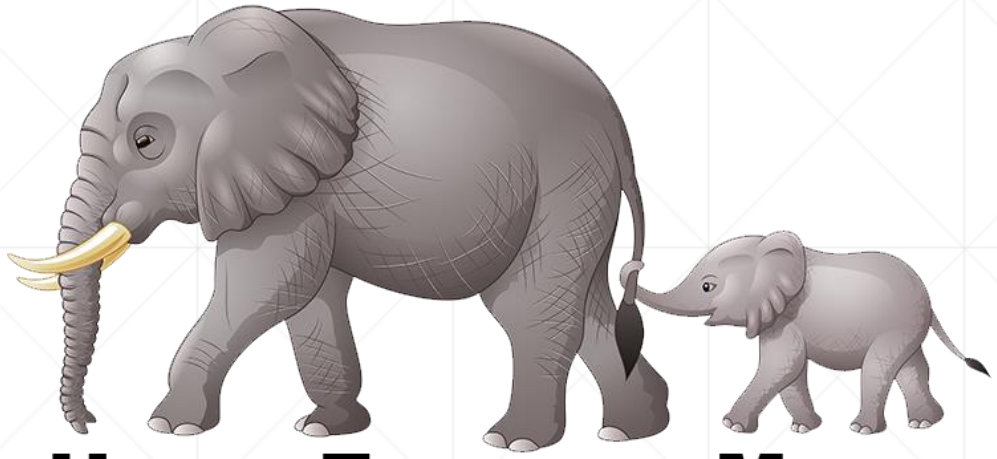
Thursday, February 17, 2022

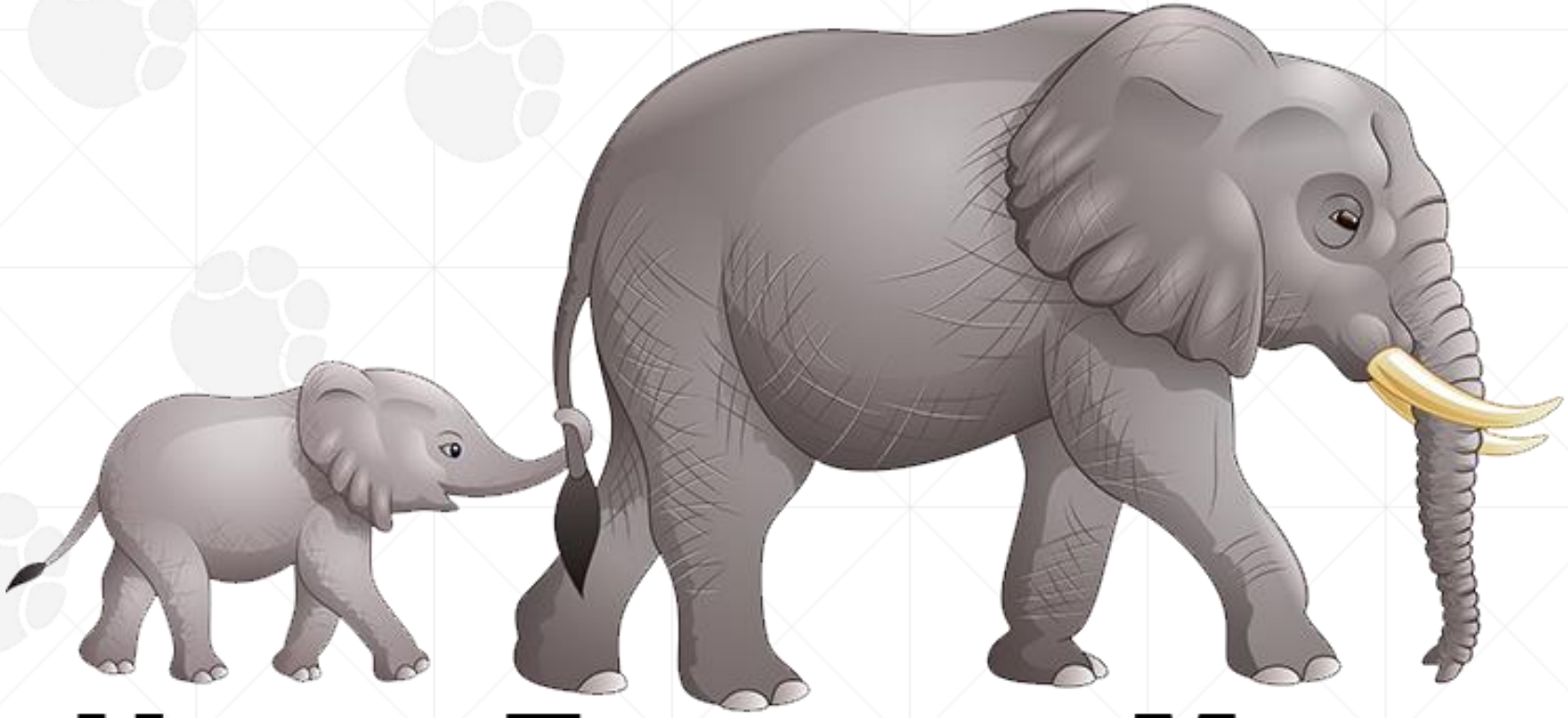


~ PRESENTS ~

Sustainability in the City of Orlando

Featuring Chris Castro, Orlando Director of Sustainability and Resilience

Sponsored by Pearl's Premium Ultra-Low Maintenance Grass Seed



URBANELEPHANTMEDIA

PEER-TO-PEER LEARNING MADE EASY

Sustainability Training for Urban Designers and Policymakers

Randy Rodgers, Director of Big Ideas
Randy@UrbanElephantMedia.com
563-562-2925

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PEARL'S PREMIUM ULTRA LOW MAINTENANCE LAWN SEED™

AWARD-WINNING PEARL'S PREMIUM ULTRA LOW MAINTENANCE LAWN SEED

People Pet & Planet Friendly™ Sustainable Grass

For All Residential, Commercial & Municipal Locations, Cemeteries, Airports, Along Roads & All Soils & Climates

- **Lush Dark Emerald Green Grass that is barefoot soft**
- **Grows so slow - Mow & Weed-Whack only once a month *rather than weekly***
- ***Or never mow* for a lean over 3-inch high no mow meadow**
- **4-Foot Roots *need* 75% less water & *absorbs more water to lessen run off***
- ***Plant right over* existing lawn – *out-competes most weeds & other grass***
- **Needs no chemicals – safer for children, dogs, elderly & the environment**
- **Stays Green *Year Round in spite of extreme heat or cold***
- **Sequesters 10x the carbon *to help lessen climate change & extreme weather***
- **For both lawns and green roofs - full sun to deep shade under trees**

ONLY GRASS TO RECEIVE LEED CREDITS (up to 6) FROM THE US GREEN BLDG COUNCIL

CALL (508) 653-0800 for Information / Volume Discount

www.PearlsPremium.com or contact Jackson@PearlsPremium.com

Our Presenter

Chris Castro
Director of Sustainability & Resilience
City of Orlando
chris.castro@cityoforlando.net

Green Works Orlando: Racing Towards A Zero Carbon Economy!

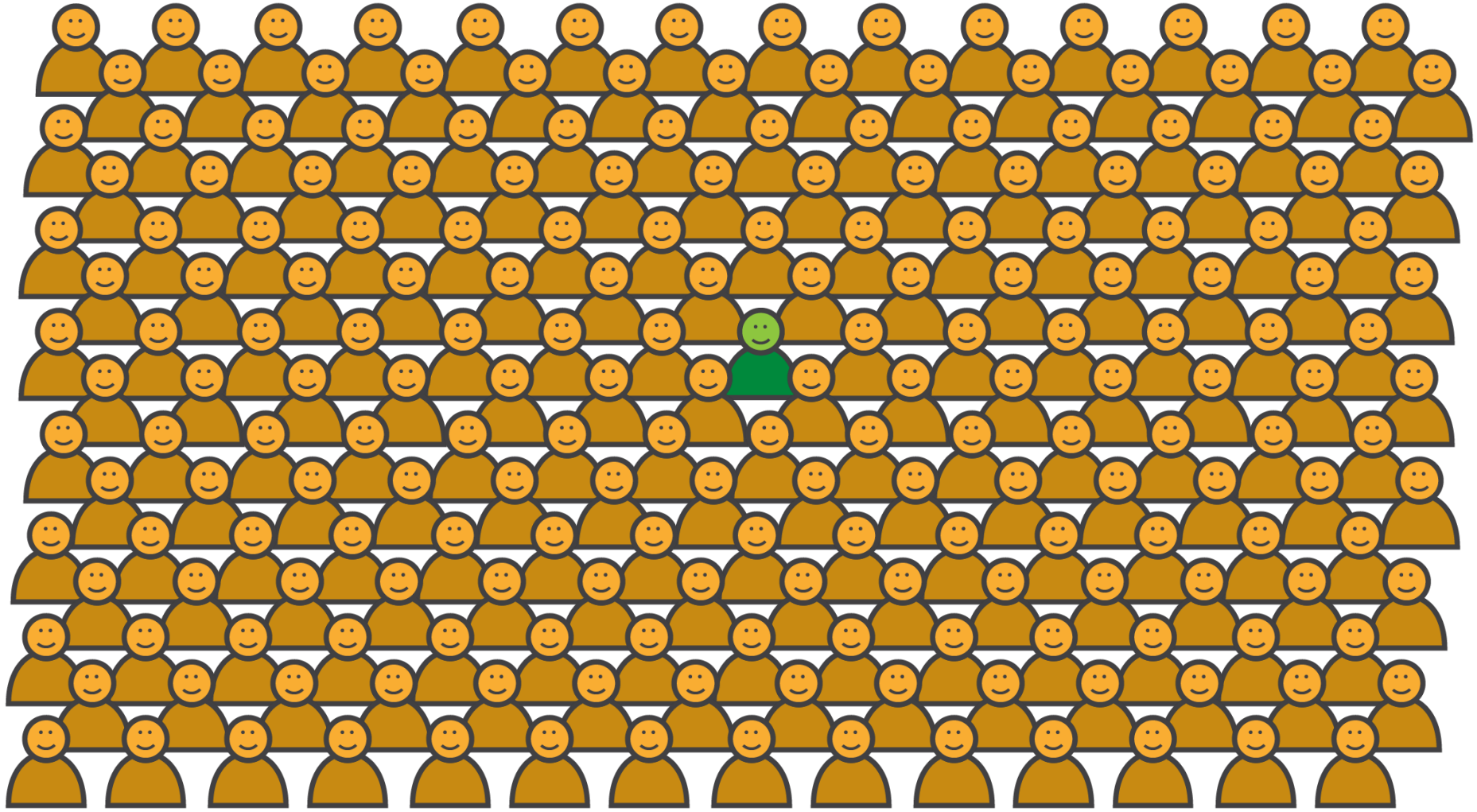
Chris Castro, LEED GA, CPB
Director, Office of Sustainability & Resilience
Future-Ready co-chair
City of Orlando

Orlando region’s population grows 1,500 people per week

Top fastest growing MSA’s in the U.S.

75+ million visitors per year

1 Resident to 255 Tourists



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

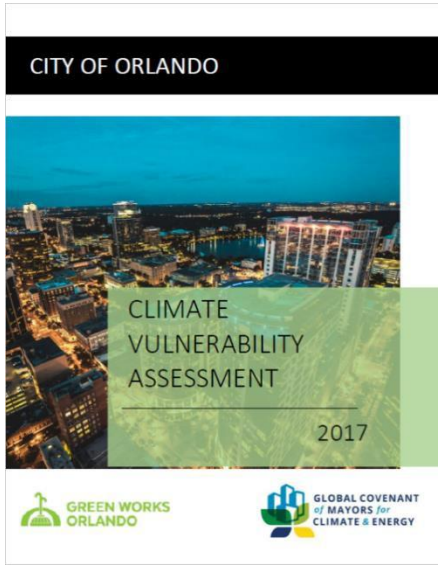
- Focuses on 7 key areas:
  - Clean Energy
  - Green Buildings
  - Local Food Systems
  - Zero Waste
  - Livability
  - Clean Water
  - Electric & Alternative Transportation


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

Pathway towards Sustainability & Resilience

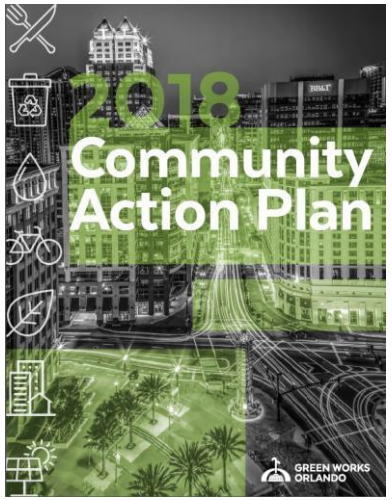
Municipal Operations Sustainability Plan (2012, updated in 2017)

Climate Vulnerability Assessment (2017)



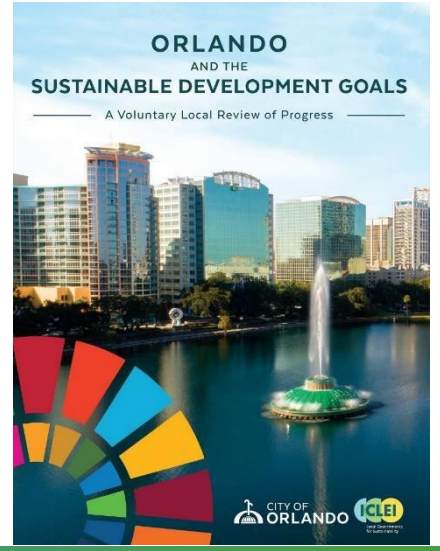
Greenhouse Gas Inventory (2018)

Community Sustainability Action Plan (2013, updated in 2018)

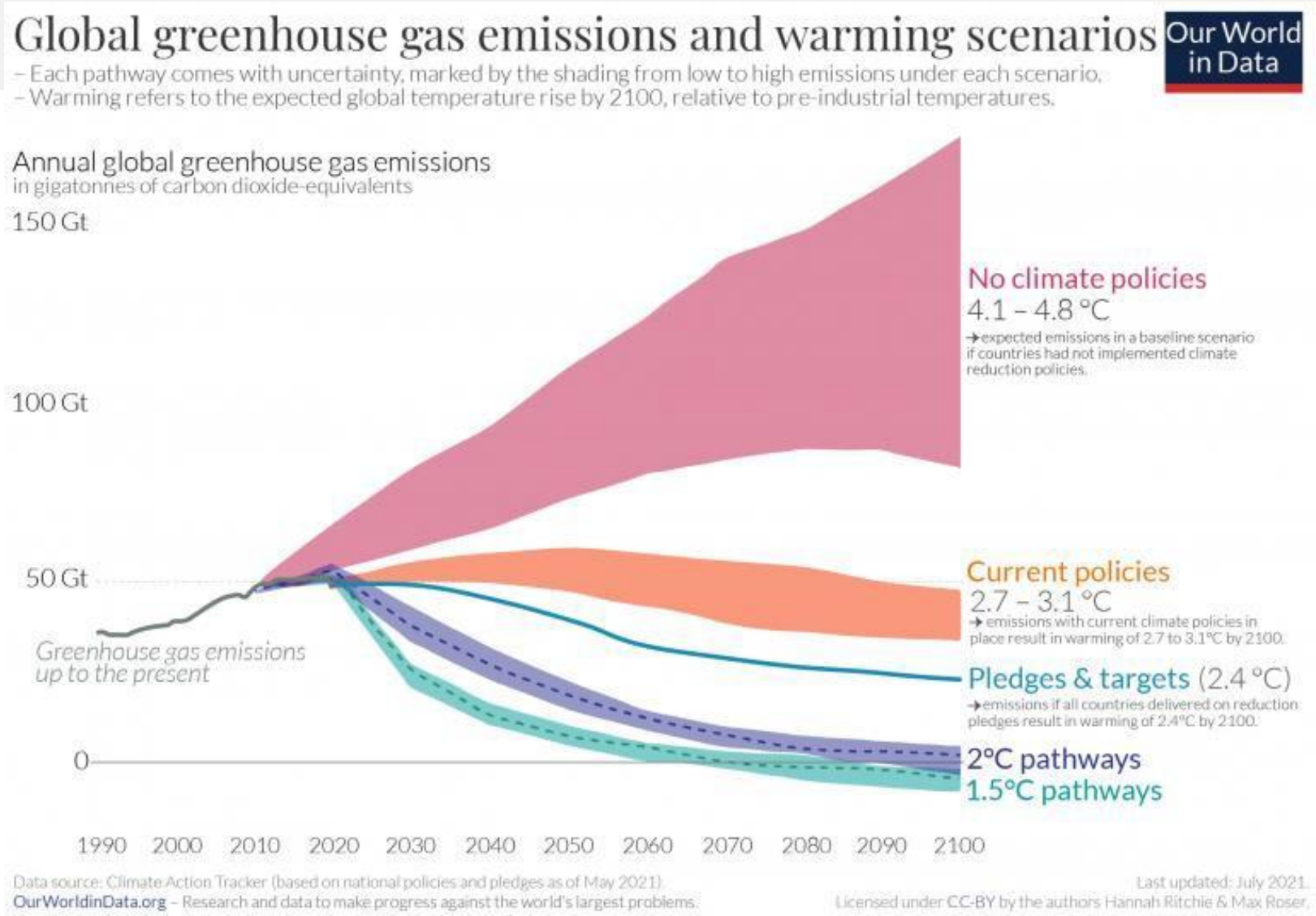


Vision Zero Plan (2019)

Future-Ready Master Plan (2020)



Voluntary Local Review of SDGs (2021)



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

Local government action is essential for reaching global goals

WHY

CITIES NEED TO ACT

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

Generate **80%** of GPD

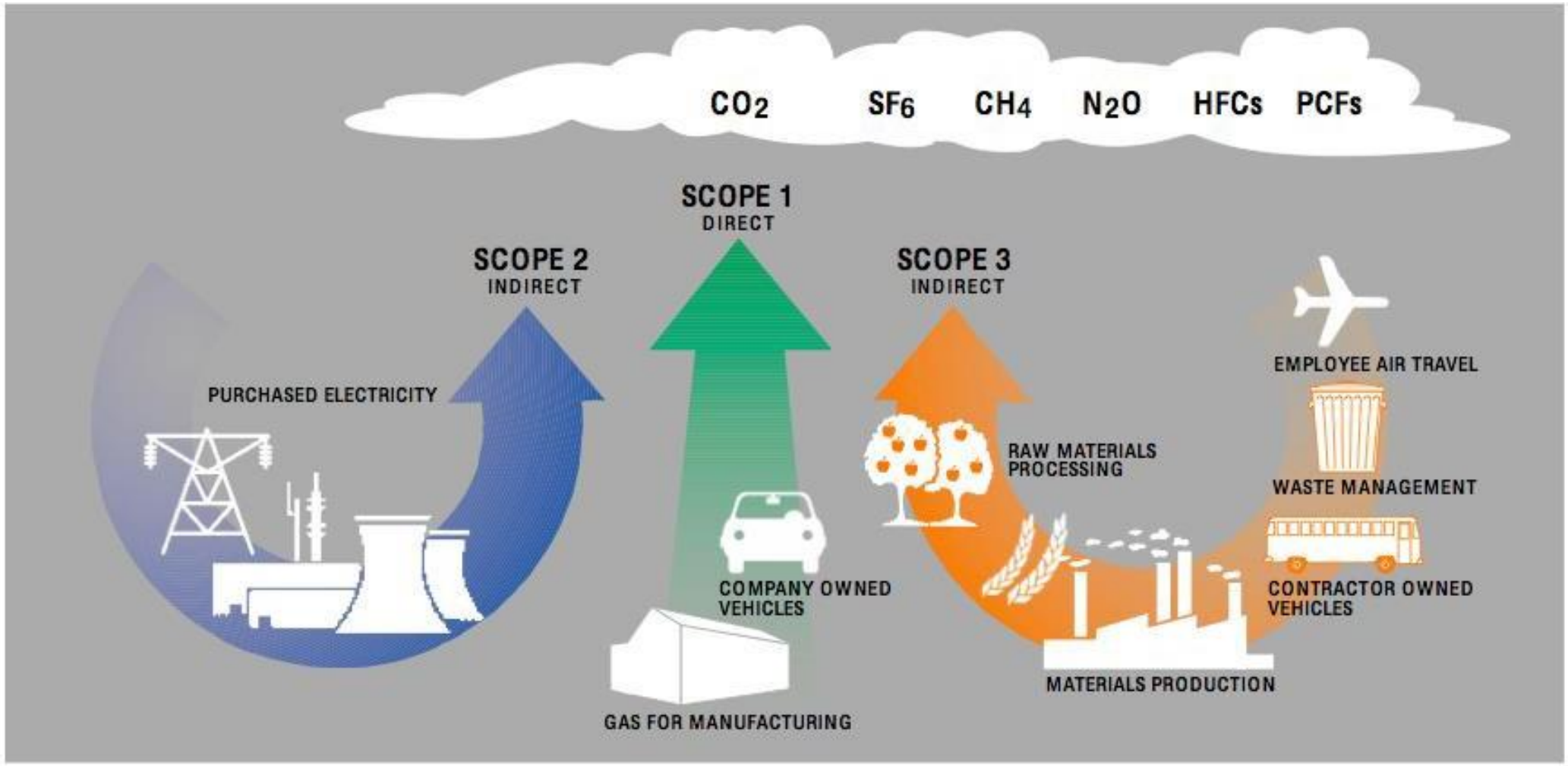
80% of cities do not meet air quality standards

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.

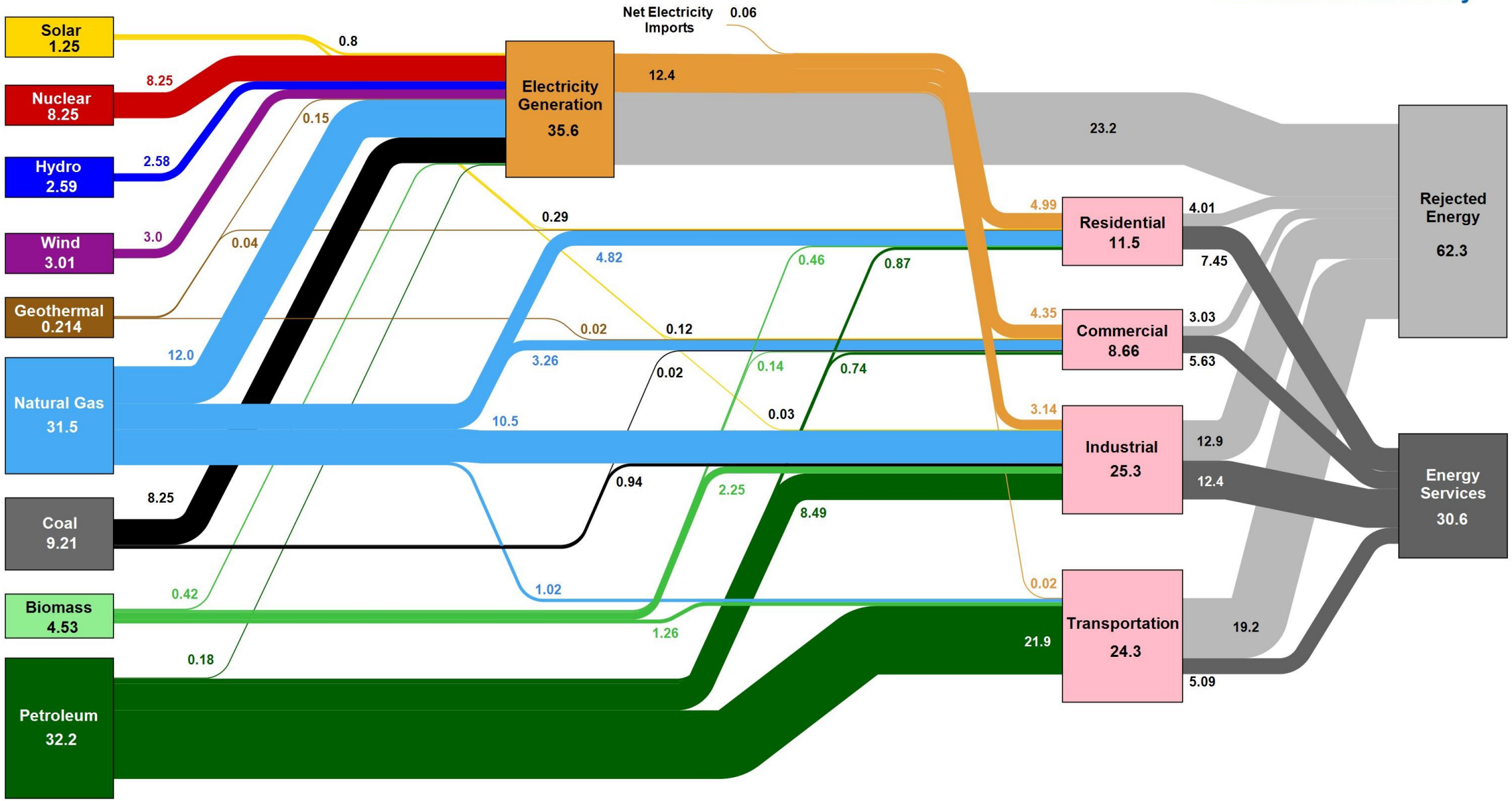
And now … cities suffer the worst impacts of the COVID-19 pandemic.

It starts with understanding your Carbon Footprint via a Greenhouse Gas Emissions Inventory (GHGi)



Estimated U.S. Energy Consumption in 2020: 92.9 Quads

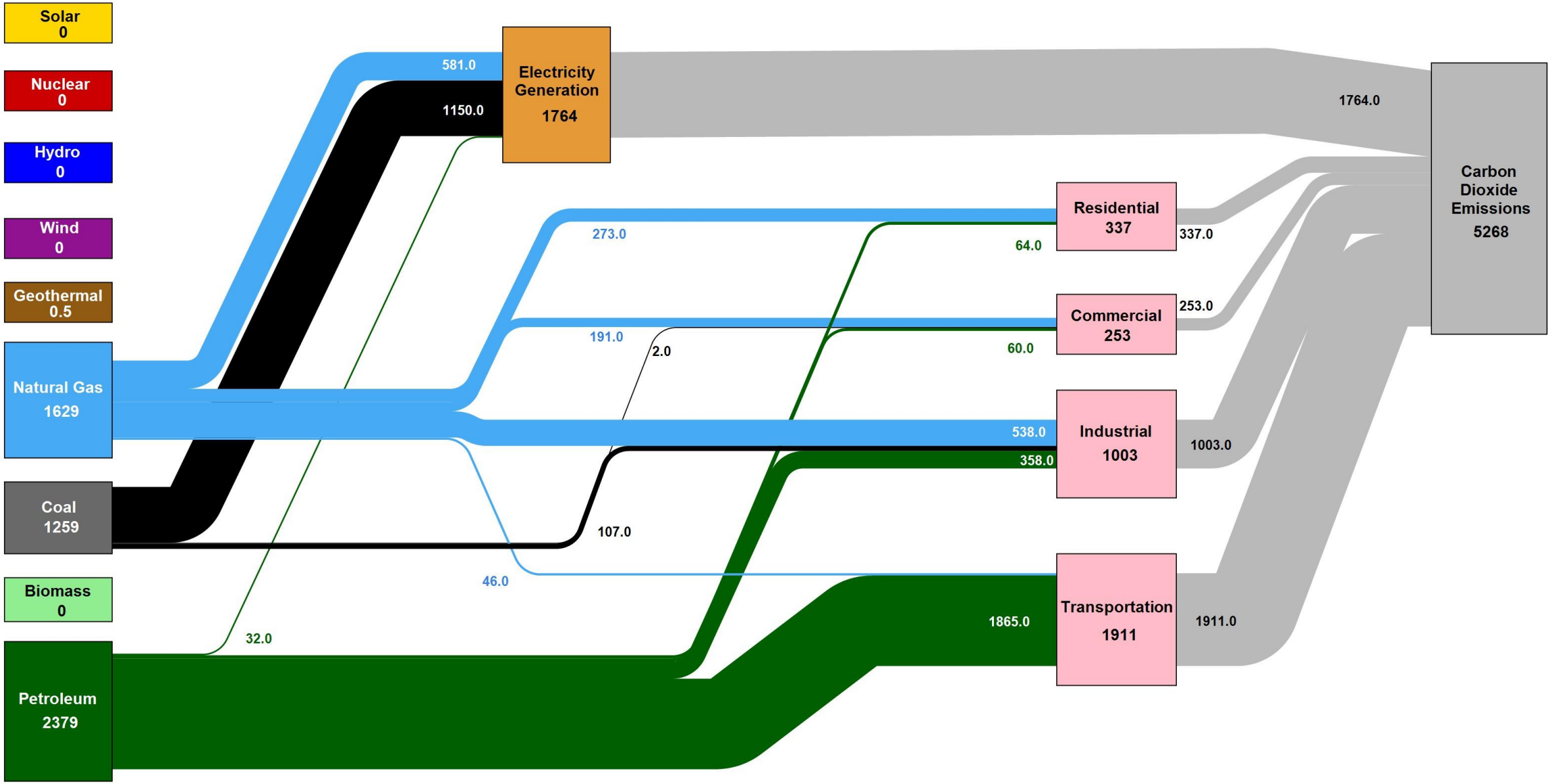
Lawrence Livermore National Laboratory



Source: LLNL March, 2021. Data is based on DOE/EIA MER (2020). 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

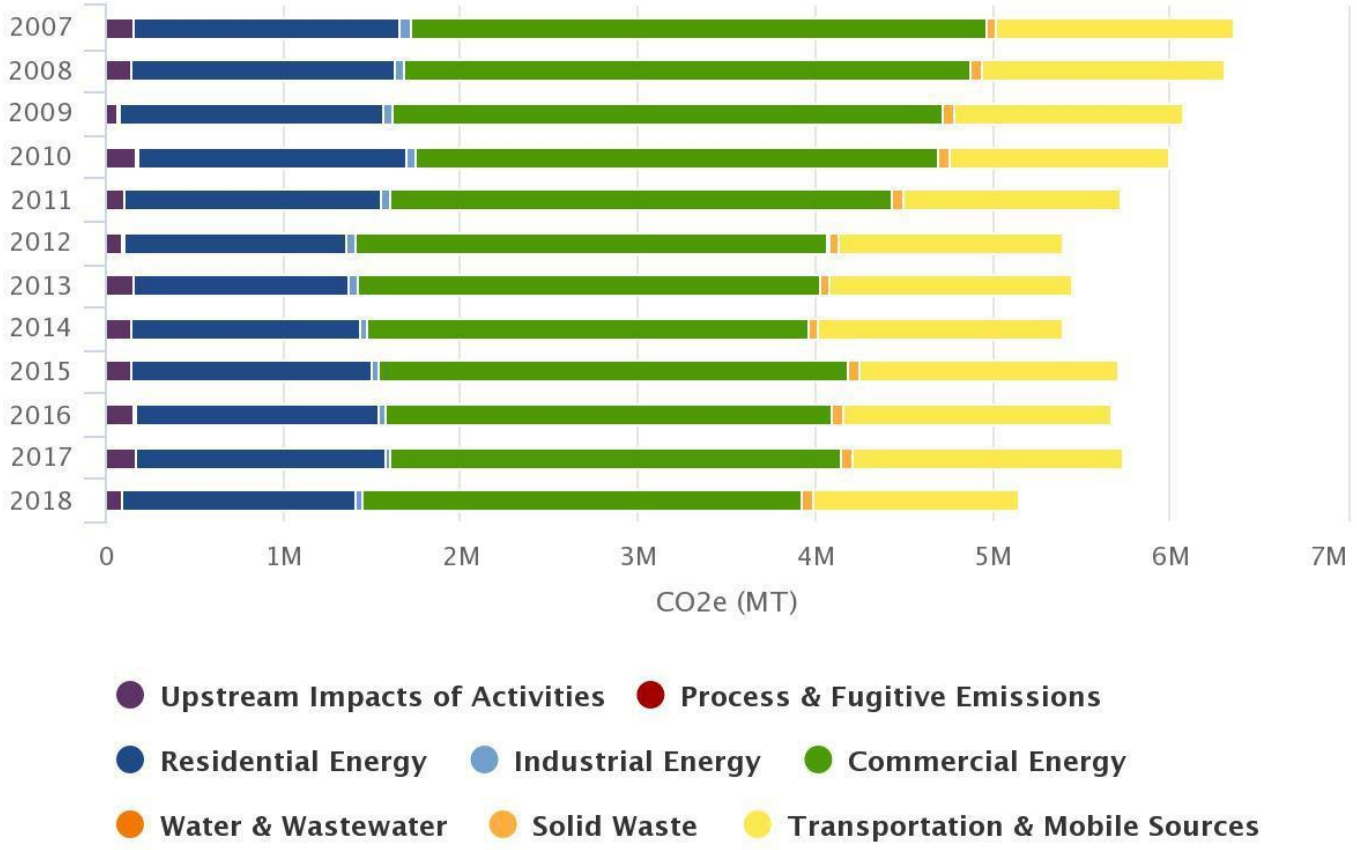
Estimated U.S. Carbon Dioxide Emissions in 2018: ~5,268 Million Metric Tons

Lawrence Livermore National Laboratory

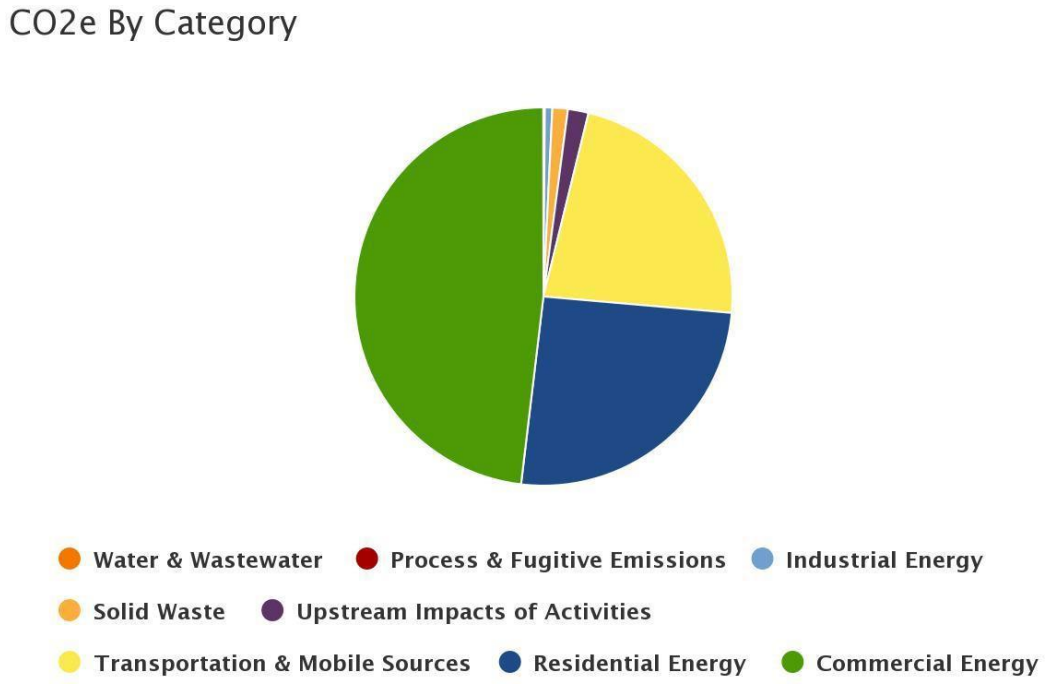


Source: LLNL July, 2019. Data is based on DOE/EIA MER (2018). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Carbon emissions are attributed to their physical source, and are not allocated to end use for electricity consumption in the residental, commercial, industrial and transportation sectors. Petroleum consumption in the electric power sector includes the non-renewable portion of municipal solid waste. Combustion of biologically derived fuels is assumed to have zero net carbon emissions - the lifecycle emissions associated with producing biofuels are included in commercial and industrial emissions. Totals may not equal sum of components due to indepedent rounding errors. LLNL-MI-410527

Orlando’s Citywide yearly emissions by sector / source

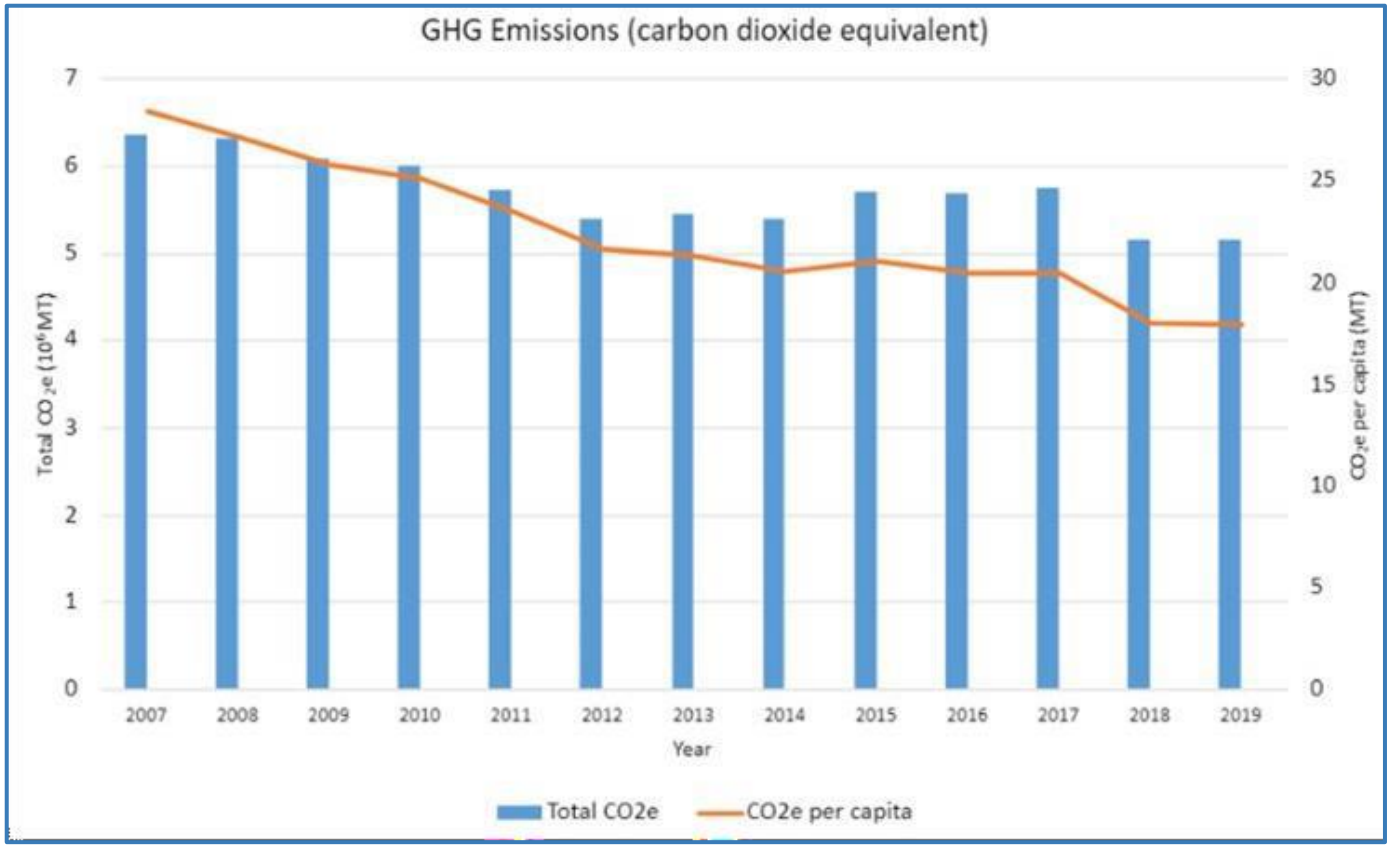


EDF ENVIRONMENTAL DEFENSE FUND | CLIMATE CORPS



Climate goals: Reduce greenhouse emissions

Goal: 90% reduction of greenhouse gases by 2040

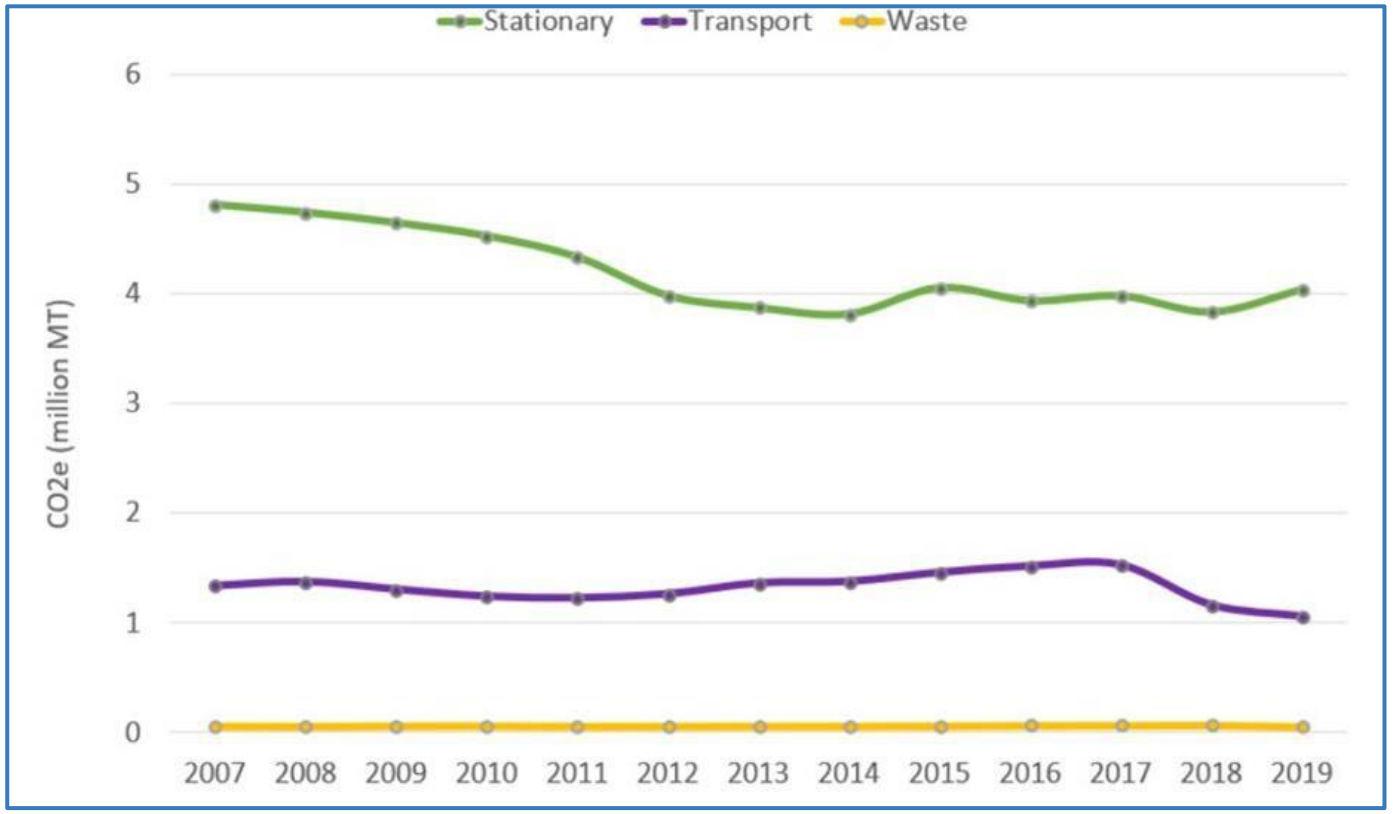


-19% reduction (overall); *-37% reduction (per capita)*

We need to triple or quadruple this rate!

Climate goals: Reduce greenhouse emissions

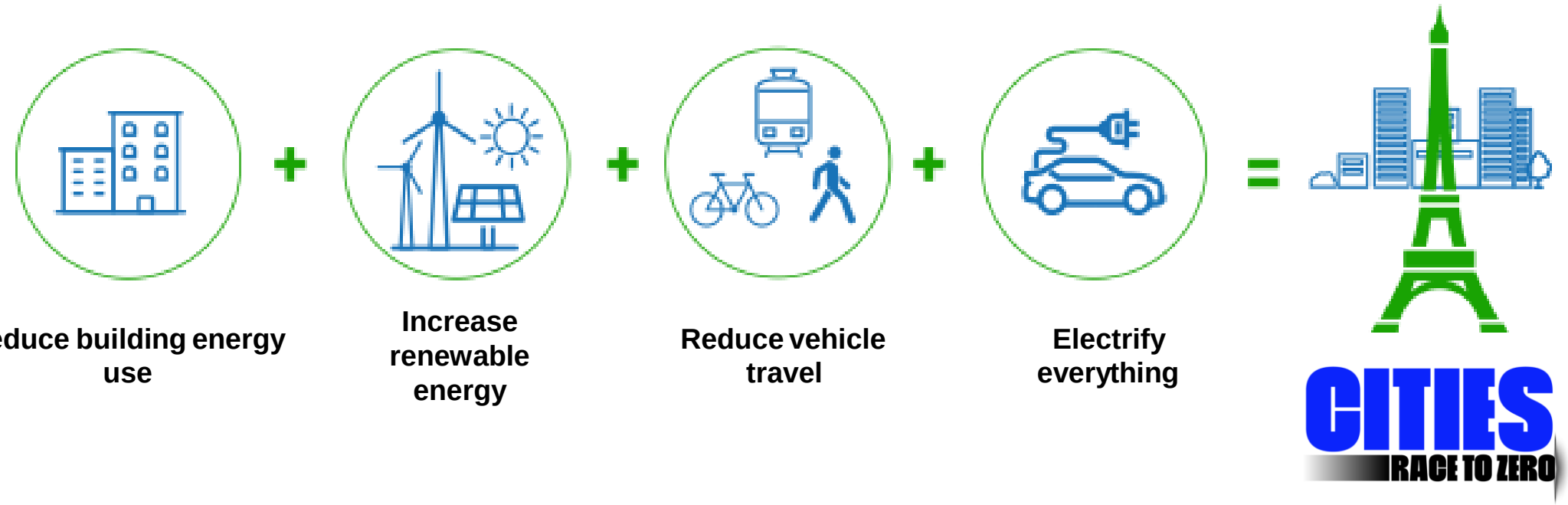
Goal: 90% reduction of greenhouse gases by 2040



Buildings: -16%; Transportation: -19%; Waste: -9%

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

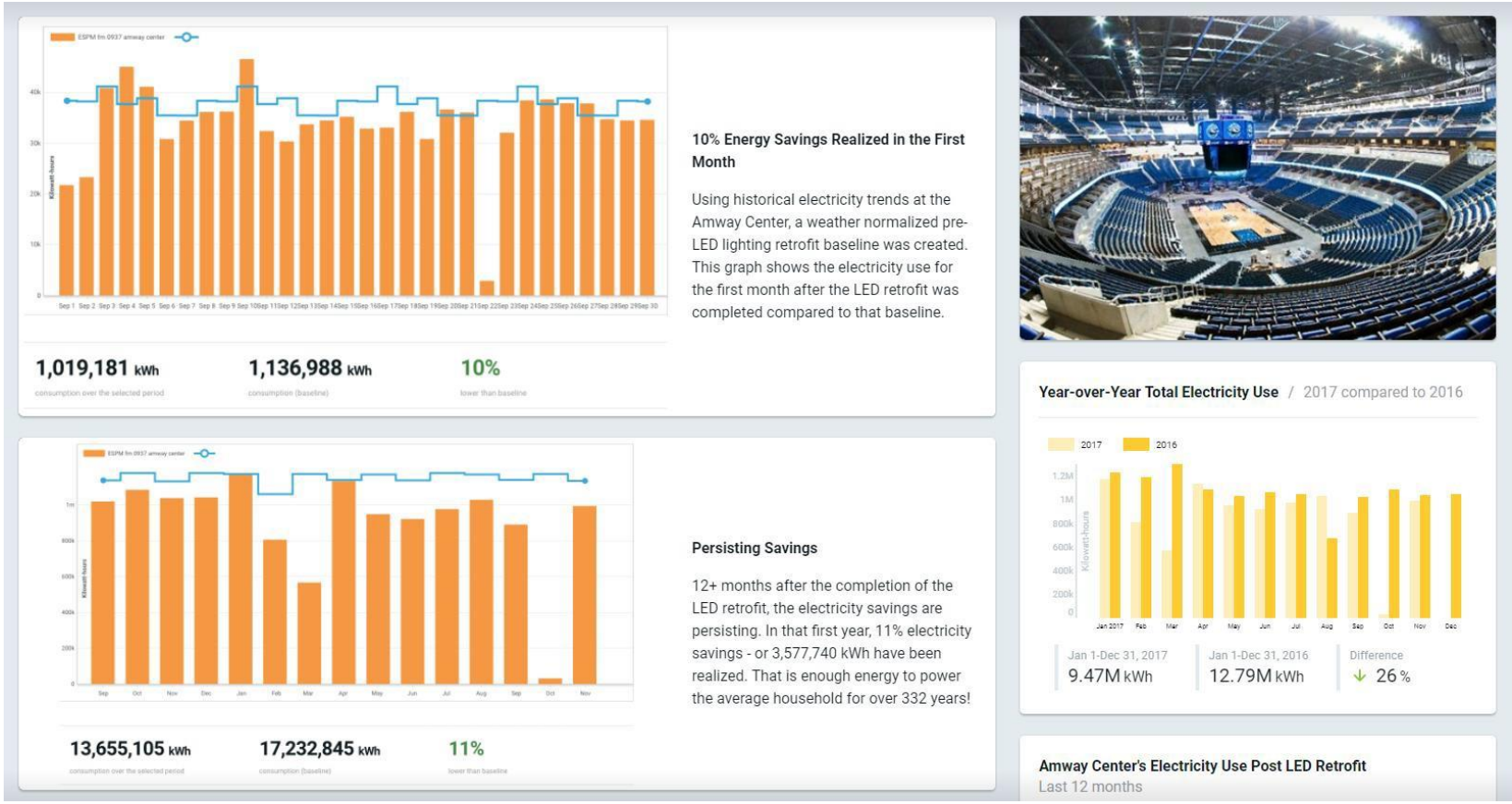
Mandatory LEED Silver certification for City buildings – Grid Interactive Efficient Buildings (GEBs)

Municipal Green Bond for EE

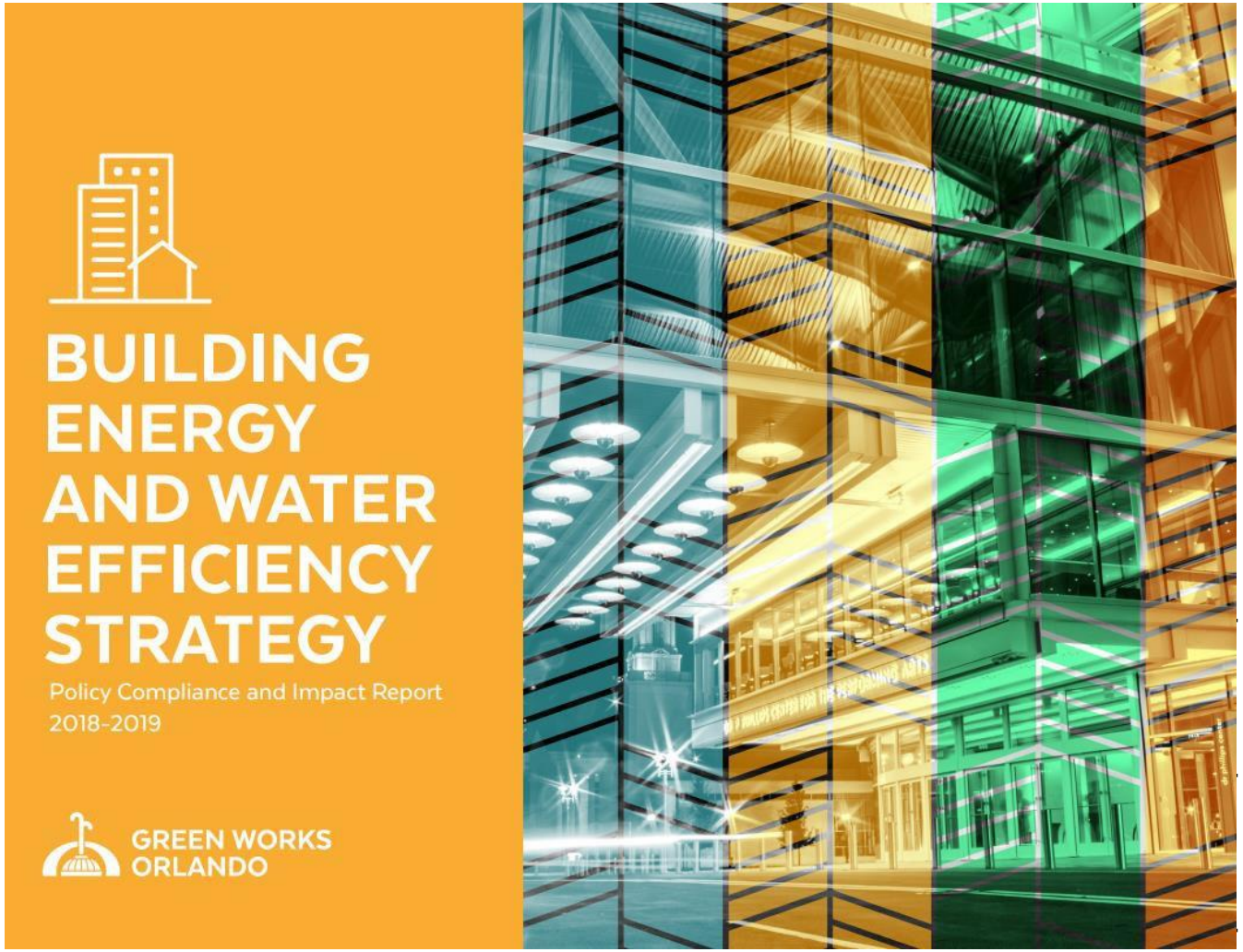
- $17.5 M green bond for energy efficiency
- 56 municipal buildings across 5+ M sq ft.
- Self-performed vs. ESCO/ESPC model
- Lucid BuildingOS as EM&V tool

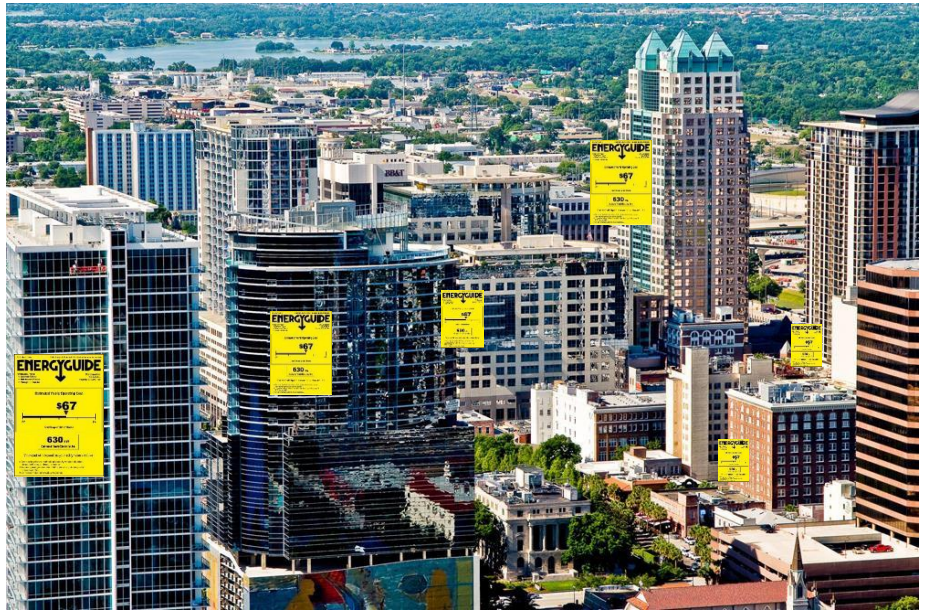
RESULTS:

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



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





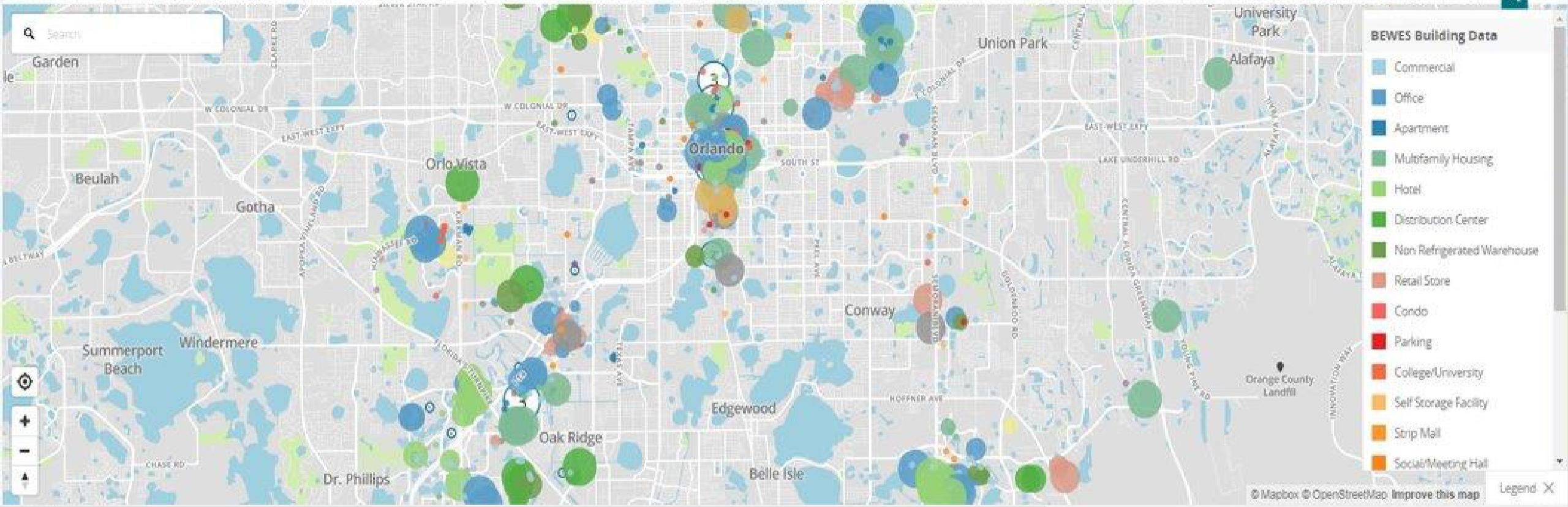
Completed the 2017 Central Florida Battle of the Buildings, 265 buildings participated

Developed ‘Energy & Green Buildings” sub-committee

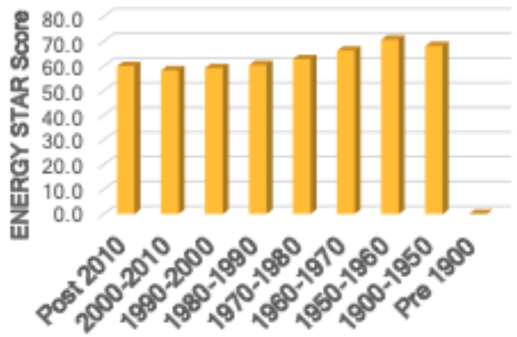
Publishing BEWES Impact Report in July 2021

BEWES Data by ENERGY STAR Score

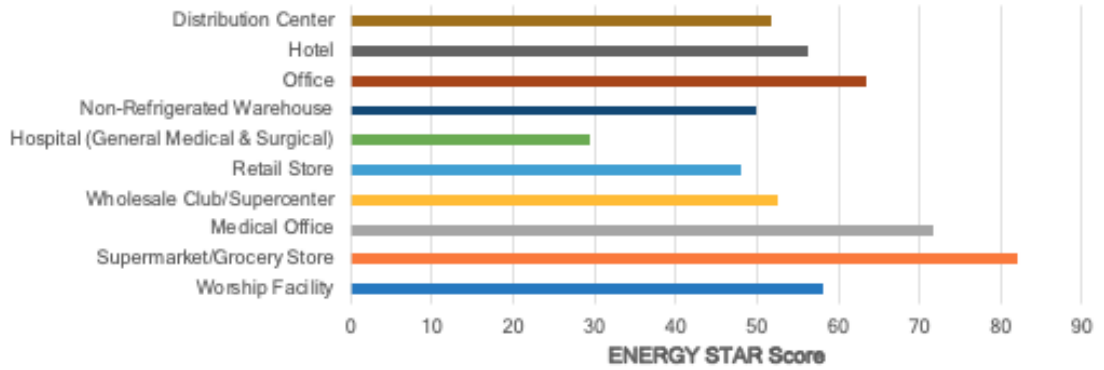
This visualization represents the building energy data submitted to the city for the 2019 BEWES compliance season with the size of each data point corresponding to the building's ENERGY STAR score. The ENERGY STAR Score is a measure of how well your property is performing relative to simila... pe...



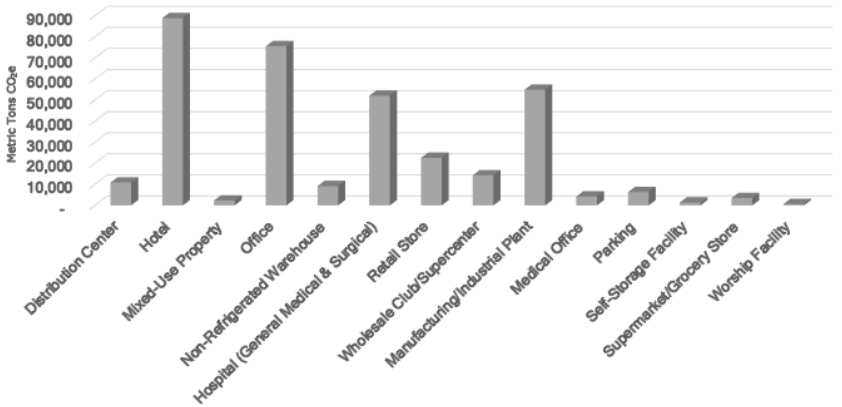
2019 Average ENERGY STAR Score by Year Built



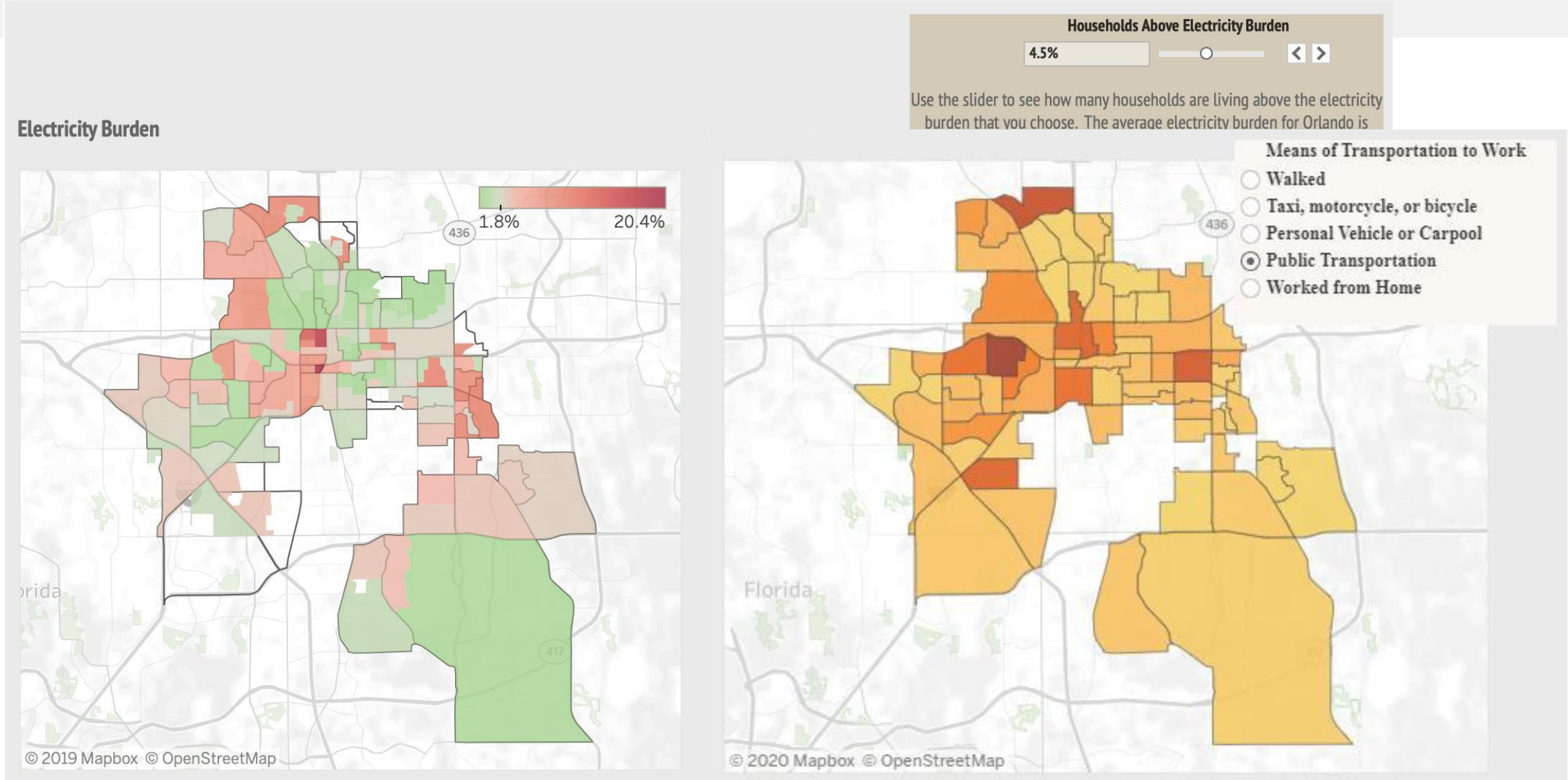
2019 ENERGY STAR Score by Commercial Use Type



2019 BEWES GHG Emissions (Metric CO_2e)



Equity Mapping: uncovering the housing, energy, water, transportation, and food burdens of our residents



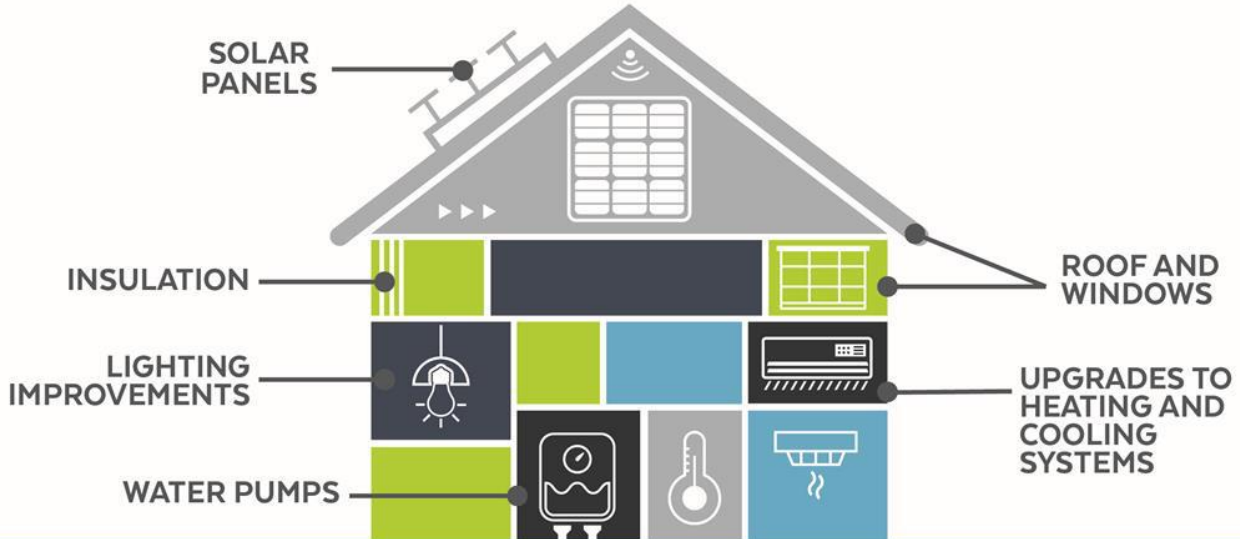
Enabling Financing Options for Homes and Businesses

EFFICIENCY® DELIVERED
Energy Efficiency Home Upgrades by OUC

Property Assessed Clean Energy
© EnergySage

SELF
SOLAR AND ENERGY LOAN FUND

EXAMPLE OF IMPROVEMENTS:

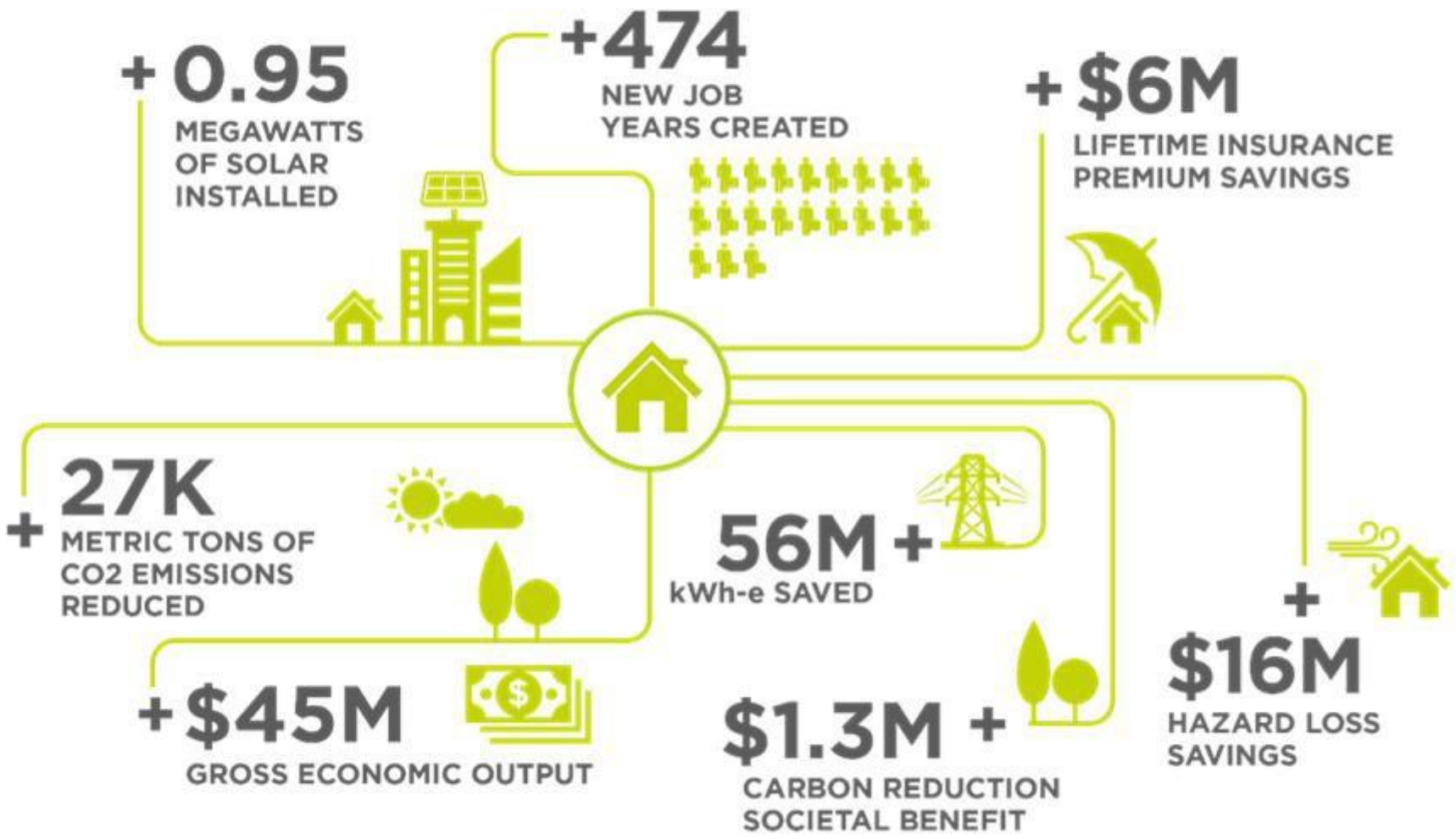


Pamela Turner
Loan Impacts: Safety, Health, Quality of life, Credit Rebuilding

Amount of Loan: $7,231.21

Type of loan: Wind Hazard Mitigation *(Roof Repair)*

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.

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

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?

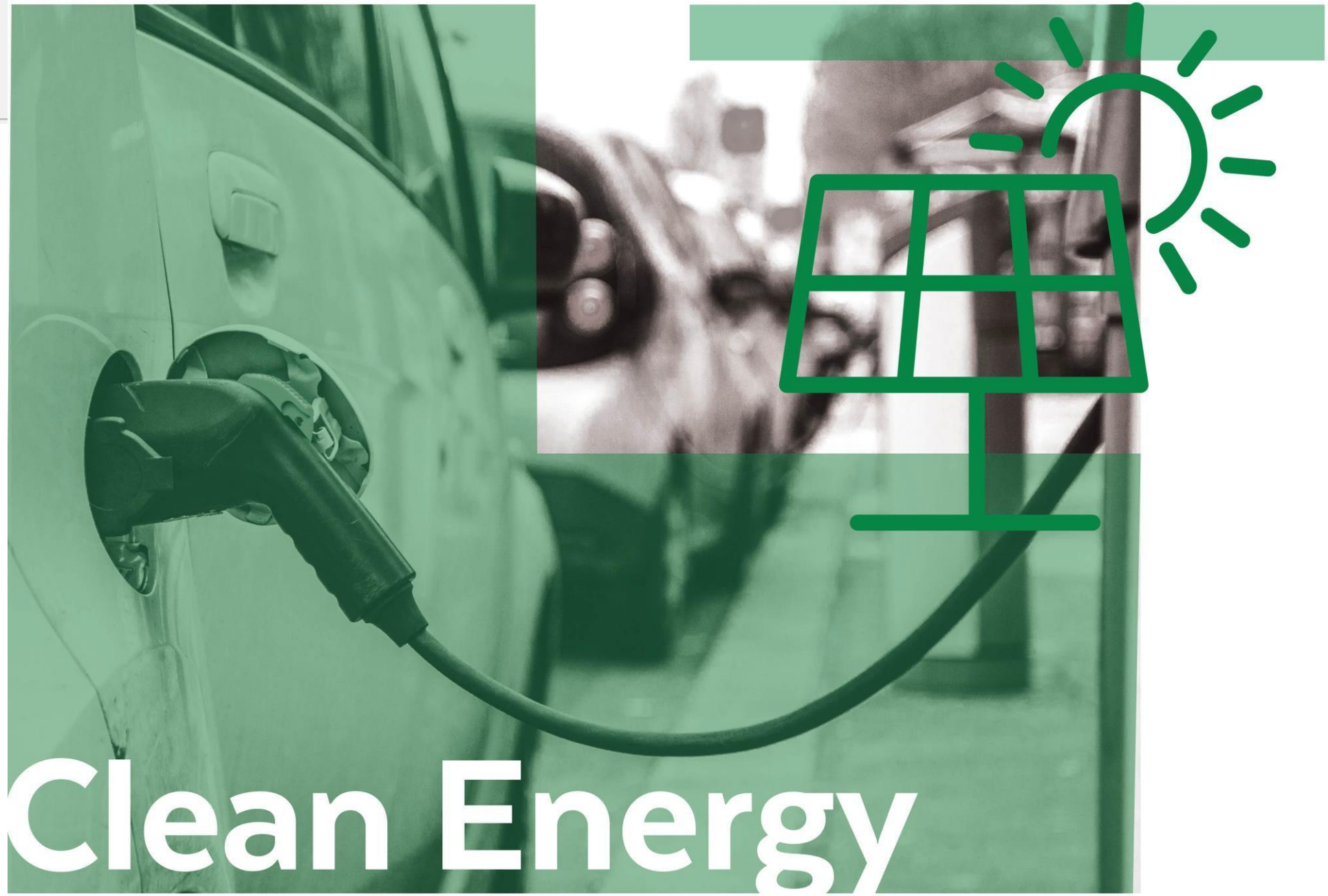
On the first year of property taxes, an office building valued similarly to the Citrus Center would receive an incentive up to $250,000 for building and certifying LEED Gold.

PROCESS FOR DEVELOPERS

Submit GBIP application → Receive agreement letter → Build LEED-Certified building → Submit GBIP claim → Receive tax rebate

GREEN WORKS ORLANDO

American Cities Climate Challenge


Clean Energy

OUC's Fuel Mix

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

On August 8th, 2017, the City of Orlando adopted **100% Renewable Electricity Policy**:

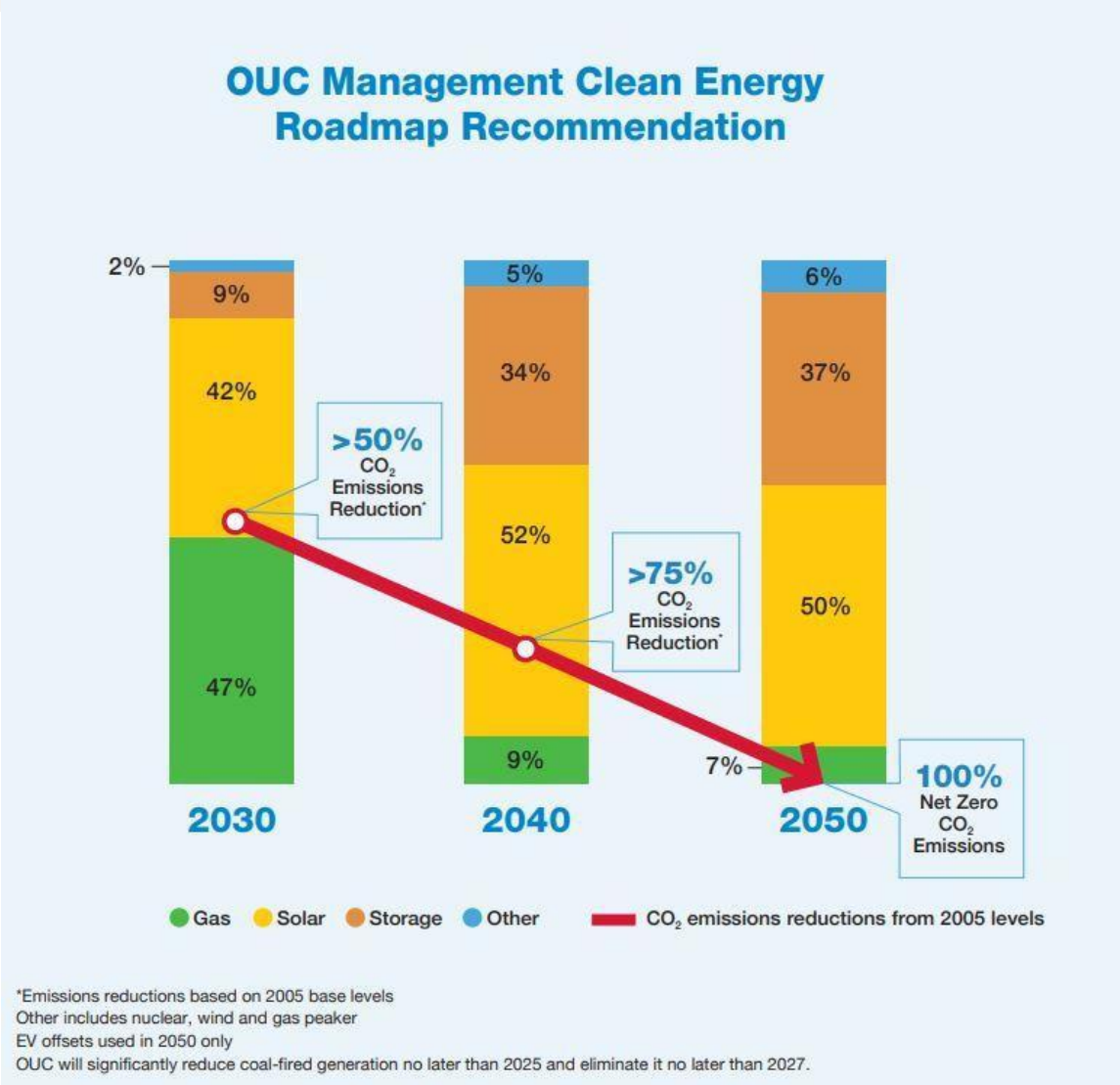
Municipal operations by 2030

Citywide by 2050*

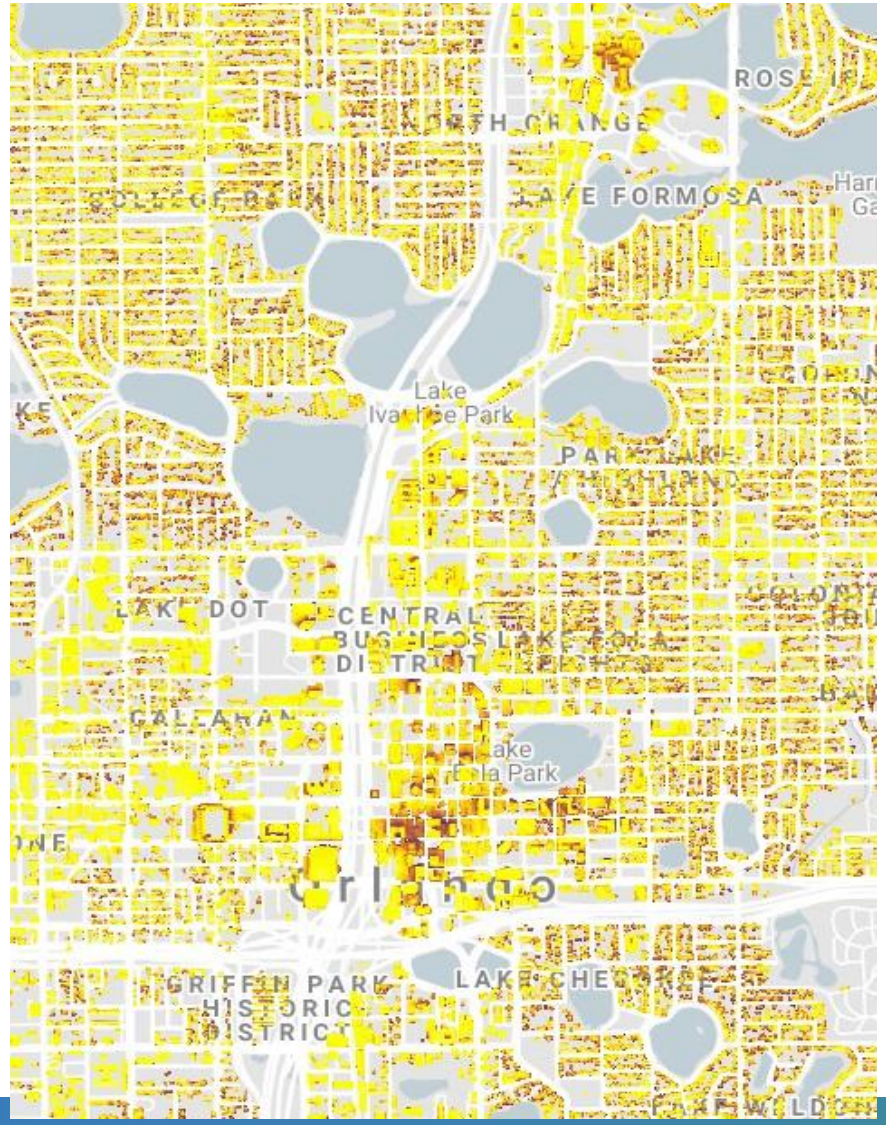
Orlando Utility Pulling Plug on Coal-Fired Generation

OUC The Reliable One

- **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**.
- **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**.



Citywide Rooftop Solar dGen Study



NREL Transforming ENERGY

Project Sunroof

greenlink

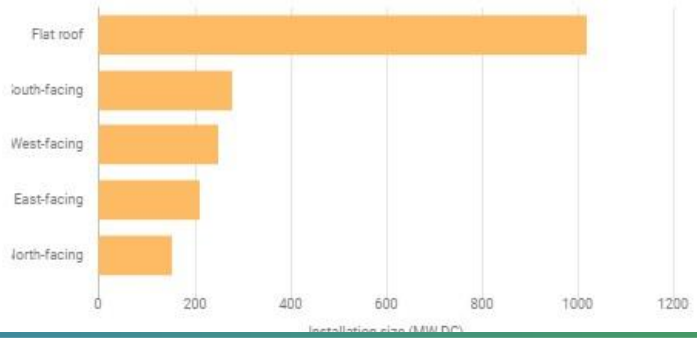
Overall

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

Roofs	Roofs
92%	54.5K

Roof space	Capacity	Electricity
135M sq ft	1.9K MW DC	2.6M MWh AC per yr

Total installation size (MW DC)

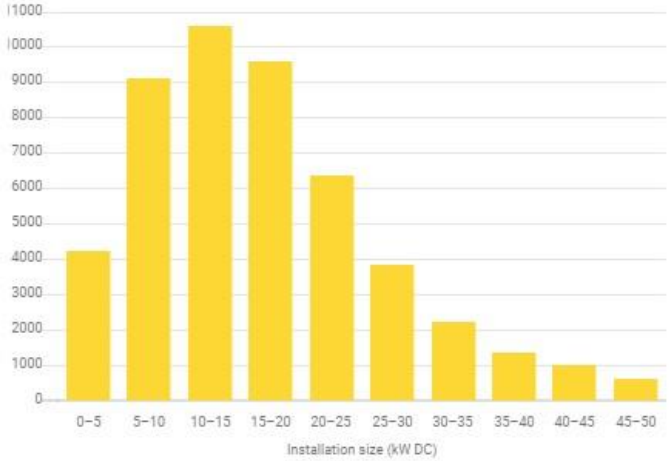


Per roof

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

Roof space	Capacity	Electricity
1.2K sq ft	16.3 kW DC	21.6K kWh AC per yr

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



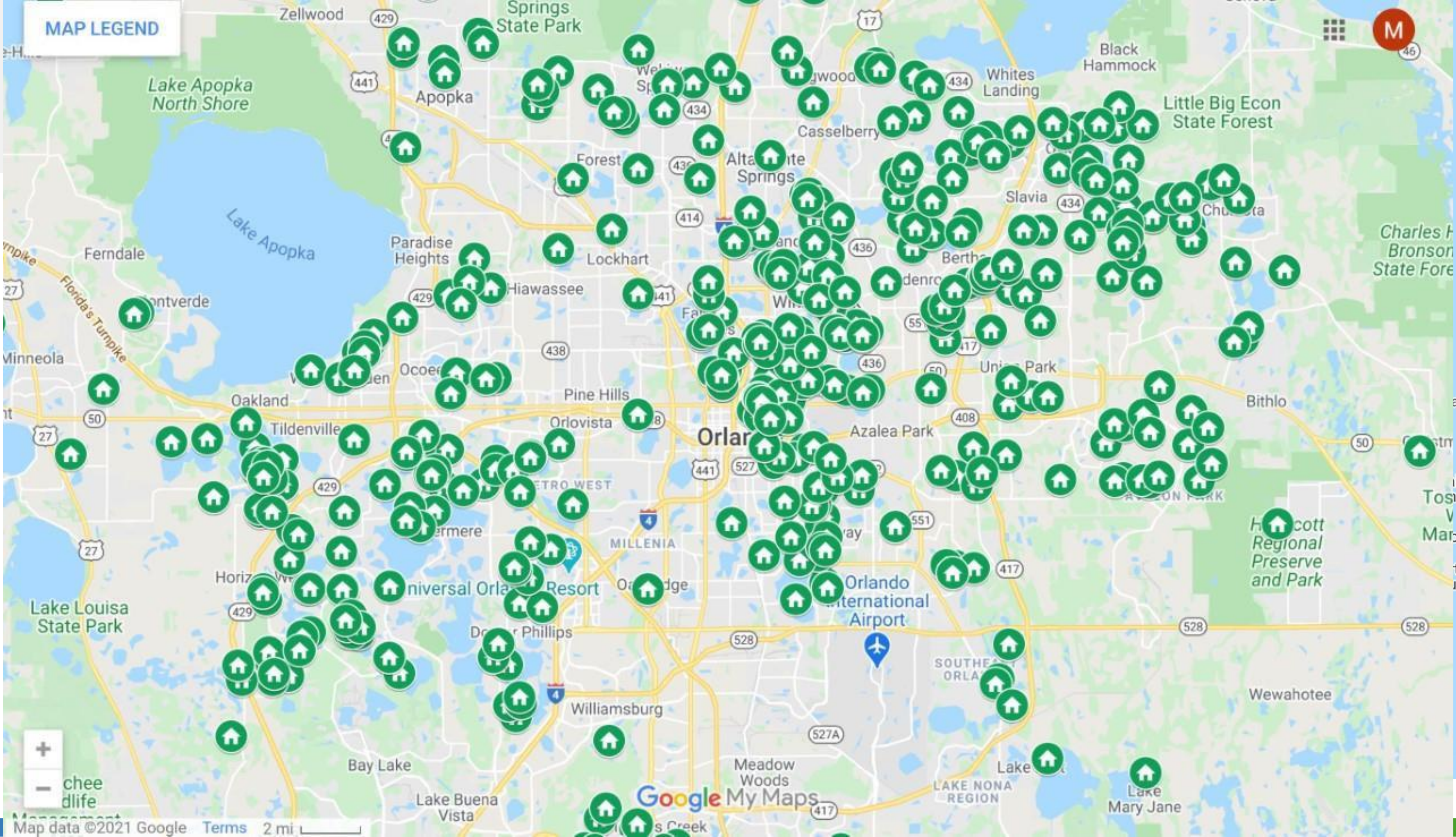
NREL Solar Energy Innovation Network (SEIN)

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

REopt

- 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
Zellwood
Springs
State Park
Apopka
Lake Apopka
North Shore
Lake Apopka
Ferndale
Florida's Turnpike
Minneola
Paradise
Heights
Hiawassee
Lockhart
Casselberry
Whites
Landing
Black
Hammock
Little Big Econ
State Forest
Slavia
Oakland
Tildenville
Pine Hills
Orlovista
Azalea Park
Bithlo
MILLENIA
Lake Louisa
State Park
Regional
Preserve
and Park
Wewahootee
Williamsburg
Bay Lake
Meadow
Woods
Lake Buena
Vista
LAKE NONA
REGION
Mary Jane
Google My Maps
Map data ©2021 Google
Terms
2 mi

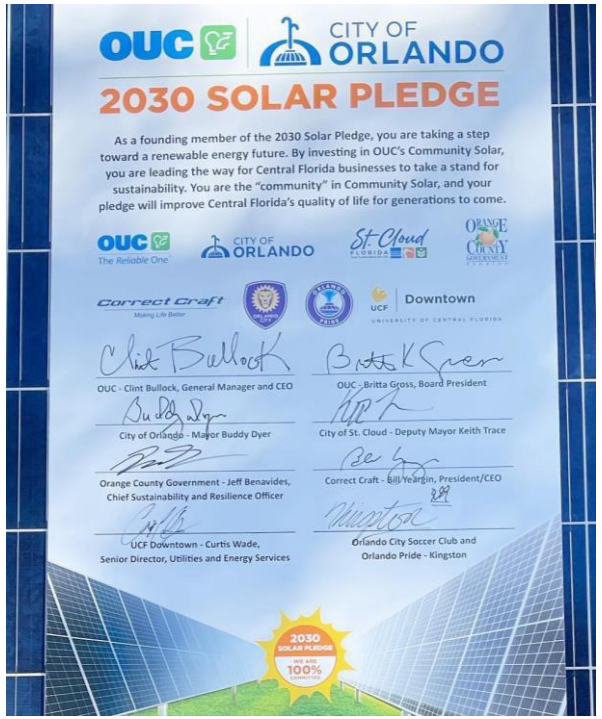
130 MW+ Community Solar program — 150MW in pipeline

2030 Solar Pledge

Goal: Recruit businesses to join 100% clean energy pledge with City and OUC

Founding partners: Orange County, City of St. Cloud, UCF, CorrectCraft, Orlando City/Pride Soccer

Commitment to power 10% or more of your monthly electricity by solar and show your leadership to the whole Orlando community.



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


Tue Nov 17 2020
50 ft
nearmap

Green Hydrogen Nanogrid Pilot @ OUC Gardenia facility

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

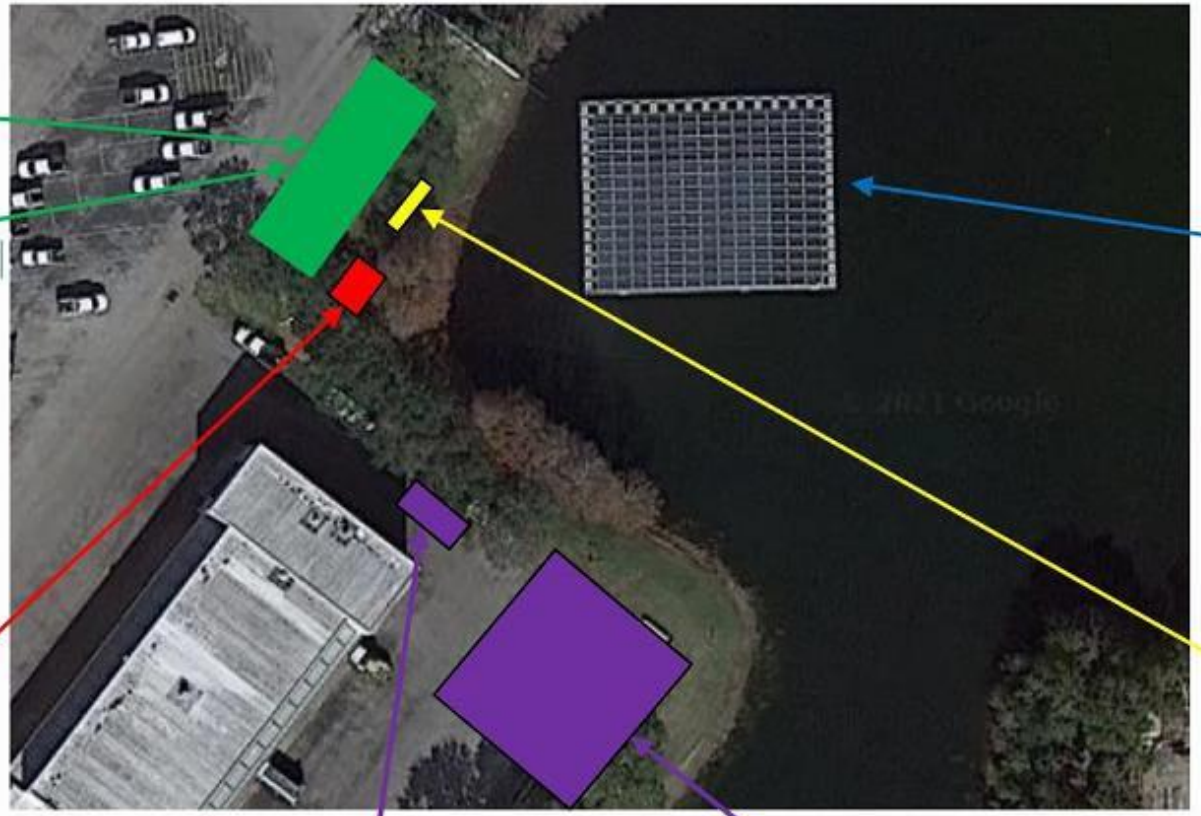
Three electric vehicle (EV) chargers, including one with vehicle-to-grid (V2G) capability.

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



64kW Floating Solar Array

Two Vanadium Redox Flow Batteries

Hydrogen Facility

Controller

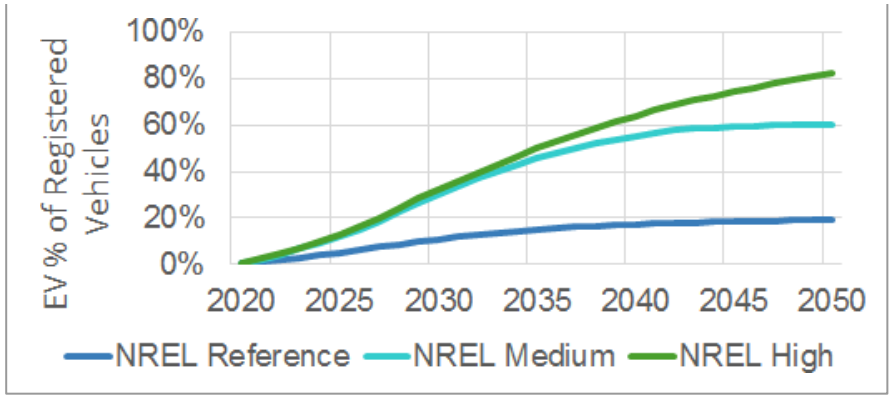
Transportation

Alternative Transportation & Mobility

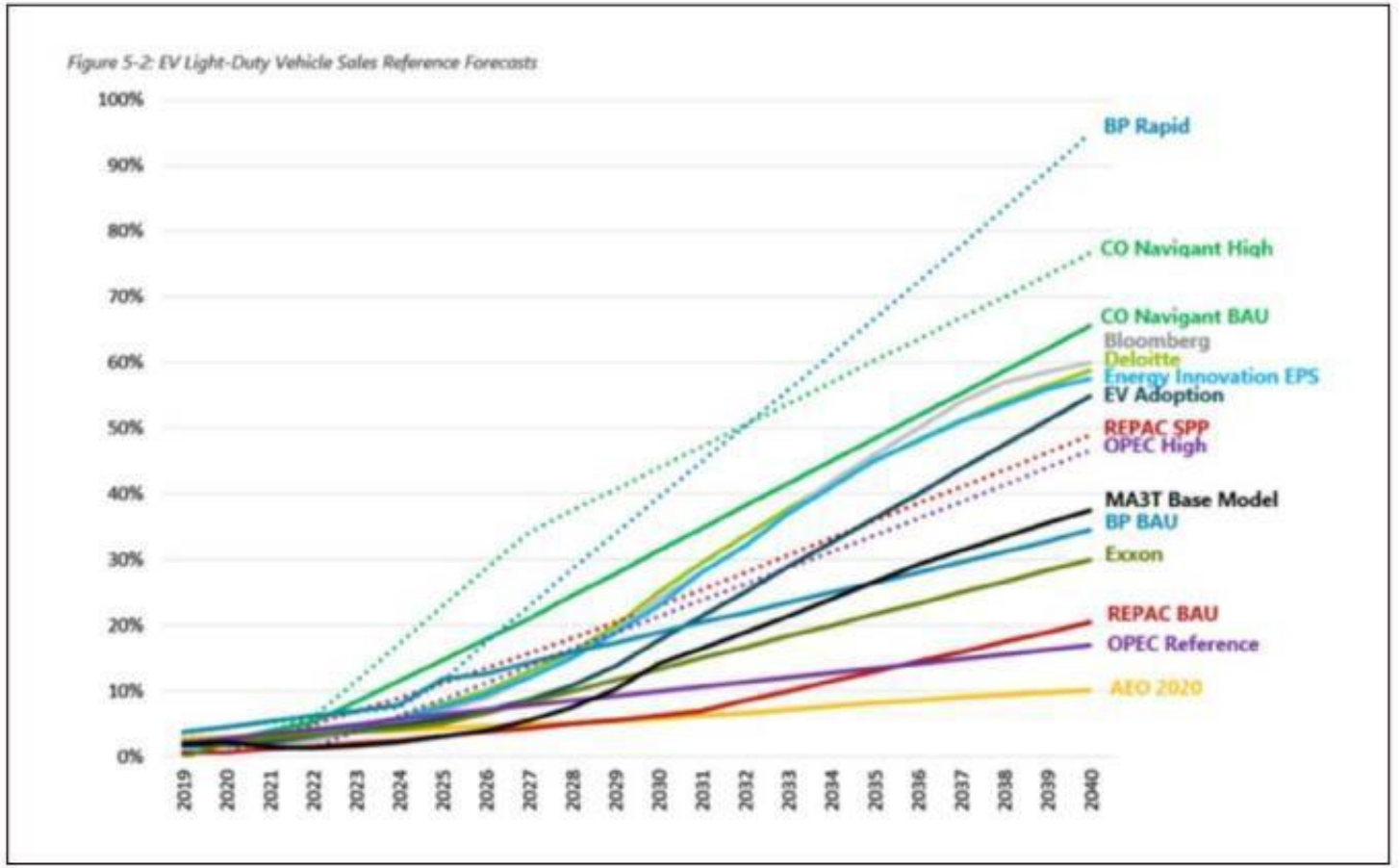
- 350+ miles of sidewalks & bike paths
- E-Bike + E-Scooter Share
- Ride share enabled
- SunRail Commuter Train
- Lymmo BRT (free)
- LYNX transit bus system
- AV shuttle pilots
- Virgin Brightline Train – *coming soon!*

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

?

EV Readiness (Development)

Consumer rebates

Fleet electrification

EV consumer education

EV charging access

?

?

?

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

- **EV Purchasing Collaborative with Climate Mayors**

Electric Micromobility

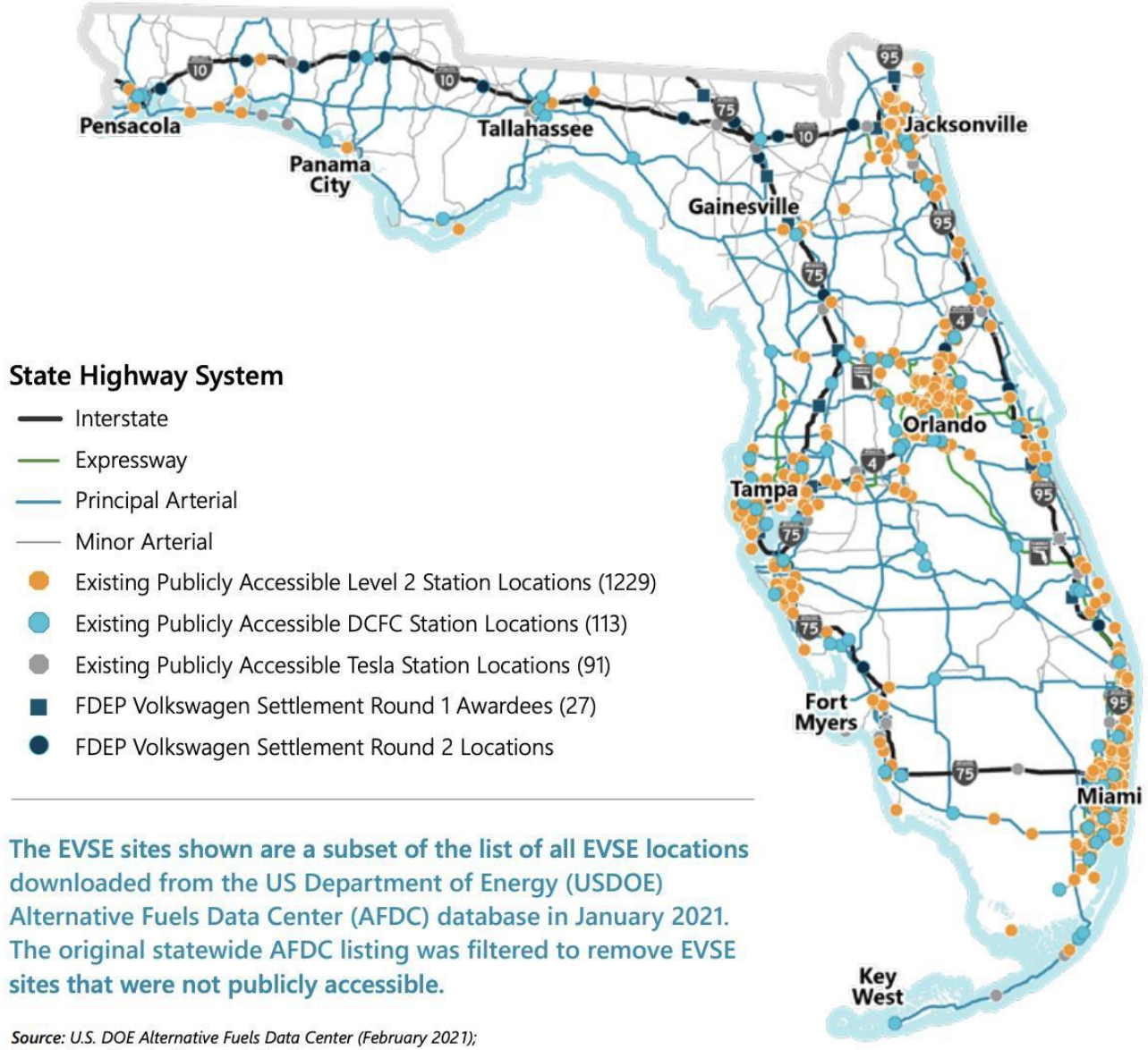
- Creates another affordable mobility option
- Promotes sustainability and active transportation, reduces auto parking demand and increases recreational opportunities
- Complements existing transit service by offering “last-mile” connectivity
- Helps reduce traffic congestion and pollution by replacing automobile trips

- **Current pilot extended until Q1 2022; Seeking full-time e-scooter and e-bike operators**

Expansion of public charging stations

Existing Publicly Accessible EVSE Locations

Prior to conducting the gap analyses, the existing publicly available EVSE locations were identified. The following page provides results from these gap analyses.



The EVSE sites shown are a subset of the list of all EVSE locations downloaded from the US Department of Energy (USDOE) Alternative Fuels Data Center (AFDC) database in January 2021. The original statewide AFDC listing was filtered to remove EVSE sites that were not publicly accessible.

Source: *U.S. DOE Alternative Fuels Data Center (February 2021); Florida Department of Transportation (February 2021)*
Date of Production: *3/17/2021*

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.

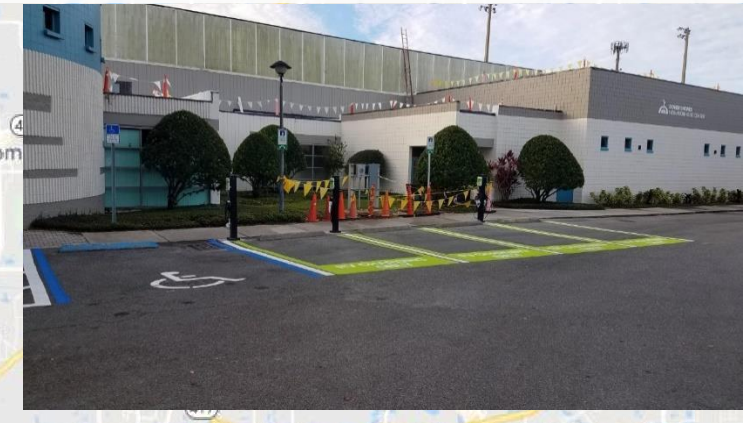
EV Charging Locations - City-Wid...

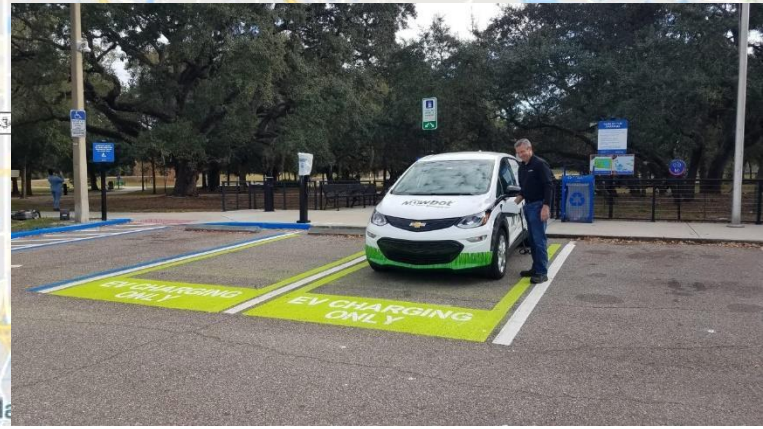
A map of the recommended locations to implement public facing EV chargers

94 views

All changes saved in Drive

Base map





Maitland
Lockhart
Eatonville
Hiawassee
Winter Park
Fairview Shores
Orlando Science Center
Harry P. Leu Gardens
COLLEGE PARK
Lake Ivanhoe Park
Pine Hills
Orlovista
Orlando
Orlando Executive Airport
Azalea Park
DIXIE BELLE
WADEVIEW PARK
METRO WEST
SOUTHWEST ORLANDO
The Holy Land Experience
Windermere
MILLENIA
Holden Heights
Conway
Edgewood
Universal Orlando Resort
Fun Spot America
Oak Ridge
Pine Castle
Lake Butler
Bay Hill
FLORIDA CENTER
Tangelo Park
Sky Lake
Belle Isle
Doctor Phillips
Orange County National Golf Center and Lodge
Lake Tibet
Florida's Turnpike

EV Recharge Mobility Hubs

OUC EV Programs

- **OUCharge-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

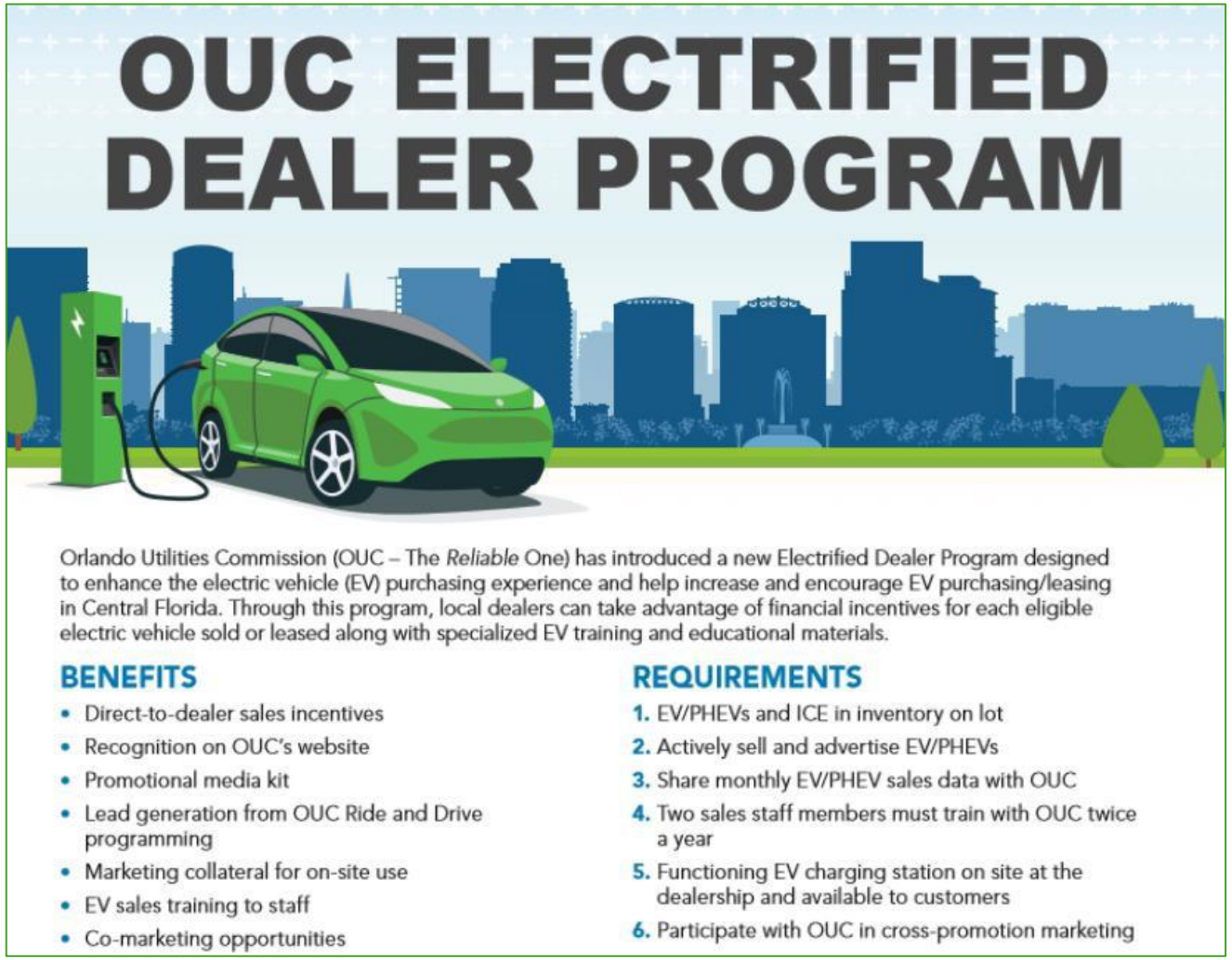
Electrified Dealership Program

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

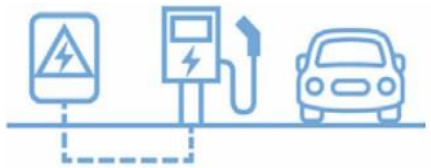
Next steps: Continue to build dealership pipeline. Continue to train more salespeople.



EV Readiness Code

- An EV readiness ordinance requires a percentage of parking spaces built to include electrical infrastructure that enables future EV charging.
  - MF, Hotel = 20% Capable; 2% Installed
  - CRE, Retail = 10% Capable; 2% Installed
- New construction or Substantial enlargement
- 40 amps / 2 parking spaces
- Effective January 1st, 2022

EV Capable: Install electrical panel capacity with a dedicated branch circuit and a continuous raceway from the panel to the future EV parking spot.



EVSE Installed: Install a minimum number of Level 2 EV charging stations.

Graphics: Sacramento, CA. **Definitions:** SWEEP.


THE CLIMATE FOR CHANGE IS NOW.
PARIS
TO
PITTSBURGH
NATIONAL GEOGRAPHIC
DOCUMENTARY FILMS

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