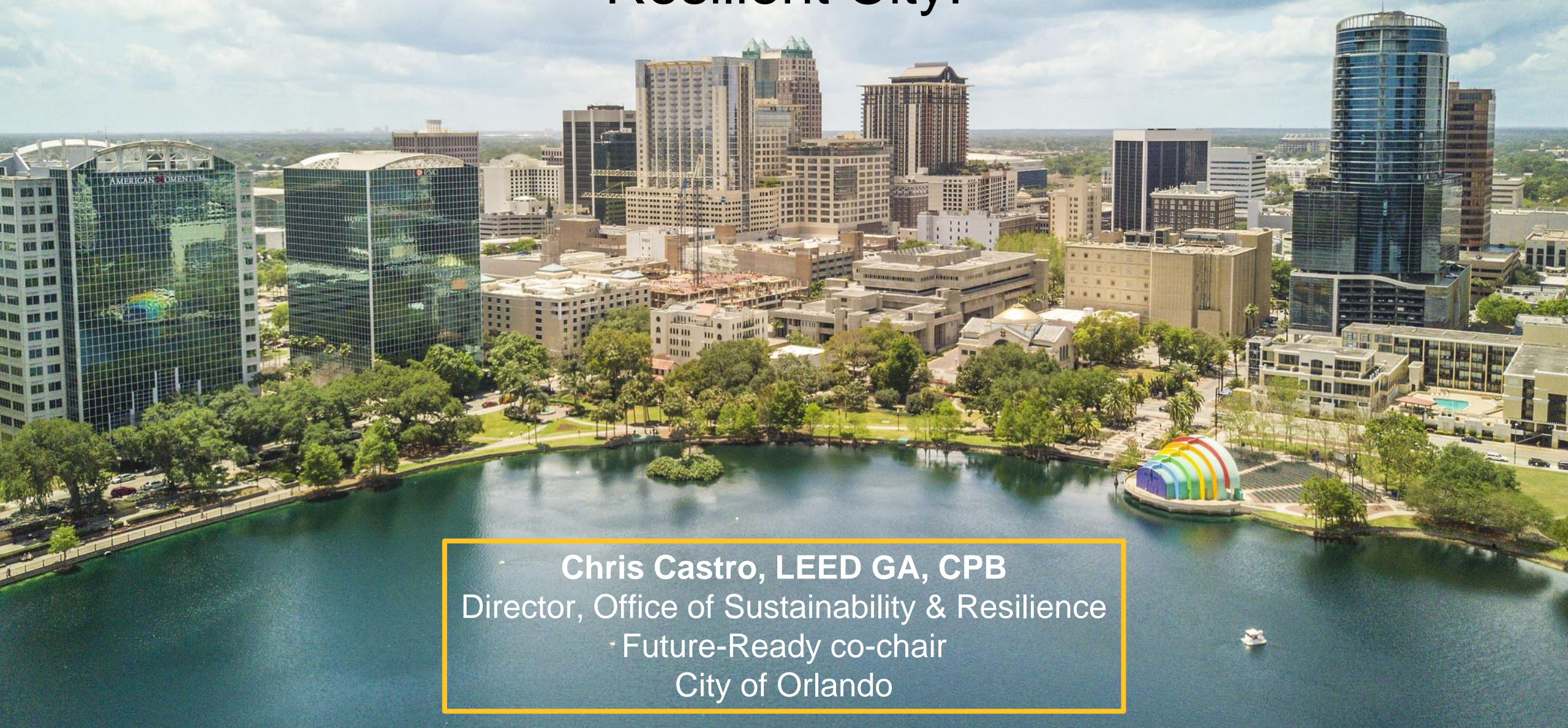


Green Works Orlando: Becoming a Healthy, Equitable, Resilient City!



Chris Castro, LEED GA, CPB
Director, Office of Sustainability & Resilience
Future-Ready co-chair
City of Orlando

Green Works Orlando

Office of Sustainability & Resilience

- Award-winning sustainability program called “**Green Works Orlando**” launched by Mayor Buddy Dyer in 2007
- Develops internal and citywide policies + programs to:
 - Protect natural resources and the environment (air, water, land)
 - Improve public health and social equity
 - Create green economic dev. and green jobs opportunities
 - Decrease air pollution and carbon emissions
 - Enhance city resilience and adapt to climate change impacts
 - Reduce operational expenses and enhance efficiency
 - Educate the residents and businesses on sustainable practices
- Focuses on 7 key areas:
 - Clean Energy
 - Green Buildings
 - Local Food Systems
 - Zero Waste
 - Livability
 - Clean Water
 - Electric & Alternative Transportation



SUSTAINABLE DEVELOPMENT GOALS

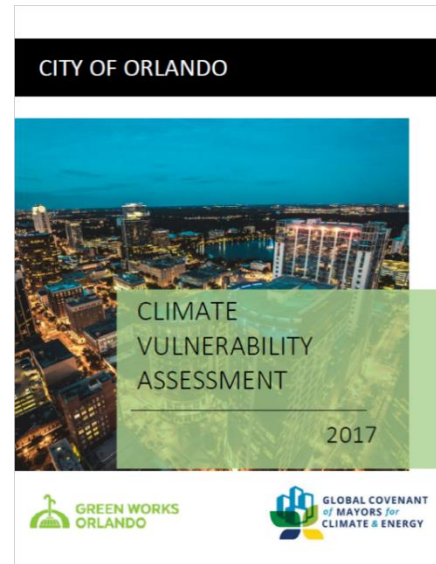


Pathway towards Sustainability & Resilience

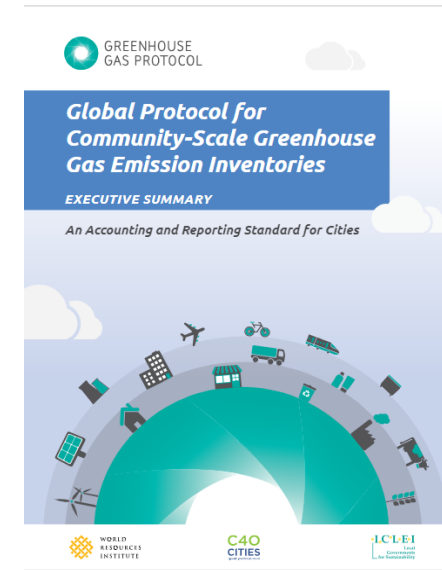
Municipal Operations
Sustainability Plan
(2012, updated in 2017)



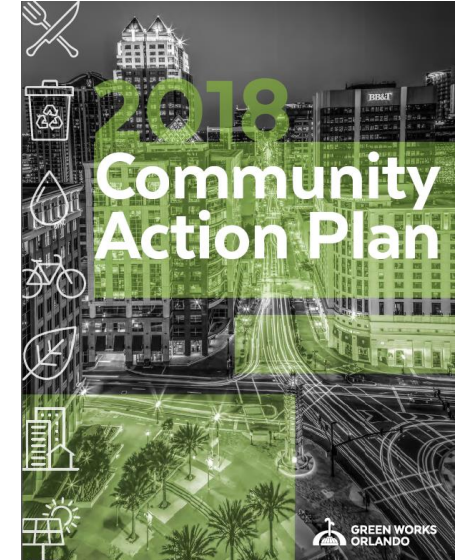
Climate Vulnerability Assessment
(2017)



Greenhouse Gas Inventory
(2018)



Community Sustainability Action
Plan
(2013, updated in 2018)



Vision Zero Plan
(2019)



Future-Ready Master Plan
(2020)



WHY CITIES NEED TO ACT

Home to **55%**
of the global population

Generate **80%** of
GPD

80% of cities do
not meet air quality
standards

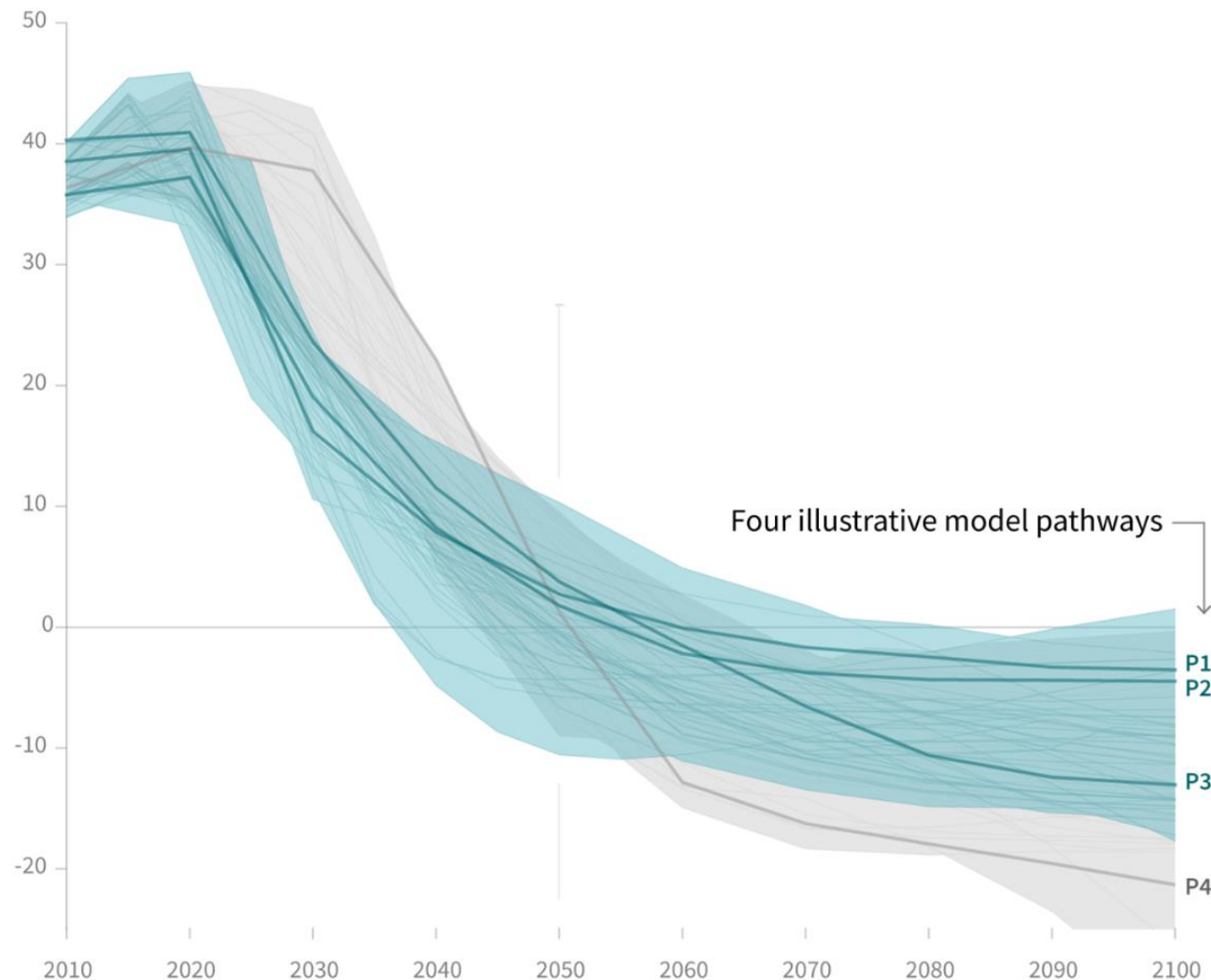
Responsible for **75%** of
global energy use and
emissions

By 2050, 5 billion people living in cities will be exposed to
food insecurity, extreme heat, and/or sea-level rise.

And now ... IPCC Report has underscored that we are
in a **CODE RED** situation and demand urgent action
from our elected leaders.

Global total net CO₂ emissions

Billion tonnes of CO₂/yr



**For the safety of
people, planet, and
economy
we must reduce
global emissions in
half by 2030 and
reach net zero
emissions by 2050**

Source: IPCC Special Report on Global Warming of 1.5°C

CITIES

RACE TO ZERO

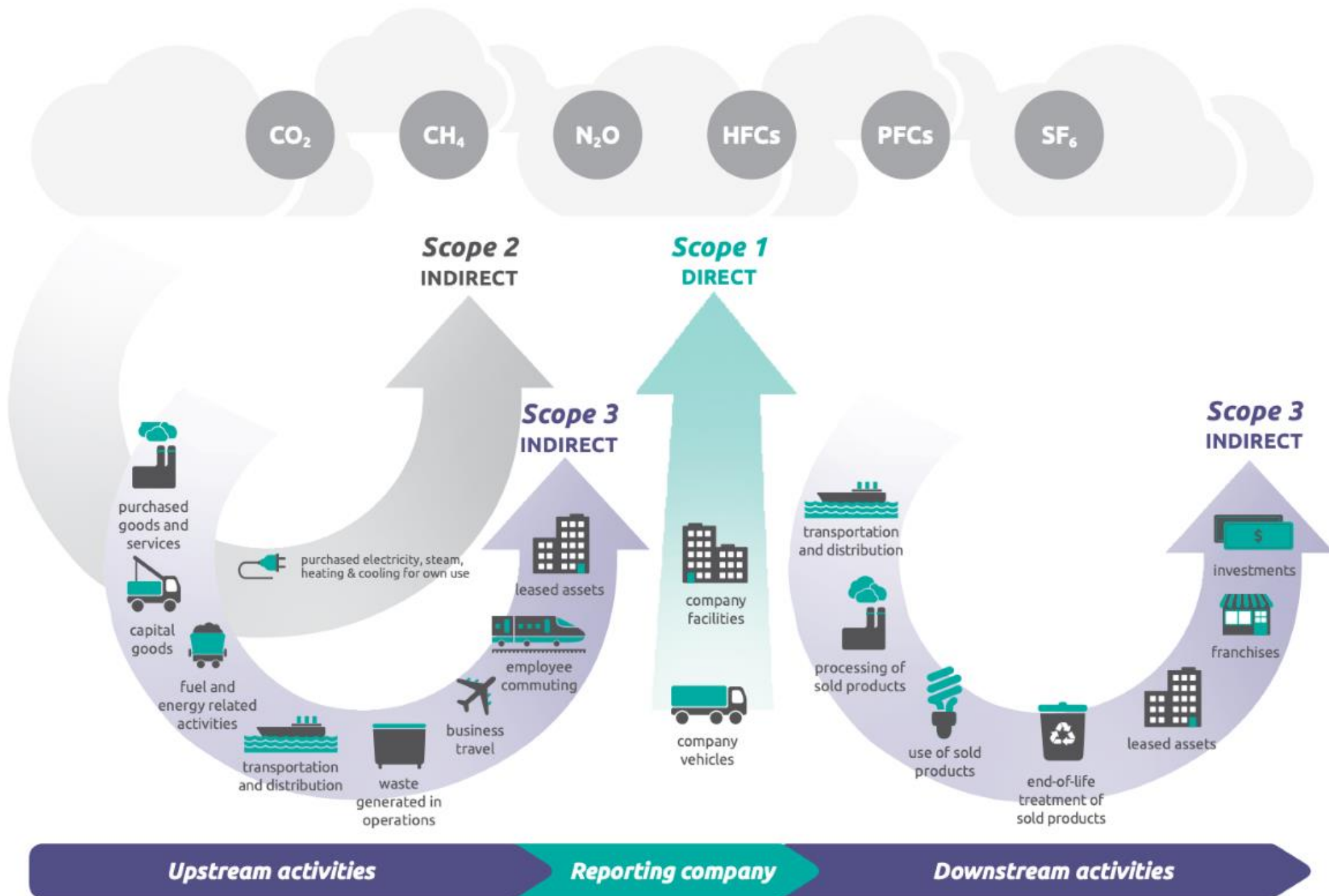
&

RACE TO ZERO

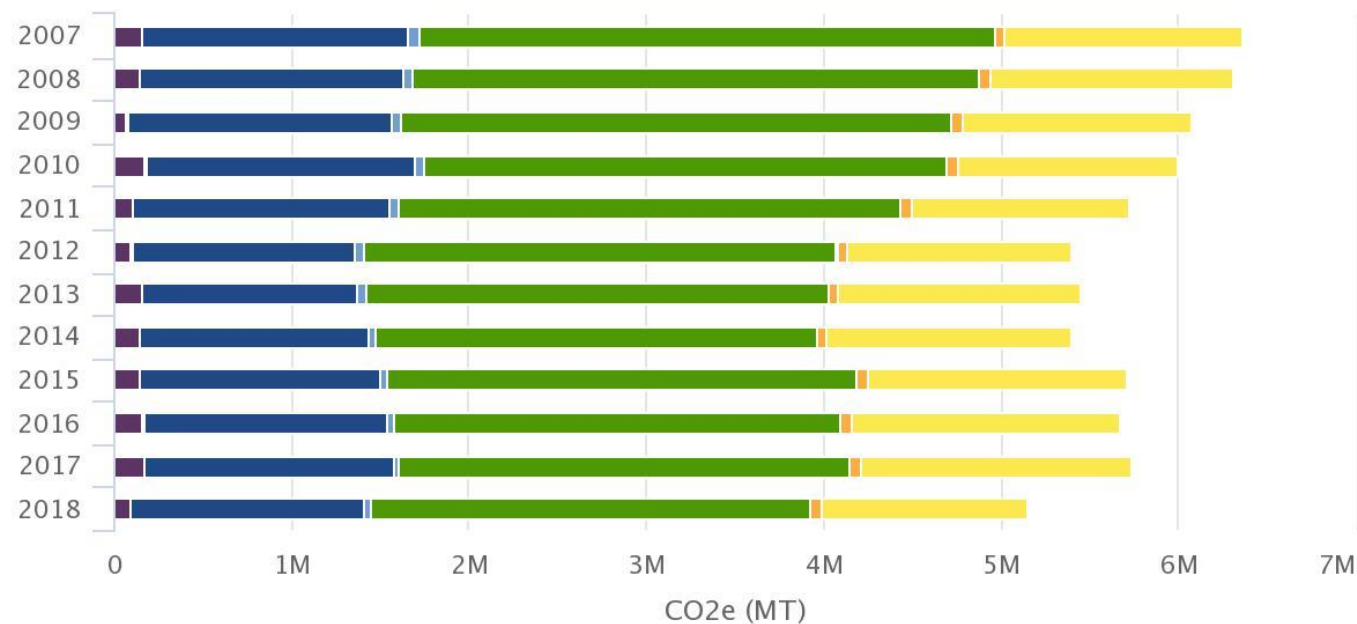


© Henning Witze

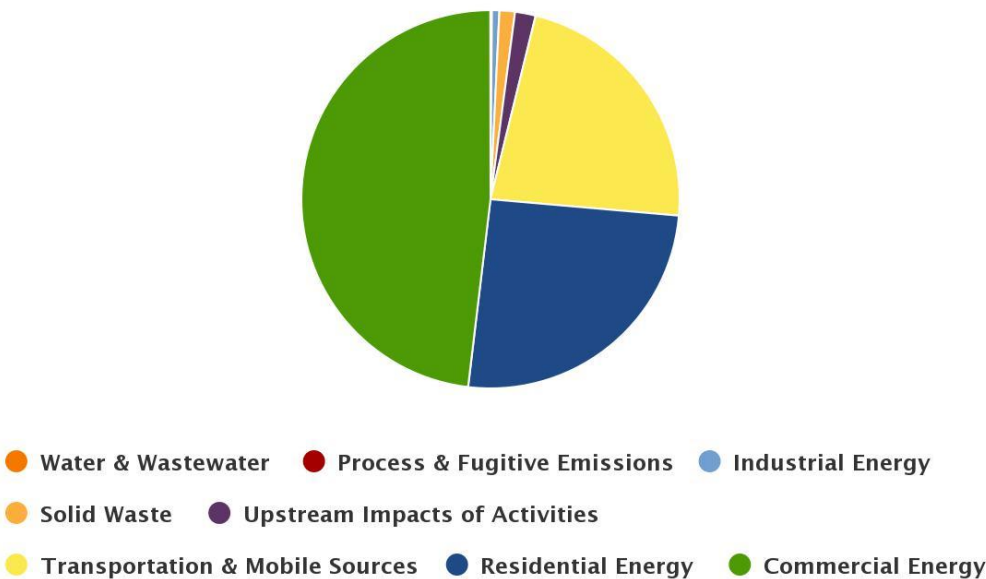




Orlando's Citywide yearly emissions by sector / source



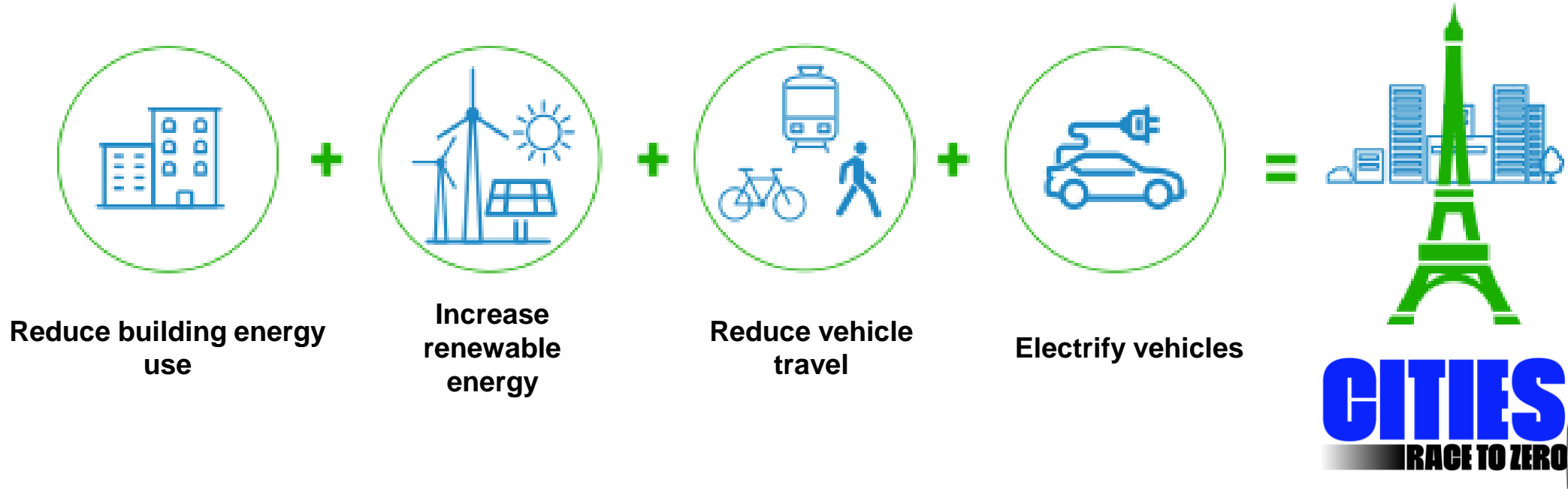
CO2e By Category



- Upstream Impacts of Activities Process & Fugitive Emissions
- Residential Energy Industrial Energy Commercial Energy
- Water & Wastewater Solid Waste Transportation & Mobile Sources

Orlando's Climate Action Strategy

Through the **American Cities Climate Challenge**, the City of Orlando has launched an effort to accelerate and deepen our climate actions to create the greatest climate impact through 2030 and showcase the benefits – **good jobs, cleaner air, and cost savings** – that climate solutions brings.





Green Buildings



Mandatory LEED Silver certification for City buildings – Grid Interactive Efficient Buildings (GEBs)





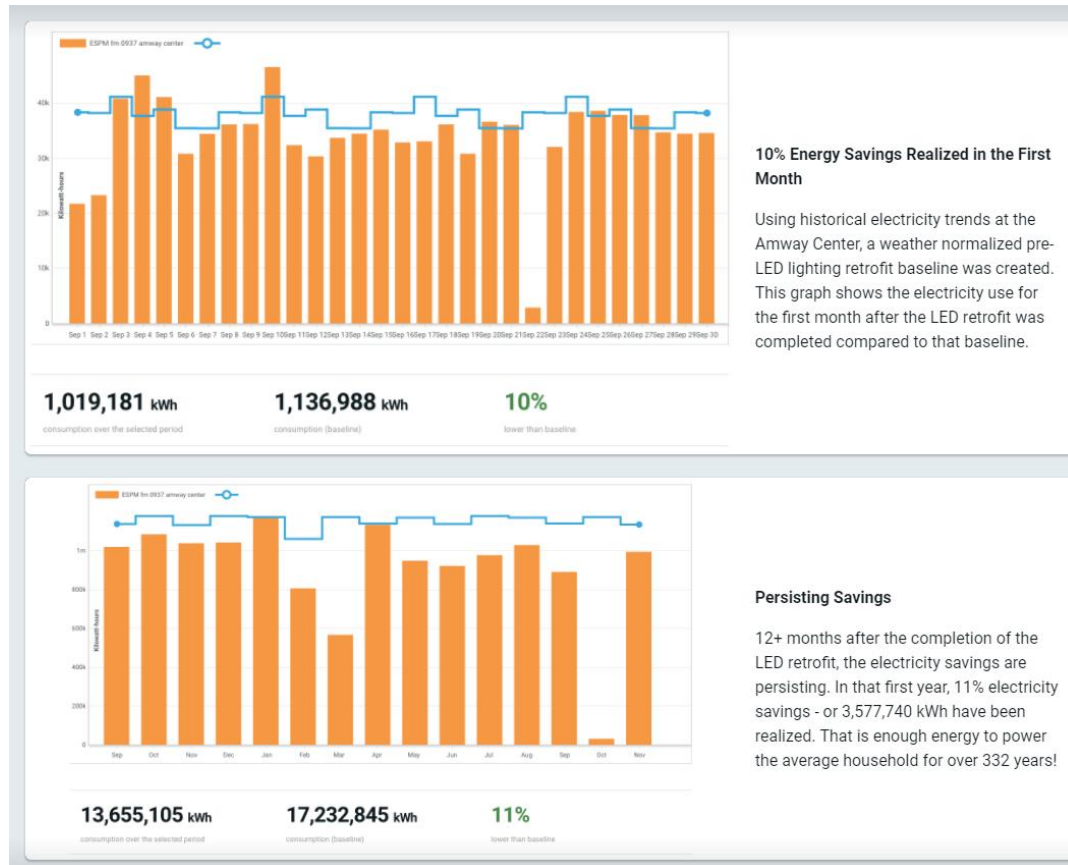
Municipal Green Bond for EE



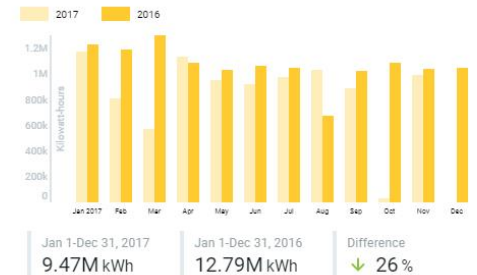
- \$17.5 M green bond for energy efficiency
- 56 municipal buildings across 5+ M sq ft.
- Self-performed vs. ESCO/ESPC model
- Lucid BuildingOS as EM&V tool

RESULTS:

- EUI savings: 23.4% portfolio-wide
- Annual savings: \$2.4 M
- Revolving energy fund ~\$250,000 per year

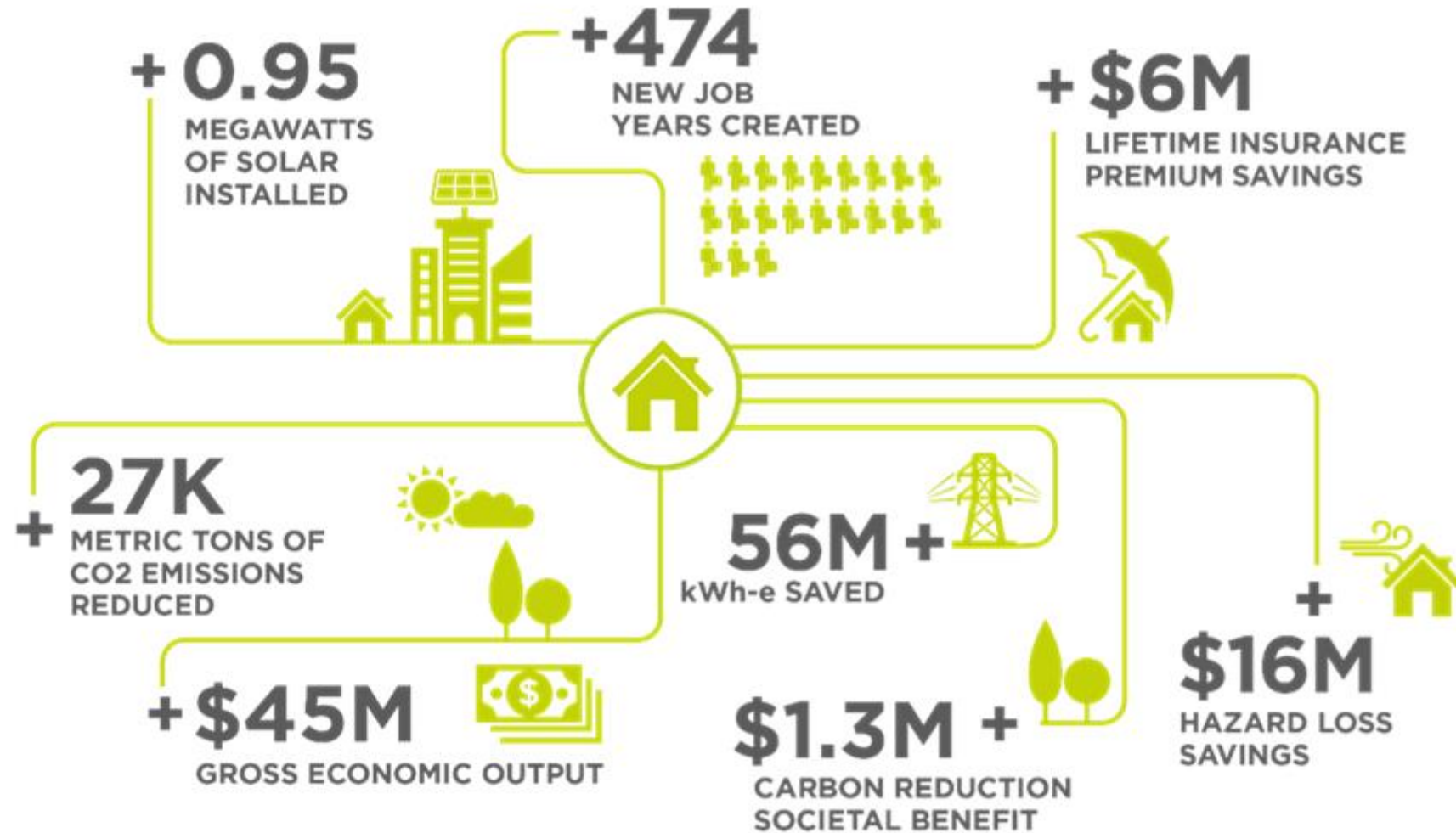


Year-over-Year Total Electricity Use / 2017 compared to 2016



Amway Center's Electricity Use Post LED Retrofit
Last 12 months

Estimated impact¹ of \$18M² in nearly 1,000 funded disaster resiliency, renewable energy, and energy efficiency property improvement projects across the Orlando Area.



¹Data 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>

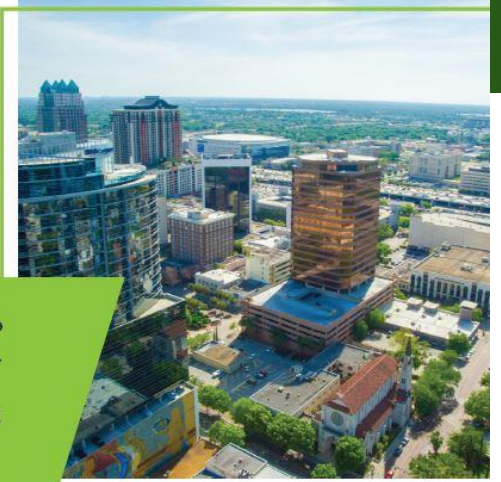
²Represents rounded dollar amount of PACE contracts funded by Ygrene through October, 2019.

Green Building Incentive Program

- Majority of green buildings owned by government and academia
- Property Tax rebate for healthy and high-performing buildings
 - LEED Silver: 50%
 - LEED Gold: 75%
 - LEED Platinum: 100%
- Benefit available in first property tax payment
- New commercial/MF construction or substantial improvement (50% sf+) only

8/20/2021

ORLANDO'S GREEN BUILDING INCENTIVE PROGRAM



Buildings are the single-largest user of energy in Orlando and account for nearly 80% of Orlando's total emissions. When we make buildings more energy efficient, owners and tenants can save money on utilities, lower operating costs, and reduce pollution.

WHAT IS THE GREEN BUILDING INCENTIVE PROGRAM (GBIP)?

GBIP encourages developers to build sustainably through a City of Orlando property tax rebate. Multi-family and non-residential buildings are eligible when:

- New construction or undergoing a substantial enlargement
- Project achieves LEED Silver certification or higher

This 5-year pilot program (2021-2025) provides a performance-based one time rebate incentive at three levels:

- ✓ LEED Silver receives **50%** rebate
- ✓ LEED Gold receives **75%** rebate
- ✓ LEED Platinum receives **100%** rebate

WHO BENEFITS?

DEVELOPERS: Increased value; recognition of leadership, recoup costs with GBIP

TENANTS: Lower operating costs, decreased water and energy consumption, increased occupancy rates

EMPLOYEES: Health and productivity

COMMUNITY: Reduced greenhouse gas emissions, better mobility options, decreased pressure on natural resources and electrical grid

WHAT WOULD THIS LOOK LIKE?

On the first year of property taxes, an office building valued similarly to the Citrus Center would receive an incentive up to \$250,000 for building and certifying LEED Gold.

PROCESS FOR DEVELOPERS



American Cities
Climate Challenge



Clean Energy

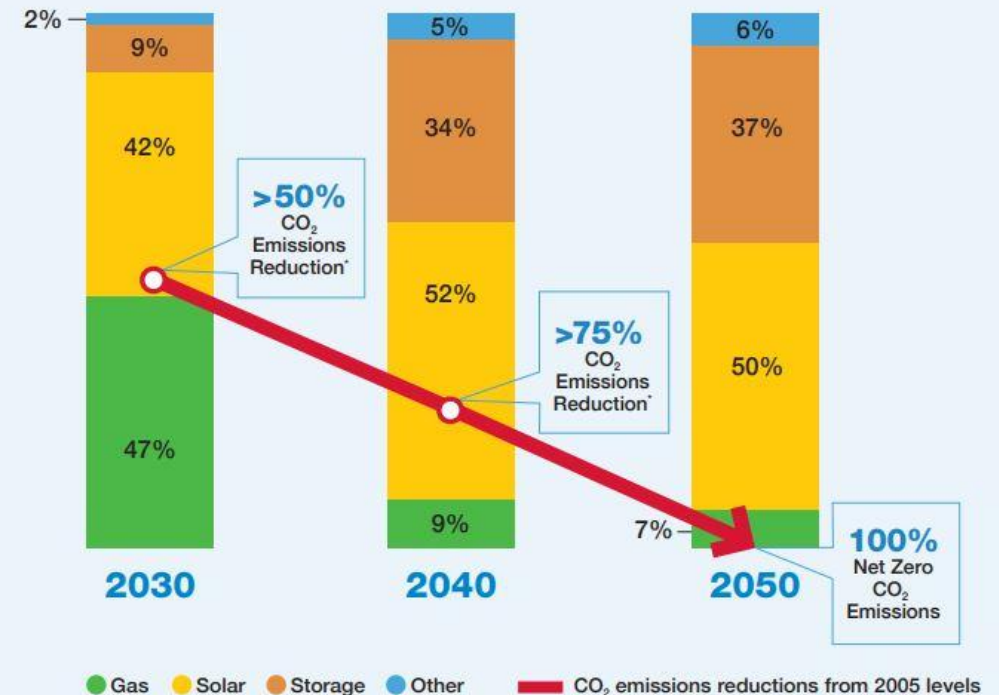


On August 8th, 2017, the City of Orlando adopted **100% Renewable Electricity Policy:**
Municipal operations by 2030
Citywide by 2050*

Orlando Utility Pulling Plug on Coal-Fired Generation

- **Net-zero carbon by 2050**
- **End coal-fired generation**, with a significant reduction no later than 2025, and eliminating it no later than 2027.
- **Accelerate solar and energy storage as primary strategies.** The utility also said it “will continue to monitor cost and performance developments for new and existing clean technologies, such as hydrogen and small modular reactors.”
- **Leverage future clean technologies** to ensure diversity for reliability, in order to reduce dependency on solar and storage.
- **Strive to maintain competitive rates for customers while achieving strategic goals.** The utility acknowledged that, “Advancements of this magnitude require significant investments. However, the recommendation delivers the best value.”

OUC Management Clean Energy Roadmap Recommendation



*Emissions reductions based on 2005 base levels

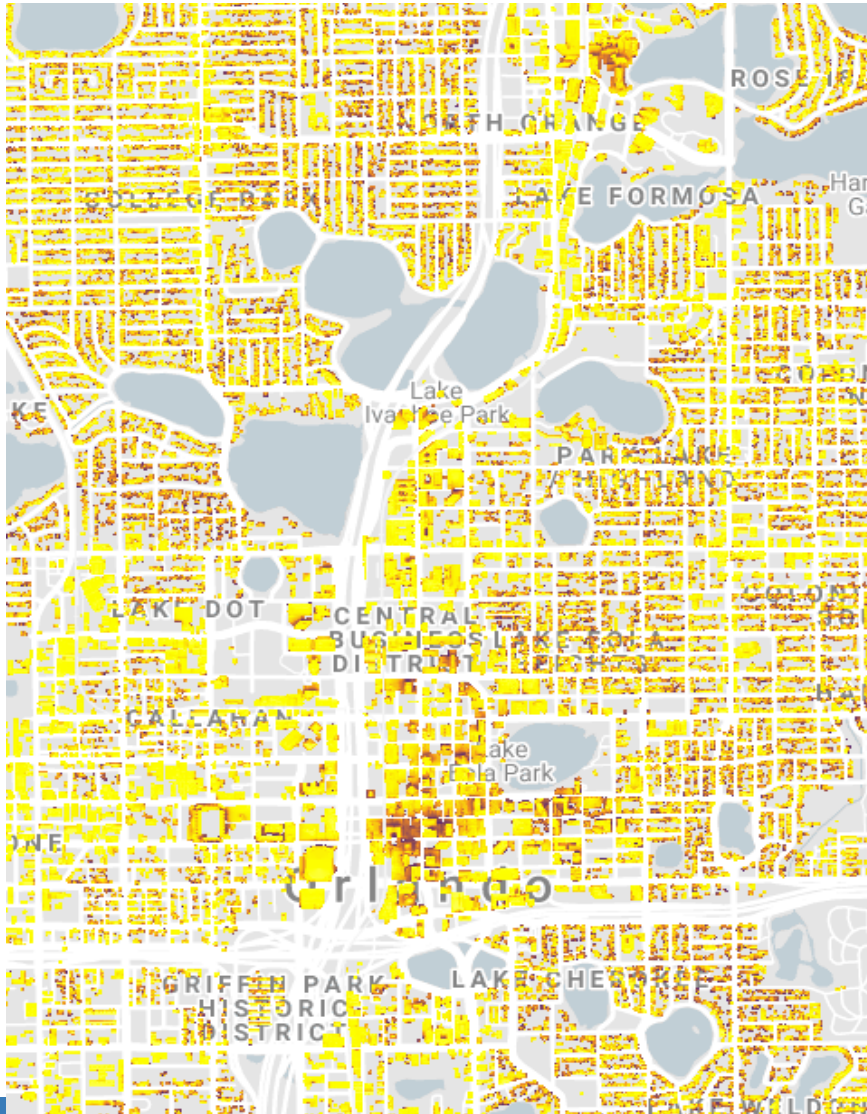
Other includes nuclear, wind and gas peaker

EV offsets used in 2050 only

OUC will significantly reduce coal-fired generation no later than 2025 and eliminate it no later than 2027.



Citywide Rooftop Solar dGen Study



Overall

Total estimated size and solar electricity production of viable roofs for Orlando, FL

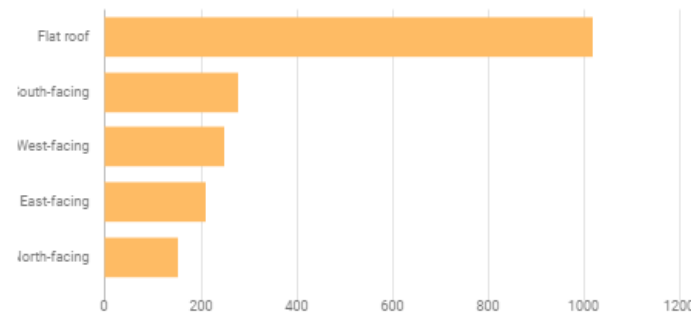
Roofs
92%
54.5K

Roof space
135M
sq ft

Capacity
1.9K
MW DC

Electricity
2.6M
MWh AC per yr

Total installation size (MW DC)



Per roof

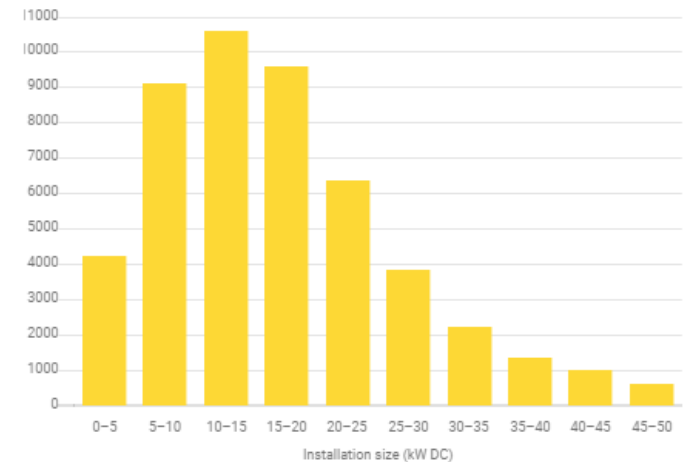
Median estimated system size and solar electricity production per viable roof for Orlando, FL

Roof space
1.2K
sq ft

Capacity
16.3
kW DC

Electricity
21.6K
kWh AC per yr

Rooftop solar capacity distribution (number of roofs, < 50kW)

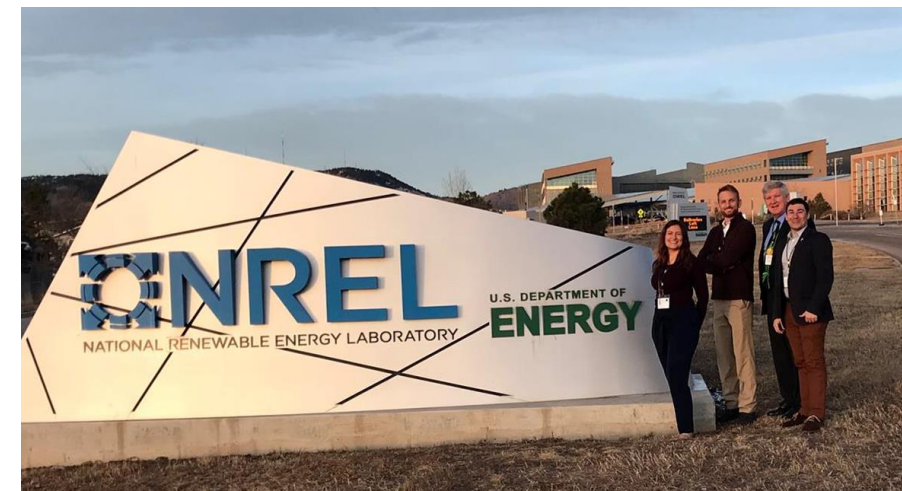




NREL Solar Energy Innovation Network (SEIN)



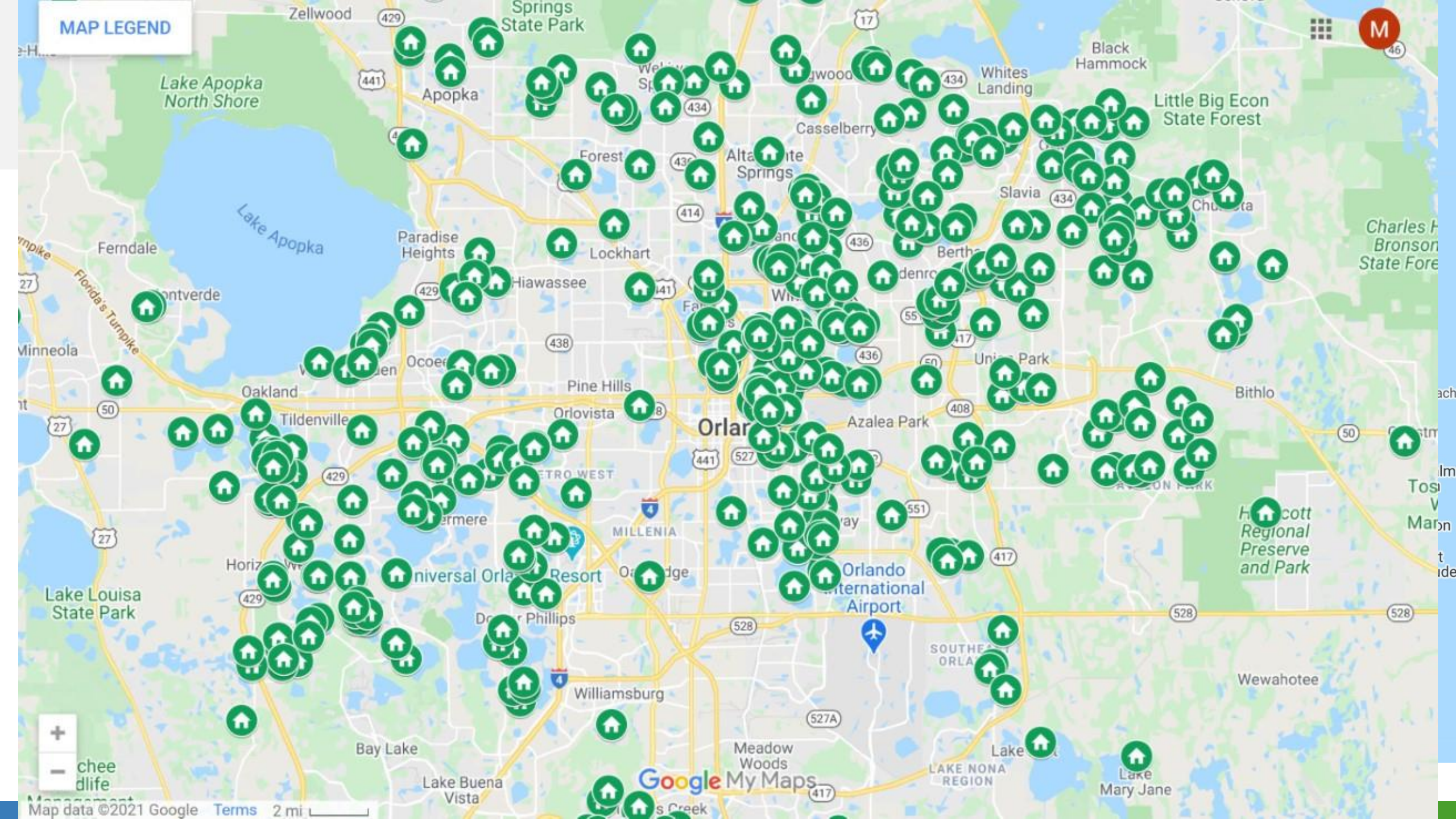
- Evaluated the techno-economic potential of PV and storage at critical City facilities
- Analyzed 15-min interval electric load data and complex utility rate structure of each site
- Provided technology sizing recommendations
- Compared direct purchase to third-party owned
- Analysis was used to prioritize CIP projects targeting rooftop solar and energy storage



FLEET & FACILITIES COMPLEX



MAP LEGEND



130 MW+ Community Solar program — 150MW in pipeline



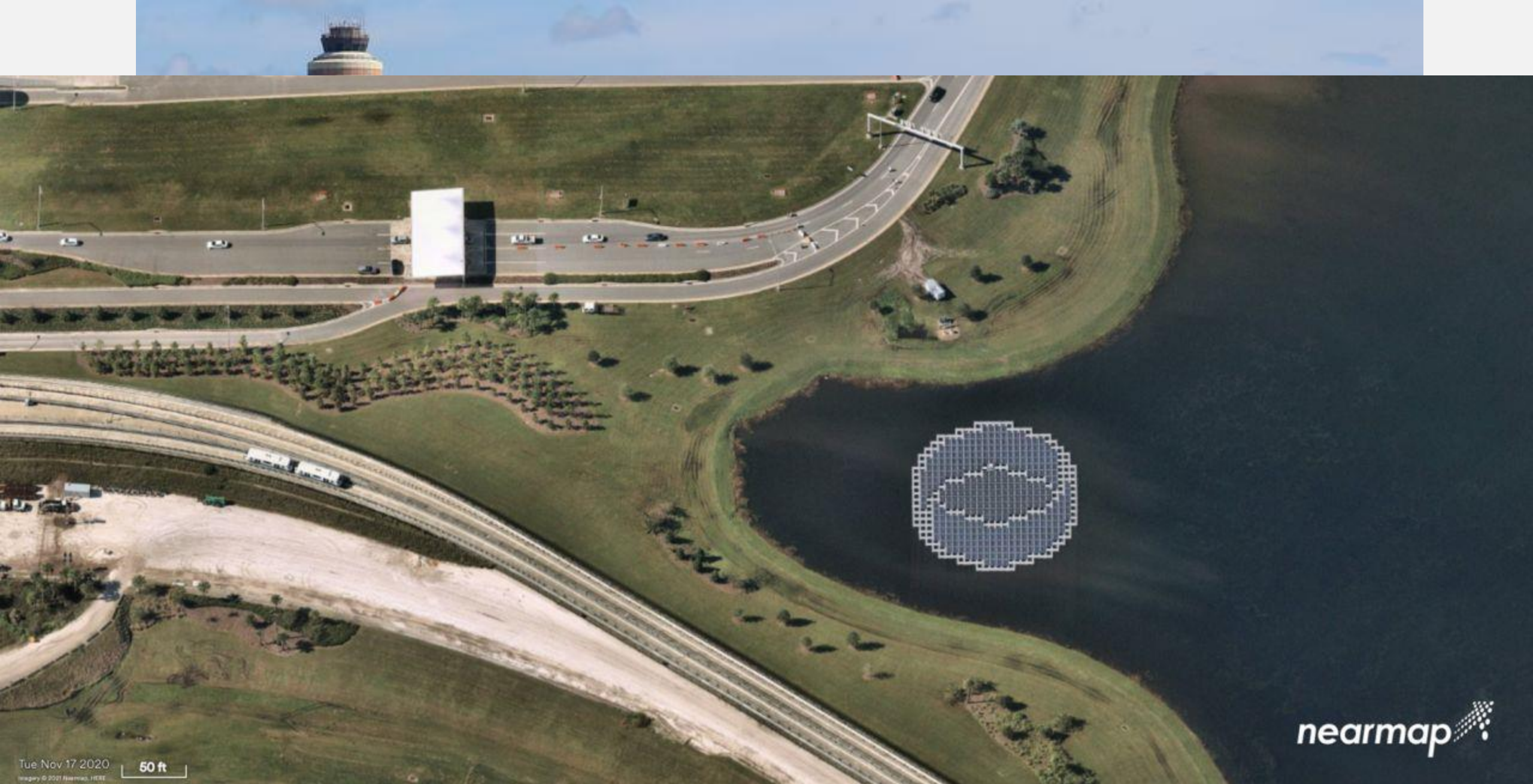
City Facilities on Community Solar



52 City facilities are subscribed:

- Orlando City Hall
- Orlando Police HQ
- 17 Fire Stations
- 12 Neighborhood and Senior Centers
- 21 Parks, including Lake Eola Park





nearmap

Tue Nov 17 2020
Imagery © 2021 Nearmap, HERE

50 ft





Green Hydrogen Nanogrid Pilot @ OUC Gardenia facility

A floating solar array, which recently was expanded to 64 kilowatts of capacity from 31.

Three electric vehicle (EV) chargers, including one with vehicle-to-grid (V2G) capability.

Two Vanadium Redox Flow (VRF) batteries, which are used to store and dispatch energy.

H2 electrolyzer and two trailers with hydrogen storage tanks and H2 fuel cell





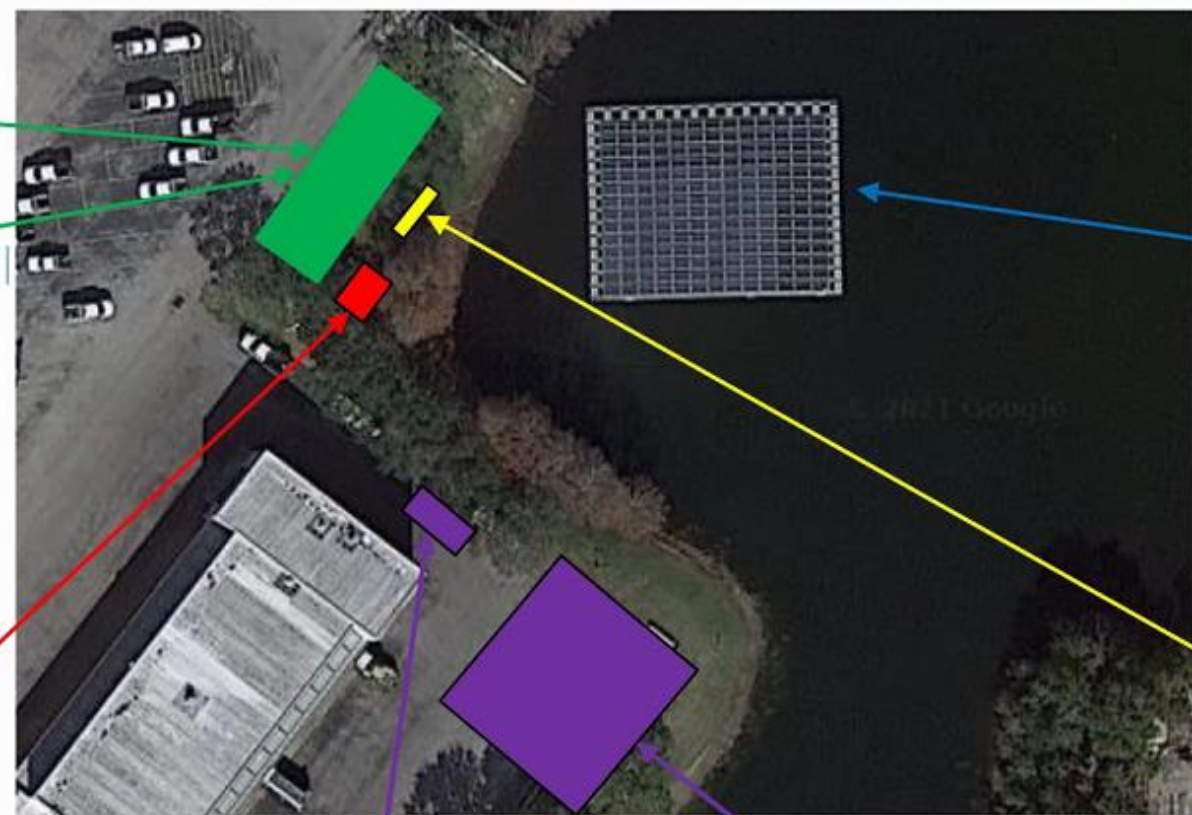
Vehicle-to-grid
EV Charging
Station



DC Fast Charger



Two Vanadium Redox Flow
Batteries



64kW Floating Solar
Array



Controller



Hydrogen Facility



Transportation

The market has rapidly accelerated towards EV adoption with big commitments

CNBC
Biden plans to replace government fleet with electric vehicles
PUBLISHED MON, JAN 25 2021-5:38 PM EST | UPDATED TUE, JAN 26 2021-8:58 AM EST

General Motors to eliminate gasoline and diesel light-duty cars and SUVs by 2035

Big U.S. automaker says it will invest heavily in electric vehicles and be carbon neutral by 2040

SCIENCE BUSINESS TECH
Lyft vows '100 percent' of its vehicles will be electric by 2030

TECH TRANSPORTATION CARS
Ford is more than doubling its investment in electric and autonomous vehicles to \$29 billion

Jaguar Land Rover Goes Electric

THE WALL STREET JOURNAL

Jaguar Land Rover will invest \$3.5 billion a year to roll out its first fully electric model by 2024

Why 2020 Is the Turning Point for Electric Cars

Major auto brands, startups and opportunistic investors are all joining the electric-vehicle the coming EV revolution



TECHNOLOGY NEWS JANUARY 15, 2018 **REUTERS**

Global carmakers to invest at least \$90 billion in electric vehicles

Volvo says it will make only electric cars by 2030

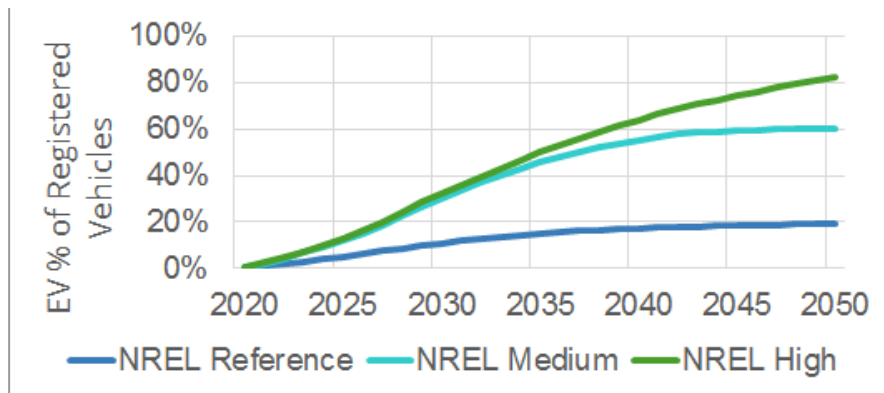
Requirements Added To St. Louis Codes, Local Electricians Are Ready



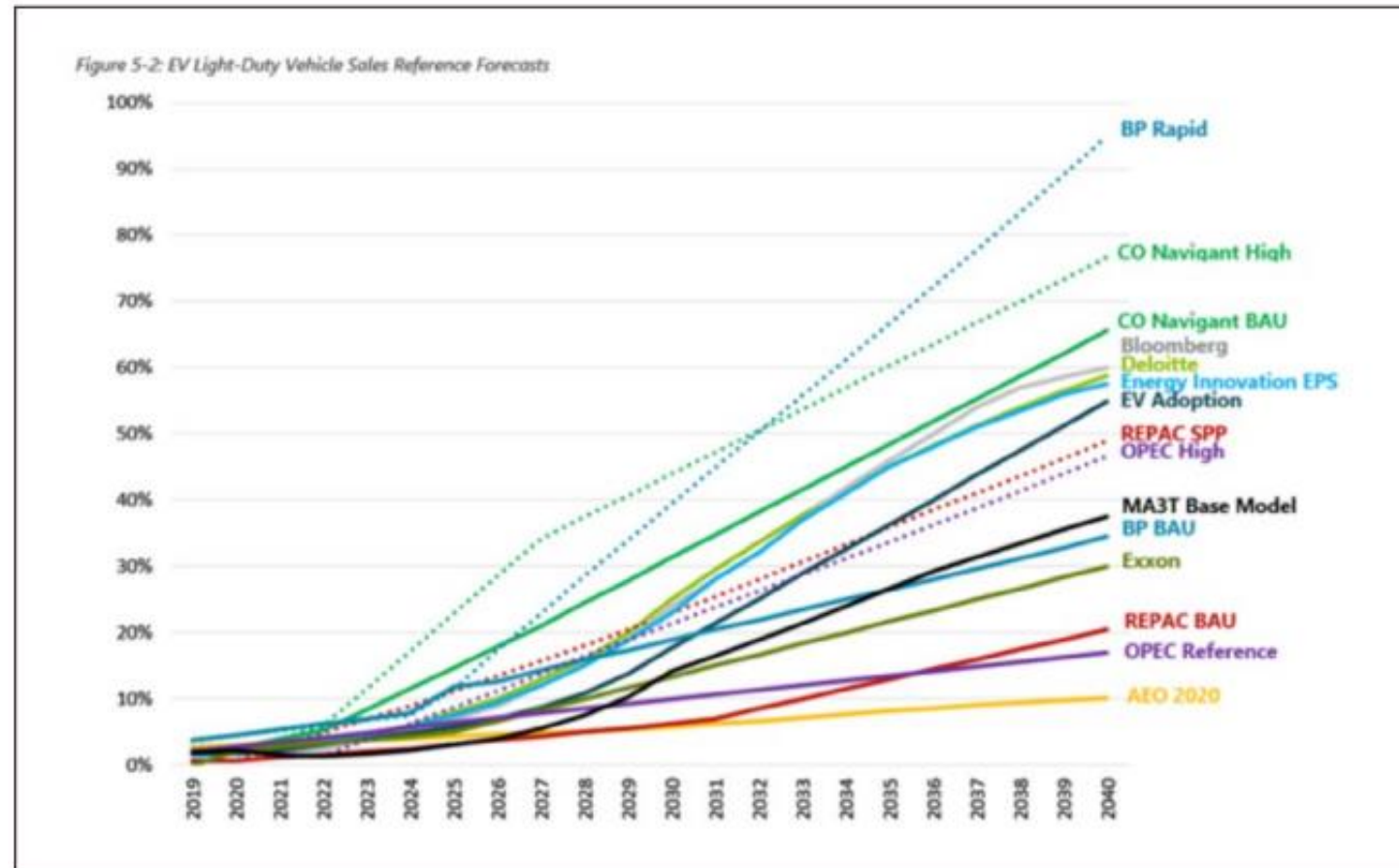
everybody in.

Trajectory for electric vehicle (EV) adoption and charging demand...

- By 2025, EV adoption is projected to more than double in the Orlando metro area.
- By 2030, EV adoption is projected to reach 10-30% of registered vehicles, and by 2050, nearly 70%.

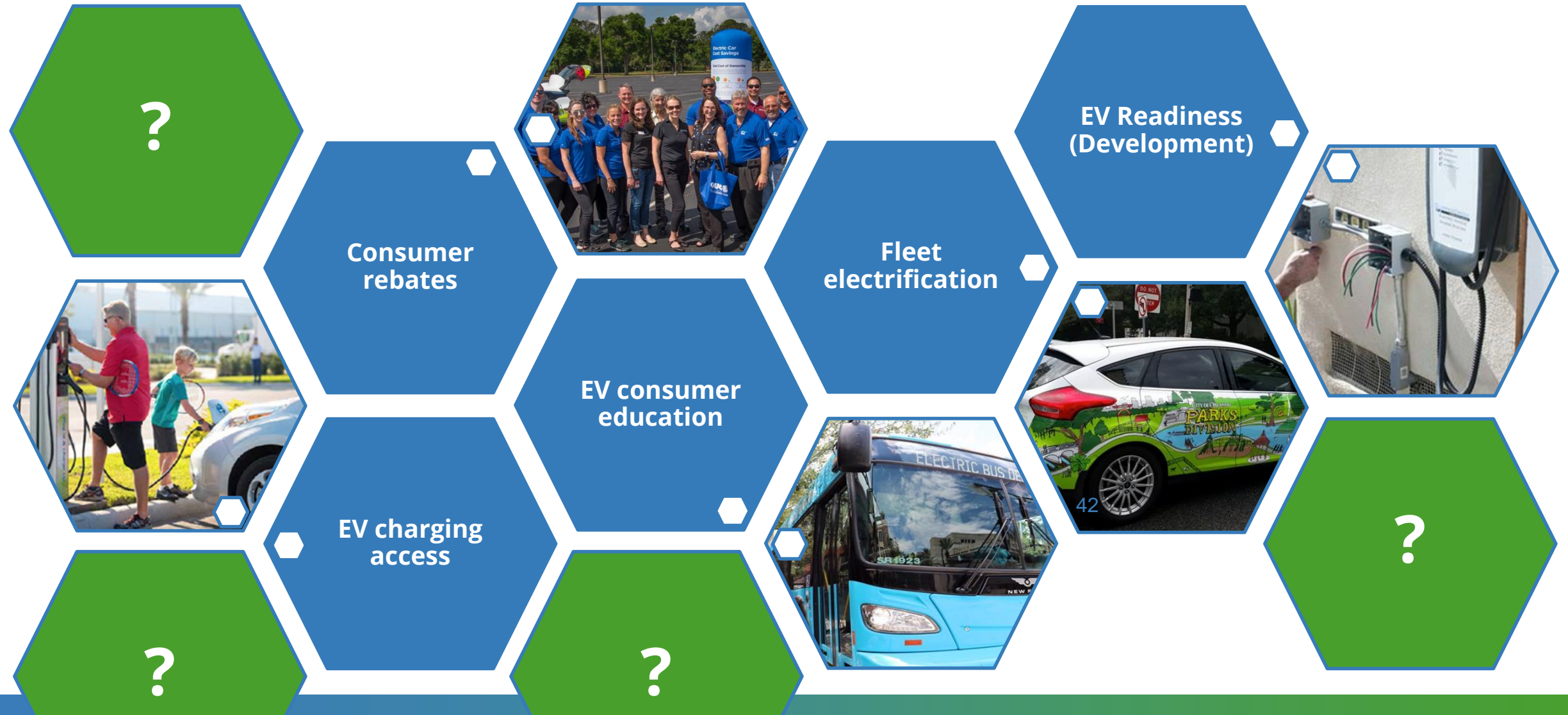


Source: National Renewable Energy Lab



Source: FDAC

We are creating an e-mobility ecosystem and preparing for a rapid and massive transformation ahead





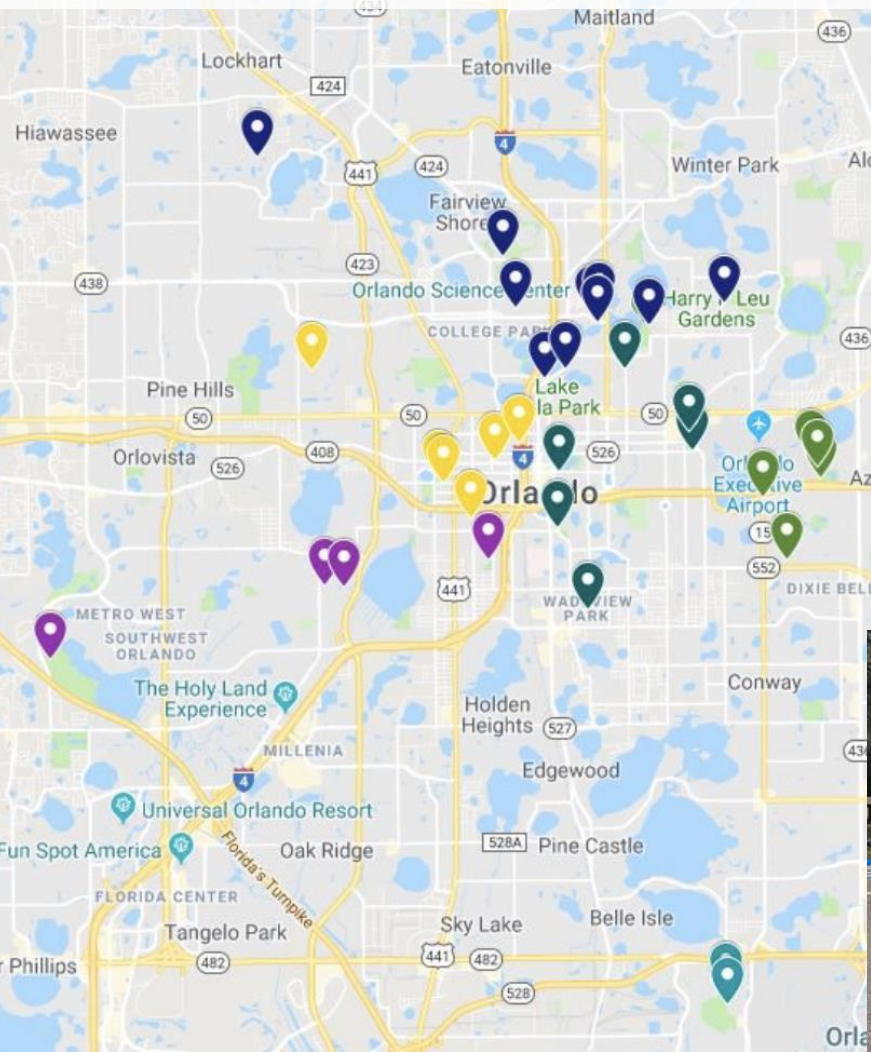
Municipal EV Fleet - ~3,000 vehicles

- **Goal:** 100% Electric and Alt. Fuel for all City Fleet by 2030
- **200+ EV & Hybrids in City Fleet**
 - 15 new Chevy Bolts EV's for City Hall motor pool
 - 15 Nissan Leafs
 - 4 EV Motorcycles for OPD
 - Solar golf cart pilots
- Submitted LOI for 100 F-150 EV Trucks
- Fleet electrification study by ATLAS
- **EV Purchasing Collaborative with Climate Mayors**



EV Charging Locations - City-Wid...
A map of the recommended locations to
implement public facing EV chargers
94 views
All changes saved in Drive

**Starting April 2021, the City of Orlando and OUC will be enabling
100+ new Level 2 EV charging stations throughout City parks, Rec
centers, parking garages, and more.**



EV Recharge Mobility Hubs



OUC EV Programs

- **OUC Charge-It:** EV charging station “as-a-service”
- **OUC EV Rebate:** \$200 rebate for purchasing a new EV or PHEV
- **OUC Test Drive:** \$50 VISA giftcard for test driving an EV
- **Electrified Dealership:** Promotes dealerships meeting EV criteria; Financial incentives for sales reps



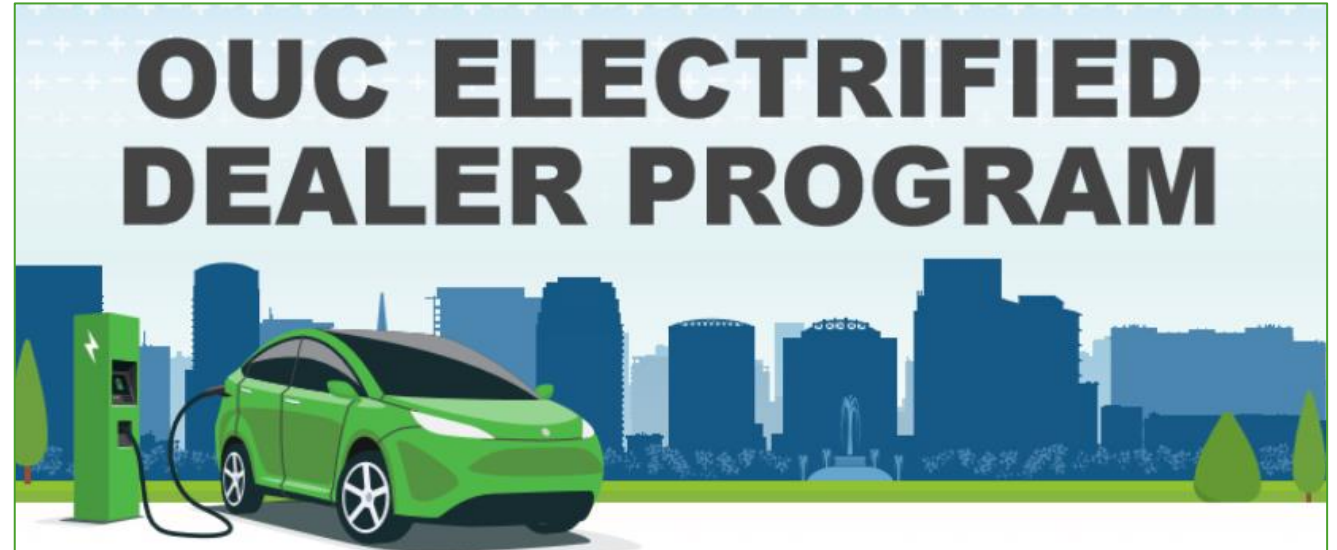
Electrified Dealership Program

Launch: November 2020

Progress:

- 3 dealerships participating with a goal of 15 participating in 2021
- Diversity in branding. Nissan, Jaguar, Volvo confirmed
- 8 of 30 sales reps trained
- Chevrolet (3), Audi, Ford and Mini all introduced to the program

Next steps: Continue to build dealership pipeline. Continue to train more salespeople.



OUC ELECTRIFIED DEALER PROGRAM

Orlando Utilities Commission (OUC – The Reliable One) has introduced a new Electrified Dealer Program designed to enhance the electric vehicle (EV) purchasing experience and help increase and encourage EV purchasing/leasing in Central Florida. Through this program, local dealers can take advantage of financial incentives for each eligible electric vehicle sold or leased along with specialized EV training and educational materials.

<h3>BENEFITS</h3> <ul style="list-style-type: none"> • Direct-to-dealer sales incentives • Recognition on OUC's website • Promotional media kit • Lead generation from OUC Ride and Drive programming • Marketing collateral for on-site use • EV sales training to staff • Co-marketing opportunities 	<h3>REQUIREMENTS</h3> <ol style="list-style-type: none"> 1. EV/PHEVs and ICE in inventory on lot 2. Actively sell and advertise EV/PHEVs 3. Share monthly EV/PHEV sales data with OUC 4. Two sales staff members must train with OUC twice a year 5. Functioning EV charging station on site at the dealership and available to customers 6. Participate with OUC in cross-promotion marketing
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There are many banks. Our bank is being founded as the only one to fight climate change.

The nation's first climate-focused bank will be coming to the St. Pete/Tampa Bay region in 2021.



Chris Castro, LEED GA, CPB
Director, Office of Sustainability & Resilience
Future-Ready co-chair
City of Orlando
chris.castro@orlando.gov