Orlando is that some underserved communities do not all have a reliable source of internet access due to various economic and societal constraints. Readily accessible internet would also help the City become more resilient during natural disasters and other unforeseen circumstances, where government services, businesses, educators, and students may be required to work from home.

The Community Wi-Fi strategy aims to prepare the City of Orlando to become a hyper-connected city through development of a connected infrastructure by advancing implementation of fiber connected public Wi-Fi in areas currently deficient from this connectivity. The Community Wi-Fi strategy as a part of the Future-Ready City Master Plan will discuss the following items that will need to be addressed as a part of this effort:

- The need for a master inventory of existing fiber facilities and a coordinated master plan for additional fiber (If required).
- Working with carriers to develop standards and policy to address efficient installation of 5G communications infrastructure (If required).
- Identification and prioritization of installation locations of Distributed Antenna Systems at city facilities and existing buildings located in vulnerable communities.

1.5 Referenced Documentation

Table 2: Referenced Documentation

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Form FM-SE-01 Concept of Operations (ConOps) TEMPLATE	Revision Dated September 4, 2019	https://www.fdot.gov/traffic/ITS/Projects-Deploy/SEMP.shtm
Solution-Community Wi-Fi for Underserved Communities	2020	VHB Project Team
Downtown Alliance Free Public Wi-Fi	2020	https://www.downtownny.com/wifi
Social and Economic Effects of Community Wireless Networks and Infrastructures	2013	https://books.google.com/books?id=jMyeBQAAQBAJ&ppis=_c&printsec=frontcover#v=onepage&q&f=false
Planning and Implementing a Wi-Fi zone for your Town	2014	https://www.vtrural.org/programs/digital-economy/services/wifi/toolkit
City of Orlando Comprehensive Plan (Growth Management Plan)	2012	https://www.orlando.gov/Our-Government/Records-and-Documents/Plans-Studies/Comprehensive-Plan

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
City of Orlando Policies and Procedures	2019	https://www.orlando.gov/Our-Government/Records-and-Documents/Policies-and-Procedures
City of Orlando Code of Ordinances	2020	https://library.municode.com/fl/orlando/codes/code_of_ordinances

2. Current System Situation

2.1 Description of the Current System or Situation

Currently, the City of Orlando does not have a readily accessible public Wi-Fi network available City-wide to residents and visitors. There are limited areas of public Wi-Fi available at government facilities such as City Hall and libraries. However, access to the Wi-Fi is limited to inside the premises and during operational business hours. Expansion of publicly available Wi-Fi will lessen these constraints and allow those without readily available internet access to increase their connectivity capabilities.

3. Proposed Concept

3.1 Description of Concept

The concept of the Community Wi-Fi strategy is to implement a system that will allow the City of Orlando to become a hyper-connected city through the development of connected infrastructure by advancing the implementation of fiber Public Wi-Fi in areas currently deficient from this connectivity. This will provide residents and visitors with enhanced opportunities for education, communications, and community services. A pilot project in 2021 could provide Wi-Fi to one or more underserved communities and serve as a starting point to begin adding internet access to underserved areas in a phased manner, potentially block by block. The infrastructure could be placed on existing city infrastructure (e.g. light/utility poles, buildings) that would allow for point-to-point communications to create rings of network availability that could be expanded/scaled over time. The infrastructure could be fed using the City's existing fiber optic network.

3.2 Goals and Objectives

The goal of this strategy is to provide free and widely accessible Wi-Fi to residents and visitors of underserved communities. Below are network applications being considered.

- The promotion of enhanced opportunities for communication, education, and community. With internet connectivity becoming a critical service, communities within the City will be provided a service that will foster the betterment of residents and visitors.
- Reduction of the digital divide. Those that live and work in areas that are economically disadvantaged should have equitable access to critical City services.

- Provide critical infrastructure for the concept of Internet of Things (IoT). This will provide a communication backbone for the expansion of the technology within the City.
- Encouragement of private investment.
- Support the development of connected and autonomous vehicles.

3.3 High-Level Impact Analysis

The development of the Community Wi-Fi strategy would produce several benefits to the users and the city of Orlando. Allowing those without readily available internet access to connect to the internet will accomplish the goal of reducing the digital divide. Additionally, in the future, this service could be supplemented with fiber networks, 5G Communications (only as needed), and widespread implementation of a public safety Distributed Antenna Systems (DAS) for city services use. Recent changes to Florida fire codes for buildings mandate a two-way radio communication enhancement/signal booster system to be installed by 2022 with some multi-family properties eligible for extensions through 2025. Compliance with this requirement in existing buildings represent a critical means of in-building communication for first responders and a challenge for building owners.

3.4 Performance Measures

A Before and After Study should be performed to demonstrate the benefits related to Community Wi-Fi strategy. The suggested performance measures to quantify these benefits are listed below:

- Reliability of publicly available Wi-Fi – The Wi-Fi will be considered reliable when it's availability to the public no less than 95%.
- Number of communities served – An increase of users and communities served over time will demonstrate that the City-wide Wi-Fi is effective and will promote the scalability of the strategy.
- Network uptime – The network should be fully operational for 99% of the time for the Community Wi-Fi strategy to be continuously rendered functional.
- Network speed – The ideal network speed for the strategy to prove beneficial is 100 megabits per second download and 15 megabits per second upload.
- Available network bandwidth – The available network bandwidth will be determined by the number of users and level of usage. In the case of 1,000 users with high usage (instructor led training, video streaming and large file transfer) a bandwidth of 145 megabits per second would be considered advantageous.
- Utilization – A demonstration in increasing numbers regarding utilization will prove the effectiveness of the Community Wi-Fi strategy and promote the scalability of the project.

3.5 Operational Constraints and Policies

The Community Wi-Fi strategy comes with operational constraints that need to be considered for implementation. The systems and intelligent hardware chosen will require coordination, installation, maintenance, and operation. Each of the above mentioned come with a cost that needs

to have appropriate funding in order to benefit the City of Orlando. This funding must be identified and allocated, and proper equipment maintenance must take place to ensure that the investment is not wasted. In addition, a Memorandum of Agreement (MOA) will need to be created between the City and the owners of any private buildings that the City infrastructure for this project is to be installed.

It is anticipated that the Smart Parking and Operations Strategy will possibly impact, at a minimum, the following City of Orlando ordinances and policies:

- Growth Management Plan (Comprehensive Plan):
  - Urban Design Element: Goal 1 and Goal 7
- Code of Ordinances:
  - Sec. 9 – Utilities, General; Conveyance and Services *(Chapter 15 – Orlando Utilities Commission).*
  - Sec. 23.03 – Definitions, Sec. 23.06 – Rules, Regulations and General Conditions, Sec. 23.08 – Wireless Facilities, Sec. 23.14 – Insurance, Sec. 23.15 Indemnification, Sec. 23.16 – Construction Bond, Sec 23.17 – Performance Bond, Sec 23.18 – Security Fund, Sec. 23.19 Enforcement Remedies *(Chapter 23 – Communications Right-Of-Way Utilization).*
  - Sec. 54.80 – Use of Streets and Pole Attachments, Sec. 54.81 – Transfer Assignments *(Chapter 54 – Streets and Sidewalks / Article VI – Communications Lines Within Rights-Of-Way).*
- Economic Development Policies:
  - 1231.1 City Planning – Current Planning (Land Development).
  - 1235.1 City Planning – Strategic Planning/Special Projects.
  - 1210.1 Business Development – Organization and Policy.
  - 1210.2 Business Development – Economic Development Incentives.
  - 1234.1 City Planning – Urban Design and Historic Preservation.
- Information Technology Policies:
  - 754.10 Systems and Networks Support – Internet and Intranet Policy.
  - 755.1 Software Support Bureau – Software Support.

It is recommended that possible amendments to the ordinances and policies mentioned above be a part of a support system to assist with the development and maintenance of a City-wide smart parking system. Please note that this is not all inclusive and that other ordinances and policies should be updated as appropriate.

3.6 Justification

As stated earlier, internet access has become a critical service.. Those that live and work in areas that currently have economic disadvantages should not be denied this essential access. With this strategy, the City of Orlando has an opportunity to solve both this issue and prepare to become a hyper-connected city through the development of connected infrastructure by advancing implementation of fiber connected public Wi-Fi in areas currently deficient from this connectivity.

3.7 Proposed Strategy Support

The implementation of the Community Wi-Fi strategy will require the following support activities:

- Support from the selected Internet Service Provider (ISP).
- Lease segments to Mobile Network Operators (MNO'S).
- Preventative maintenance of all equipment. It is recommended that this be added to the maintenance protocols currently in use by the City.
- Continued evaluation of bandwidth needs.
- MOAs with all entities that will have public infrastructure installed on their private facilities.
- Regular community outreach. It is essential that the public be made aware of this service and the benefits it will provide them.

4. Risk Assessment

4.1 Short Term Risks

- Cybersecurity
    - Mitigation strategy: training personnel, regular monitoring of system and installing/maintaining security patches.
- System malfunction
    - Mitigation strategy: provide preventative regular maintenance (PM) and surveillance to system.
- Vandalization
    - Mitigation strategy: ensure preventative installation of equipment and make use of security services already provided by the City.
- Lack of participation from Community
    - Mitigation strategy: educate and communicate to the community the benefits and usage of a free community Wi-Fi program.

4.2 Long Term Risks

- Outdated Wi-Fi equipment
    - Mitigation strategy: provide continuous review of equipment to stay current and update existing technologies when possible. Plan for life cycle replacement and extend support for legacy equipment.
- The whole system becomes obsolete
    - Mitigation Strategy: bring about a Wi-Fi system that is as relevant as possible and understand the possibility that it has a finite shelf life.
- System malfunction
    - Mitigation strategy: provide regular maintenance and surveillance to system.
- Insufficient funding for continued operations and maintenance

- Mitigation strategy: Project buy-in from stakeholders. Revise and update current MOU frequently. Implementation of cost-effective technology. Lease segments to MNO's.

4.3 Risk Assessment

The Community Wi-Fi Strategy must be equipped to deal with short-term and long-term risks associated with implementation. The risk assessment criteria used to measure the operational and design levels of risks are the following: Proper planning and scoping, exposure evaluation, risk characterization, and mitigation measures (risk treatment).

5. Lifecycle Assessment

5.1 Overview

Proactive management of City assets requires not only proper funding, installation, and maintenance of Wi-Fi equipment, but planning for equipment end-of-life as well. This concept of life cycle replacement is crucial to the long-term effectiveness of the Community Wi-Fi strategy to ensure that the service is not interrupted when equipment does reach end-of-life status. It is recommended that the City consider a 10-year lifecycle for all equipment due to two main factors: technological advancements and equipment environment. Technological capabilities of today will be outstripped by future development, so it is to be expected that the technological capabilities of Wi-Fi equipment of today will not be able to perform to the standards of technology in the future. In addition, network equipment will be subjected to normal industry wear and tear, and any outdoor technology such as fiber and wireless access points will be subjected to environmental factors that will cause additional wear and tear and potentially more severe damage, lowering the effectiveness of the infrastructure. It is recommended that the City of Orlando budget for this life cycle replacement during this 10-year period of equipment activity to limit the potential for service interruption when the time comes to replace any outmoded equipment. In addition, it is recommended that any equipment chosen to replace equipment that has reached end-of-life is compatible with the existing system design.

5.2 Assessment

Based on generated insights, rapidly expanding technology and environmental factors affect the lifecycle of network equipment. The following are the key lifecycle milestones to be monitored: functionality, durability, efficiency, availability, and optimization.

6. Benefits and Costs

6.1 Overview

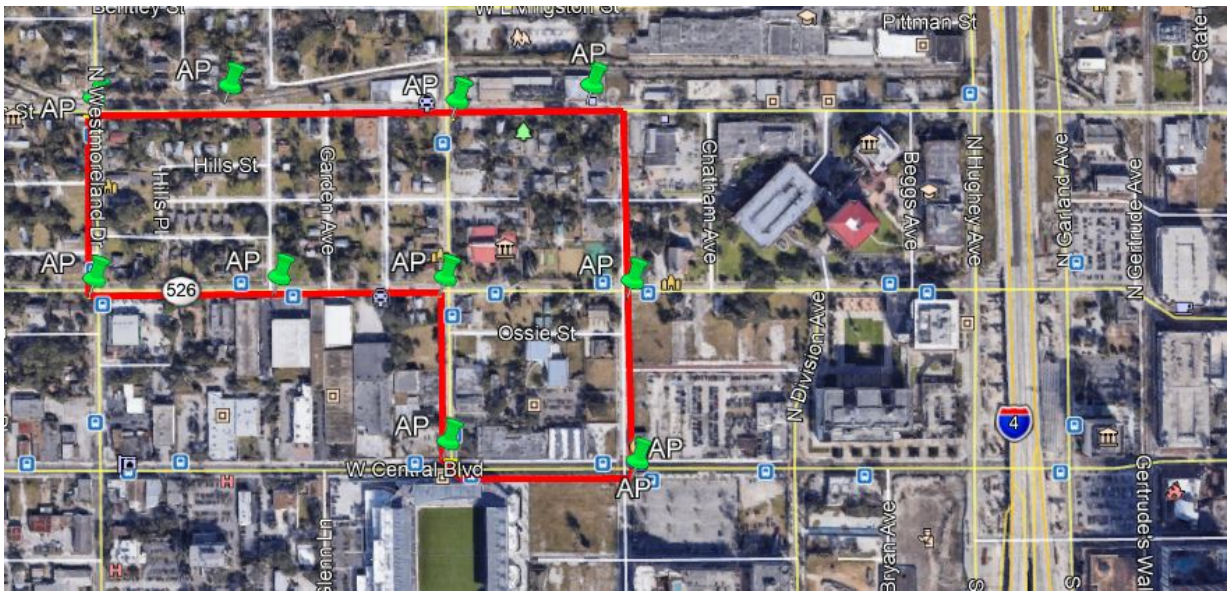
In order to understand the value that the Community Wi-Fi strategy will provide the City of Orlando; an analysis of benefits and costs needs to be conducted. An analysis of benefits will allow the City of Orlando to understand the effects the strategy will have on the community and the

City's communication infrastructure. The purpose of a cost analysis is to ensure the strategy is feasible and has properly funding.

The provision of free Wi-Fi to the communities of the City of Orlando has several qualitative benefits. It will provide increasing number of citizens who are in need of proper communications infrastructure the ability to receive potentially life changing information: job opportunities, health assessments, education, etc. The implementation of a free high-speed Wi-Fi network also gives citizens and businesses the opportunity to influence the productivity and innovation trajectory of the City of Orlando as part of the plan to become a Future-Ready city. In addition, the Community Wi-Fi strategy will be seen as an asset to infrastructure expansion. It will benefit transportation, utilities, public safety and environmental optimization. Implementing said strategy will provide the City of Orlando with tools for empowerment and social inclusion, resulting in a better connected and informed society. Finally, the Community Wi-Fi strategy as part of the City of Orlando Future-Ready City Master Plan, will drive economic development by providing jobs, encouraging private investment and supporting rollout of connected and autonomous vehicles.

A preliminary high-level cost estimate has been conducted to determine the initial cost of installing a Wi-Fi network in a section of the Callahan community of the City of Orlando. A preliminary design was also developed to better estimate the cost. The design consists of installing ten (10) Access Points (APs) strategically located to create a mesh network throughout a 6,782-foot perimeter of a section of the Callahan community (which is being used a pilot area sample; see Figure 1). The design of this mesh network consists of each AP being installed on existing power poles with connection to power and the supporting ITS infrastructure. The design also proposes the installation of equipment that will aid the wireless communication devices, also known as access points (Aps).

Figure 1 Callahan Area Sample



6.2 Cost Analysis

The cost estimate for said design includes the costs of: above and underground conduit, communication cable, electric and ITS pull boxes, electrical service meters, electrical service wire, electrical service pole mounted disconnects, service poles, NEMA enclosures, APs, security gateway appliance(s), mobilization, maintenance of traffic, completion of design, contingency and the furnishing and installation of previously mentioned equipment. It is estimated that the Callahan pilot project of the Community Wi-Fi strategy will have a total initial capital cost of $150,000 and a recurring cost of $2,000 a month plus a 2% inflation rate annually over a 10 year lifecycle (i.e.: Yr. 1= $24,000, Yr. 2 = $24,480 and Yr. 3= $24,969, etc.).

7. Implementation

7.1 Constraints and Needs

The internet has become a medium for humans to connect and access a broad spectrum of social, economic, educational, political, medical and personal resources. The residents of the underserved communities in the City of Orlando are currently lagging, in a digital sense, because of a lack of a free high-speed public Wi-Fi network. The Community Wi-Fi strategy will serve as a solution to the lack of a Community Wireless Network (CWM) in the City of Orlando. In order to provide an efficient internet communications infrastructure for the residents of the City of Orlando, the following system, equipment, maintenance, and tactical plans need to be implemented:

- Mesh System
    - Installing several devices that communicate with one another and serve to create zones.
    - Allows the creation of rings of network availability that could be expanded/scaled over time.
- Hardware
    - Access Points (APs): infrastructure to support these would be cabinets, switches, power, and a form of connection to the ISP.
    - Gateways: takes internet from a dedicated connection to a standard internet connection.
    - Repeaters: these extend the size of the Wi-Fi zone by repeating the internet connection via one or more radios that mesh with each other.
- Software
    - Controls: these monitor the zones, monitor access points, track usage, track number of clients, track speed, configure access control, and administer information given to users.
- Internet Service Provider Agreements
    - Agreements between the City of Orlando and the chosen ISP are necessary to guard against legal matters.
    - This will help develop standards and policies to ensure efficient installation of the community network.

- Proper Security Measures
    - Set up firewalls, antivirus protection, recurring updates and data backup.
- Incorporating the community
    - Necessary stake holders: local business owners, local city officials, local downtown groups.
    - Moderator: an entity that will look after the Wi-Fi zone once it is up and running, be the point of contact, and who will be responsible for hiring an established source to provide maintenance of said network.
- Technicians/Contractors
    - Surveyors: survey the site to determine best positions for gateway and repeaters
    - Electricians/Engineers: install equipment, wiring scheme and test signal strength.
- Leveraging existing fiber facilities

7.2 Timeframe

It is estimated that the implementation of a pilot program as part of the Community Wi-Fi strategy would occur over the course of approximately one (1) year.

7.3 Key Performance Indicators

- Reliable publicly available Wi-Fi rendered to one (1) or more community(ies).
- Network uptime is no less than 99%.
- Reliable and effective network speed.
- Available and functional network bandwidth.
- Continuous increase in Wi-Fi service utilization by the residents and visitors of the City of Orlando.

8. Notes

Not applicable at this time. The remainder of the page has been left blank should there be future notes required.

9. Appendices

Not applicable at this time. Any appendices required throughout the project will be added within this section.

DOCUMENT REVISION HISTORY			
Version Number	**Approved Date**	**Description of Change(s)**	**Created/ Modified By**

Digital Twin Development and Utilization Strategy Concept of Exploration for the City of Orlando Future-Ready City Master Plan

Version: 1.0

Approval Date: [*Insert Approval Date*]

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	Dan Kirby FAIA, FAICP, Jacobs	6/19/2020
	Madeline Almodovar, Jacobs	6/19/2020
Reviewed By:		
Modified By:	Jacobs (based on comments from VHB)	6/26/2020
Approved By:		

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List of Acronyms and Abbreviations

AR ..... Augmented Reality
MR ..... Mixed Reality
SWAN ..... Smart Water Networks Forum
VR ..... Virtual Reality

1. Overview

This document is part of the Primary Focus Area Concept Exploration for the Orlando Future-Ready City Master Plan. It was developed as a Concept Exploration of the Digital Twin Development Strategy, as one of the strategies identified for the Orlando Future-Ready City Master Plan. The document discusses the existing system situation, operational constraints, proposed concepts, risk assessments, implementation, and benefit cost analysis of the strategy.

1.1 Identification

Project Name: Orlando Future-Ready City Master Plan
Document Name: Digital Twin Development and Utilization Strategy Concept of Exploration

The objective of the Digital Twin development and utilization strategy is to implement pilot projects employing Digital Twin technology to integrate data and visualization resources to improve planning, design, maintenance, operations, and quality of life for the City of Orlando.

1.2 Focus Area

This Digital Twin strategy addresses seven pillars for Future-Ready:

- Energy
- Connectivity
- Mobility
- Placemaking
- Health and Safety
- Water
- Materials

1.3 Stakeholders

Table 1: Stakeholders

Stakeholder	Project Role
City of Orlando Information Technology Department	Digital Twin ecosystem owner and maintenance
City of Orlando Transportation Department	Project sponsor, operations
City of Orlando Economic Development	Project sponsor, operations, prioritization and implementation support, outreach and community awareness
City of Orlando Public Works Department	Project sponsor, operations
City of Orlando Business and Financial Services Department	Prioritization and Implementation Support, Outreach and Community Awareness

Stakeholder	Project Role
City of Orlando Fire Department	Project sponsor, operations
City of Orlando Police Department	Project sponsor, operations
City of Orlando Venues Department	Project sponsor, operations
Orlando Utilities Commission (OUC)	Project agency partner
City of Orlando Venues Department	Project sponsor, operator/maintainer
Orange County	Implementation Partner

1.4 High-Level System Overview

As City of Orlando services and operations become increasingly complex, there is a growing need to analyze and understand interactions across the resources of the City, partner agencies, community groups, and local businesses. Connectivity of the City of Orlando's physical assets, infrastructure, and people will become increasingly important to support critical public safety, planning, resilience, facility management, and economic development functions. Development of a Digital Twin provides an unprecedented opportunity for the City to realize significant benefits; utilizing data and information to provide better asset management, increase operations efficiency, support public safety, and enhance customer experience.

Use of the term *Digital Twin* has grown rapidly over the last few years and the term is interpreted differently depending on the application. A recent article in *Advanced Modeling and Simulation in Engineering Sciences* (Wright and Davidson, 2020) explains that from the various definitions and interpretations, the three components of a Digital Twin of an object that are consistently mentioned when defining a Digital Twin are:

- **Model of an object** (or objects)
- Evolving **set of data relating to the object**
- **Means of dynamically updating or adjusting the model** in accordance with the data

Although the definition can vary, a commonly cited benefit of a Digital Twin is better-informed decision making facilitated through enhanced insights and analytics that the Digital Twin enables (Figure 1). There is no single use case for a Digital Twin; rather, these Digital Twins should be tailored to the requirements of the City and may vary depending on the application. Furthermore, there is no single path to develop a Digital Twin and the maturity of different aspects of a Digital Twin will and should vary depending on the application, data integrity, and anticipated benefit.

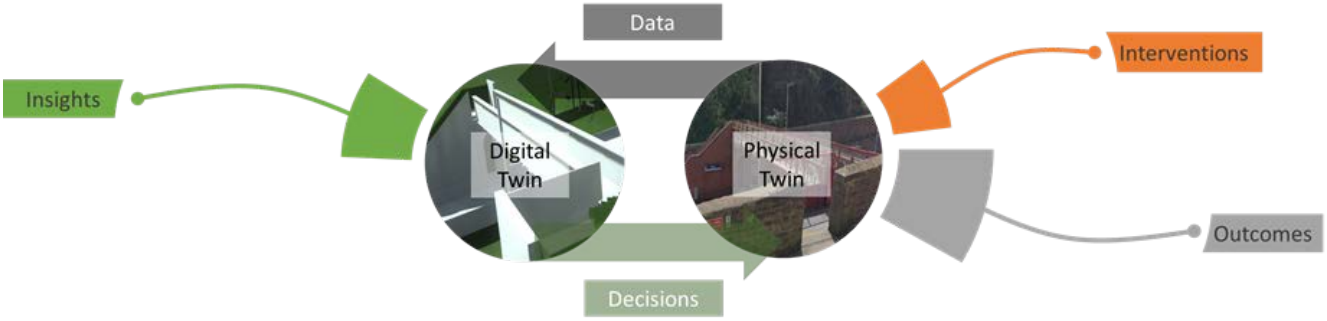

Figure 1: Connected Environment between the Digital and Physical Twins

1.5 Referenced Documentation

Table 2: Referenced Documentation

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Form FM-SE-01 Concept of Operations (ConOps) TEMPLATE	Revision Dated September 4, 2019	https://www.fdot.gov/traffic/ITS/Projects-Deploy/SEMP.shtm
Digital Twin Architecture in water/wastewater system	March 2020	https://www.swan-forum.com/digital-twin-h2o-work-group/
How to tell the difference between a model and a Digital Twin	March 2020	Wright, L. and S. Davidson. How to tell the difference between a model and a Digital Twin. Adv. Model. and Simul. in Eng. Sci. 7, 13 (2020). https://doi.org/10.1186/s40323-020-00147-4
City of Orlando Comprehensive Plan (Growth Management Plan)	2012	https://www.orlando.gov/Our-Government/Records-and-Documents/Plans-Studies/Comprehensive-Plan
City of Orlando Policies and Procedures	2019	https://www.orlando.gov/Our-Government/Records-and-Documents/Policies-and-Procedures
City of Orlando Code of Ordinances	2020	https://library.municode.com/fl/orlando/codes/code_of_ordinances

2. Current System Situation

2.1 Description of the Current System or Situation

Although the City of Orlando does not have an existing Digital Twin, various City departments currently use technology and information that can contribute to the operationalization of a Digital Twin. Technology such as geographic information systems, asset tracking, smart parking technology, and sensors can contribute to the creation of a Digital Twin ecosystem. In addition, the City of Orlando has been in discussions with the University of Central Florida to explore creation of a Digital Twin for the UCF Downtown Campus.

2.2 Operational Constraints

The Digital Twin strategy aims at improving the City of Orlando's visualization, analytical, and scenario planning capabilities. This strategy is applicable across all Future-Ready pillars and across all departments. The success of this strategy relies on planning and scoping to achieve a reasonable payback time and realize benefits of leveraging projects across the City. To achieve a scope that prioritizes critical needs and return of investment, a high level of consensus on the desired functionality and potential for cross-departmental use are needed. Information management and program management activities, including budget and milestones, should be shared and communicated to community stakeholders, agency partners, and City staff throughout the project.

Digital Twin technology is maturing at a rapid pace and an investment in one type of technology will require a long-term commitment to maintain such technology. The scope of the Digital Twin ecosystem will evolve and mature based on ongoing evaluation of pilot projects and careful analysis of initial efforts.

3. Proposed Concept

3.1 Description of Concept

For this concept, a Digital Twin is not a single product. It is multiple value-enhancing products that when connected, produce outcomes greater than the sum of their parts. It is not a final product, but a constantly evolving ecosystem of intelligent assets that continue to provide value to the system that they digitally represent. As an example, Figure 2 describes the components of Digital Twin as it applies to the water industry. In this example, the components of a water system Digital Twin architecture include data integration, analytics, and visualization. Not all components could be included in a Digital Twin, and component selection depends on how the Digital Twin is to be used.

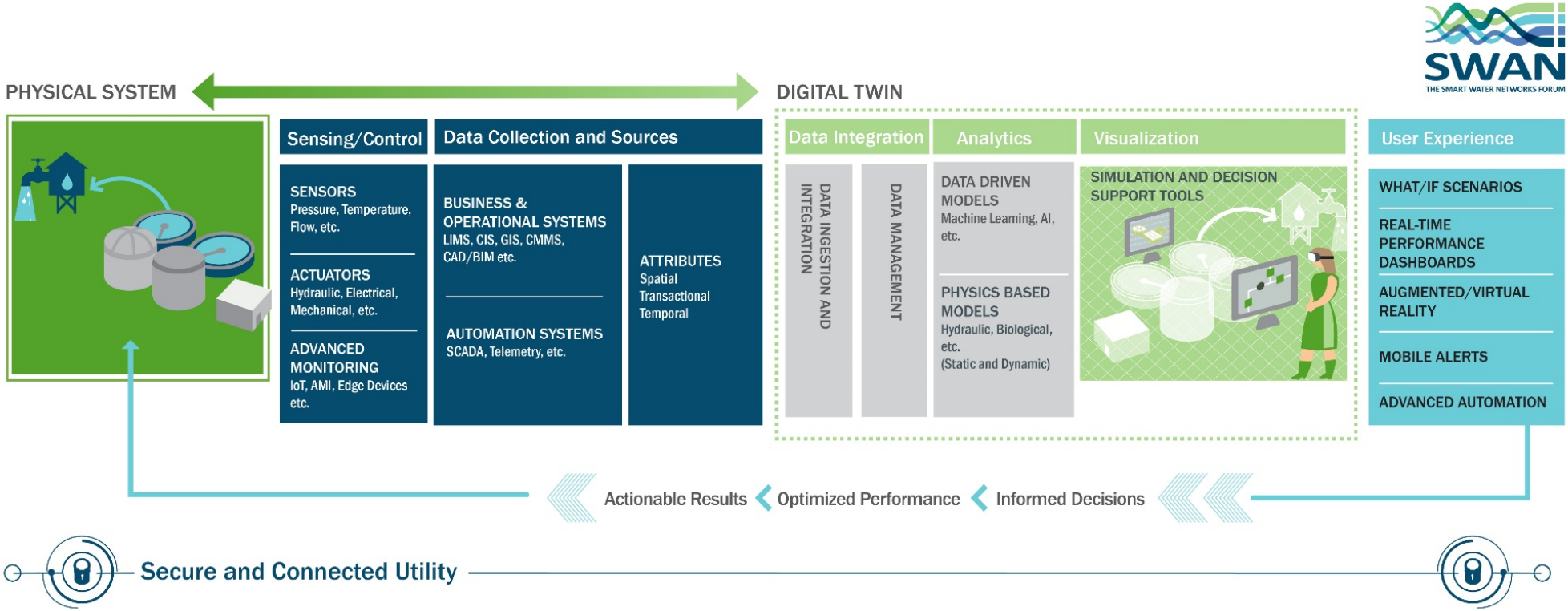

Figure 2: Referenced Architecture of a Digital Twin for the Water Industry as described by the Smart Water Networks Forum (SWAN) Digital Twin Workgroup (SWAN 2020)

Considering the different components of a Digital Twin and the various departments and facilities included in the seven pillars the Digital Twin will represent, the concept of a Digital Twin for the City of Orlando can be better described as an ecosystem of Digital Twins (Figure 3). This ecosystem will include Digital Twins that represent the various assets within each system of the City.

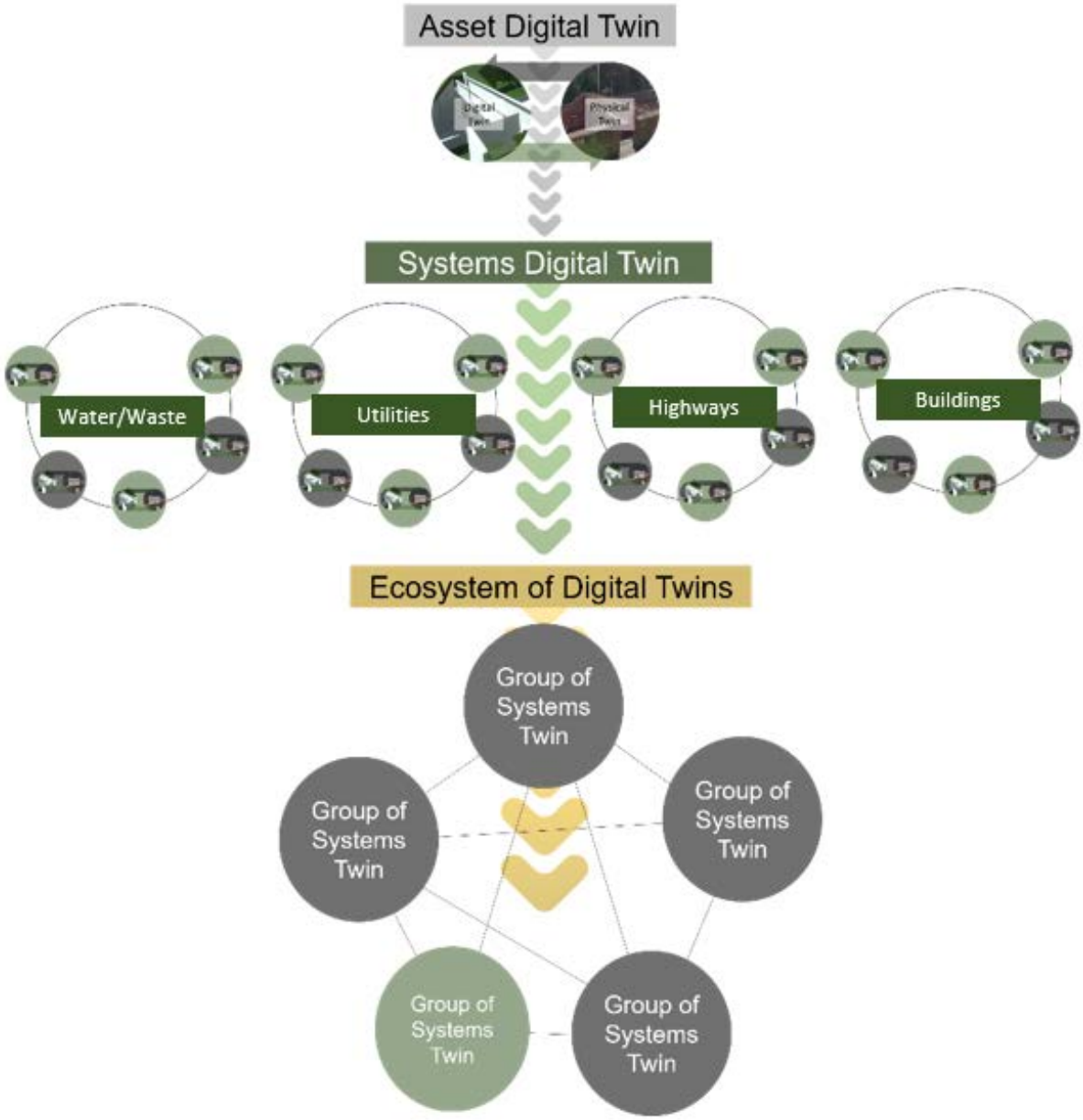

Figure 3: Ecosystem of Digital Twins

This ecosystem will provide powerful insight across the seven pillars of the Future-Ready roadmap.

A Digital Twin's function may be based on live data streams from IoT-connected assets, enabling real-time analysis by Artificial Intelligence (AI) algorithms and changes to be made directly through the Digital Twin, or fed by asset systems to determine prescriptive maintenance or capital investment of a water system. Digital Twins may also incorporate Virtual Reality (VR), Augmented Reality (AR), or Mixed Reality (MR) to benefit operational staff in training simulation, asset location or hazard identification, or lessons learned of recent operational scenarios. There is no singular utilization of a Digital Twin as its utilization depends on the outcomes and benefits required from it.

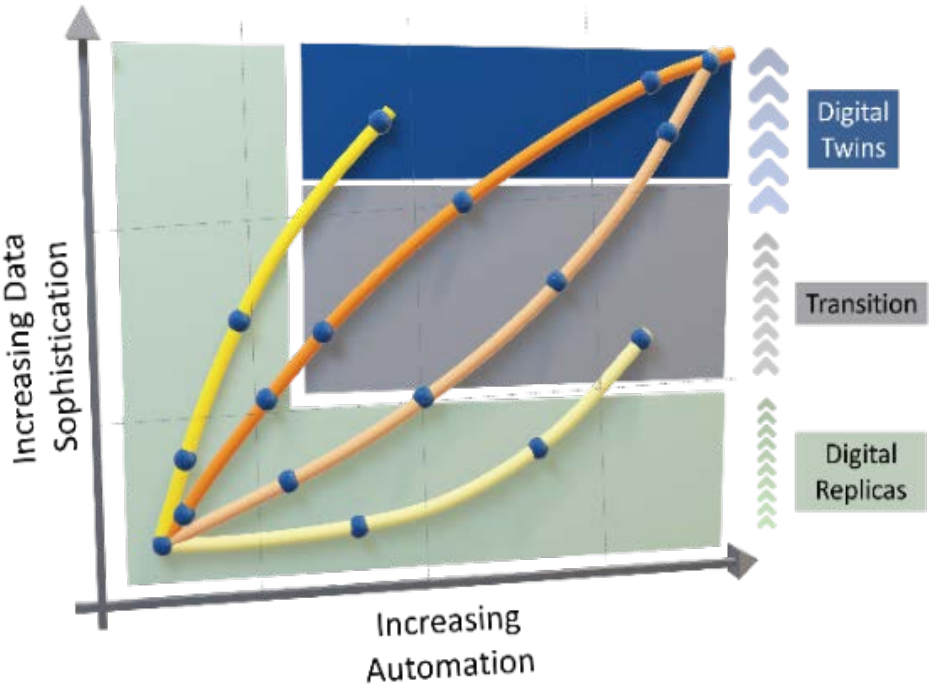

Figure 4: Multiple Routes to Digital Twin

Similarly, as illustrated on Figure 4, the route of development and level of development of a Digital Twin varies depending on their utilization or use case. A Digital Twin may only be developed to a level of maturity where it could be considered a 'Digital Replica' (i.e., without the automated exchange of information), or it may continue to be developed to a greater level of maturity that continues to add value as it matures. Incremental improvements to the Digital Replica enable increased levels of maturity and sophistication, which may involve the addition of inputs from connected devices, increased exchange of data, and the utilization of data analytics. From this stage, further development may enable the use of advanced analytical techniques and algorithms to move from a state in which decisions are made by humans informed by the Twin, to a state in which the Twin itself is able to make decisions utilizing live data.

Creation of a Digital Twin ecosystem requires an interconnected hardware, software, and suppliers, with each element contributing to produce outcomes from an asset that's value is greater than the sum of its parts. These elements may include 3D visualization; real-time data; or, at the most basic level, the federation of multiple data sources into one single access location. However,

there is no one-size-fits-all approach to Digital Twins and the technology needed to meet an organization's objectives. This proposed concept will enrich decision making, adding value by creating an environment where intelligence is readily available to those who need it—ultimately benefitting the residents of Orlando.

3.2 Goals and Objectives

- Increase operational efficiency and cross-functionality
    - Develop a software agnostic approach to allow for software/hardware flexibility based on end-user needs
    - Enable long-term real-time automated controls of various systems
- Reduce risk by providing for scenario planning and real time management of multiple inputs
    - Enable analysis of "what if" scenarios and events
    - Provide Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) simulation capabilities for various pillars
- Develop a Digital Twin agile development approach to develop a Digital Twin ecosystem in a manner that provides ever-increasing functionality and benefits
    - Provide development scalability based on achieving short-term and long-term goals

3.3 High-Level Impact Analysis

Development of a Digital Twin ecosystem provides an unprecedented opportunity for the City of Orlando to realize significant benefits by leveraging digital information to promote smart asset management, efficient operations, system optimization, and customer experience.

3.4 Performance Measures

Recommended performance measures for a Digital Twin are:

- Reasonable payback time of reduction in asset acquisition and management costs
- Enhanced public health and safety for mobility and health and safety-related Digital Twins
- Improved visitor experience at events
- Decrease in downtimes and maintenance costs for public works infrastructure
- Agile deployment of smart buildings

3.5 Operational Constraints and Policies

The Digital Twin strategy comes with operational constraints. Proper implementation of this strategy will require detailed confirmation of existing assets and their capability, coordination of desired functional priorities across departments, and a planned series of integrated short- and long-term operational goals. There will also be opportunities to leverage the investments of partner agencies and various other stakeholders.

The Digital Twin Strategy will impact various City of Orlando ordinances and policies in the long term depending on the focus of each Digital Twin and the results of data visualization and scenario planning results. Such policies will be determined and studied on a case-by-case basis. In addition, compliance with current state law and cybersecurity frameworks will require classification and special handling of certain data.

3.6 Justification

The seven pillars of the Orlando Future Ready City Master Plan are: connectivity, energy, health and safety, placemaking, mobility, water, and materials. Digital Twins can address priorities within and across each of these pillars. Opportunities include: better asset management, fine tuning of technology adoption and deployment, information sharing and visualization, scenario planning, optimized operations, increased health and safety coordination, faster and more effective emergency response, and increased situational awareness and availability of resources.

3.7 Proposed Strategy Support

An ongoing team of partners is necessary to develop and support the Digital Twin ecosystem. A process of ongoing management and data governance is critical to the development and maintenance of the Digital Twin ecosystem. This will require ongoing interdepartmental participation in the prioritization and oversight of the process. In addition, it will be necessary to engage and inform stakeholders, partner agencies, and City staff as additional functionality comes online. Properly managed information gained through sensors, mobile technology, and crowdsourcing can also be used to support these efforts. A team of internal and external resources will be necessary on an ongoing basis as neither the timely implementation of priorities nor the reliability of the system should be compromised.

4. Risk Assessment

Mitigation strategies for short- and long-term risks are listed below.

4.1 Short-Term Risks

- Prioritization of pilot projects that have limited application
    - Mitigation strategy: Give priority to projects that address multiple departments and provide for broader future use cases across multiple pillars
- Data integrity, availability, storage, and completeness
    - Mitigation Strategy: Data gap analysis and scope adjustment during planning process and implantation
- Awareness and incorporation of Digital Twin results and achievements with user community, “Research and Development to market” timeline for the Digital Twin to be cost-effective and valuable.

    - Mitigation strategy: Evaluate data input and outputs and ensure that they meet a specific need for the City and stakeholders; evaluate partnerships and ensure that benefits reach the partner stakeholders, adopting specific milestones and goals for pilot projects as well as applications and outreach beyond the project itself; prepare a communication and tracking strategy to publish "case studies"
- Compliance with Florida Sunshine law requirements and compliant handling of sensitive of exempted information may dictate additional legal screen
    - Mitigation Strategy: Strict procedures that may require identification and removal or anonymization of exempted data streams

4.2 Long Term Risks

- Ownership and maintaining the Digital Twin
    - Mitigation strategy: Phased implementation, budgeting, and cost-benefit analysis by sponsor/champion department, cost sharing, and partnerships
- Timely integration of Digital Twin technology advancements into City processes
    - Mitigation strategy: Cost analysis comparison between ownership versus "software as-a service" strategy, taking into consideration longevity of data ownership versus visualization technology; cost-benefit analysis includes discrete timeframes for market analysis; regular review of applications of Digital Twin

4.3 Risk Assessment

A detailed risk assessment should occur at the beginning of each Digital Twin undertaking to communicate to each stakeholder involved the boundaries for each project. Controlling scope and budget will be important for successful implementation of this strategy.

5. Lifecycle Assessment

5.1 Overview

Creation of a Digital Twin ecosystem represents a core investment in creating a Future-Ready city. Lifecycle costs vary greatly with the scope and implementation of each component project. Ideally, earlier projects will build capabilities and functionality to be leveraged in subsequent projects. In addition, the implementation of core Future Ready strategies such as the Data Fusion Center present the possibility of enabling and supporting the Digital Twin ecosystem. The City can leverage existing internal and external data assets and, along with the Data Fusion Center strategy, share the initial costs of data consolidation and analytics based on the Digital Twin roadmap and pilot project scope(s). Hardware and software costs and ongoing maintenance will depend on the type of ecosystem selected.

A careful assessment of market providers will be needed on a case-by-case basis to ensure ongoing costs and lessons learned can be applied and leveraged throughout the Digital Twin ecosystem.

Practical considerations for deployment of Digital Twins is end-user adoption. Training and communications across stakeholders will be necessary to optimize use of technology, tools, and resources.

5.2 Assessment

Detailed assessment of each Digital Twin will be based on achievement of the specific goals established by stakeholders and each participating department. Developmental stages for each Digital Twin should be created to identify clear milestones and scope. An example of a timeline or roadmap for a Digital Twin includes:

- Start-up/Quick Wins: Meeting the short-term budgeted Future-Ready strategic projects and evaluating applicability of those projects to the long-term Digital Twin strategy.
- 0 to 6 Months: Creating short- and long-term strategies to develop pilot projects, including structure, people, process, technology, and connected data; and designing the overall Digital Twin program management structure to enable successful implementation.
- 6 to 12 Months: Deliver a Digital Twin pilot project.
- 1 to 4 Years: Increase maturity towards a full Digital Twin.
- Maturity: 4 to 10 Years: Continual improvement, consolidation, and integration with the Data Fusion Center.

Lifecycle costs should be evaluated at each phase of the process. It is estimated that $250,000 to $1 million dollars per year will be needed to develop and maintain a Digital Twin system, not including Data Fusion Center costs.

6. Benefit Cost Analysis

6.1 Overview

The multiple potential benefits to the City of adopting a Digital Twin strategy include: improved resource and asset management, increased efficiency of mobility initiatives, improved quality of life and wellness for residents and visitors, more timely decision making and informed scenario planning, and information sharing with regional and local stakeholders, benefitting communication and risk sharing among stakeholders.

6.2 Initial Cost Estimate

Costs can vary when approaching the Digital Twin concept as an ecosystem of Digital Twins that are developed and matured depending on the desired short- and long-term functionality.

Initial costs are assumed to develop data gathering and digital replica environment of the system or infrastructure/asset and are estimated to be around $250,000, but the cost can vary widely based on the scope of the Digital Twin.

Examples of estimated initial costs (i.e., the costs needed to create a digital replica, as a minimum) and applications of Digital Twin technology for certain strategies related to Future-Ready are:

- Energy Asset Management (BIM 3D, geospatial) – Integration with Data Fusion Center (cost will vary depending on asset and scope)
  - Data Analytics
  - Scenario Visualization
- Resilience Hubs (one location, approximately $250,000)
- Smart Parking and Operations (each location, approximately $50,000 to $250,000)
  - Parking Analytics
  - Scenario Visualization
- Pedestrian Safety (1 location, (approximately $50,000 to 250,000)
  - Intersection Analytics
  - Scenario Visualization
- Intelligent Traffic Systems (to be determined)
- Public spaces (depends on the scope)
- Emergency management (depends on scenario)
- Wastewater System (one wastewater treatment plant) ($150,000 to $500,000)
- Event planning (one event venue, pedestrian analysis, approximately $100,000 to $200,000)
- Integrated Materials Recovery Center (one location, approximately $100,000 to $300,000 for system, asset/Building Information Modeling (BIM) estimate will depend on design)

Creating a replica and running scenarios, especially for complex environments, vary widely in range based on the scope of the Digital Twin. At the high end, the costs can approach $5 million for complex models with advanced functionality.

6.3 Benefit Cost Analysis

A benefit cost analysis will need to be performed once a Digital Twin pilot project is scoped to determine the benefit of the overall process and technology to the City of Orlando and its stakeholders.

7. Implementation

The implementation of a fully mature Digital Twin ecosystem is quite daunting if undertaken all at once. An agile development process should be considered to promote awareness of early benefits of Digital Twins, and to allow for adaptability of Digital Twin development. It is also important to consider the City's organizational structure and operating model throughout the lifecycle of the Digital Twin to ensure accountability and responsibility for the development, maintenance, and utilization of the Digital Twin is clearly defined and understood. This will ensure consistent and long-lasting benefits from developing the Digital Twin. Lastly, use of high-quality data is recognized as the foundation of effective decision-making and is an important characteristic of a

Digital Twin. A focus should be made to connect all data in a unified platform that will promote data integrity and produce a platform of which the value of the connected data sets is greater than the sum of its parts.

With these three focuses of implementation—an agile development process, understanding of accountability and responsibility, and high-quality data—considered, the following steps are provided as a general high-level guidance on creating a Digital Twin:

1. Develop and prioritize potential use cases. This aligns with the goals and objectives listed previously in Section 3.2. However, a more detailed analysis of what specific use cases and outcomes are important to the City will need to be developed through stakeholder engagement and will need to incorporate feedback already received during this Future-Ready City Master Plan.
2. Data Fusion Center. Assess current data sources and streams to identify data constraints that could impact feasibility of use cases and outcomes desired in Step 1. This assessment includes data integrity, quality, reliability, input method, and other characteristics that impact Digital Twin fidelity. This step also includes assessment of the City's current data sharing and connectivity capabilities among the various departments as they align the seven pillars.
3. Revisit the list developed in Step 1 and reprioritize use cases taking into consideration data constraints identified in Step 2. Reprioritization continues to occur throughout the Digital Twin lifecycle.
4. Integrate and connect current data sources into a single standardized geodatabase, data environment tied to geographic information system or a Data Fusion Center that can be accessed by various Digital Twins. Develop standardizations on data input.
5. Start to develop strategic Digital Twins based of prioritized list from Step 3. For each Digital Twin to be developed:
    a. Develop agile development strategy defining how Digital Twin development teams will operate.
    b. Identify the champion of the Digital Twin to ensure benefits of Digital Twin are realized.
    c. Develop conceptual Digital Twin (Digital Replica).
        i. Identify options for capturing 3D real world geometry of existing facilities/ develop standards for 3D Model deliverables for new infrastructure.
    d. Increase maturity toward a Digital Twin.
    e. Continue improvement of the Digital Twin.

7.1 Constraints and Needs

The Digital Twin ecosystem will be built upon a comprehensive data and asset information framework where multiple data sources are connected into a common data environment. Potential Digital Twin implementation constraints include:

- Need for Digital Twin champions. If a champion cannot be identified for each project, the benefits from developing a Digital Twin will diminish.
- Securing funding for continued maintenance and upkeep of the Digital Twin Ecosystem

- Data integrity, quality, reliability, and organization

7.2 Timeframe

The implementation of a Digital Twin depends on the end use and physical system it will represent. Implementation is also strongly dependent upon current data integration and management conditions. By utilizing the agile development method, near term implementation of smaller Digital Twin of specific end use can be realistically implemented within 12 months. The Digital Twin ecosystem potentially represents multiple connected projects across the seven pillars and thus could take years to implement and develop to maturity.

7.3 Key Performance Indicators

- Payback time of asset management and placemaking-related Digital Twins developed: around 5 to 10 years
- Enhanced public health and safety for mobility and health and safety-related Digital Twins: Decrease of pedestrian and biking accidents at selected location up to 20 percent; increase pedestrian and biking traffic up to 5 percent at selected location
- Improved visitor experience at selected event venue or location by reduced traffic congestion and increased public attendance from previous year
- Decrease in downtime and maintenance costs for public works infrastructure by implementing an asset management system that tracks lifecycle costs and increases the number of preventive maintenance actions
- Agile deployment of smart building technology to track building performance and achieve targets for reduction in energy usage and reduction in loss of life and property from predictable events

8. Notes

Not applicable at this time. The remainder of the page has been left blank should there be future notes required.

9. Appendix

Not applicable at this time.

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Food Recovery Network Program for the City of Orlando Future-Ready City Master Plan

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List of Acronyms and Abbreviations

CET ..... Center for EcoTechnology
EPA ..... Environmental Protection Agency
FRNP ..... Food Recovery Network Program
MEANS ..... Matching Excess and Need for Stability
NRDC ..... Natural Resources Defense Council
RIDOH. ..... Rhode Island Department of Health
UCF ..... University of Central Florida
U.S. ..... United States of America

1. Overview

This document will serve as part of the Primary Focus Area Concept Exploration for the City of Orlando Future-Ready City Master Plan Project. This document was developed with the intent of being a Concept Exploration of the Food Recovery Network Program strategy, being one of the priority shortlisted strategies of the City of Orlando Future-Ready City Master Plan Project. This document discusses the existing system situation, the operational constraints, the proposed objectives, the recommendations, and use cases pertaining to the strategy.

1.1 Identification

Project Name: City of Orlando Future-Ready City Master Plan Project
Document Name: Food Recovery Network Program Concept of Exploration

The Food Recovery Network Program strategy aims to address the food insecurity challenge within the City of Orlando by promoting the reduction of food being discarded within the City. This will be done by promoting partnerships with nonprofits and food recipient organizations, food-related businesses, institutions and third-party technology providers.

The pillar focus area that this strategy addresses is:

- Materials

1.2 Stakeholders

Table 1: Stakeholders

Stakeholder	Project Role
The City of Orlando	Operator/Project Sponsor/System User
City of Orlando Solid Waste Division	Operator/Project Sponsor
City of Orlando Greenworks Department	Operator/Project Sponsor
Non-Profit Organizations (i.e. Second Harvest, DNF Food Bank)	System users/Project Sponsor
Commercial and Institutional Food Services (Restaurants, Retail, Hospitality, Schools, Churches)	System users
City of Orlando Residents	System users

1.3 High-Level System Overview

According to studies, forty (40) percent of the United States food supply goes uneaten each year. This equates to Americans throwing out as much as $218 billion each year. Despite these discoveries, forty-one (41) million people are considered to have a lack of access to food (e.g food insecure); and in Central Florida alone, one (1) in seven (7) people are food insecure (see Appendix

A). This level of food inefficiency has significant, economic, social and environmental impacts. As the City of Orlando aims to become America's premier Future-Ready City, it needs to take advantage of the technological advancements regarding food management and the on-going food recovery efforts within the City.

The Food Recovery Network Program (FRNP) strategy aims to promote and pilot solutions that will open the door for the vast opportunities of food recovery within the City of Orlando. According to the Environmental Protection Agency (EPA), food recovery is one of the top preferred methods of managing food waste. Food Recovery is the practice of collecting edible food that would go to waste from commercial and institutional production and distributing said food to people in need. Currently, within the City of Orlando there exist a number of food organizations that help food insecure individuals; yet, seventy-eight (78) million more meals are needed to fill the hunger gap in the City's communities (see Appendix A). The objective of the FRNP strategy is to explore the possible ways of assisting these organizations to reduce the amount of food being discarded in a more fully, informed, and strategic way, and to promote the incorporation of advanced technologies to better distribute edible food that would otherwise be discarded.

This document contains a review of the food recovery and food waste current system within the City of Orlando and lists the objectives of the FRNP strategy. Along with a current system review and list of objectives, this document also provides a list of use cases and recommendations that will help the City of Orlando tackle food insecurity.

1.4 Referenced Documentation

Table 2: Referenced Documentation

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Form FM-SE-01 Concept of Operations (ConOps) TEMPLATE	Revision Dated September 4, 2019	https://www.fdot.gov/traffic/ITS/Projects-Deploy/SEMP.shtm
The Hunger Picture in Central Florida	2019	https://www.feedhopenow.org/site/SPageServer/?NONCE_TOKEN=DC5A2EB8A9BC06190CFDF04365AB3E0E&pagename=about_hunger
Tackling Food Waste in Cities: A Policy and Program Toolkit	2019	https://www.nrdc.org/sites/default/files/food-waste-cities-policy-toolkit-report.pdf
Modeling the Potentail to Increase Food Rescue: Denver, New York City, and Nashville	2017	https://www.nrdc.org/sites/default/files/modeling-potential-increase-food-rescue-report.pdf
Wasted Food Programs and Resources Across the United States	N/A	https://www.epa.gov/sustainable-management-food/wasted-food-programs-and-resources-across-united-states
Food Recovery Pilot to pick up excess food in 3 community centers	2019	Green Works Orlando – Sustainability Department

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
UCF Food Recovery Network	2019	https://sustainable.ucf.edu/wp-content/uploads/2019/04/Food-Recovery-Network.pdf
Food Waste Prevention and Recovery Assesment Report for the City of Seattle	2016	http://www.seattle.gov/util/cs/groups/public/@spu/@garbage/documents/webcontent/1_051538.pdf
Relish Rhody: Rhode Island Food Strategy	2017	http://dem.ri.gov/relishrhody/pdf/rifood17.pdf
Center for EcoTechnology: Rhode Islando	2016	https://wastedfood.cetonline.org/states/rhode-island/
Baltimore Food Waste and Recovery Strategy	2018	https://www.baltimoresustainability.org/wp-content/uploads/2018/09/BaltimoreFoodWasteRecoveryStrategy_Sept2018_FINAL.pdf

2. Current System

2.1 Description of the Current System or Situation

As concept support, information on the current food efforts to minimize food waste within the City of Orlando has been collected. These efforts are being led by organizations and initiatives which include, but are not limited to the following:

- Green Works Orlando
- Second Harvest Food Bank of Central Florida (a member of Feeding America)
- DNF Food Bank
- Orlando Union Rescue Mission
- Food Recovery Network – University of Central Florida (UCF) branch
- Servants Heart Center Food Bank
- Religious Organizations: churches and schools.
- Central Florida Haven of Hope

One of the City's ongoing food diversion efforts is being led by Green Works Orlando, which is a branch of the City of Orlando government that aims to transform the City into one of the most environmentally-friendly, economically and socially vibrant communities in the nation. The effort being explored, is the development of a food rescue pilot within three (3) community centers. The main intent of this pilot would be to test the feasibility of utilizing the expertise of a third-party food recovery facilitator organization. The goal of the food rescue pilot is to implement a long-term vision that includes delivering all excess sealed prepared foods to hungry people in the community (see Appendix B). Apart from exploring the opportunity to assist food recovery, Green Works Orlando has developed a commercial food waste initiative that can divert businesses' food and organic waste to beneficial end uses such as compost and clean energy.

Second Harvest, one the nation's leading food banks, provided in 2019 nearly 63 million meals to families, kids and seniors. They count with 550 feeding partners and continue to engage to seek more partnerships.

UCF is looking to start a chapter of the Food Recovery Network verified program. The Food Recovery Network verified program is the largest student led movement fighting food waste in colleges and universities. It is a non-profit organization that works to divert waste of prepared foods on college campuses by donating them to community partners. The Food Recovery Network verified program provides donors and recipients the tools and education needed to divert donated prepared food to those in need.

2.2 Operational Constraints

Information provided by reaching out to stakeholders shows that there is an interest from commercial and institutional food providers to donate excess food, and that partnerships exist between donors and recipients; but many food distribution organizations lack the equipment, technology and transportation to facilitate the collection and distribution of primarily prepared foods. In addition, information provided by stakeholders shows that there is a lack of a City-wide analysis that assesses how much more surplus food could potentially be donated by the commercial and institutional food providers. Research also shows that there is a need to assess the estimated annual food needs among the food insecure individuals of the City of Orlando. In addition, there is also a need to explore the possibilities of promoting food waste prevention in businesses and institutions. A city-wide analysis that provides information on how much surplus food could be donated, will facilitate the development of a program that can provide the elements needed for distribution of donated prepared foods. The lack of a system that supports the distribution of donated prepared foods leads to more food waste which ends up in landfills. Landfilled wasted food is a major contributor to greenhouse gas emissions, studies show that food waste is responsible for 6% of global gas emissions.

3. Goals and Objectives

The FRNP strategy aims to promote and pilot solutions that will create opportunities for food recovery within the City of Orlando, untapping the potential for food rescue and hunger reduction. The following objectives are being considered as a part of the FRNP strategy:

- Leverage partnerships between commercial and institutional donors and the nonprofit organizations that fight against hunger.
- Promote the development of preventative protocols and solutions that will incentivize businesses and consumers to avoid over purchasing foods. Prevention efforts keep the food from going to waste initially and offer the greatest environmental benefits (see Appendix D). The development of protocols and solutions that ensure prevention will reduce the amount of food produced, processed, shipped packaged and so on.
- Explore the possible ways of assisting food recovery organizations within the City to reduce the percentage of edible food going to waste.

- Promote the incorporation of advanced technologies to better distribute edible food that would otherwise be discarded.
- Evaluate the role that food rescue efforts can play in a wider strategy to address wasted food.
- Reduce the cost of food recovery organizations by exploring the needs of said organizations to target funding opportunities.
- Reduce the percentage of uneaten food and address the near-term insecurity while improving environmental outcomes.
- Inspire other cities around Central Florida to undertake similar efforts.

3.1 High-Level Impact Analysis

By promoting the incorporation and development of modern food recovery solutions, the Food Recovery Network Program strategy could support communities in Orlando by providing donated (sometimes untouched foods) that would otherwise go to waste.

The development of the FRNP strategy would produce several benefits to the City of Orlando. Such benefits include reduction in greenhouse gases, reduction in costs incurred to the City from food waste, improvement of business cultures within the community and reduction of hunger and food insecurity for the vulnerable communities. In addition, the FNRP strategy would also provide detailed data/analytics for identifying food demands within the City, providing an efficient/streamlined approach to allocate and redistribute surplus foods.

3.2 Justification

Most people do not realize how much food they throw away every day, from uneaten leftovers to spoiled produce. Studies show that more than one-third of the total amount of food discards in the retail grocery sector could potentially be donated under optimal conditions. The FRNP strategy aims to promote the development of optimal collection and distributing conditions. More than half of the food thrown away ends up in landfills; once in landfills, food breaks down to produce methane, a potent greenhouse gas which contributes to climate change. With this strategy, the City of Orlando has an opportunity to solve both this issue and prepare to become the next innovative City to tackle the food waste by promoting and piloting solutions that will help the fight against hunger. Given the increasing economic turbulence and income inequality as a result of the current global pandemic, maximizing opportunities to connect donated surplus foods to those in need is critical.

4. Use Cases

4.1 Rhode Island Case Study

The Rhode Island Department of Health (RIDOH) developed a program in 2017 called The Rhode to End Hunger Initiative. The initiative was developed to address the related issues of food waste and hungry Rhode Island residents. An important step to launching the initiative was to identify a mechanism to connect food donors with food recipients. Important factors were considered such

as keeping costs to a minimum and reducing barriers to participation. The initiative conducted a scan of available services and selected the Matching Excess and Need for Stability (MEANS) database as the conduit for bringing unused, safe and healthy food to the residents of Rhode Island. MEANS database is a nationally recognized nonprofit organization that operates a free, online communication platform that connects food donors and receivers in real-time. Since the implementation of the initiative, in one (1) year, ten (10) tons of food was prevented from going to waste and was made available to Rhode Islanders in need.

Another effort being developed in the state of Rhode Island, is the Relish Rhody Plan to reduce waste food. In 2016 the governor of Rhode Island announced the hiring of the state's and nation's first director of food strategy to lead the development of Rhode Island's first comprehensive Food Strategy. Since then the state of Rhode Island has supported the partnership of The Center for EcoTechnology (CET) that helps business and institutions divert waste food and partners with service providers such as Phood (company that provides products that calculate waste for commercial food businesses).

4.2 City of Baltimore Case Study

The City of Baltimore partnered with the Institute for local Self-Reliance and a variety of stakeholders to develop a food waste recovery strategy called "The Baltimore Food & Waste Recovery Strategy" in 2018. Stakeholders and partners include, to name a few, representatives from the following:

- Baltimore City Department of Public Works
- Baltimore City Public Schools
- Maryland Department of The Environment
- The Food Recovery Network

With support from the Natural Resources Defense Council and the Rockefeller Foundation, the city has hired a Food Matters Technical Advisor to begin work on implementing this strategy. The strategy consists of setting 69 strategies around the following topics:

- Commercial and Institutional Food Waste Reduction and Recovery
- Composting at Home & in the Community
- Creating Scalable Composting Infrastructure
- Composting in K-12 Schools

4.3 City of Seattle Case Study

In 2016, the City of Seattle published a report called Food Waste Prevention and Recovery Assessment Report. The report was funded by the City of Seattle and prepared by The University of Washington Center for Public Health Nutrition. The purpose of the ninety-nine-page report was to provide a current summary of challenges and opportunities in commercial food waste prevention and recovery in the City of Seattle. For seven (7) months in the year 2015, interviews were conducted to understand the challenges and opportunities in food waste prevention and recovery.

Interviews consisted of meeting with anti-hunger agencies, public agencies, non-governmental organizations, and food-generating businesses. The interviews were recorded, transcribed and the transcriptions were coded to highlight themes that emerged from the data. The findings as a result from these interviews led the report to provide recommendations on Food Waste Prevention, Diversion and Recovery (see Appendix C). The recommendations are summarized below:

- Take an integrated (systems) approach to food waste: system level approaches help identify core problems and integrated solutions across multiple stakeholders.
- Measure to create meaning: measurement helps stakeholders know the scale, build awareness and identify priorities.
- Avoid waste in the first place (lead with prevention): the most preferred pathway for food waste reduction in the EPA hierarchy is source reduction (see Appendix D).
- Support the food donation / recovery system: the second most preferred pathway for food waste is donation of edible foods.

4.4 NRDC Case Study

In October of 2017 the Natural Resources Defense Council (NRDC) published a report titled "Modeling the Potential to Increase Food Rescue: Denver, New York City, and Nashville". With support from the Rockefeller Foundation, the NRDC explored the potential to keep good food from being discarded through increased food rescue in the cities of Denver, New York City, and Nashville. Highlights of their research include the following:

- The untapped potential for food rescue from the grocery retail, restaurant and institutional food service sectors equates to 92 million meals annually for three cities combined.
- Area businesses could play a large role in addressing food insecurity.
- Across all three cities, grocery store retail showed the greatest untapped potential. Grocery store retail represents just over 60 percent of the untapped potential discovered.
- Institutional food service sectors such as hospitality, healthcare, universities and K-12 schools have the potential to provide significant volumes of quality food. Institutional food service sectors represent 26 percent of the untapped potential for food rescue.
- Restaurants make up around 7 percent of the untapped potential for food rescue.
- Much of the food that institutions and restaurants could potentially donate would be prepared foods.

The report also addressed the costs and associated investment needs regarding food recovery. This was done by extracting current costs, capital assets, and distribution methods being used in the City of Denver. The report estimated that to achieve the ambitious goal of recovering and distributing the needed 901 tons of additional food there would be a cost of $2.0 million per year. In addition, an initial capital investment of $213,000 would be needed to provide the needed vehicles and storage for said goal.

5. Recommendations

5.1 Recommendations and Considerations

Based on insights provided by reaching out to stakeholders on current system and research on recent case studies, to ensure the efficient development of the FRNP strategy, it is recommended that the City of Orlando conduct a study that will analyze and identify a current summary of challenges and opportunities in commercial food waste prevention and recovery in the City of Orlando. Said report will help the City of Orlando leverage partnerships, such as the UCF Food Recovery Network, identify financial investment opportunities and recommend infrastructures that would be needed to more fully realize the City's potential for food recovery. The recommendations for funding, at a minimum, are the following:

- The funding of an analysis to estimate the amount of additional food donations that could be potentially sourced from commercial and institutional food providers.
- The funding of the Green Works Orlando food rescue pilot.
- The funding of an inventory of all commercial and institutional food providers that are wanting and willing to donate food.
- The funding of a system that will address the distribution needs of the food recovery organizations, especially smaller organizations such as schools, churches, and community programs.

In order to correctly and efficiently assist in the recovery and distribution of food and to design a plan of action, it is also recommended that the City of Orlando pilot extensive in-depth outreach to stakeholders to understand the current efforts, needs and interest in partnerships (see Figure 1). Outreach activities could include:

- Survey on stakeholders understanding of food recovery services and use of technology.
- Webinars to discuss the project goals, objectives and allow stakeholders to voice concerns and research interests.
- City-wide round table discussion with stakeholders specifically centered on food insecurity and food recovery opportunities.
- In person workshops to discuss findings from use cases.

Figure 1

Recommendations and Considerations

Organizations and individuals around the U.S and the world have come up with creative ways to solve the food waste crisis by using emerging technologies such as data collection platforms,

websites, mobile applications, and artificial intelligence. It is recommended that the City of Orlando explore the possibility of partnering with said companies and organizations to better promote the recovery and distribution of food. Below is a list of some of the most popular food recovery emerging technology companies that are partnering with private and public food organizations:

- Goodr: provides a secure ledger that tracks an organization's surplus food from pickup to donation, delivering real-time social and environmental impact reporting analytics.
- Transfernation: is New York's City on-demand food rescue platform. Organizations using Transfernation's mobile application can request a pickup for untouched extra food and Transfernation will deliver it to the closest local feeding program.
- Food Rescue US: An application that fights food insecurity by connecting food donors with hunger relief organizations. The algorithm matches surplus food to a nearby shelter and sends a driver to transport the food.
- Winnow: seeks to minimize commercial kitchen food waste through smart meter technology attached to a food waste bin. Users can track major sources of waste and concentrate on improvement by entering the food type and specific product being wasted into the smart meter.
- Copia: is a platform that allows businesses to redistribute food surplus by connected said businesses to local shelters, after school programs, and other nonprofit organizations. Copia's software allows users to track surplus trends, and easily access tax savings.

6. Notes

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APPENDIX A – Second Harvest Hunger Facts

APPENDIX B – Green Works Orlando Food Rescue Pilot

APPENDIX C – City of Seattle Food Recovery Report Recommendations

APPENDIX D – EPA Food Recovery Hierarchy Pyramid

Food Recovery Network Program for the City of Orlando Future-Ready City Master Plan

Version: 1.0

Approval Date: [*Insert Approval Date*]

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List of Acronyms and Abbreviations

CET ..... Center for EcoTechnology
EPA ..... Environmental Protection Agency
FRNP ..... Food Recovery Network Program
MEANS ..... Matching Excess and Need for Stability
NRDC ..... National Resources Defense Council
RIDOH. ..... Rhode Island Department of Health
UCF ..... University of Central Florida
U.S. ..... United States of America

1. Overview

This document will serve as part of the Primary Focus Area Concept Exploration for the City of Orlando Future-Ready City Master Plan Project. This document was developed with the intent of being a Concept Exploration of the Food Recovery Network Program strategy, being one of the priority shortlisted strategies of the City of Orlando Future-Ready City Master Plan Project. This document discusses the existing system situation, the operational constraints, the proposed objectives, the recommendations, and use cases pertaining to the strategy.

1.1 Identification

Project Name: City of Orlando Future-Ready City Master Plan Project
Document Name: Food Recovery Network Program Concept of Exploration

The Food Recovery Network Program strategy aims to address the food insecurity challenge within the City of Orlando by promoting the reduction of food being discarded within the City. This will be done by promoting partnerships with nonprofits and food recipient organizations, food businesses, institutions and third-party technology providers.

1.2 Focus Area

This initiative will address the following foundational element of the Future-Ready City program:

- Community Engagement and Digital Services

The pillar focus area that this strategy addresses is:

- Solid Waste

1.3 Stakeholders

Table 1: Stakeholders

Stakeholder	Project Role
The City of Orlando	Operator/Project Sponsor/System User
City of Orlando Solid Waste Division	Operator/Project Sponsor
City of Orlando Greenworks Department	Operator/Project Sponsor
Non-Profit Organizations (i.e. Second Harvest, DNF Food Bank)	System users/Project Sponsor
Commercial and Institutional Food Services (Restaurants, Retail, Hospitality, Schools, Churches)	System users
City of Orlando Residents	System users

1.4 High-Level System Overview

According to studies, forty (40) percent of the United States food supply goes uneaten each year. This equates to Americans throwing out as much as $218 billion each year. Despite these discoveries, forty-one (41) million people are considered to have a lack of access to food (e.g food insecure); and in Central Florida alone, one (1) in seven (7) people are food insecure (see Appendix A). This level of food inefficiency has significant, economic, social and environmental impacts. As the City of Orlando aims to become America's premier Future-Ready City, it needs to take advantage of the technological advancements regarding food management and the on-going food recovery efforts within the City.

The Food Recovery Network Program (FRNP) strategy aims to promote and pilot solutions that will open the door for the vast opportunities of food recovery within the City of Orlando. According to the Environmental Protection Agency (EPA), food recovery is one of the top preferred methods of managing food waste. Food Recovery is the practice of collecting edible food that would go to waste from commercial and institutional production and distributing said food to people in need. Currently, within the City of Orlando there exist a number of food organizations that help food insecure individuals; yet, seventy-eight (78) million more meals are needed to fill the hunger gap in the City's communities (see Appendix A). The objective of the FRNP strategy is to explore the possible ways of assisting these organizations to reduce the amount of food being discarded in a more fully, informed, and strategic way, and to promote the incorporation of advanced technologies to better distribute edible food that would otherwise be discarded.

This document contains a review of the food recovery and food waste current system within the City of Orlando and lists the objectives of the FRNP strategy. Along with a current system review and list of objectives, this document also provides a list of use cases and recommendations that will help the City of Orlando tackle food insecurity.

1.5 Referenced Documentation

Table 2: Referenced Documentation

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Form FM-SE-01 Concept of Operations (ConOps) TEMPLATE	Revision Dated September 4, 2019	https://www.fdot.gov/traffic/ITS/Projects-Deploy/SEMP.shtm
The Hunger Picture in Central Florida	2019	https://www.feedhopenow.org/site/SPageServer/?NONCE_TOKEN=DC5A2EB8A9BC06190CFDF04365AB3E0E&pagename=about_hunger
Tackling Food Waste in Cities: A Policy and Program Toolkit	2019	https://www.nrdc.org/sites/default/files/food-waste-cities-policy-toolkit-report.pdf
Modeling the Potentail to Increase Food Rescue: Denver, New York City, and Nashville	2017	https://www.nrdc.org/sites/default/files/modeling-potential-increase-food-rescue-report.pdf

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Wasted Food Programs and Resources Across the United States	N/A	https://www.epa.gov/sustainable-management-food/wasted-food-programs-and-resources-across-united-states
Food Recovery Pilot to pick up excess food in 3 community centers	2019	Green Works Orlando – Sustainability Department
UCF Food Recovery Network	2019	https://sustainable.ucf.edu/wp-content/uploads/2019/04/Food-Recovery-Network.pdf
Food Waste Prevention and Recovery Assesment Report for the City of Seattle	2016	http://www.seattle.gov/util/cs/groups/public/@spu/@garbage/documents/webcontent/1_051538.pdf
Relish Rhody: Rhode Island Food Strategy	2017	http://dem.ri.gov/relishrhody/pdf/rifood17.pdf
Center for EcoTechnology: Rhode Islando	2016	https://wastedfood.cetonline.org/states/rhode-island/
Baltimore Food Waste and Recovery Strategy	2018	https://www.baltimoresustainability.org/wp-content/uploads/2018/09/BaltimoreFoodWasteRecoveryStrategy_Sept2018_FINAL.pdf

2. Current System

2.1 Description of the Current System or Situation

As concept support, information on the current food efforts to minimize food waste within the City of Orlando has been collected. These efforts are being led by organizations and initiatives which include, but are not limited to the following:

- Green Works Orlando
- Second Harvest Food Bank of Central Florida (a member of Feeding America)
- DNF Food Bank
- Orlando Union Rescue Mission
- Food Recovery Network – University of Central Florida (UCF) branch
- Servants Heart Center Food Bank
- Religious Organizations: churches and schools.
- Central Florida Haven of Hope

One of the City's ongoing food diversion efforts is being led by Green Works Orlando, which is a branch of the City of Orlando government that aims to transform the City into one of the most environmentally-friendly, economically and socially vibrant communities in the nation. The effort being explored, is the development of a food rescue pilot within three (3) community centers. The main intent of this pilot would be to test the feasibility of utilizing the expertise of a third-party

food recovery facilitator organization. The goal of the food rescue pilot is to implement a long-term vision that includes delivering all excess sealed prepared foods to hungry people in the community (see Appendix B). Apart from exploring the opportunity to assist food recovery, Green Works Orlando has developed a commercial food waste initiative that can divert businesses' food waste to beneficial end uses such as compost and clean energy.

Second Harvest, one the nation's leading food banks, provided in 2019 nearly 63 million meals to families, kids and seniors. They count with 550 feeding partners and continue to engage to seek more partnerships.

UCF is looking to start a chapter of the Food Recovery Network verified program. The Food Recovery Network verified program is the largest student led movement fighting food waste in colleges and universities. It is a non-profit organization that works to divert waste of prepared foods on college campuses by donating them to community partners. The Food Recovery Network verified program provides donors and recipients the tools and education needed to divert donated prepared food to those in need.

2.2 Operational Constraints

Information provided by reaching out to stakeholders shows that there is an interest from commercial and institutional food providers to donate excess food, and that partnerships exist between donors and recipients; but many food distribution organizations lack the equipment, technology and transportation to facilitate the collection and distribution of primarily prepared foods. In addition, information provided by stakeholders shows that there is a lack of a City-wide analysis that assess how much more surplus food could potentially be donated by the commercial and institutional food providers. Research also shows that there is a need to assess the estimated annual food needs among the food insecure individuals of the City of Orlando. In addition, there is also a need to explore the possibilities of promoting food waste prevention in businesses and institutions. A city-wide analysis that provides information on how much surplus food could be donated, will facilitate the development of a program that can provide the elements needed for distribution of donated prepared foods. The lack of a system that supports the distribution of donated prepared foods leads to more food waste which ends up in landfills. Landfilled wasted food is a major contributor to greenhouse gas emissions, studies show that food waste is responsible for 6% of global gas emissions.

3. Goals and Objectives

The FRNP strategy aims to promote and pilot solutions that will open the door for the vast opportunities of food recovery within the City of Orlando, untapping the potential for food rescue and hunger reduction. The following objectives are being considered as a part of the FRNP strategy:

- Leverage partnerships between commercial and institutional donors and the nonprofit organizations that fight against hunger.

- Promote the development of preventative protocols and solutions that will incentivize businesses and consumers to avoid over purchasing foods. Prevention efforts keep the food from going to waste initially and offer the greatest environmental benefits (see Appendix D). The development of protocols and solutions that ensure prevention will reduce the amount of food produced, processed, shipped packaged and so on.
- Explore the possible ways of assisting food recovery organizations within the City to reduce the percentage of edible food going to waste.
- Promote the incorporation of advanced technologies to better distribute edible food that would otherwise be discarded.
- Evaluate the role that food rescue efforts can play in a wider strategy to address wasted food.
- Reduce the cost of food recovery organizations by exploring the needs of said organizations to target funding opportunities.
- Reduce the percentage of uneaten food and address the near-term insecurity while improving environmental outcomes.
- Inspire other cities around Central Florida to undertake similar efforts.

3.1 High-Level Impact Analysis

By promoting the incorporation and development of modern food recovery solutions, the Food Recovery Network Program strategy could support communities in Orlando by providing donated (sometimes untouched foods) that would otherwise go to waste.

The development of the FRNP strategy would produce several benefits to the City of Orlando. Such benefits include reduction in greenhouse gases, reduction in costs incurred to the City from food waste, improvement of business cultures within the community and reduction of hunger and food insecurity for the vulnerable communities. In addition, the FNRP strategy would also provide detailed data/analytics for identifying food demands within the City, providing an efficient/streamlined approach to allocate and redistribute surplus foods.

3.2 Justification

Most people do not realize how much food they throw away every day, from uneaten leftovers to spoiled produce. Studies show that more than one-third of the total amount of food discards in the retail grocery sector could potentially be donated under optimal conditions. The FRNP strategy aims to promote the development of optimal collection and distributing conditions. More than half of the food thrown away ends up in landfills; once in landfills, food breaks down to produce methane, a potent greenhouse gas which contributes to climate change. With this strategy, the City of Orlando has an opportunity to solve both this issue and prepare to become the next innovative City to tackle the food waste by promoting and piloting solutions that will help the fight against hunger. Given the increasing economic turbulence and income inequality as a result of the current global pandemic, maximizing opportunities to connect donated surplus foods to those in need is critical.

4. Use Cases

4.1 Rhode Island Case Study

The Rhode Island Department of Health (RIDOH) developed a program in 2017 called The Rhode to End Hunger Initiative. The initiative was developed to address the related issues of food waste and hungry Rhode Island residents. An important step to launching the initiative was to identify a mechanism to connect food donors with food recipients. Important factors were considered such as keeping costs to a minimum and reducing barriers to participation. The initiative conducted a scan of available services and selected the Matching Excess and Need for Stability (MEANS) database as the conduit for bringing unused, safe and healthy food to the residents of Rhode Island. MEANS database is a nationally recognized nonprofit organization that operates a free, online communication platform that connects food donors and receivers in real-time. Since the implementation of the initiative, in one (1) year, ten (10) tons of food was prevented from going to waste and was made available to Rhode Islanders in need.

Another effort being developed in the state of Rhode Island, is the Relish Rhody Plan to reduce waste food. In 2016 the governor of Rhode Island announced the hiring of the state's and nation's first director of food strategy to lead the development of Rhode Island's first comprehensive Food Strategy. Since then the state of Rhode Island has supported the partnership of The Center for EcoTechnology (CET) that helps business and institutions divert waste food and partners with service providers such as Phood (company that provides products that calculate waste for commercial food businesses).

4.2 City of Baltimore Case Study

The City of Baltimore is partnering with the help of the Institute for local Self-Reliance and a variety of stakeholders developed a food waste recovery strategy called "The Baltimore Food & Waste Recovery Strategy" in 2018. Stakeholders and partners include, to name a few, representatives from the following:

- Baltimore City Department of Public Works
- Baltimore City Public Schools
- Maryland Department of The Environment
- The Food Recovery Network

With support from the National Resources Defense Council and the Rockefeller Foundation, the city has hired a Food Matters Technical Advisor to begin work on implementing this strategy. The strategy consists of setting 69 strategies around the following topics:

- Commercial and Institutional Food Waste Reduction and Recovery
- Composting at Home & in the Community
- Creating Scalable Composting Infrastructure
- Composting in K-12 Schools

4.3 City of Seattle Case Study

In 2016, the City of Seattle published a report called Food Waste Prevention and Recovery Assessment Report. The report was funded by the City of Seattle and prepared by The University of Washington Center for Public Health Nutrition. The purpose of the ninety-nine-page report was to provide a current summary of challenges and opportunities in commercial food waste prevention and recovery in the City of Seattle. For seven (7) months in the year 2015, interviews were conducted to understand the challenges and opportunities in food waste prevention and recovery. Interviews consisted of meeting with anti-hunger agencies, public agencies, non-governmental organizations, and food-generating businesses. The interviews were recorded, transcribed and the transcriptions were coded to highlight themes that emerged from the data. The findings as a result from these interviews led the report to provide recommendations on Food Waste Prevention, Diversion and Recovery (see Appendix C). The recommendations are summarized below:

- Take an integrated (systems) approach to food waste: system level approaches help identify core problems and integrated solutions across multiple stakeholders.
- Measure to create meaning: measurement helps stakeholders know the scale, build awareness and identify priorities.
- Avoid waste in the first place (lead with prevention): the most preferred pathway for food waste reduction in the EPA hierarchy is source reduction (see Appendix D).
- Support the food donation / recovery system: the second most preferred pathway for food waste is donation of edible foods.

4.4 NRDC Case Study

In October of 2017 the National Resources Defense Council (NRDC) published a report titled "Modeling the Potential to Increase Food Rescue: Denver, New York City, and Nashville". With support from the Rockefeller Foundation, the NRDC explored the potential to keep good food from being discarded through increased food rescue in the cities of Denver, New York City, and Nashville. Highlights of their research include the following:

- The untapped potential for food rescue from the grocery retail, restaurant and institutional food service sectors equates to 92 million meals annually for three cities combined.
- Area businesses could play a large role in addressing food insecurity.
- Across all three cities, grocery store retail showed the greatest untapped potential. Grocery store retail represents just over 60 percent of the untapped potential discovered.
- Institutional food service sectors such as hospitality, healthcare, universities and K-12 schools have the potential to provide significant volumes of quality food. Institutional food service sectors represent 26 percent of the untapped potential for food rescue.
- Restaurants make up around 7 percent of the untapped potential for food rescue.
- Much of the food that institutions and restaurants could potentially donate would be prepared foods.

The report also addressed the costs and associated investment needs regarding food recovery. This was done by extracting current costs, capital assets, and distribution methods being used in the

City of Denver. The report estimated that to achieve the ambitious goal of recovering and distributing the needed 901 tons of additional food there would be a cost of $2.0 million per year. In addition, an initial capital investment of $213,000 would be needed to provide the needed vehicles and storage for said goal.

5. Recommendations

5.1 Recommendations and Considerations

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- The funding of an analysis to estimate the amount of additional food donations that could be potentially sourced from commercial and institutional food providers.
- The funding of the Green Works Orlando food rescue pilot.
- The funding of an inventory of all commercial and institutional food providers that are wanting and willing to donate food.
- The funding of a system that will address the distribution needs of the food recovery organizations, especially smaller organizations such as schools, churches, and community programs.

In order to correctly and efficiently assist in the recovery and distribution of food and to design a plan of action, it is also recommended that the City of Orlando pilot extensive in-depth outreach to stakeholders to understand the current efforts, needs and interest in partnerships (see Figure 1). Outreach activities could include:

- Survey on stakeholders understanding of food recovery services and use of technology.
- Webinars to discuss the project goals, objectives and allow stakeholders to voice concerns and research interests.
- City-wide round table discussion with stakeholders specifically centered on food insecurity and food recovery opportunities.
- In person workshops to discuss findings from use cases.

Figure 1

Recommendations and Considerations

Organizations and individuals around the U.S and the world have come up with creative ways to solve the food waste crisis by using emerging technologies such as data collection platforms, websites, mobile applications, and artificial intelligence. It is recommended that the City of Orlando explore the possibility of partnering with said companies and organizations to better promote the recovery and distribution of food. Below is a list of some of the most popular food recovery emerging technology companies that are partnering with private and public food organizations:

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- Transfernation: is New York's city on-demand food rescue platform. Organizations using Transfernation's mobile application can request a pickup for untouched extra food and Transfernation will deliver it to the closest local feeding program.
- Food Rescue US: is an application that fights food insecurity by connecting food donors with hunger relief organizations. The algorithm matches surplus food to a nearby shelter and sends a driver to transport the food.
- Winnow: seeks to minimize commercial kitchen food waste through smart meter technology attached to a food waste bin. Users can track major sources of waste and concentrate on improvement by entering the food type and specific product being wasted into the smart meter.
- Copia: is a platform that allows businesses to redistribute food surplus by connected said businesses to local shelters, after school programs, and other nonprofit organizations. Copia's software allows users to track surplus trends, and easily access tax savings.

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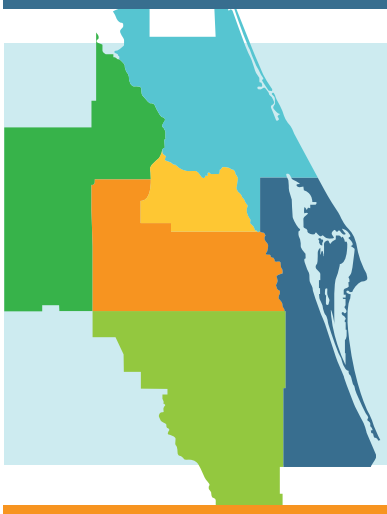
APPENDIX A – Second Harvest Hunger Facts

THE HUNGER PICTURE Central Florida



1 in 7 people are food insecure.

Nearly **half a million** people will find it necessary to seek help with food this year.

Second Harvest FOOD BANK OF CENTRAL FLORIDA

Our mission is to create hope and nourish lives through a powerful hunger relief network, while multiplying the generosity of a caring community.

FeedHopeNow.org

THE HUNGER GAP

78 million

more meals a year are needed to fill the **hunger gap** in our community.

CLIENT DEMOGRAPHICS

46% White
25% Black/African American
18% Hispanic/Latino
11% Other

OUR MOST VULNERABLE POPULATION

1 in 5 kids

is at risk of going to bed hungry tonight.

About 1 in 10

Florida residents **50 and older** risk hunger due to lack of resources.

Food Sources & Donors

Second Harvest Food Bank

Partner Feeding Programs

Kids, Families and Seniors

APPENDIX B – Green Works Orlando Food Rescue Pilot

Food Rescue Pilot

The Issue

Fourteen (14) City of Orlando Neighborhood Centers serve an estimated 1400 meals daily for afterschool programming. Per USDA meal reimbursement requirements, each student is required to take a meal and a milk. Community Centers are required to dispose of all meals every day, and cannot refrigerate onsite. Because of these specific program requirements all uneaten food is going into the garbage. By conducting a food waste audit over the course of 2 weeks during the spring of 2019, the Green Works team found that on average each child produced 1.4 pounds of food waste per day.

Overview of Existing Efforts

As a result of that initial audit, the City selected 3 community centers to pilot a couple different food diversion interventions. First, the pilot community centers started share tables (pictured below). The items that the students did not want were placed on the share table for other students to take.

Second, the solid waste division organized the collection of all uneaten food through its commercial food waste collection program. All uneaten food was collected and diverted to an anaerobic digestion facility where it is processed into energy and put back into the grid.

Expansion Proposal

The two interventions discussed above, together, are a great start toward addressing the mounting waste at our community centers; however, there is indeed great potential for expansion. The City would like to explore a 30 day food recovery pilot for 1 to 3 City neighborhood centers starting in Fall 2020. The main intent of this pilot would be to test the feasibility of utilizing the expertise of a 3rd party food recovery facilitator organization, such a Goodr, to expand the City's ongoing food diversion efforts in the area of food recovery and distribution. The long-term vision includes delivering all excess sealed prepared foods to hungry people in our community.

*These three centers currently have a share table and participate in commercial food waste collection

Rock Lake- Meal served at 3:30pm*, 440 N Tampa Ave

Northwest- Meal served at 4:30pm*, 3955 Wd Judge Dr

Colonialtown- Meal served at 3:30pm*, 1517 Lake Highland Dr #2605

*Meal times/days subject to change after COVID-19.

Current Limitations

- Facility managers are limited on time (uploading daily menus, inputting excess amounts, requesting pickup, etc)
- Maintaining proper food temperature until pickup. The centers lack the equipment to store and refrigerate leftover food.
- Menus change every day, resulting in more or less waste from students therefore making quantities variable everyday. This makes it difficult for recipients to plan accordingly.

Expectations/Needs

The City seeks a quote for services for a 30 day trial and the preparation time needed before beginning. The partnering company would assist with the organization/facilitation of timely pickups of excess food at 1-3 community centers, five days per week, for 30 days (weekends excluded). The company will also provide data on the number of meals rescued and the recipients of those meals.

Evaluation

- Determine program fit: cost per month and number of meals recovered
- Identify needs and customize program for City:
    - Educational materials
    - Operational logistics for neighborhood center team
        - Uploading menus
        - Maintaining the food within proper temperature
        - Meeting the driver for pickup
        - Managing daily surplus
- Possible staff training on food safety
- Containers to transport food

- Consider engaging in more pilot testing to better understand the needs of the City Neighborhood Centers
- Strategize pilot expansion for phase II into additional neighborhood centers

Contacts

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Christopher Castro, Director of Sustainability, chris.castro@cityoforlando.net, 407-246-3463

APPENDIX C – City of Seattle Food Recovery Report Recommendations

Food Waste Prevention, Diversion and Recovery Recommendations for City of Seattle

Take an integrated (systems) approach to food waste

System level approaches help identify core problems and integrated solutions across multiple stakeholders.

Use EPA's Food Recovery Hierarchy as a framework to prioritize food diversion efforts

- *Use messaging that integrates prevention, recovery, and composting across all of the City's food waste diversion efforts*
- *Dedicate staff time to food waste prevention and recovery*

Develop a Food Waste and Recovery Roundtable

- *Provide a forum to facilitate involvement of and communication between stakeholders and to foster a comprehensive approach from prevention to composting, across all sectors/stakeholders*

Explore opportunities to leverage funding across agencies or programs to expand food waste diversion efforts

- *Identify food waste intersections between departments that could led to joint funding and/or staff collaboration*
- *Consider using future compost fines to fund food waste prevention and donation programs or food waste diversion education*

Collaborate regionally and nationally

- *Pursue opportunities to collaborate with state, county, and national agencies as well as other local governments*
- *Pursue opportunities to collaborate with other coalitions and non-governmental agencies*

Measure to create meaning

Measurement helps us to know the scale, build awareness, and identify priorities.

Develop and implement standard food waste metrics

- *Support the use of standard food waste metrics to regularly measure amount of food diverted and compare within and between sectors over time*
- *Use metrics developed to inform SPU's Solid Waste Plan Update and other relevant policies*

Develop a Seattle Food Waste Challenge to engage the public (across sectors) in helping to measure

- *Use the Challenge to get more granular data (i.e. catering and institutional kitchens vs upscale restaurants) in order to understand food waste reduction potential by sector*
- *Include qualitative stories in addition to quantitative data to capture the full picture*

Keep food waste on the radar

- *Use data gathered from above efforts to continue raising awareness and to develop a campaign*

Food Waste Prevention, Diversion and Recovery Recommendations for City of Seattle

Avoid waste in the first place (lead with prevention)

The most preferred pathway for food waste reduction in the EPA hierarchy is source reduction.

Make food waste apparent

- *Develop a second phase of piloting food waste prevention measurement with businesses*
- *Develop food waste assessment for other types of businesses (e.g. quarterly mailings to businesses comparing their food waste to that generated by their peers)*
- *Provide support to businesses in conducting food waste audits*

Make the case for food waste from the consumer level to the food service industry

- *Integrate food waste prevention best practices into culinary and food service training*
- *Highlight successes (case studies, publicity, forums, model prevention policies)*
- *Interview consumers to determine if perceptions of consumer expectations are true*
- *Educate consumers to push businesses to take prevention steps*
- *Educate consumers on best-by, sell-by, and use-by dates*
- *Build awareness in youth and by extension, greater awareness with parents/adults*

Support the food donation / recovery system

The second most preferred pathway for food waste is donation of edible foods

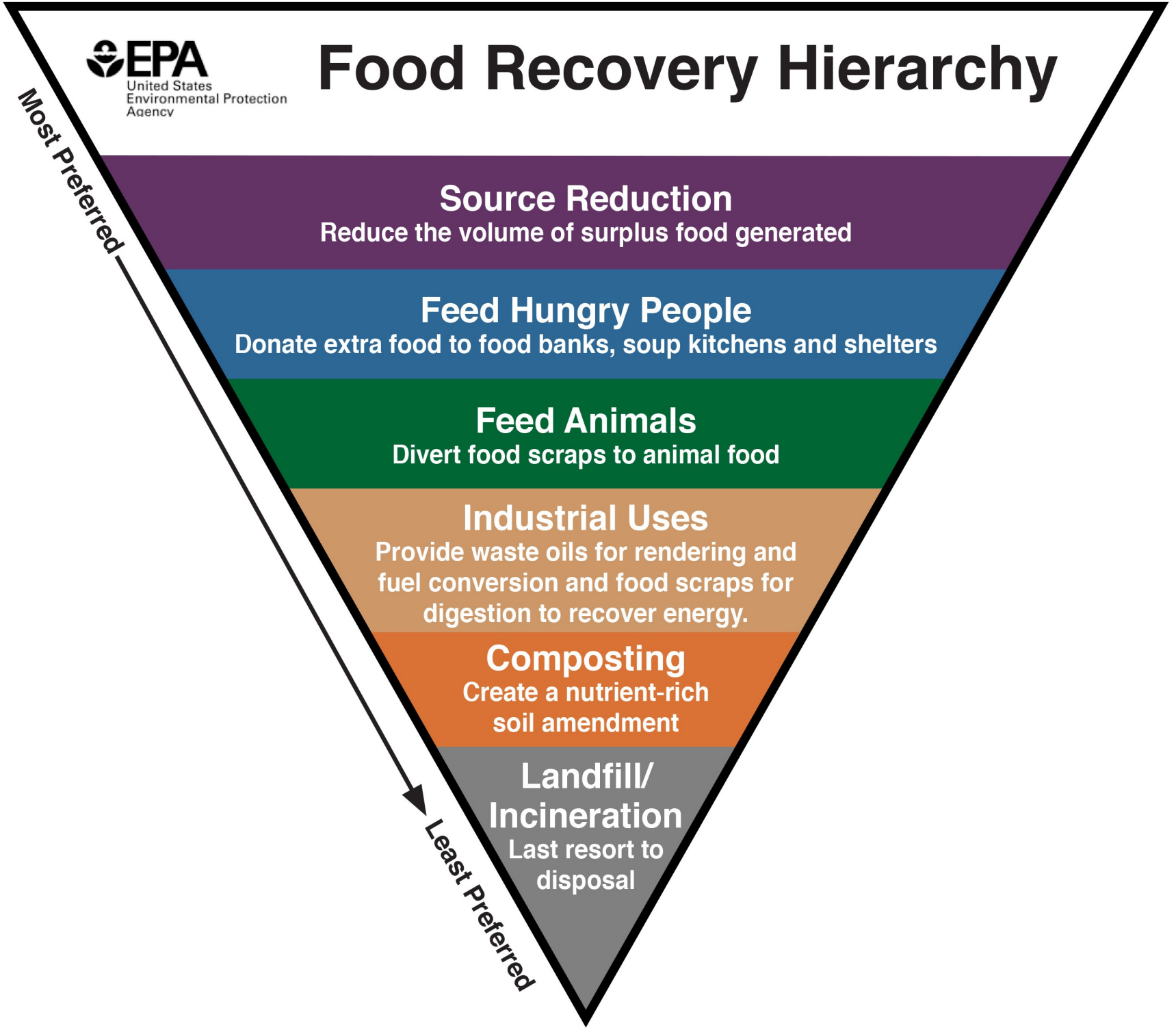
Increase infrastructure and capacity of the emergency food system

- *Explore ways for food banks to acquire infrastructure that helps move and store perishable food*
- *Develop new tools and technologies such as apps*
- *Evaluate fee reductions or waivers (compost, parking) for anti-hunger agencies so they have more funding available to purchase nutritious food*
- *Support the development of a corps of volunteers (e.g. by partnering with FoodCorps or other agencies that connect food-system volunteers to communities)*

Increase donations of nutritious foods to the emergency food system

- *Strengthen farm-to-food bank connections*
- *Explore how to increase processing of perishable foods to be used by emergency food system*
- *Investigate transportation options for moving food from donors to food banks*
- *Support food procurement strategies that get beyond the challenges of transporting and storing perishable food*

APPENDIX D – EPA Food Recovery Hierarchy Pyramid


EPA
United States
Environmental Protection
Agency
Food Recovery Hierarchy
Most Preferred
Least Preferred
Source Reduction
Reduce the volume of surplus food generated
Feed Hungry People
Donate extra food to food banks, soup kitchens and shelters
Feed Animals
Divert food scraps to animal food
Industrial Uses
Provide waste oils for rendering and fuel conversion and food scraps for digestion to recover energy.
Composting
Create a nutrient-rich soil amendment
Landfill/ Incineration
Last resort to disposal

Integrated Transportation Application Strategy Concept of Exploration for the City of Orlando Future-Ready City Master Plan

Version: 1.0

Approval Date: [*Insert Approval Date*]

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List of Acronyms and Abbreviations

API	Application Programming Interface
AVL	Automatic Vehicle Location
D5	District Five (5)
FDOT	Florida Department of Transportation
GPS	Global Positioning System
MOD	Mobility On Demand
NL	Neighbor Link
OTP	OpenTrip Planner
RMCE	Route and Mode Choice Engine
TNCs	Transportation Network Companies
UCF	University of Central Florida
U.S.	United States of America

1. Overview

This document will serve as part of the Primary Focus Area Concept Exploration for the City of Orlando Future-Ready City Master Plan Project. This document was developed with the intent of being a Concept Exploration of the Integrated Transportation Application Strategy, being one of the priority shortlisted strategies of the City of Orlando Future-Ready City Master Plan Project. The document discusses the existing system situation, the operational constraints, the proposed concepts, the risk assessments, the implementation and the benefit cost analysis of the strategy.

1.1 Identification

Project Name: City of Orlando Future-Ready City Master Plan Project
Document Name: Integrated Transportation Application Strategy Concept of Exploration

The Integrated Transportation Application Strategy is a strategy that plans to assist the City of Orlando in developing a mobility guidance tool in order to take advantage of emerging technologies and partnership opportunities as a solution to the growing mobility needs of the public.

1.2 Focus Area

The pillar focus area that this strategy addresses is:

- Mobility

1.3 Stakeholders

Table 1: Stakeholders

Stakeholder	Project Role
The City of Orlando Transportation Department	Project sponsor, Operator/Maintainer
Orange County Government	Operator/Maintainer
Florida Department of Transportation	Operator/Maintainer
Orlando Regional Transportation Partners (e.g. FDOT, LYNX, Metroplan Orlando, Central Florida Expressway Authority, SunRail)	Operator/Maintainer/System Users
Orlando Economic Partnership	Sponsor
Orlando Alliance for Regional Transportation	Sponsor
Transportation Network Companies – (e.g. Uber, Lyft, Tesla, EasyTaxi, etc.)	Operator/Maintainer/System Users

Stakeholder	Project Role
Software/Platform Providers (e.g. RouteMatch, Ecolane, Pantonium, Omnimodal, OpenTrip Planner)	Operator/Maintainer/System Users
Apps and Mobile Service Providers	Systems Users
Multimodal facilities	System Users
The Public (e.g. City of Orlando commuting Residents and Visitors)	System Users

1.4 High-Level System Overview

Transportation across the major cities of the world and the U.S.A is being rapidly affected by a dramatic increase of urbanization and population. This causes a significant strain on existing infrastructure and land resources. As the City of Orlando grows to become a Future-Ready City, the City's current transportation departments and providers need to take advantage of the latest emerging intelligent mobility efforts and partnership opportunities to better meet the needs of the public.

The Integrated Transportation Application Strategy aims to implement a mobility guidance tool to offer on-demand transportation information and service to the residents and visitors of the City of Orlando. This document aims to explore the benefits and challenges of implementing an integrated mobility solution. The strategy consists of providing users and visitors of the City of Orlando the ability to plan multi-modal trips; a combination of transit, ridesharing, walking and biking, all in one centralized location through the use of a mobile application designed to run on smartphones/smart devices and transit kiosks. The Integrated Transportation Application strategy as part of the Future-Ready City Master Plan is comprised of the following features:

- Expand on the efforts currently in place by the Florida Department of Transportation (FDOT) – District 5 (D5) by developing a separately designed and maintained front-end user interface (e.g. application) of the District's multi-modal trip planning engine called the Route and Mode Choice Engine.
- Strategically install solar powered transit kiosks in underserved communities, bus stops and City Hall, by leveraging the information provided by FDOT-D5 on their transit kiosk pilot program in the University of Central Florida (UCF).
- Provide FDOT-D5 the City's relevant transportation data to better serve the multi-modal platform.
- Support a single payment system effort.

The implementation of the Integrated Transportation Application strategy will provide the residents and visitors of the City of Orlando with all options for mobility to support their daily needs such as getting to work, school, appointments, events and any place they need to go in the Orlando metro area. Providing users with real-time traveler information that can be personalized to specific needs will promote the continuous use of public and private transportation systems, it will promote sustainable solutions that will benefit the environment and it will promote the inter-operability and strong partnerships between transportation organizations.

1.5 Referenced Documentation

Table 2: Referenced Documentation

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Form FM-SE-01 Concept of Operations (ConOps) TEMPLATE	Revision Dated September 4, 2019	https://www.fdot.gov/traffic/ITS/Projects-Deploy/SEMP.shtm
Solution-Integrated Transportation Application	2020	VHB Project Team
Mobility as a Service: Concept and Practice	March 2018	https://nationalcenterformobilitymanagement.org/wp-content/uploads/2018/03/2018_03_MaaS_Final.pdf
Mobility on Demand Operational Concept Report	September 2017	https://rosap.ntl.bts.gov/view/dot/34258
Mobility as a Service report	April 2019	https://www.uitp.org/sites/default/files/cck-focus-papers-files/Report_MaaS_final.pdf
Bringing Mobility as a Service to the United States: Accessibility Opportunities and Challenges	January 2017	National Aging and Disability Transportation Center (NADTC) http://www.nadtc.org/wp-content/uploads/Bringing-Mobility-as-a-Service-to-the-US-Accessibility-Considerations-Final.pdf
LYNX Information	2020	https://www.golynx.com/tripapps/ https://www.golynx.com/?id=1156140
Mobility as a Service: Implications for Urban and Regional Transport	September 2017	https://www.polisnetwork.eu/wp-content/uploads/2019/06/polis-maas-discussion-paper-2017-final_-2.pdf
FDOT Route and Mode Choice Presentation	2019	Katie King, P.E., Metric Engineering, FDOT ITS Consultant

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Mobility as a Service Business Models, Vendor Strategies, and Market Forecasts 2020-2027	2020	https://www.juniperresearch.com/researchstore/key-vertical-markets/maas-mobility-as-a-service-market-research-report?utm_campaign=pr1_maas20_technology_apr20&utm_source=businesswire&utm_medium=pr
Technical Special Provisions for Transit Kiosk System	2019	Nicholas J Spatola, P.E. Faller, Davis & Associates
Intelligent Transportation Systems Plans *Ped/Safe Greenway Deployment*	2019	Atkins North America FDOT
Essential Steps to Take When Implementing a Mobile Application Strategy	2012	https://www.gartner.com/en/documents/2230016/essential-steps-to-take-when-implementing-a-mobile-appli

2. Current System Situation

2.1 Description of the Current System or Situation

As concept support, information on the current mobility infrastructure (private and public) of the City of Orlando has been collected. Currently, the City counts on a variety of transportation services. These services include but are not limited to the following:

- City of Orlando Car Share Program (Zipcar)
- Central Florida Regional Transit Authority (d.b.a LYNX)
    - Local bus service
    - NeighborLink (NL)
    - FastLink
    - ACCESS LYNX
    - LYMMO
    - SunRail Connections
- SunRail
- Transportation Network Companies (TNCs)
- Taxis/Private Carriers
- Ridesharing
- Bike/Scooter Share Programs
- Rideshare Hub Pilot Program

Along with an inventory of transportation services within the City of Orlando, current information on recent transportation initiatives and efforts being developed by City of Orlando partners, also serve as support to the Integrated Transportation Application strategy. In 2018, FDOT- D5, began to develop an engine that will have the ability to power multi-modal trip planning. This engine is called the Route and Mode Choice Engine (RMCE) and it's based on the open source software

OpenTrip Planner (OTP). The development of the Route and Mode Choice Engine includes four (4) primary components:

1. Application Programming Interfaces (APIS) and Data Sources (i.e. TNCs, Bike-Sharing, Public Transit, Third-Party Data, and SunGuide Data)
2. Routing Engine
3. Trip Scoring
4. Real-Time Trip Planning and Monitoring

The concept of the RMCE aligns well with the need for a City-developed user interface. The RMCE allows for the processing of single or multimodal trips and can support front-end mobility and wayfinding applications with real time mobility information. Users will be able to input their destination requests from an application and provide decision-making parameters and constraints: such as time, cost, walking distance, etc. Following the user's request and provided information, the engine will process all available data sources to determine the available trips and provide the user with information on findings. The engine will provide users trip options that include both single and multimodal options, for example transit and bicycle. In addition, it will also provide users timely updates based on delays, schedule or route changes, providing the users the ability to modify a previously planned trip based on real-time information. It is expected that the RMCE will be active and ready to use by December 2021. The RMCE is being developed as a web-based service and the objective is for users to access the information through the use of embedded mobile applications and transit kiosks.

As part of their effort to reach out to the public, FDOT-D5 is installing eleven (11) transit kiosks on the UCF campus as part of the PedSafe/Greenway project. Since the RMCE is a web-based service, it will be accessible through the transit kiosks that will provide users an interactive platform from which to request, view, and combine multiple modes of transit for a single trip to a destination. Transit kiosks will be installed at existing shuttle stop locations on the UCF campus, providing on demand mobility to underserved users in the area who don't own automobiles or have access to smartphones/smart devices. FDOT-D5 is looking to use self-sustaining technology for the kiosks such as solar power and cellular communication for scalability. It is expected that the pilot program of these transit kiosks will be deployed in the UCF campus no later than November 2021. FDOT-D5 is designing the kiosks to be scalable for future deployments across D5.

2.2 Operational Constraints

Given the limitations with current service design, the transit services and partnerships mentioned above in section 2.1 do not fully meet the needs of residents and visitors of the City of Orlando. Even though many of the mobility services mentioned above possess and utilize mobile applications to separately service their users, and despite the fact that FDOT-D5 is developing the RMCE; there does not exist a mobile application that serves as the front-end user interface of an integrated multi-modal trip planning platform, such as the RMCE. The lack of a mobile application that provides access to the information provided by the RMCE, results in an increase in traffic congestion, and less utilization of said mobility services. It is recommended that the City of Orlando take advantage of the opportunity to expand on the efforts currently in place by FDOT-

D5 by developing a separately designed and maintained mobile application, the Integrated Transportation Application, that leverages the OTP source code and will serve as a front-end user interface of the RMCE. It is also recommended, that as part of the Integrated Transportation Application strategy, the City of Orlando leverage the open source information that will be provided by FDOT-D5 on their transit kiosk pilot program, to enhance the City's ability to improve equity in transportation by providing access to information and services to all users.

3. Proposed Concept

3.1 Description of Concept

The concept of the Integrated Transportation Application strategy is an on-demand mobility distribution application where a single user interface (e.g. application) offers the residents and visitors of the City of Orlando access to any and all transportation services in their community; offering users tailor-made mobility solutions based on their individual needs. This concept will help render a solution to the growing mobility needs of the community such as the first/last mile problem. Providing an integrated mobility service will promote an efficient public transportation system, optimize routes and increase cost-savings for the public and the City of Orlando.

3.2 Goals and Objectives

The goal of the Integrated Transportation Application Strategy is to place the City of Orlando in a Future-Ready position by addressing the growing mobility needs of the residents and visitors. This will be done by developing, as a solution, an integrated mobility application. The goal includes developing a user interface of the existing trip combining engine, RMCE, so that residents and visitors of the City of Orlando can access multi-modal trip planning information through their smartphones/smart devices and transit kiosks. All with the intention of providing users convenient, reliable and low-cost transportation options. Below are the objectives being considered:

- Develop and design a customized City of Orlando mobile and web application that will provide residents and visitors the convenience of multi-modal trip planning. Through this application, users will be able to access information on how to plan for trips from their origin destination to the requested destination; by using a variety of transportation service providers such as public transit, ridesharing, car-sharing, bike/scooter-sharing, car rental, ride-hailing and so on. Information provided through this application includes top ranked trip options, cost, arrival time, and trip duration. Once a trip option has been selected, users will also be provided with updates on real-time information such as schedule delays and road closures. Access to such information will allow for users to make informed decisions about their transportation choices. The Integrated Transportation Application will serve as the front-end user interface that runs on the RMCE (back-end) being developed by FDTO-D5.
- Strategically install solar powered transit kiosks throughout the underserved communities of the City of Orlando; specifically, at bus stops, community centers and City Hall. Transit kiosks will allow users that don't have smartphones/smart devices, access to the application that is running on the RMCE engine. In addition, kiosks should be installed with a public

Wi-Fi hotspot. The installation of Wi-Fi in said kiosks will be a complement of the Community Wi-Fi Future-Ready shortlist strategy. Efficient installation of said transit kiosks will be achieved by leveraging information provided by FDOT-D5 on their transit kiosk pilot program that will be deployed in the UCF campus by November 2021.

- Provide support for a single payment system. The City's assistance with this effort will serve to bring forward a unified back-end fare collection system that will allow for residents and visitors of the City of Orlando to pay for their multi-modal trips chosen under the Integrated Transportation Application.

3.3 High-Level Impact Analysis

The development of the Integrated Transportation Application Strategy would produce several benefits to the public and the City of Orlando. The development of an application that provides citizens mobility information and the installation of transit kiosk that provides access to said application, will promote the continuous use of public and private transportation, and in turn, produce revenue to the transportation sector of the City. In addition, it will provide the potential to decrease the overall environmental impact of the transportation system by offering more efficient and environmentally friendly mobility options. The use of the Integrated Transportation Application will promote change in user's travel behavior towards more sustainable travel options, which in turn, will promote better air quality, efficient energy use and safe transportation. The implementation of the strategy will support the inter-operability and strong partnerships between transportation organizations, companies, and the City government to better plan and improve the transportation infrastructure of today and the future. In addition, the data collected and shared as a result of the implementation of the Integrated Transportation Application Strategy partnerships, would assist the City of Orlando to better plan and improve the transportation infrastructure in the future.

3.4 Performance Measures

A Before, During and After Study should be performed on the strategy to demonstrate the benefits related to providing mobility service solutions to the residents and visitors of the City of Orlando. The suggested performance measures are:

- Revenue trend: an increasing level of usage of the customized application and the improvement of traffic congestion, air quality, and quality of life should generate continuous income. A noticeable increase in over-all City revenue as an effect of the Integration Transportation Application, will demonstrate high-quality performance of the strategy.
- Usage of mobile application: an increase in usage of the mobile application would suggest that the users consider the service helpful and reliable.
- Service reliability: a continuous reliable service will depend on on-time performance, level of quality and deliverance of correct real time information. A reliable service will encourage trust in the users and highlight the effectiveness of the strategy.

- Accessibility: the increasing ability of citizens to access the transportation services promoted by the Integrated Transportation Application Strategy will demonstrate the overall success of the solution.
- Cost per trip: average prices should be set to lower than that of owning a private vehicle. Reliable, fair, personalized, and optimized costs per trip are expected to entice residents and visitors to choose mobility services over alternative transportation options.

3.5 Operational Constraints and Policies

The Integrated Transportation Applications Strategy comes with operational constraints that need to be considered for implementation. Implementing said strategy means exploring the option of moving outside the exclusive control of traditional boundaries of transportation providers. The Integrated Transportation Strategy requires a business eco-system in which several organizations (technological and transportation) must act in collaboration. In order to develop a customized front-end user interface of the RMCE, the City of Orlando government, as the Integrated Transportation Application Strategy developer, must consider drafting a series of contracts, policies, ordinances and regulations, in order to establish effective regional partnerships. In addition, the systems and intelligent hardware chosen to implement the proposed strategy will require coordination, installation, maintenance and operation. Each of the above mentioned come with a cost that need to have appropriate funding in order to benefit the City of Orlando. As a result, this also calls for building partnerships with third-party technology developers to carry out such tasks.

The Integrated Transportation Application Strategy must also adhere to existing policies and regulations while making needed amendments to such. It is anticipated that the Integrated Transportation Application Strategy will possibly impact, at a minimum, the following City of Orlando ordinances and policies:

- Growth Management Plan (Comprehensive Plan):
  - Transportation Element: Goals 1-4.
  - Intergovernmental Coordination: Goal 1
- Code of Ordinances:
  - Sec. 59.201 - Public Transportation Level of Service, Sec. 59.209 - Transportation Concurrency Exception Area (TCEA) and Mobility Strategies (*Chapter 59 – Concurrency Management/ Part 2 - Level of Service Standards for City Services*)
  - Sec. 10.01 – Definitions, Sec. 10.04 - Bicycle Sharing, Sec. 10.05 – Motorized Scooters Pilot Program (*Chapter 10 – Bicycles, Scooters, Micromobility Devices and Bicycle Paths*)
  - Section 58.1001 – Purpose of Bonuses *(Chapter 58 – Zoning Districts and uses/Part 6 – Density and Intensity Bonuses/ 6A – Introductions)*
  - Sec. 56.02 – Intent and Purpose, Sec. 56.04 – Definitions, Sec. 56.08 Alternative Impact Fee Calculation (*Chapter 56 – Impact Fees/ Part I. – Transportation Impact Fee)*
- Economic Development Policies:
  - 1233.1 City Planning – Transportation Planning.

  - 1235.1 City Planning – Strategic Planning/Special Projects.
  - 1210.1 Business Development – Organization and Policy.
- Management and Budget Policies:
  - 2100.3 Revenue Policy.

It is recommended that possible amendments to the ordinances and policies mentioned above be a part of a support system to assist with the development and maintenance of a city-wide Integrated Transportation Application strategy. Please note that this is not all inclusive and that other ordinances and policies should be updated as appropriate.

3.6 Justification

According to the United States (U.S.) Census Bureau, the City of Orlando is a continuously growing City with a population growth that propelled the City into the top tier of the nation's fastest growing metro areas in 2018. Not only is the City growing in population, but according to Visit Orlando (the region's official destination tourism and marketing organization), Orlando was the most visited destination in the U.S. with 75 million visitors in 2018. Studies show, that a good majority of the Orlando metro area residents seek multiple transportation options and are depending more on technology to guide their transportation decisions. Existing transportation providers and Global Positioning System (GPS) navigation applications have limited options that do not allow for the process of trip combining across multiple modes of transportation; the current system in turn, does not fully meet the needs of the residents and visitors of the City. With the lack of an application that provides users' information on, the current transit services and multi-modal trip planning options provided by the RMCE, the result is an increase in traffic congestion and less utilization of mobility services. In addition, there must be consideration for underserved communities and users that don't have access to smartphones/smart devices as part of addressing the Title VI and Equity concerns of the public. Therefore, there is a high demand for providing users access to the various mobility options generated by the RCME through a customized city user interface, the Integrated Mobile Application, and the installation of transit kiosks in underserved communities. The Integrated Transportation Application strategy seeks to improve mobility options of the City's residents and visitors by developing a multi-modal trip planning mobile application and installing transit kiosks for better access to mobility information. The result will be an improvement of quality of life to the residents and visitors of the City, promoted sustainable intelligent mobility efforts and a City that will be considered Future-Ready.

Furthermore, in light of the recent global pandemic (the corona virus also known as COVID-19) the Integrated Transportation Application strategy will prove itself to be resourceful considering it is a data driven strategy. The residents and visitors of the City of Orlando will require real-time information regarding occupancy levels to support intermodal routing options and information on contagion hotspots in hopes of flattening the curve of the current and next contagion. Information on how to get to healthcare locations will also be critical. The Integrated Transportation Application strategy could develop services that allow users to filter for intermodal journeys that meet social-distancing criteria. It is recommended that the City of Orlando, along with its regional transportation partners, develop resiliency efforts surrounding mobility services to ensure the safety of travelers within the region.

3.7 Proposed Strategy Support

The development of an Integrated Transportation Application Strategy will require the following support activities.

- Reaching out to regional partners and third-party technology providers that will assist the City in developing a customized multi-modal trip planning application.
- Well-developed and efficient public transportation networks.
- Developed partnerships with public transportation systems, TNCs and third-party technology platform providers.
- Preventative maintenance of application system and installed equipment. It is recommended that this be added to the maintenance protocols currently in use by the City.
- Support from the City's Information Technology (IT) department, the Transportation department on the continuation of data analytics. In order to effectively predict demand, and relay updated real-time mobility information to the citizens through the proposed application, it is recommended that the City of Orlando share with FDOT-D5 the data analytics of the following:
    - Transportation assets (i.e. parking lots and garages, lane closures, traffic demand)
    - Event information such as date, size and location
    - Police and Fire Automatic Vehicle Location (AVL) and signal state (if permitted in the future)
- Proper and effective marketing solutions that will meet the needs of the transportation services and ensure proper public/private funding.
- Implementation of a management entity that will oversee the management and maintenance of the application and transit kiosk. This includes providing said entity with staff and personnel to assist.
- Proper urban space allocation and street design.
- Education to the community and visitors about the selected Integrated Transportation Application strategy implementations and the benefits provided. This would result in effective and educated usage of transportation services rendered by the City and its partners.

4. Risk Assessment

With the many benefits of an integrated mobility application, and the installation of public transit kiosk that will allow access to mobility information, there are possible inherent short- and long-term risks to be considered; especially when considering external-agency data usage, coordination and hosting objectives to meet the needs of all stakeholders. It is to be noted, that the Integration Transportation Application is dependent on the RCME and other data sources for the data it will share with its users. This presents a risk, as these third-party data providers are not under the City's governance. This section identifies some possible short- and long-term risks and mitigation strategies associated with the Integrated Transportation Application strategy.

4.1 Short Term Risks

- Cybersecurity:
  - Mitigation technique: training personnel, regular monitoring of system and installing/maintaining security patches.
- System malfunction:
  - Mitigation technique: provide regular maintenance and surveillance to application software and transit kiosk equipment.
- Lack of participation from community:
  - Mitigation technique: provide all-inclusive services that consider languages, disabilities, and unserved/underserved communities. Implement motivational techniques like gamification of services and provide rewards as an incentive for continuous service usage.

4.2 Long Term Risks

- Outdated technology:
  - Mitigation strategy: provide continuous review of technological equipment to stay current and update existing technologies when possible. Plan for life cycle replacement and extended support.
- System malfunction:
  - Mitigation strategy: ensure there is a continued monitoring process and plan to provide regular maintenance of the application and equipment.
- Insufficient funding for continued operations and maintenance:
  - Mitigation strategy: Ensure a dedicated funding source, buy-in from stakeholders, cost-effective technology. Invest in proven marketing techniques to motivate the public to use the service.
- Higher costs for the user or the transport provider:
  - Mitigation strategy: take advantage of alternate revenue streams such as advertising and secure proper funding to ensure that fares remain low.
- Increased inequality:
  - Mitigation strategy: consider limiting premium levels of service (such as priority seats and boarding) to further promote equality.
- Partnership termination:
  - Mitigation strategy: Ensure that the private and public transportation companies' needs are being met and secure solid partnerships under contracts, laws and policies.
- Threat of Private Monopoly:
  - Mitigation strategy: generate a series of policies that will prohibit the transport operators from undermining the integrated transportation application provider and its regional partner.

4.3 Risk Assessment

The Integrated Transportation Application Strategy must be equipped to deal with short-term and long-term risks associated with implementation. The risk assessment criteria used to measure the operational and design levels of risks are the following: Proper planning and scoping, exposure evaluation, risk characterization, and mitigation measures (risk treatment). An evaluation of risks and planning should consider an upkeep with changing technologies to facilitate growing needs.

5. Lifecycle Assessment

5.1 Overview

Proactive management of the Integrated Transportation Application Strategy requires not only proper funding, implementation, and maintenance, but also for the planning of adequate and proper lifecycle replacements of the strategy's components: regional partnerships, customized multi-modal trip planning application, and transit kiosks. The lifecycle of the Integrated Transportation Application strategy as a whole, largely depends on the respective lifespans of its components mentioned above. This concept of lifecycle replacement is crucial to the long-term effectiveness of the Integrated Transportation Application strategy to ensure that the service is not interrupted.

One factor to consider, is the lifespan of the trip planning application; a unified mobility platform can have a lifespan of only thirty (30) days to well over fifteen (15) years. This depends on proper funding, City management, and separate management of the back-end interface it runs on, the RMCE. It is difficult to put a number on how many years the City of Orlando should update/replace a mobile application that is primarily data driven and dependent on emerging technological improvements. In addition, the lifecycle of the Integrated Transportation Application, will largely depend on the partnerships mentioned above. It is recommended that the City plan and budget for renewal of contracts made between the government and the transportation partnerships to guarantee the longevity of the services provided under the strategy.

Another strategy lifecycle factor to consider, is the lifespan of the transit kiosks and its equipment (i.e. tablet, cabinets, connections, cables, power, docking stations, etc.). It is recommended that the City consider a ten (10) to fifteen (15) year lifecycle for all transit kiosk equipment due to two (2) main factors: technical advancements and equipment environment. Technological capabilities of today will be outdone by the advancements of tomorrow, so it is to be expected that the technological capabilities of the transit kiosks of today will not be able to perform to the standards of technology in the future. In addition, equipment will be subjected to normal industry wear and tear, as a result to environmental factors such as temperature changes, construction, and potential vandalism. It is recommended that the City of Orlando and its partners properly budget for this lifecycle factor when the time comes to modify and/or replace their systems and resources. It is important to recommended that any equipment chosen to replace equipment that has reached end-of-life is compatible with the existing system design.

In conclusion, it is difficult to place a specific number of years to the lifespan of the Integrated Transportation Application strategy considering that it largely depends on the individual lifecycle

planning of its components. As time progresses, if executed correctly, the Integrated Transportation Application strategy will evolve, optimize and adapt itself to the ever-changing needs of the future.

5.2 Assessment

Based on generated insights, rapidly expanding technology, economic factors, and environmental factors affect the lifecycle of the Integrated Transportation Application. The following are the key lifecycle milestones to be monitored: Functionality, durability, efficiency, availability, and optimization.

6. Benefit Cost Analysis

6.1 Overview

In order to understand the economic value, the Integrated Transportation Application Strategy will provide the City of Orlando and residents, an analysis of benefits and costs needs to be conducted. An analysis of benefits will allow the City of Orlando to understand the effects the strategy will have on the community and the City's transportation infrastructure. The purposed of the qualitative benefits and cost analysis is to ensure that that the strategy is feasible and has proper funding.

The Integrated Transportation Application strategy aims to provide the City of Orlando with a solution to the growing mobility needs of its residents and visitors. The idea is to connect devices, people and services across streets and transit. The integrated multi-modal trip planning application will serve as one tool, for one trip, with multiple modes of transportation. The transit kiosks will serve as wayfinding devices for users in underserved communities. The Integrated Transportation Application strategy is aimed to be designed in a manner that will allow for scalability over time as data collection and technology evolves. The provision of a trip planning application along with the installation of transit kiosks, has several economic benefits. According to various studies, for every $1 invested in public transportation, approximately $4 are generated in economic returns. A recent study from Juniper Research, found that the revenue generated by the use of a Mobility on Demand (MOD) application that integrates different transport services (i.e. buses, taxis, train, TNCs, bikes, walking) would exceed $52 billion by the year 2027, up from $405 million in the year 2020. This same research also noted that MOD platforms will save noteworthy time for users from the year 2021, it is expected that by the year 2027, integrated mobility applications will save users a total of 2.7 days' worth of time in a year. In addition to saving time, and money, multi-modal trip planning applications will reduce road congestions as they provide improved ways to travel in the busy urban City environment.

A preliminary cost estimate has been developed to determine the initial cost of implementing the Integrated Transportation Application strategy in the City of Orlando. The estimate is comprised of two phases: Phase I: the development and design of a customized City owned front-end single user interface (application) of the RCME; and Phase II: the installation of solar powered transit kiosks with Wi-Fi in underserved communities throughout the City. The design is a pilot project that consists of installing a total of ten (10) transit kiosk strategically placed by bus stops in

underserved communities of the City and by City Hall. The design proposes the installation of equipment that will aid the transit kiosks. Please note that the cost for installing the kiosks will depend on the exact location of their placement and the information provided to the City by the FDOT-D5 on the findings of their transit kiosk pilot program in UCF.

6.2 Initial Cost Estimate

The cost analysis for said design includes the costs of: underground conduit, removal of concrete, excavation, installation of concrete, performance turf, communication cable, pull boxes, service poles, rugged touch screen tablet, tablet docking station, power supply, table enclosure, CCTV camera, communications, mobilization, maintenance of traffic, completion of design, contingency and the furnishing and installation of the previously mentioned equipment. It is estimated that the Integrated Transportation Application strategy will have a total initial capital cost of $729,000. This is the sum of the Phase I cost (application development) = $200,000 and the Phase II cost (installing 10 transit kiosks) = $529,000. In addition, it is estimated that the operations and maintenance cost for the first year will equate to $62,694 leading to a total operations and maintenance cost of $686,482 over a 10-year period.

7. Implementation

7.1 Constraints and Needs

As the City of Orlando takes steps towards becoming a Future-Ready City, it must address the mobility needs of the public as one of its goals. With transportation technologies advancing and changes in the mobility market presenting great opportunities, the current government and transportation entities must take advantage of these to better promote connectivity, accessibility and affordability. The Integrated Transportation Application Strategy aims to develop a solution to the growing mobility needs and changes of the City of Orlando.

The solution is based on the mobility guidance concept, where residents and visitors will be able to receive delivery of mobility services under one application. The concept is for commuters to have on-demand accessibility of transportation services and for them to be able to plan and pay for trips with the information provided under the multi-modal trip planning application. Ideally, the process a user will have to go through when using the platform will be the following:

- Registration: grants access to the mobility packages offered by the City and its partners.
- Journey Planning: provides a list of services and the option to combine said services based on destination and convenience.
- Booking: user will decide what service to select.
- Payment: user will be able to pay for the service provided in advance or as the trip progresses. This will depend on the package the user has chosen (Note that the single-payer system is not included in this proposal)
- Journey: the user embarks on trip and receives information relevant to their journey from the platform operator.

In order to develop the Integration Transportation Application Strategy in an efficient manner that will meet the goals mentioned above, at the least, a series of implementation tactical plans will be required for the following phases:

- Phase I: Development and design of a customized City owned front-end single user interface (application) of the RCME. The development of the mobile application will consist of the following:
    - Consideration of Title VI/Equity needs. It is a principle concern to ensure that all mobility services meet all requirements related to equity.
    - Collection of information on case studies developed around the world to better understand the business eco-system of the MOD concept.
    - Determine whether the City of Orlando will develop the mobile application internally or outsource development and design to a third party.
    - Determine a look and design of the application that matches the City's marketing solutions.
    - Assess the City's organization ability to develop and support mobile application development.
    - Define security concerns, such as the need for mobile application management and encryption and location of data assets.
    - Define the elements of the application's architecture.
    - Define a deployment strategy for the application.
    - Determine what tools will be needed to analyze the effectiveness of the application.

- Phase II: Strategically install a total of ten (10) solar powered transit kiosks with Wi-Fi connection around bus stops in underserved communities and City Hall. These kiosks are meant to provide users who don't have access to smartphones/smart devices and who don't own cars, access to the multi-modal trip planning application. Apart from defining a deployment strategy for the transit kiosks, and determining a management plan, the following system, equipment, maintenance and tactical plans will be needed:
    - Equipment:
        - Rugged Tablet
        - Tablet docking station
        - NEMA enclosure (pole lockable)
        - CCTV camera
        - Wireless communication device
        - Solar panel (with battery and voltage regulator)
        - Aluminum service pole
        - Mounting brackets for all devices
    - Proper Security Measures: set up security protocols and design a system that can be protected against vandalism and cyber-attack.
    - Technicians/Contractors: surveyors and engineers will be needed to determine the best locations for the installation of the kiosks and for the installation of the equipment.

7.2 Timeframe

It is estimated that the Integrated Transportation Application Strategy implementation will have the following timeframe. It is anticipated that the RMCE will be active and ready to use by December 2020; it would be ideal for the development of Phase I to happen shortly after December 2020 and be available to use six (6) months after the RMCE deployment. The development of Phase II is expected to start after the deployment of the FDOT-D5 transit kiosks pilot program scheduled to deploy no later than November 2021. This means that the development of Phase II would occur over the course of one (1) year after the FDOT-D5 deployment.

7.3 Key Performance Indicators

- Increasing trend of generated revenue in the public and private transportation agencies.
- Continuous service reliability that will depend on performance of time and level of quality.
- Ensure all residents and users have accessibility to the services provided.

8. Notes

Not applicable at this time. The remainder of the page has been left blank should there be future notes required.

9. Appendices

Not applicable at this time. Any appendices required throughout the project will be added within this section.

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List of Acronyms and Abbreviations

CBO ..... Community Based Organizations
C-EOC..... Community Emergency Operations Center
CERT ..... Community Emergency Response Team
CIVIC..... Civic Innovation Challenge
COVID-19..... Coronavirus Disease 2019
FEMA ..... Federal Emergency Management Agency
IT..... Information Technology
MOU ..... Memorandum of Understanding
NSF ..... National Science Foundation
OUC ..... Orlando Utilities Commission
PV ..... Photovoltaic
USDN..... Urban Sustainability Directors Network

1. Overview

This document is part of the Primary Focus Area Concept Exploration for the City of Orlando Future-Ready City Master Plan Project. It was developed with the intent of being a Concept of Exploration for the Resilience Hubs Strategy, as one of the strategies identified for the City of Orlando Future-Ready City Master Plan Project. The document discusses the resilience hub concept and background, structure, operations, examples of resilience hubs, and steps to establish hubs.

1.1 Identification

Project Name: City of Orlando Future-Ready City Master Plan Project

Document Name: Resilience Hubs Strategy Concept of Exploration

The objective of the Resilience Hubs Strategy is to illustrate the value of resilience hubs not only during an emergency or disruption, but also its value in community building during normal operations.

1.2 Focus Area

All pillar focus areas can be addressed by resilience hubs:

- Energy
- Connectivity
- Mobility
- Placemaking
- Health and Safety
- Water
- Materials

1.3 Stakeholders

Given the potential amount and types of stakeholders involved in the Resilience Hubs initiative, it is recommended that the list of stakeholders be revised and tailored to each location before and after each resilience hub is planned, and that such stakeholders be engaged in the planning process. Stakeholders who may be involved in planning a resilience hub are listed in Table 1.

Table 1: Stakeholders

Stakeholder	Project Role
Neighborhood residents, community leaders, faith-based organizations, community-based organizations and residents	Community knowledge, relationship builder, communicators
Local businesses	Community knowledge, resource assistance

Stakeholder	Project Role
Community foundations	Funding support
Elected officials	Project champion
Orlando Utilities Commission (OUC)	Utilities service provider
Local government staff	Project management and project budget
City of Orlando Families, Parks and Recreation	Programming
City of Orlando Fire Department	Emergency response and coordination
City of Orlando Police Department	Emergency response and coordination
City of Orlando Information Technology (IT) Department	Citywide Wi-Fi integration and communications
Federal Emergency Management Agency (FEMA)	Coordinated disaster preparedness and response
Orange County Family, Health, and Social Services	Social services referrals
Florida Department of Agriculture	Consumer fraud and price-gouging support
Orange County Citizen Corps	Volunteer coordination
American Red Cross	Coordinated disaster preparedness and response

1.4 High-Level System Overview

Resilience is a word that has seen growing popularity in the last few years. While increasingly common, it is also often misunderstood and narrowly interpreted. Resilience in its broadest sense is the capacity of *individuals*, communities, institutions, businesses, infrastructure and/or natural systems to survive, adapt, and thrive, regardless of the chronic stresses and acute shocks they experience. Shocks are defined as sudden events that threaten a system and stresses are more slow-moving situations that weaken an organization. The essential element of a resilient community, or in this case a resilient smart city, is individual people. Resilient people build resilient families, neighborhoods, communities, and cities. Resilient individuals have access and opportunities for education, affordable housing, jobs, and mobility options in safe, healthy, and safe neighborhoods.

According to the Urban Sustainability Directors Network (USDN) resilience hubs are “community-serving facilities augmented to support residents and coordinate resource distribution and services before, during or after a “disruption” or “shock” like a hurricane, pandemic, or large scale or infrastructure failure. USDN is a peer-to-peer network of local government professionals

from communities across North America dedicated to creating a healthier environment, economic prosperity, and increased social equity. The City of Orlando is an active member.

1.5 Referenced Documentation

Sources used during preparation of this document are listed in Table 2.

Table 2: Referenced Documentation

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Form FM-SE-01 Concept of Operations (ConOps) TEMPLATE	Revision Dated September 4, 2019	https://www.fdot.gov/traffic/ITS/Projects-Deploy/SEMP.shtm
Resilience Hubs: Shifting Power to Communities and Increasing Community Capacity Guide to Developing Resilience Hubs USDN Resilience Hubs Analysis Tool	Various dates	www.usdn.org
OUC Presentation to Orlando City Council	January 22, 2018	http://www.cityoforlando.net/cityclerk/wp-content/uploads/sites/12/2018/02/Hurricane-Irma-OUC-Presentation.pdf
Orange County Citizen Corps	2020	https://www.orangecountyfl.net/OpenGovernment/BoardsAndSpecialDistricts/OrangeCountyCitizenCorps.aspx#.XvteMT98Che
Greater Miami and the Beaches Resilient 305	Viewed May 18, 2020	www.resilient305.com
Source Interviews	May 2020	Personnel Interviews: Kristin Baja, USDN Climate Resilience Officer Jane Gilbert, Miami Chief Resilience Officer
City of Orlando Comprehensive Plan (Growth Management Plan)	2012	https://www.orlando.gov/Our-Government/Records-and-Documents/Plans-Studies/Comprehensive-Plan
City of Orlando Policies and Procedures	2019	https://www.orlando.gov/Our-Government/Records-and-Documents/Policies-and-Procedures
City of Orlando Code of Ordinances	2020	https://library.municode.com/fl/orlando/codes/code_of_ordinances

2. Current System Situation

2.1 Description of the Current System or Situation

Resilience hubs have not yet been created or activated in the City of Orlando; however, the City is pursuing a National Science Foundation (NSF) Civic Innovation Challenge (CIVIC) grant opportunity in partnership with the University of Central Florida to design and deploy small and/or portable resilience hubs.

The NSF CIVIC grant is encouraging communities and universities to work together to determine local challenges and rapidly develop and deploy new solutions to address those challenges. One of the tracks in this program focuses on better equipping our communities to improve their resilience to natural disasters. This is a two-stage grant. The first stage includes a $50,000 planning grant and the second stage includes a $1 million grant to deploy the solution designed in Stage 1.

As part of the Future-Ready Master Plan process, the City of Orlando hosted community meetings in each Commission District in early 2020 to gain resident input on issues that could be addressed as part of this plan. Based on resident input, one of the recurring themes was “equitable resilience.” Not everyone can afford a back-up generator and during major storm events a significant percentage of residents have suffered sustained power loss. Per OUC, Hurricane Irma caused 60 percent power loss to OUC customers at peak, 80.1% system restoration within 3 days and full system restoration time of 5 days. In Florida’s panhandle, Hurricane Michael caused widespread outage of most power and communication services.

While the global pandemic started impacting the Orlando area after the community meetings, it has amplified these resilience issues and the need for hyper local community resources.

2.2 Operational Constraints

Resilience hubs are a new type of facility proposed for the City of Orlando to address an unmet need by increasing resident support and access to services and resources before, during, and after a natural hazard event. Currently, localized citizen-led efforts related to disruption events do not have a point of focus. In addition, basic functional needs such as emergency, power, wi-fi access, and food distribution are coordinated on an ad-hoc basis, instead of at permanent neighborhood locations.

3. Proposed Concept

3.1 Description of Concept

Resilience hubs can be created within existing neighborhood community facilities that are used year-round as centers for community-building activities, or hubs designed into new developments —such as a new public facility, a new multi-model mobility center, or a new public/privately developed partnership. With the right design, a resilience hub can meet a variety of community needs, including, but not limited to, emergency planning, response, and recovery; access to public health information and services, access to job training and childcare, and serving as a trusted source of information and foster community building. Additional benefits include reducing greenhouse gas emissions, improving local quality of life, neighborhood revitalization, and neighborhood empowerment.

Hubs are hyper local and designed to meet the needs of a community; therefore, no two hubs are identical. While there is an established process to establish a hub as described below, hubs are tailored to address a community's vulnerabilities, fit its cultural identity, and succeed in large part to the commitment of established trusted leaders, volunteers, and funding partners.

Resilience hubs serve a crucial role in disaster preparation and response, but they also operate year-round. Hubs have three operation modes—normal phase, preparation phase, and response/recovery phase—that follow the same flow as the four phases of emergency management, shown on Figure 1. Resilience hubs rely on trust, collaboration, and community respect. Successful hubs are not one dimensional; rather, they are equipped and staffed to operate day-to-day and are nimble enough to shift gears to address any sudden shock. In the true spirit of resilience, these hubs allow the community to adapt, thrive, and move forward from an event.

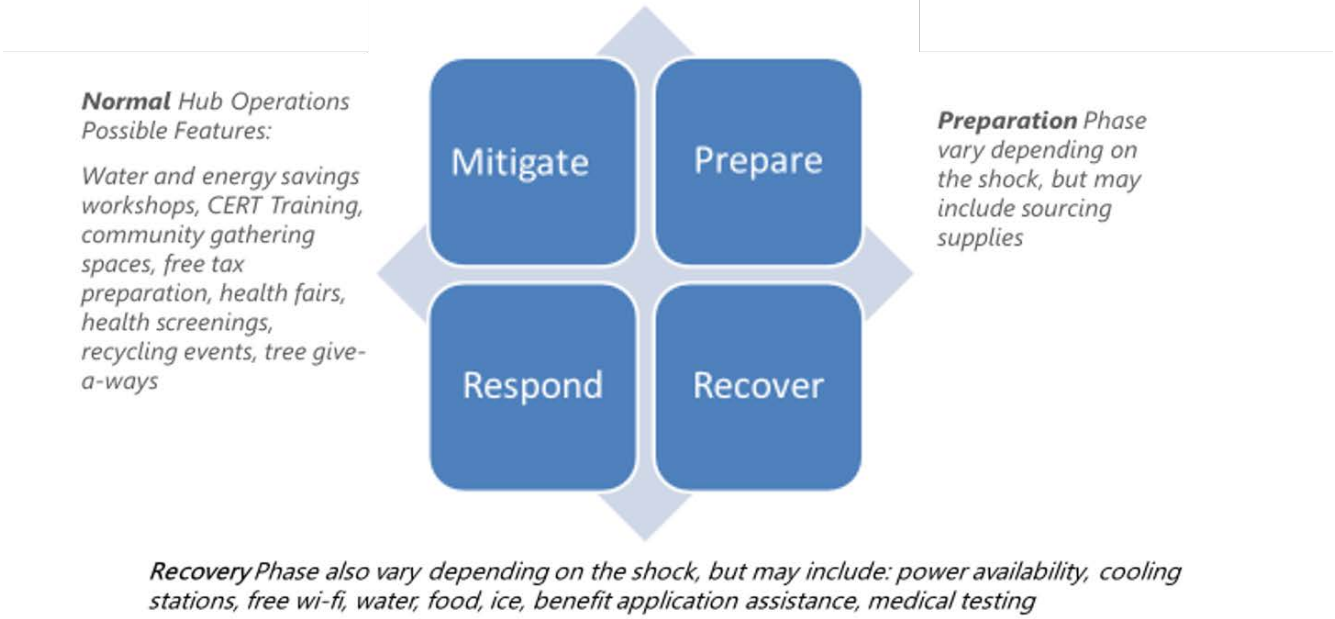

Figure 1: Four Phases of Emergency Management and Three Resilience Hub Modes Operations

Resilience hubs are staffed by a combination of community-based organizations (CBOs), local government agencies, utility providers, and other service provider partners.

Several examples of resilience hubs are found throughout the U.S. Since all hubs are uniquely different, it is difficult to point to best practices or cases studies; rather, there are lessons and inspiration that can be gleaned from peer cities. One example from South Florida is included in the Resilient 305 strategy created for Miami-Dade County. Resilient 305 was created through a unique partnership that includes the County, City of Miami Beach, City of Miami, and the Rockefeller Foundation 100 Resilient Cities Network. During the development of this plan, Miami-Dade experienced two significant shocks that influenced the process and recommended actions: the Zika outbreak in 2016 and Hurricane Irma in 2017. Both events highlighted the need for hyper-local community engagement to build resilience.

Miami Dade County had not experienced a direct storm since 2005 when Hurricane Irma arrived as a category 3 on September 10, 2017. Local community climate change activists and inner-city community organizers created "community emergency operations centers" (C-EOCs) to respond to the immediate needs of the most vulnerable populations. Often before a hurricane makes landfall, emergency managers advise local communities to prepare and secure 3 days of food and water. Not every household can afford that level of preparation, which was the case in Miami.

The C-EOC became the first line of communication and resources before, during, and after the storm. The volunteers used social media to inform residents and recruit additional services and support. The mission was clear—to reach the pockets of the County where the community did not have the resources to be on their own during preparation and hurricane recovery. The C-EOCs, with volunteers and support from the Miami Foundation and the Knight Foundation, provided meals, water, and information to more than 20,000 residents of Miami's most vulnerable communities.

The C-EOC model was applauded and highlighted in *Resilient 305* (see Table 1). The City of Miami is supporting and embracing the establishment of resilience hubs, inspired by the C-EOCs, in targeted communities. The City has identified eight existing neighborhood parks and three new planned facilities, chosen for their high use, in areas of high density and in low to median income neighborhoods. Miami resilience hubs will serve a crucial role in disaster preparation and response, but they will also operate year-round. These hubs will offer connections to government initiatives, as well as their own programming and supplemental social services.

3.2 Goals and Objectives

The objectives of establishing City of Orlando resilience hubs are to:

- Improve community level emergency preparedness
- Improve resident quality of life (access to opportunities)
- Foster community placemaking and neighborhood cohesion
- Build community resilience—the ability to survive, adapt, and thrive

3.3 High-Level Impact Analysis

According to the USDN, "Resilience Hubs provide an opportunity to build local community power and leadership. They are focal points for neighborhood revitalization that provide the resources residents need to enhance their own individual capacity while also supporting and strengthening their neighborhood and neighbors. Instead of being led by local government, they are intended to be supported by local government and other partners but led and managed by community members, community-based organizations, and/or faith-based groups."

3.4 Performance Measures

The suggested performance measures for Resilience Hubs are:

- Citizen engagement – Increase the number of Community Emergency Response Teams (CERT) trained residents that are involved and associated with a resilience hub
- Awareness of Resilience Hubs services – Increase number of residents accessing Resilience Hub services before an event (e.g., training, employment opportunities)
- Success of hazard mitigation and preparedness activities
- Readiness and activation and of the facility for mitigation, response, and recovery activities (normal, disruption, and recovery modes)

3.5 Operational Constraints and Policies

The City of Orlando Resilience Hubs Strategy comes with operational constraints that need to be considered for implementation. It will require coordination, installation, maintenance, and operation. Each of these comes with a cost and will need to have appropriate funding in order to benefit the City of Orlando. This calls for building partnerships to carry out such tasks.

A review of the City land use and zoning code should be conducted during the site selection process. Coordination with the Orlando Utilities Commission (OUC) could provide locations where the resilience hub could support and enhance the power utility system and reduce the incidence of outages. It is anticipated that the Resilience Hubs Strategy will possibly impact various City of Orlando ordinances and policies.

3.6 Justification

The seven pillars of the Orlando Future Ready City Master Plan are: connectivity, energy, health and safety, placemaking, mobility, water, and materials. Orlando Resilience Hubs can address each of these priorities through outreach education, information during normal operations, and in response to a shock, hubs can easily and quickly adapt and serve the immediate needs a community, as shown in Tables 3 and 4.

Table 3: Resilience Hub Services Related to the Future-Ready Pillars

Smart City Pillars	Resilience Hub Service
Energy	Reliable and renewable energy sources; lower energy costs; emergency or uninterrupted power
Connectivity	Community wi-fi; information sharing
Mobility	Multimodal hubs
Placemaking	Energy efficient; green infrastructure
Health and Safety	Community sub-stations; health screenings; emergency meal services; community education
Water	Water quality information; filter distribution
Materials	Recycling education; collection events; compost center

Table 4: Resilience Hub Services Related to Shocks

Shock	Resilience Hub Service
Pandemic or disease outbreak	Centers of testing; medical supplies
Heat wave	Cooling center
Power outage	Power supply center
Economic downturn	Employment referral and training center; childcare centers
Hurricane recovery	Neighborhood food, water, ice distribution center
Terrorism	Family reunification; information; counseling

As community hubs are created through the facilitated process, hub services can be enhanced and tailored to address specific neighborhood resilience building goals.

Next Steps

If the City of Orlando decides to create community resilience hubs, six hubs (one in each commission district) can be evaluated and developed according to the steps described in Section 3.7. District commissioners can be the local champion and convener who partners with the trusted community leader to set up a hub. Additionally, a successful project team that will identity issues and facilitate the creation of community goals should include: local homeowner associations; local active residents; local businesses; City of Orlando staff well versed in finance, sustainability and City operations; and OUC.

From Parramore to Azalea Park to College Park and Colonialtown, every community is special and unique with its on flavor and fabric. Each resilience hub can address each pillar, and further address specific neighborhood needs and wants.

3.7 Proposed Strategy Support

Support will be required from neighborhood stakeholders including residents and business as well as the City Commission.

Steps to Creating Community Resilience Hubs

The following steps, shown on Figure 2, are provided as general guidance in creating resilience hubs. This is best accomplished through facilitated and iterative process to maintain trust and momentum. The local government plays an important role but, is not the driver. As a USDN member, the City of Orlando can access member services to get started.

Figure 2: Resilience Hubs Implementation Steps

1. Identify Hub Area and Key Stakeholders
   Resilience hubs share a common framework; yet are uniquely created to fit a community's distinct needs. A first step in creating a hub is identifying the natural boundaries and the trusted leaders. Chose a location that already attracts an audience—a location that is familiar and trusted. Identify players and designated roles and responsibilities from the beginning.
2. Assess Community Vulnerabilities and Needs

   Understand the constituent audience—demographics, income, culture heritage and pride, educational opportunities, condition of the built and natural environment, housing affordability, business and job profiles, and mobility options. Also review and determine community strengths in order to create opportunities out of the vulnerabilities.
3. Set Community Goals

With the identification of partners and understanding of the issues, the community goals can be verbalized and recorded as a road map. By identifying goals to address vulnerabilities, the hub is poised to determine services, staffing, and supplies.

4. Select the Site and Assess Facility Conditions

   Resilience hubs need to be safe, secure, and able to serve in response and recovery. A facilities condition assessment will be required to determine its condition and capacity. At a minimum this would include a review of the building from a building code perspective (mechanical, electrical, plumbing), water quality and efficiency, energy efficiency and redundancy, air quality, and interior and exterior space requirements.

5. Identify and Secure Funding
   Funding will be required to upgrade, operate, and maintain each hub. Partners should cast a wide net of potential funding sources to build a budget including, but not limited to, municipal funding, local utilities, grants, and foundations.

6. Upgrade, Source, and Operationalize

   Prepare and invest in the site and staff based on the needs and dollars allocated. Procure the necessary supplies and ensure supply-chain mechanisms.

7. Activate, Monitor, Improve

   Open the doors and commit to a process of continues evaluation and improvement. Also ensure that the hub is multi-dimensional, prepared for a variety of shocks and operation in normal times, as well in preparation or recovery.

4. Risk Assessment

Mitigation strategies for short- and long-term risks are listed below.

4.1 Short Term Risks

- Public safety/civil unrest
  - Mitigation strategy: Prepare Public Safety Management Plan, crowd control procedures, communication strategy, and wayfinding; during planning phase, making an advanced determination as to the critical role of a resilience hub and local authorities and resources accessibility and participation during events and subsequent emergency response.
- Damage or inaccessibility of the facility at critical times
  - Mitigation strategy: Prepare Operations and Maintenance Plan (including mitigation strategies) and adopt Memorandums of Understanding (MOUs)
- Failure of critical systems or limited capacity during activation
  - Mitigation strategy: Prepare Operations and Maintenance Plan (including mitigation strategies) and adopt MOUs
- Limited stakeholder involvement during planning process

- Mitigation strategy: Careful identification of community organizations, neighborhood leaders, and potential funding partners, then investment in community outreach and engagement.

4.2 Long Term Risks

- System readiness
  - Mitigation strategy: Readiness exercises, periodic assessments, and inventory and asset control
- Administration
  - Mitigation strategy: Adopt MOUs, prepare Standard Operation Procedures, and train personnel
- Insufficient funding for continued operations and maintenance
  - Mitigation strategy: Ensure a dedicated funding source
- Population/community densification around a resilience hub
  - Mitigation strategy: periodic (e.g. every 5 years) evaluation of capacity, accessibility, and service area for each resilience hub.

4.3 Risk Assessment

Renewable and resilient power, communications, safety and security, and operations are the critical risks related to resilience hubs. A detailed risk assessment should be performed for each of the resilience hub steps listed in Section 3.7.

5. Lifecycle Assessment

5.1 Overview

Creation of a resilience hub represents an investment in capital and ongoing maintenance costs. While a resilience hub can be located in an existing building or purpose-built new construction, facility, the major components all require some level of ongoing resource commitments for operations and maintenance.

To provide needed service to citizens and reduce the burden on public response teams, a resilience hub must function reliably before, during, and after disruptions. A resilient and reliable power source of power is critical to the success of the resilience hub.

Practical considerations for development of a power strategy include determining the appropriate source or combination of sources necessary to meet ongoing and emergency power needs.

Solar photovoltaic (PV) can be expected to have a lifespan of 20 to 25 years but may require replacement of inverters. In addition, it is assumed that there may be some degradation in functionality. Solar PV systems require regular maintenance.

Batteries, uninterruptible power supply, and generators can be used to provide emergency power that is not reliant upon the grid. During normal operation, batteries can also reduce the dependency

upon the grid during peak usage times. The typical lifespan for batteries is 5 to 15 years, depending on the technology selected. Natural gas, propane, or diesel powered backup generators may be used, but each of these types presents their own fuel delivery, capacity, and carbon emissions challenges. Generators will require ongoing maintenance and accompanying capital costs for transformers, anchoring, and pads, tanks, walls/fencing, and containment areas.

Dependent on the services provided, a resilience hub may include equipment and systems for:

- Basic medical supplies
- Childcare services
- Counseling and trauma support
- Communications
- Emergency tools and supplies
- Financial services
- Food storage, distribution, and preparation
- Water and ice distribution
- Temporary emergency shelters
- Cooling or warming zones
- Veterinary/pet care

Any of the services incorporated into the resilience hub must remain in a state of operational readiness.

5.2 Assessment

Detailed assessment of each resilience hub will be based on the specific goals established by the community at each unique location. USDN sets forth the following phases for the development of a resilience hub:

- Phase 1: Assess Vulnerability and Select Service Area
- Phase 2: Establish Project Team, Build Partnerships, and Set Goals
- Phase 3: Identify and Evaluate Sites
- Phase 4: Identify Resilience Solutions
- Phase 5: Develop Sites and Install Solutions
- Phase 6: Activate Site and Operations

Lifecycle costs should be evaluated at each phase of the process.

6. Benefit Cost Analysis

6.1 Overview

Multiple potential benefits come with the City of Orlando's adopting a resilience hub strategy. These include: improved public health and safety, increased economic stability, improved resiliency for vulnerable populations, better community relationships, and reductions in risk mitigation costs.

6.2 Initial Cost Estimate

As an initial step, a vulnerability assessment should be undertaken to determine the appropriate service area. The next activities include goal setting in conjunction with a citizen-focused planning process, followed by the identification and evaluation of potential sites. Since all hubs are unique, the timeframe to identity, assess, construct or retrofit, and operationalize will vary. A project charter should be created at the onset to determine steps, roles, responsibilities, timeframes, and a proposed budget with revenue sources and expenditures. For the purposes of this estimate, it is assumed that a consultant would be retained to work with a neighborhood within each commission district and, collaboratively with the community and agency partners, conduct a needs assessment and establish goals for normal, disruption, and recovery modes. An allowance of $60,000 to $250,000 is recommended for location-specific planning services for each hub location, dependent on complexity.

7. Implementation

Implementation considerations include constraints, scheduling, and evaluation criteria.

7.1 Constraints and Needs

- Stakeholder and partner identification
- Site availability and land acquisition costs
- Initial capital costs
- Ongoing operations and maintenance costs
- Maintaining operational readiness
- Staffing costs

7.2 Timeframe

Since the needs of each community will vary, the timeframe to identity, assess, retrofit, source, and operationalize will also vary. A project charter should be created at the onset to determine steps, roles, responsibilities, and timeframes.

7.3 Key Performance Indicators

Specific KPIs for each Resilience Hub should be developed, considering operational, financial, sustainability, and social goals. KPIs may include:

- Operational:
    - Emergency services response time
    - Reduction in sustained power outages
- Financial:
    - Connectivity for residents and businesses
    - Impact on business revenue following a shock event

- Sustainability
    - Reduced vehicle miles traveled to access services
    - Percent of materials diverted from the landfill
    - Avoidance of energy transmission losses with renewable energy microgrid use
- Social
    - Reduction in housing displacements during recovery period
    - Number of residents accessing resilience hub services before a disruption (training, employment opportunities, etc.)
    - Reduction in food and water supply disruption for residents during activation

8. Notes

Not applicable at this time. The remainder of the page has been left blank should there be future notes required.

9. Appendixes

Not applicable at this time. Any appendixes required throughout the project will be added in this section.

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List of Acronyms and Abbreviations

DMS.....Dynamic Message Sign
ITS.....Intelligent Transportation Systems
IoT .....Internet of Things
TMC .....Traffic Management Center
MOU .....Memorandum of Understanding

1. Overview

This document will serve as part of the Primary Focus Area Concept Exploration for the City of Orlando Future-Ready City Master Plan Project. This document was developed with the intent of being a Concept Exploration of the Smart Parking and Operations Strategy, being one of the priority shortlisted strategies of the City of Orlando Future-Ready City Master Plan Project. The document discusses the existing system situation, the operational constraints, the proposed concepts, the risk assessments, the implementation and the benefit cost analysis of the strategy.

1.1 Identification

Project Name: City of Orlando Future-Ready City Master Plan Project
Document Name: Smart Parking and Operations strategy Concept of Exploration

The Smart Parking and Operations Strategy aims to implement advanced technologies as a solution to optimize parking territories and facilitate user experience in the downtown urban core.

1.2 Focus Area

The pillar focus areas that this strategy addresses are:

- Transportation
- Built Environment

1.3 Stakeholders

Table 1: Stakeholders

Stakeholder	Project Role
The City of Orlando Transportation Department	Project sponsor, operator/maintainer
The City of Orlando Parking Division	Operator/maintainer
Orange County Government	Operator/maintainer
Orlando Police Department	Operator/maintainer
Florida Department of Transportation	Operator/maintainer
Orlando Utilities Commission	Operator/maintainer
Central Florida Transportation Authority	System Users
Venues: Dr. Phillips Center for the Performing Arts, Amway Arena, Camping World Stadium, and supporting garages.	System users

Stakeholder	Project Role
Transit Agencies	System users
Multimodal facilities	System users
Motorists	System users

1.4 High-Level System Overview

As the City of Orlando aims to become America's premier Future-Ready city, the current parking infrastructure needs to take advantage of the innovative and technological advances that are being developed throughout the world.

The Smart Parking and Operations Strategy aims to expand on the smart parking initiative (including ParkMobile app partnership) already developed by the City of Orlando to incorporate advanced technologies to easily facilitate parking in downtown Orlando. All of this is done with the intent of supplying users with a better quality of life by limiting unnecessary delays for vehicles on the roadways, along with increasing revenue to the City of Orlando. The Smart Parking and Operations Strategy as part of the Future-Ready City Master Plan is comprised of the following features:

- Identification of parking availability within a facility (public surface lots and parking structures) or on-street spaces.
- Priority and reserved parking features (As applicable).
- Unified fare collection backend that would serve as support to the smart parking mobile application.

1.5 Referenced Documentation

Table 2: Referenced Documentation

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Form FM-SE-01 Concept of Operations (ConOps) TEMPLATE	Revision Dated September 4, 2019	https://www.fdot.gov/traffic/ITS/Projects-Deploy/SEMP.shtm
Solution-Smart Parking Solutions	2020	VHB Project Team
City of Orlando Parking Division	2020 City of Orlando	https://www.orlando.gov/Our-Government/Departments-Offices/Transportation/Parking
What is Smart Parking	5/12/2018	https://www.parkeagle.com/2018/05/12/what-is-smart-parking/
Real-Time Parking Availability Study	2/15/2013	John Battle, Metric Engineering

Document Name	ID, Revision, Date, etc.	Link, or Contact Info to Obtain
Transportation Revenues Collected by State and Local Governments	2012	https://www.bts.gov/content/transportation-revenues-collected-state-and-local-governments
Orlando Main Street Parking Study	2019	Kittelson and Associates, Inc.
City of Orlando Comprehensive Plan (Growth Management Plan)	2012	https://www.orlando.gov/Our-Government/Records-and-Documents/Plans-Studies/Comprehensive-Plan
City of Orlando Policies and Procedures	2019	https://www.orlando.gov/Our-Government/Records-and-Documents/Policies-and-Procedures
City of Orlando Code of Ordinances	2020	https://library.municode.com/fl/orlando/codes/code_of_ordinances
Smart Parking Management to Boost Transit, Ease Congestion: Oakland, California, Field Test Shows Promise	2007	https://www.itscosts.its.dot.gov/ITS/benecost.nsf/0/8A816D1AC8960BD1852573E7006C8E27?OpenDocument&Query=Home
Smart Parking Solutions Can Save Drivers Billions	2017	https://inrix.com/blog/2017/11/parking-cost/

2. Current System Situation

2.1 Description of the Current System or Situation

As briefly mentioned in Section 1.4, the City of Orlando in the past has integrated smart parking solutions in the downtown area. According to the City of Orlando Parking Division website, the City operates 1,000 smart metered on-street parking spaces and has integrated smart parking technology into two (2) garages. The smart parking technology implemented in the two (2) garages are Amano (brand name) smart gates that provide information on how many cars are accessing and egressing the garages. The on-street smart parking meters track parking trends and supply information on different payment options., This information is accessed through a smart phone and web-based free application called ParkMobile. In addition to the previous smart parking solutions, the City also provides residents and users with information about the parking services offered. Users can find on the web information on the following: parking garages and lots, parking rates, event parking purchases and reservations, meter rental applications, month parking availability and rates, among other services.

2.2 Operational Constraints

According to the City's Parking Division officials, about 30% percent of the smart metered on-street parking spaces have sensors embedded in the pavement to record data, but these may not be very reliable and have shown to have a high maintenance cost. In addition to the on-street metered parking spaces, the City of Orlando Parking Division operates 10 parking garages with

8,527 parking spaces and 400 surface lot spaces. The majority of these garages and surface lots, have not been introduced to smart parking solutions. This has made it difficult for users to receive information on parking availability and has made payment options more complicated. The lack of real-time data on parking resources naturally results in congestion around parking venues, consequently reducing the roadway system in Orlando. The Smart Parking and Operations Strategy aims to provide users with more parking options by identifying available parking spaces, offering priority parking reservations, and enabling pre-paid parking through a unified fare collection.

3. Proposed Concept

3.1 Description of Concept

The concept of the Smart Parking and Operations Strategy is to implement innovative technology to the existing parking infrastructure of the downtown area of Orlando with the possibility of perhaps extending said strategy to the greater Central Florida area through future partnerships. Providing real-time parking information will promote parking efficiency, alleviate corridor congestion, and improve traffic and quality of life for the users. In addition, it will provide the ability to receive data/analytics to identify parking demands within the City. This would enable the expansion into variable pricing for events or high demand parking periods.

3.2 Goals and Objectives

The goal of this strategy is that every public parking location will provide data in real time through different network applications so users can make informed decisions based on services rendered by the City of Orlando. Below are applications being considered.

- Utilization of a mobile parking application (ParkMobile) to relay the following information: parking facilities, parking availabilities, locations, time stamps, and payment options. Using the latest advances in the concept of Internet of Things (IoT), the mobile parking application utilizes and provides users with the information received from the central server connected to the intelligent parking systems.
- Incorporate priority reserved parking to the mobile application and parking facilities. The parking facilities would have designated areas for reserved parking areas and would be set apart from the remaining parking positions. These areas would be identified, payment reserved and geo-located within the application. Upon reservation, the user would be route guided to a specified reserved area for the time period identified.
- Install a unified fare collection backend that would serve the mobile parking application (ParkMobile). The users would have the option of different payment methods whether it be pre-paid cash, credit or debit.
- Vehicle detection installed in existing Orlando public surface lots and parking structures. Detection can be achieved by loop detectors or ultrasonic detectors installed at the entrance/exit of a facility. This will give users direction as to what parking facilities are at full capacity and which have available parking.
- Installation of in-facility guidance to update users on parking availability, achieved through strategically positioning signage on/around the facility. The visual signage will be

comprised of intelligent software and hardware such as Dynamic Message Signs (DMS) and Intelligent Transportation Systems (ITS) technology.

3.3 High-Level Impact Analysis

The development of the Smart Parking and Operations Strategy would produce several benefits to the users and the City of Orlando. Such benefits include promoting less pollution, efficient and increased usage of existing parking lots and structures, safe driving, and reduction of congestion and driver frustration. The Smart Parking and Operations Strategy would also provide detailed data/analytics for identifying parking demands within the City. This means that the City of Orlando would be able to see historical data which is stored and be able to make data driven decision and predictions based on the parking sensor data. This would enable the expansion into variable pricing for event or high demand parking periods. In addition, with the implementation of reserved parking areas in existing parking facilities, users would be able to make reservations for a minimal new cost therefore increasing revenue to the City of Orlando.

3.4 Performance Measures

A Before and After Study should be performed on the strategy to demonstrate the benefits related to smart parking solutions in the City of Orlando. The suggested performance measures are:

- Traffic analysis - A decrease in traffic caused by motorists looking for available parking spaces will demonstrate that the smart parking solution is effective.
- Usage of parking facilities- An increased real-time utilization of existing parking facilities will show that the information being collected by intelligent software and distributed by the mobile parking app is accurate.
- Usage of mobile parking app – An increase in usage of mobile parking app would suggest that the users consider the service helpful and reliable.
- Revenue analysis – An increase in revenue will demonstrate that the mobile parking app is effectively providing service and information to the users on parking fees.

3.5 Operational Constraints and Policies

The Smart Parking and Operations Strategy comes with operational constraints that need to be considered for implementation. The systems and intelligent hardware chosen will require coordination, installation, maintenance and operation. Each of the above mentioned come with a cost that need to have appropriate funding in order to benefit the City of Orlando. This calls for building partnerships to carry out such tasks.

It is anticipated that the Smart Parking and Operations Strategy will possibly impact at a minimum the following City of Orlando ordinances and policies:

- Growth Management Plan (Comprehensive Plan):
    - Urban Design Element: Goal 1.
    - Transportation Element: Goals 1-3.

- Code of Ordinances:
  - Sec. 39.02 – Definitions, Sec. 39.50 – Designation and Marking of Areas, Sec. 39.64 – Permit Parking Areas, Permits and Cards, Sec. 39.65 – Same-Application for Parking Permits; Conditions; Fee (*Chapter 39 - Orlando Traffic and Parking Code / Article I – In General / Article V – Stopping, Standing, and Parking: Division 3 – Off-street Parking Facilities).*
  - Sec. 61.306 – Marking and Signage of Parking Spaces, Sec. 61.307 – Parking Garages, Sec. 61.309 – Parking Layout *(Chapter 61 – Roadway Design and Access Management / Part 3 – Parking and Loading / Part 3A – Off-street Parking).*
  - Sec. 61.320 – When Additional Parking Spaces are Required, Sec. 61.321 – Counting Rules, Sec. 61.323 – Adjustments to Parking Requirements *(Chapter 61 – Roadway Design and Access Management / Part 3 – Parking and Loading / Part 3C – Number of Parking Spaces).*
  - Sec 61.340 – Purpose, Sec. 61.341 – General Requirements, Sec. 61.342 – Parking Requirements, Sec. 61.344 – Downtown Parking Program (*(Chapter 61 – Roadway Design and Access Management / Part 3 – Parking and Loading / Part 3E – City of Orlando Downtown Parking Program).*
- Economic Development Policies:
  - 1233.1 City Planning – Transportation Planning.
  - 1235.1 City Planning – Strategic Planning/Special Projects.
  - 1210.1 Business Development – Organization and Policy.
  - 1234.1 City Planning – Urban Design and Historic Preservation.
- Fleet and Facilities Management Policies:
  - 910.1 Facilities Management – Organization and Policy.
  - 910.3 Facilities Management – Maintenance and Construction.
- Management and Budget Policies:
  - 2100.3 Revenue Policy.

It is recommended that possible amendments to the ordinances and policies mentioned above be a part of a support system to assist with the development and maintenance of a City-wide smart parking system. Please note that this is not all inclusive and that other ordinances and policies should be updated as appropriate.

3.6 Justification

The City of Orlando is a growing city with a high demand for parking. There is high traffic congestion in part due to a lack of innovative technology applied to the existing parking infrastructure. The Smart Parking and Operations Strategy seeks to improve parking operations by installing smart parking solutions that will provide information through a mobile app (possibly extending to the FDOT Trip Planner app being developed) thereby increasing usage of the parking system, increasing revenue to the City of Orlando, reducing traffic congestion, and improving quality of life to the users.

3.7 Proposed Strategy Support

The implementation of the Smart Parking and Operations Strategy will require the following support activities:

- Support from a selected mobile parking application.
- Preventative maintenance of all installed equipment. It is recommended that this be added to the maintenance protocols currently in use by the city.
- Continued data analytics to identify parking demands.
- Education to the community and visitors about the new smart parking implementations and the benefits provided. This would result in effective and educated usage of existing parking services rendered by the City.

4. Risk Assessment

4.1 Short Term Risks

- Cybersecurity:
  - Mitigation strategy: training personnel, regular monitoring of system and installing/maintaining security patches.
- System malfunction:
  - Mitigation strategy: provide regular maintenance and surveillance to system.
- Mobile parking application saturation
  - Mitigation: adopt a preexisting application that already has a high level of user saturations.

4.2 Long Term Risks

- Outdated smart parking technology:
  - Mitigation strategy: provide continuous review of software to stay current and update existing technologies when possible. Plan for life cycle replacement and provide a mitigation technique that will use agnostic hardware compatible for vehicle detection, such that the monitoring systems can be updated and use existing hardware.
- System malfunction:
  - Mitigation strategy: provide regular maintenance and surveillance to system.
- Insufficient funding for continued operations and maintenance:
  - Mitigation strategy: Ensure a dedicated funding source.

4.3 Risk Assessment

The Smart Parking and Operations Strategy must be equipped to deal with short-term and long-term risks associated with implementation. The risk assessment criteria used to measure the operational and design levels of risks are the following: Proper planning and scoping, exposure evaluation, risk characterization, and mitigation measures (risk treatment).

5. Lifecycle Assessment

5.1 Overview

Proactive management of City assets requires not only proper funding, installation, and maintenance of Smart Parking equipment, but planning for equipment end-of-life as well. This concept of life cycle replacement is crucial to the long-term effectiveness of the Smart Parking strategy to ensure that the service is not interrupted when equipment does reach end-of-life status. It is recommended that the City consider a 10 to 15-year lifecycle for all equipment due to two main factors: technological advancements and equipment environment. Technological capabilities of today will be outstripped by future development, so it is to be expected that the technological capabilities of Smart Parking sensors and information dissemination techniques of today will not be able to perform to the standards of technology in the future. In addition, equipment will be subjected to normal industry wear and tear, and any outdoor technology such as fiber and parking sensors will be subjected to environmental factors such as temperature changes and potentially being repeatedly being driven over that will cause additional wear and tear and potentially more severe damage, lowering the effectiveness of the infrastructure. It is recommended that the City of Orlando budget for this life cycle replacement during this 10 to 15-year period of equipment activity to limit the potential for service interruption when the time comes to replace any outmoded equipment. In addition, it is recommended that any equipment chosen to replace equipment that has reached end-of-life is compatible with the existing system design.

5.2 Assessment

Based on generated insights, rapidly expanding technology and environmental factors affect the lifecycle of network equipment. The following are the key lifecycle milestones to be monitored:

- Functionality
- Durability
- Efficiency
- Availability
- Optimization

6. Benefit Cost Analysis

6.1 Overview

The benefit cost analysis compares the value of all benefits with that of the cost and investment of the Smart Parking and Operations strategy. A benefit cost analysis will have to be executed to measure the benefit cost ratio of the strategy. To demonstrate the positive effects the Smart Parking and Operations strategy will have on the City of Orlando and the public, an opportunity cost has been calculated. The opportunity cost will be used to determine the benefit cost ratio of implementing a smart parking strategy. Opportunity cost is defined as the cost of not implementing

a solution. In this case, the opportunity cost will be the cost should none of the parking facilities receive a smart parking solution. This will represent the cost to the public and users of the City of Orlando parking facilities should the Smart Parking and Operations strategy not be implemented or, alternatively, the savings that will be created by avoiding the effects of inefficient parking. The information used to determine this cost is derived from studies that show that the average person spends 17 hours a year searching for parking which results in $345 spent on time, fuel and emissions each year. Information provided by the city on their average daily and event garage occupancy rate was also factored into the opportunity cost calculation.

A preliminary high-level cost estimate has been conducted to determine the initial cost of installing a smart parking system in eight City of Orlando operated garages. The estimate is comprised of two (2) phases; Phase I: the initial cost of developing/configuring a parking management application and Phase II: the cost of installing a detection system for parking availability. The detection technology chosen for the purpose of the estimate is an ingress/egress detection smart parking system that counts vehicles as they enter and exit a facility. Costs are derived from a building model that assumes that each garage is a six-level garage with a total of 600 spaces. The preliminary costs include the shipping, configuration, taxes and warranty for one-year cost. Also, consider that scope differences and market conditions can cause costs to vary significantly when calculating the cost for a specific parking facility in the future. The estimates are shown below.

6.2 Capital Cost Estimate

When installing an ingress/egress detection technology smart parking system, it is estimated that the Smart Parking and Operations strategy will have a total initial capital cost of $1,091,200 for eight parking garages. This is the sum of the subtotal cost of $992,000 and a 10% design service fee. The subtotal cost is the sum of the Phase I cost (Parking Management Application) = $200,000 and the Phase II cost (Ingress/Egress Vehicle Detection system for eight garages) = $792,000. In addition, it is estimated that the operations and maintenance cost will be $597,417 over a 10-year period.

6.3 Benefit Cost Analysis

Depending on the type of detection technology (ingress/egress, level, or full) chosen by the City of Orlando for each garage, the total capital cost will then be factored into the benefit cost analysis formula. The benefit cost analysis will give the City of Orlando a better understanding of the overall value provided to both the City and motorists, expressed in monetary terms, of the Smart Parking and Operations strategy. The benefit cost ratio demonstrates the public benefit of implementing the Smart Parking and Operations Strategy. This measure quantifies the benefit to the public in dollars. This represents the dollar benefit the public receives for every public dollar spent.

When factoring the $345 spent a year by the average person looking for parking, and the average daily and event occupancy rate of a City of Orlando parking garage, the total 10-year opportunity cost to the public is $8,526,960 (includes 2% inflation per year).

The benefit cost ratio is calculated by dividing the 10-year opportunity cost ($8,526,960) by the total initial capital cost + the operations and maintenance cost ($1,688,617) which results in a benefit cost ratio of 5.05. Ultimately, this ratio demonstrates that the Smart Parking and Operations strategy will prove to be an extremely effective investment of funding for transportation purposes as the City moves forward to becoming Future-Ready.

7. Implementation

7.1 Constraints and Needs

Whether it be for recreational, work or event parking, drivers in downtown Orlando need to be provided real-time data in order to make efficient use of the existing parking infrastructure. This can be achieved through the Smart Parking and Operations Strategy. This section summarizes the basic system requirements for the implementation of such.

The strategy requires the use of existing parking facilities (public surface lots and parking structures) to install smart parking technology. These existing parking facilities will receive installation of a preferred detection technology (ingress/egress detection, level detection, or full detection) which will detect parking availability. Each parking facility will be evaluated on a case by case basis to decide what smart parking technology will be implemented in each. Information received by the detection system will be transmitted to a central software using ITS technology. This allows parking staff and others to monitor the capacity of all the parking facilities from a single user interface. Data transmission to users will be provided via DMSs in order to provide information on parking availability of each facility. Users will also receive real-time data transmission using the mobile parking application connected to the central server appointed to receive information from the detection system. Through the detection system and the data transmission, the mobile application will also provide information on the availability of priority reserved parking. Through this interface, users will be able to make parking reservations and make parking payments. The mobile parking application will have an implemented user interface (unified fare collection) allowing the application to receive payment with different options such as: prep-paid cash, credit or debit. In order to have a reliable smart parking strategy the transmission of data must be dependable.

Each one of the parking facilities will have the ability to operate as a stand-alone system but the City will achieve parking effectiveness if all the data is transmitted to one or many central monitoring locations. One logical choice is to transmit the parking data to the City of Orlando Traffic Management Center (TMC) since the facility is already connected to the City's existing traffic Ethernet network. There are numerous ways to transmit the real-time data from the parking facilities to the TMC. The most effective solution is to install a conduit and a small count fiber optic cable from the parking facility to the closest traffic signal intersection. This would result in data security since all of the communications would be transmitted on the already secure City of Orlando Traffic Operations Ethernet Network.

In summary, the smart parking technology enables the data to be transmitted from the parking facilities to a central server where the information can then be transmitted to the mobile parking application, providing real-time data to the users.

7.2 Timeframe

It is estimated that the Smart Parking and Operations strategy implementation will have a two (2) year timeframe. One (1) year for the development/adoption of a mobile parking application and one (1) for the implementation of the smart parking technologies previously discussed in this document. Please note that these two activities could occur simultaneously.

7.3 Key Performance Indicators

- Increased parking revenues within identified downtown parking facilities by 15%.
- Improve occupancy rates of existing parking facilities.
- A decrease in corridor congestions and reduced vehicle emissions.
- Daily usage of mobile parking application.

8. Notes

Not applicable at this time. The remainder of the page has been left blank should there be future notes required.

9. Appendices

Not applicable at this time. Any appendices required throughout the project will be added within this section.

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