

ORLANDO: SUSTAINABLE & RESILIENT



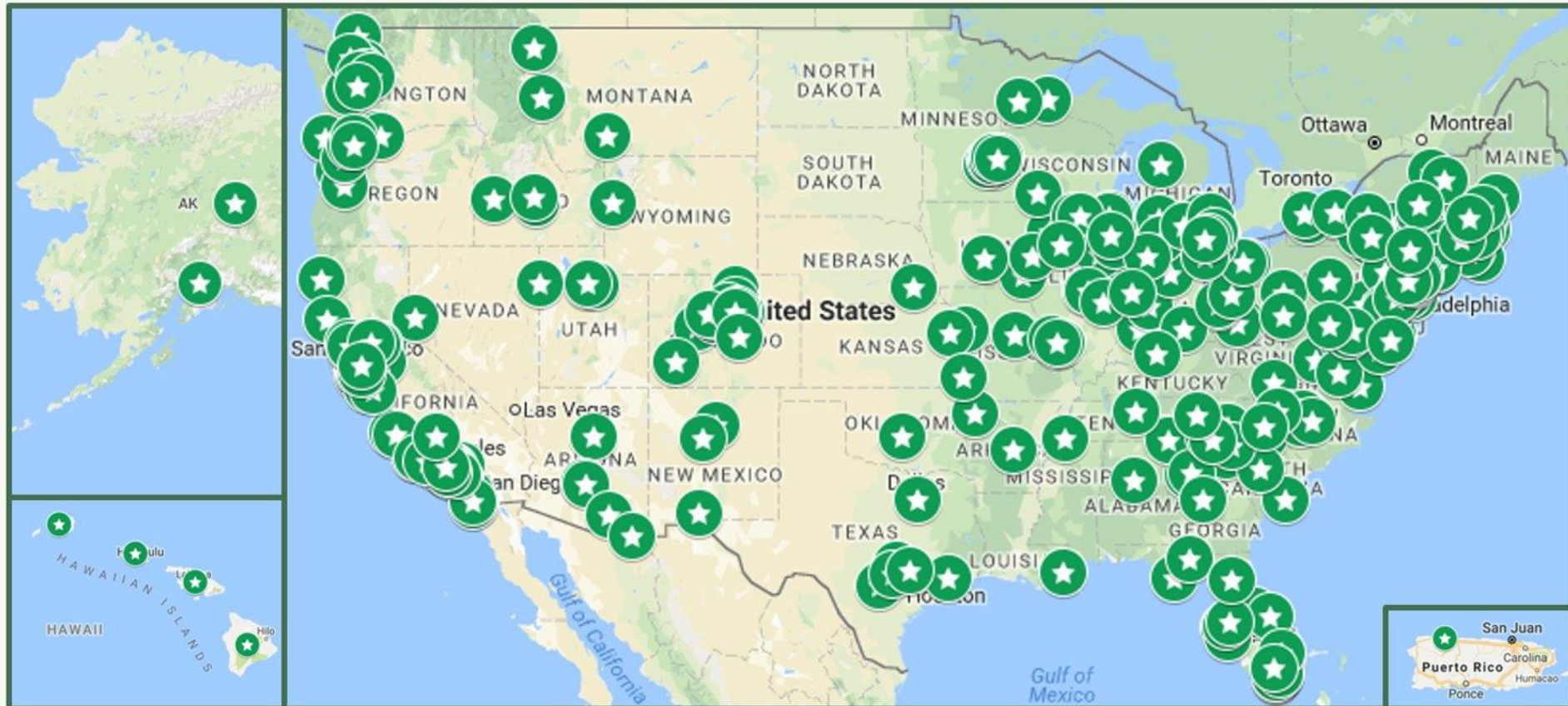
Chris Castro, LEED GA, CPB
Director, Office of Sustainability & Resilience
City of Orlando

Climate Mayors movement

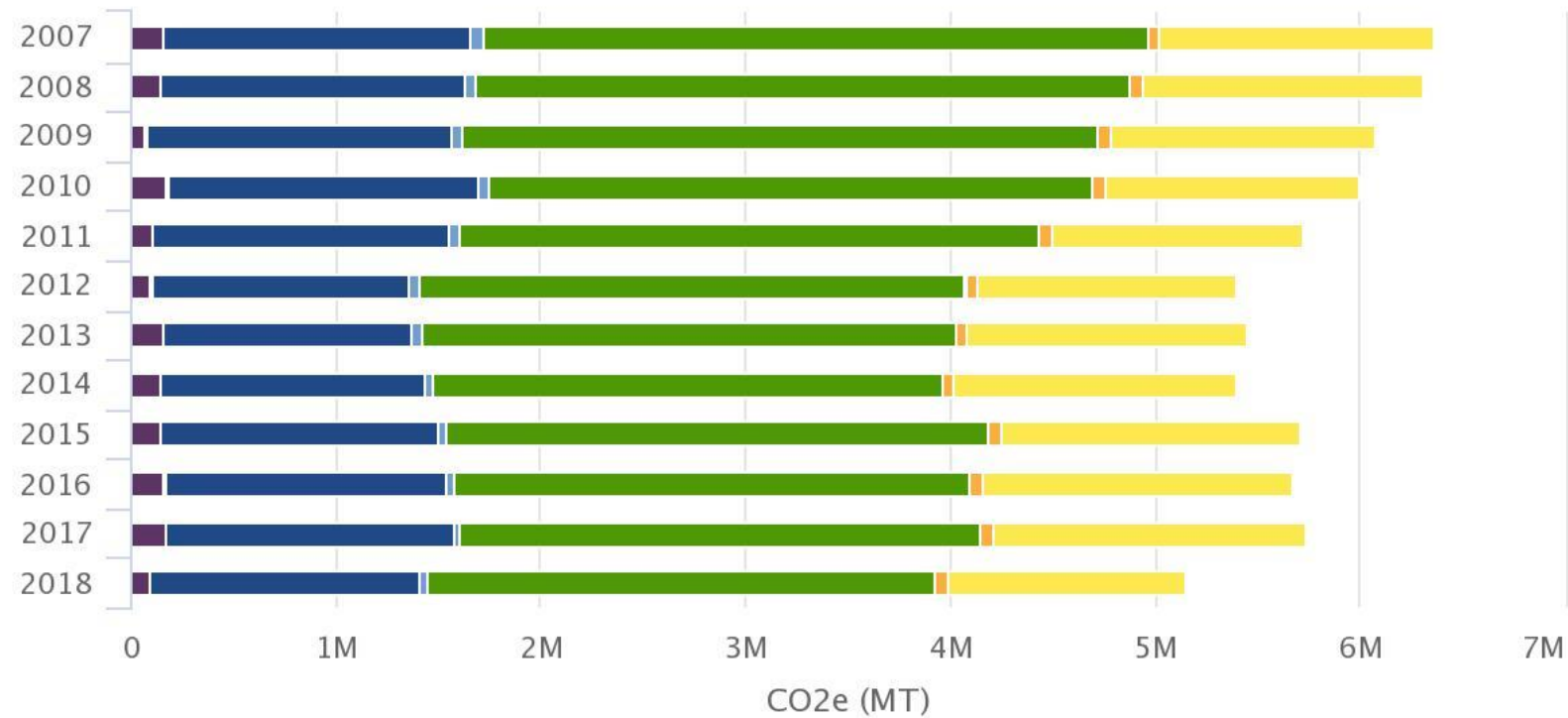
402 US #ClimateMayors, representing 69 million Americans, have committed to adopt, honor and uphold the climate goals of the Paris Agreement



CLIMATEMAYORS.ORG



Orlando's Citywide yearly emissions by sector/ source



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

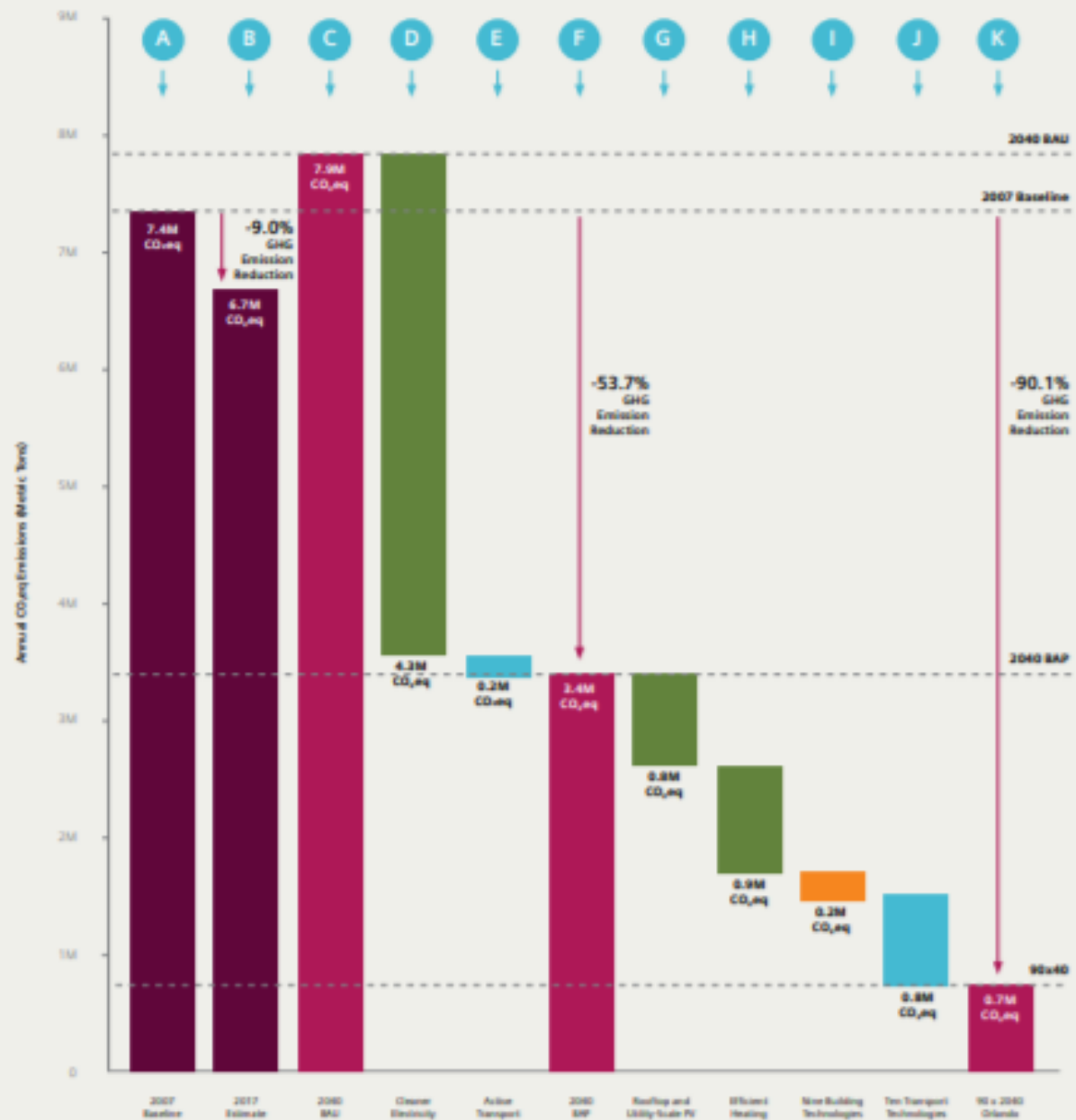
SIEMENS
Ingenuity for life

Orlando's Green Future

Technology Pathways for Building a Sustainable Future

Siemens Center of Urban Development

Pathway to 90 x 2040



Michael Bloomberg giving Orlando \$2.5 million to fight climate change

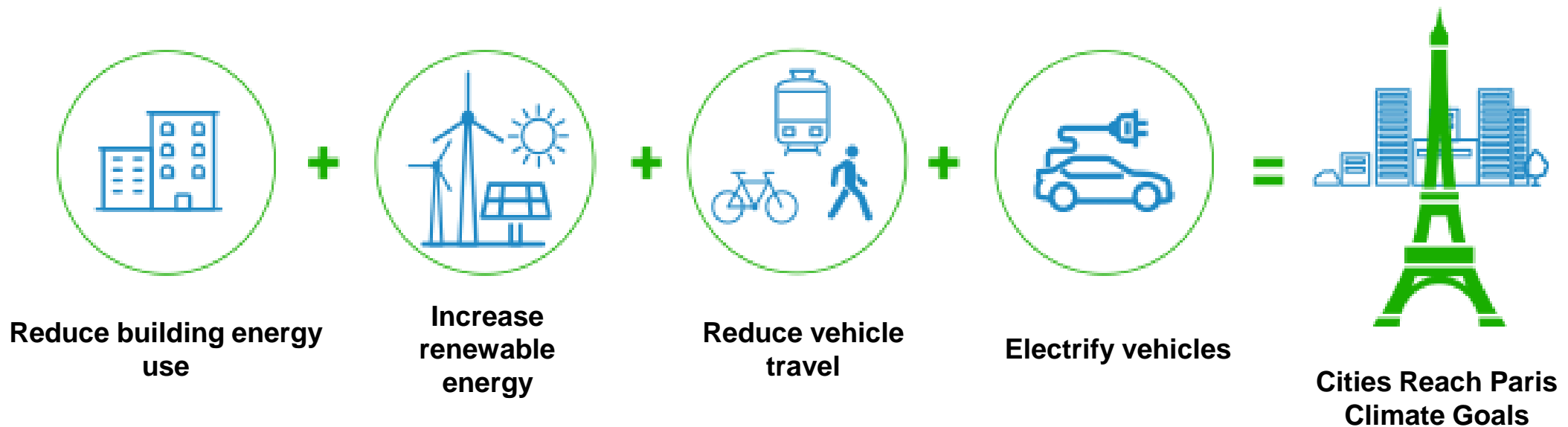


Bloomberg
Philanthropies

American Cities
Climate Challenge

About the American Cities Climate Challenge

The **American Cities Climate Challenge** is a Bloomberg Philanthropies initiative that aims to accelerate and deepen U.S. cities' efforts to create the **greatest climate impact through 2020** and showcase the benefits – **good jobs, cleaner air, and cost savings** – that climate solutions brings.



Orlando has made ambitious commitments to reduce its greenhouse gas emissions from buildings and transportation



Meet municipal electricity demand by renewable energy



Expand community solar projects



Develop a Green Building Incentive program



Pilot the building retrofit accelerator, Driving Efficient Energy Performance" (DEEP)



Electrify city fleets and buses



Expand public EV charging infrastructure



Transform the local EV market



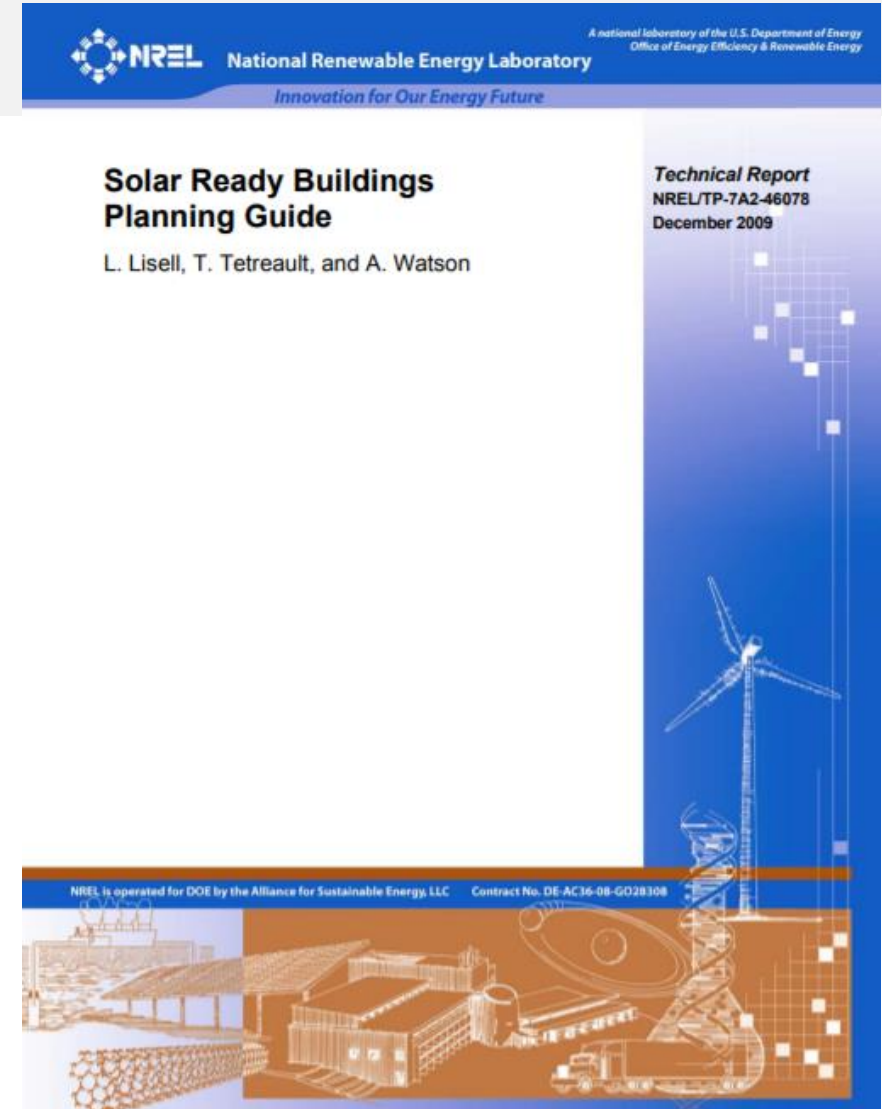
Develop local energy resource centers



Green Buildings

SOLAR & EV-READY GUIDELINES

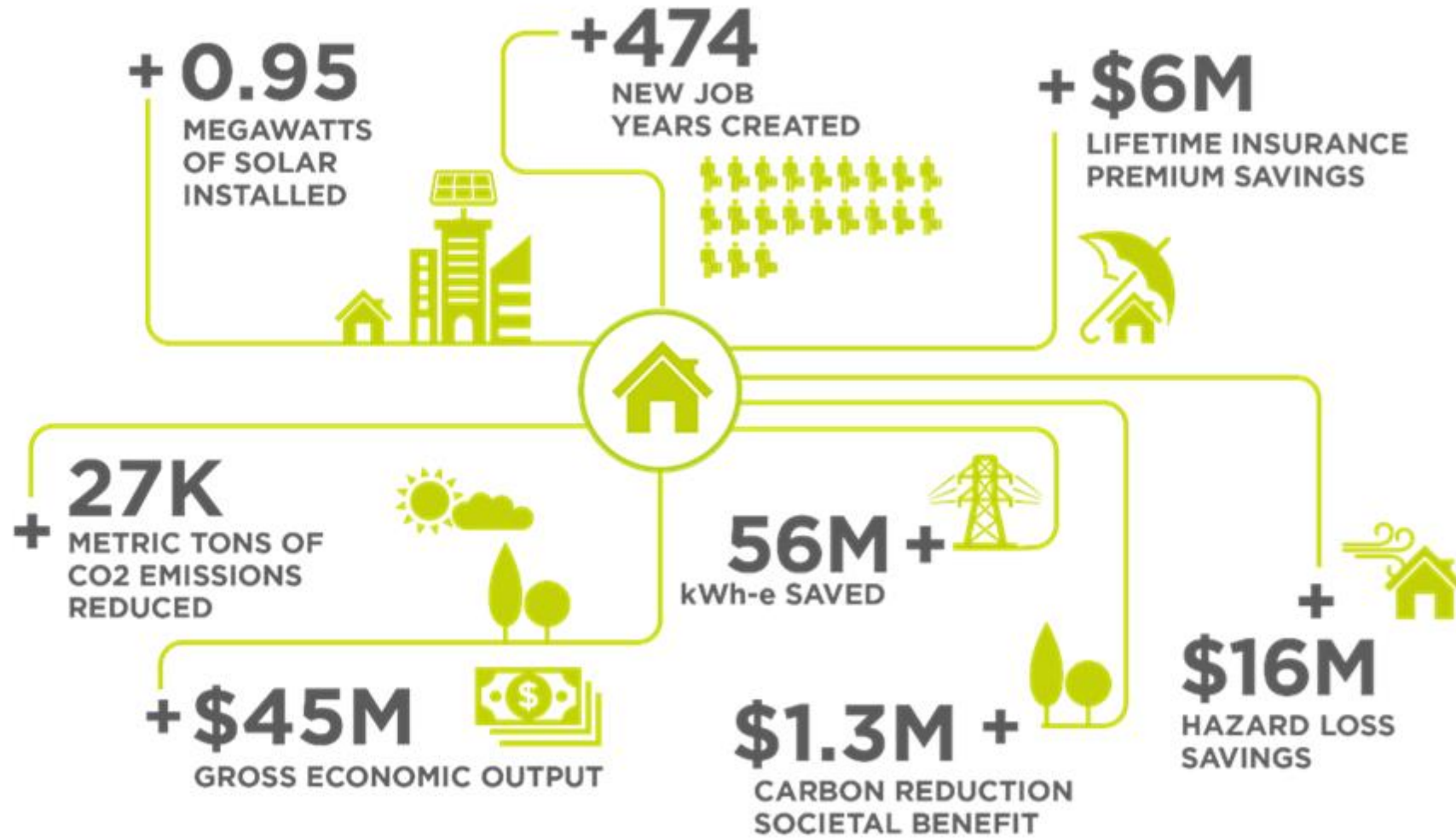
- Tailored “solar-ready” designs for Florida Building market
- Ensure proper weight load requirements
- Inverter pad placement
- Electrical panel capacity
- Conduit to the rooftop



Enabl

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

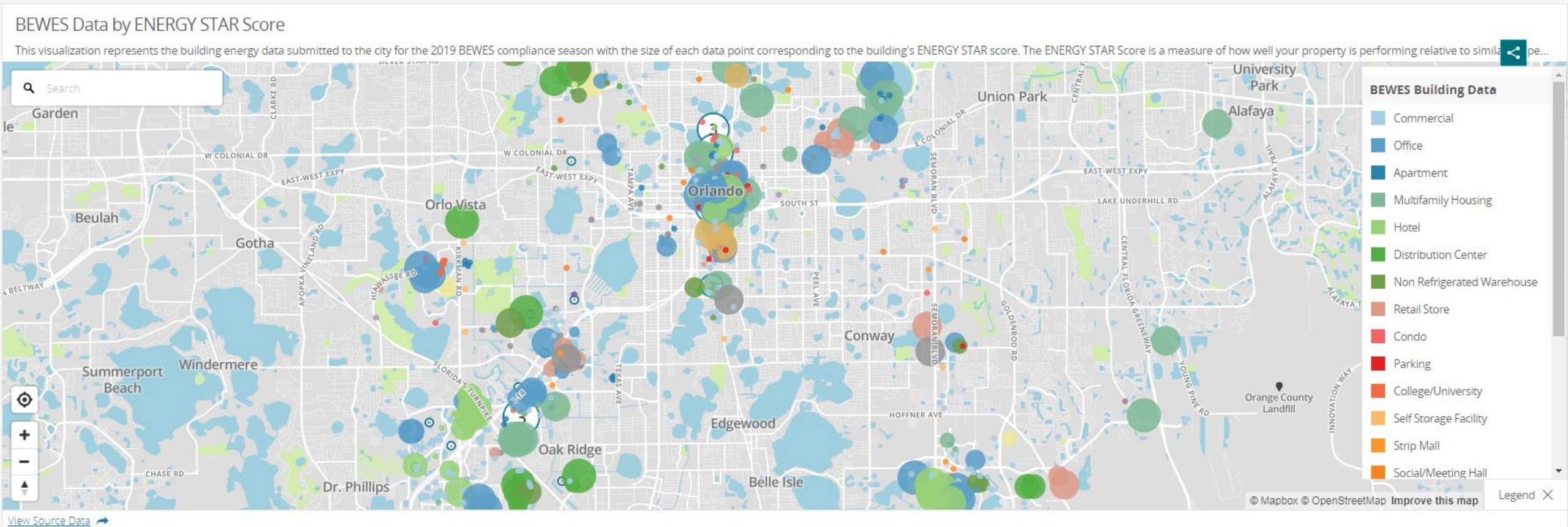
esses



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.

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





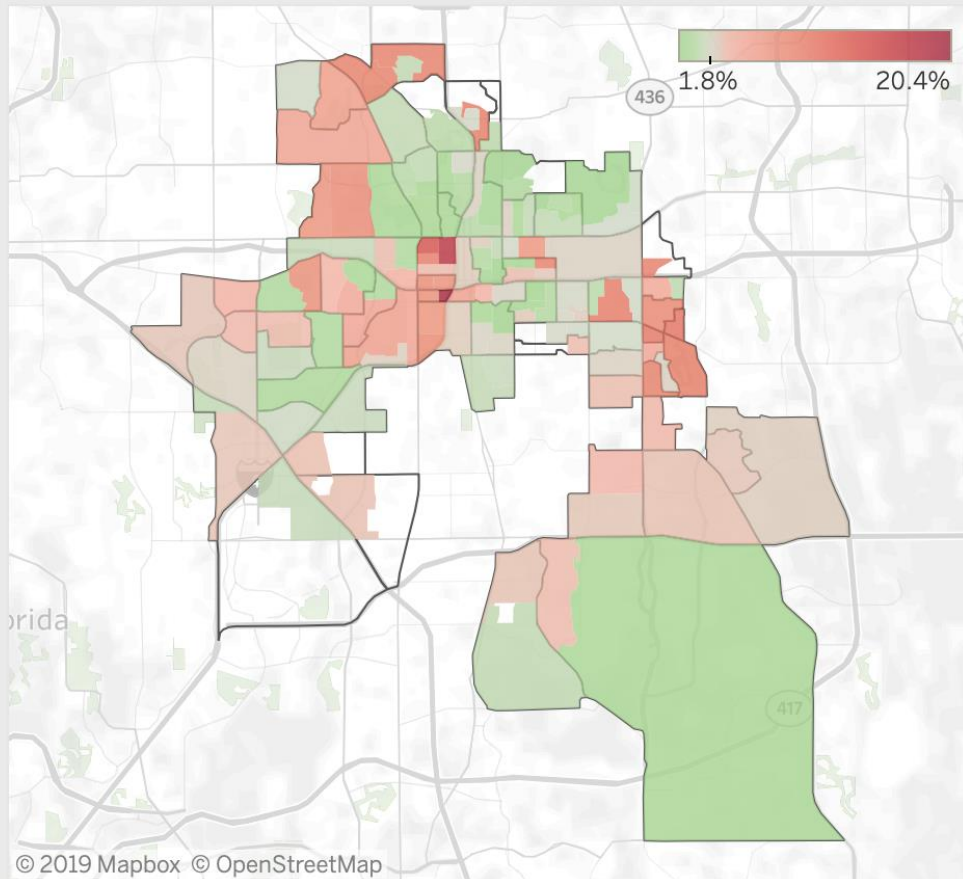
Smart Street lighting

- **GOAL: 100% LED streetlight by end of 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

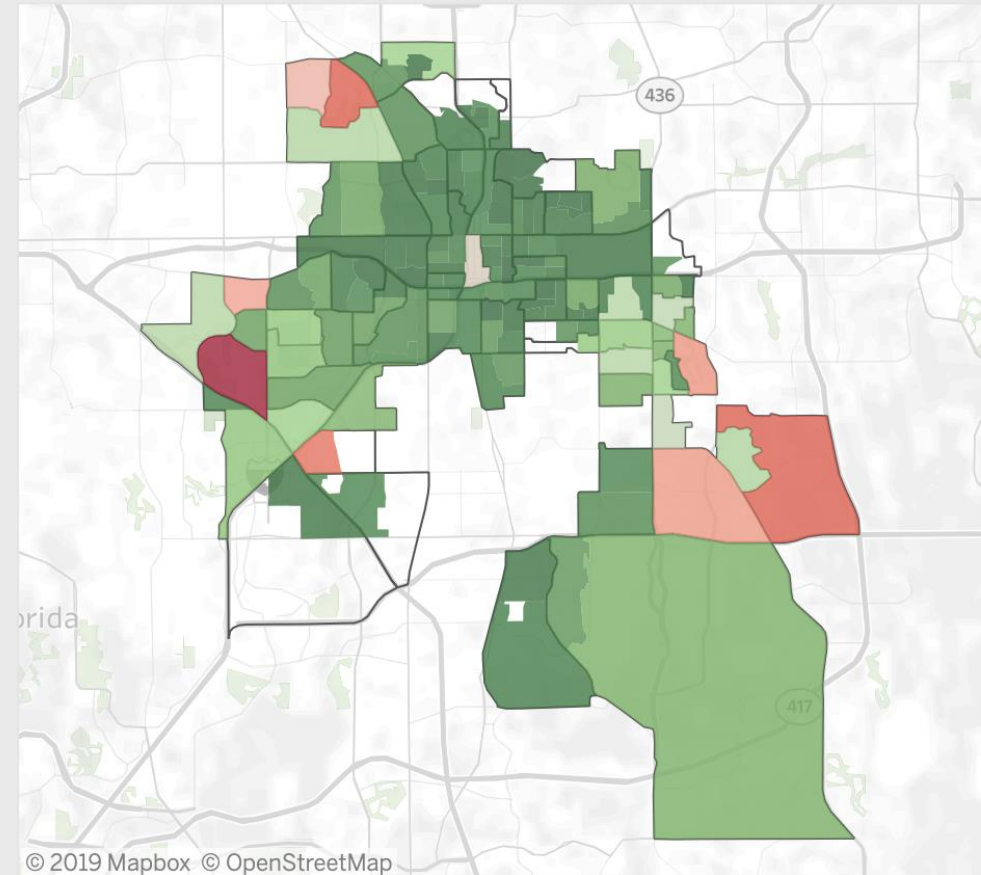


Energy and Water Equity Mapping

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%.



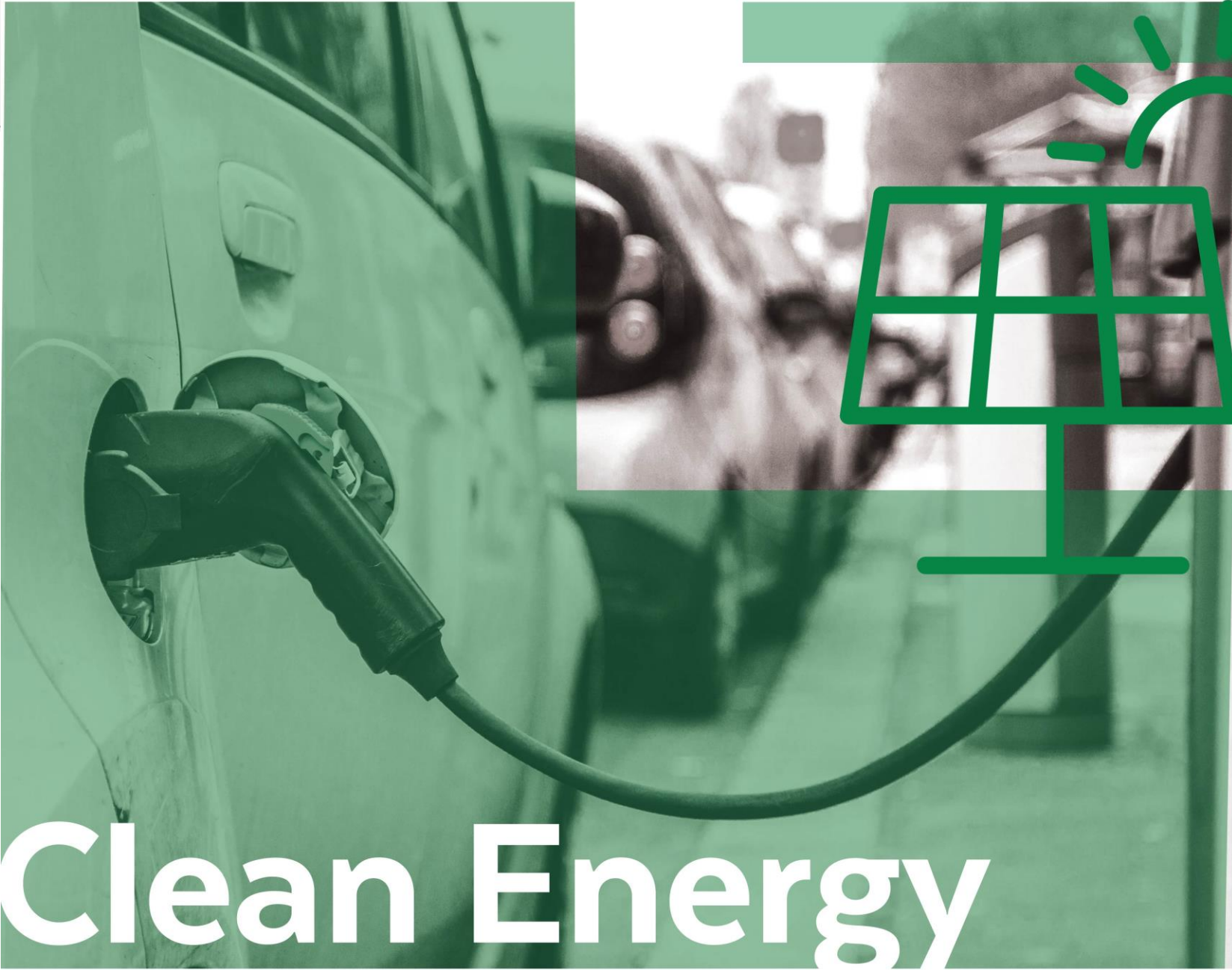
NEW HORIZONS

New Horizon's Apartments

58 affordable green housing units

- Energy Star appliances
- LED lighting
- Heat pump water heaters
- Low-flow fixtures and faucets
- Ductless HVAC
- Recycling
- Composting
- Community Garden
- Solar power

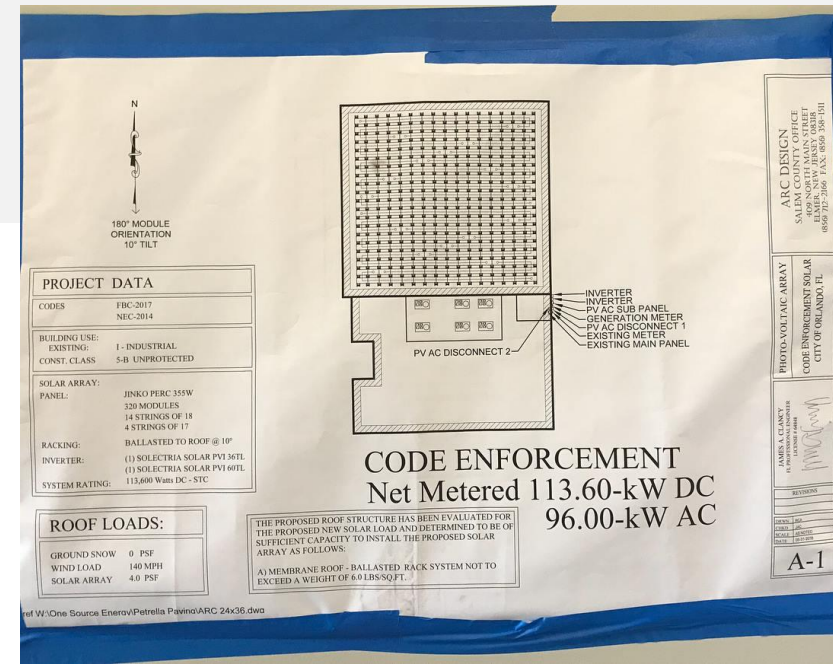




Clean Energy

FLEET & FACILITIES COMPLEX

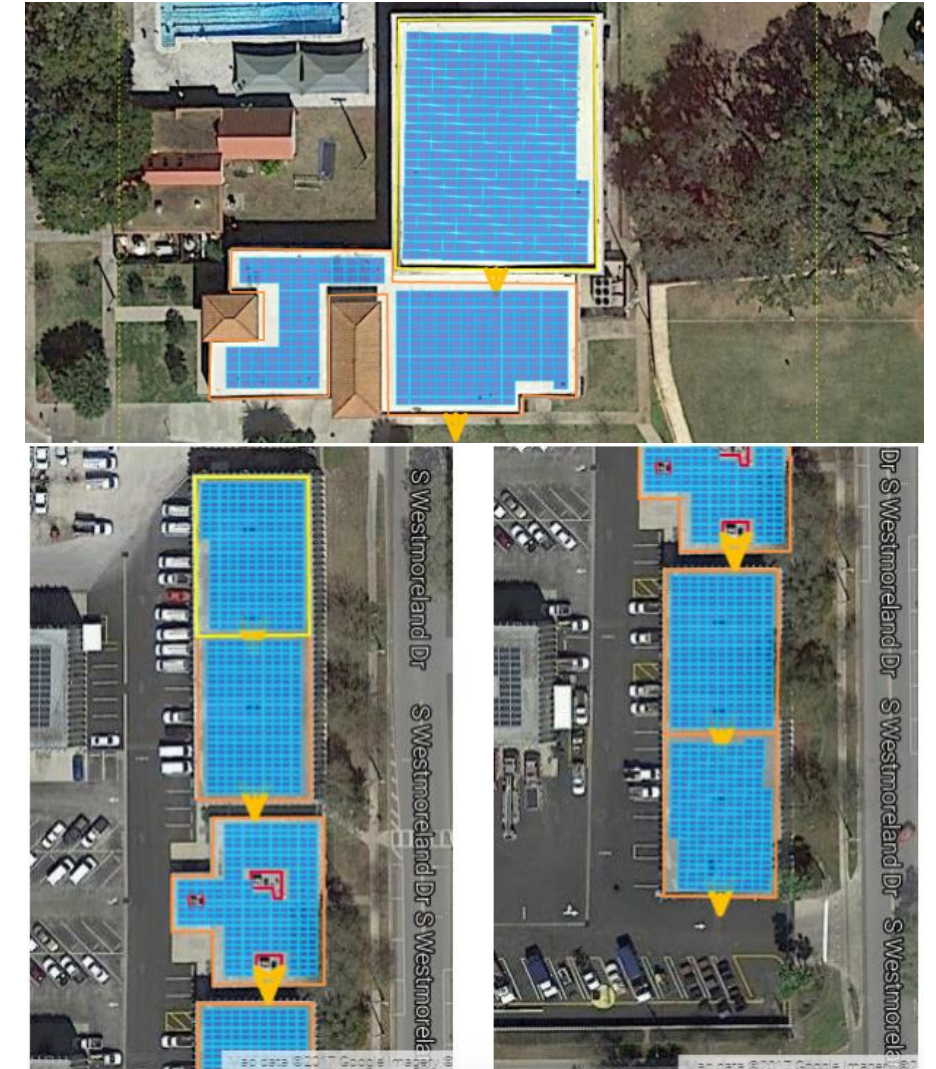
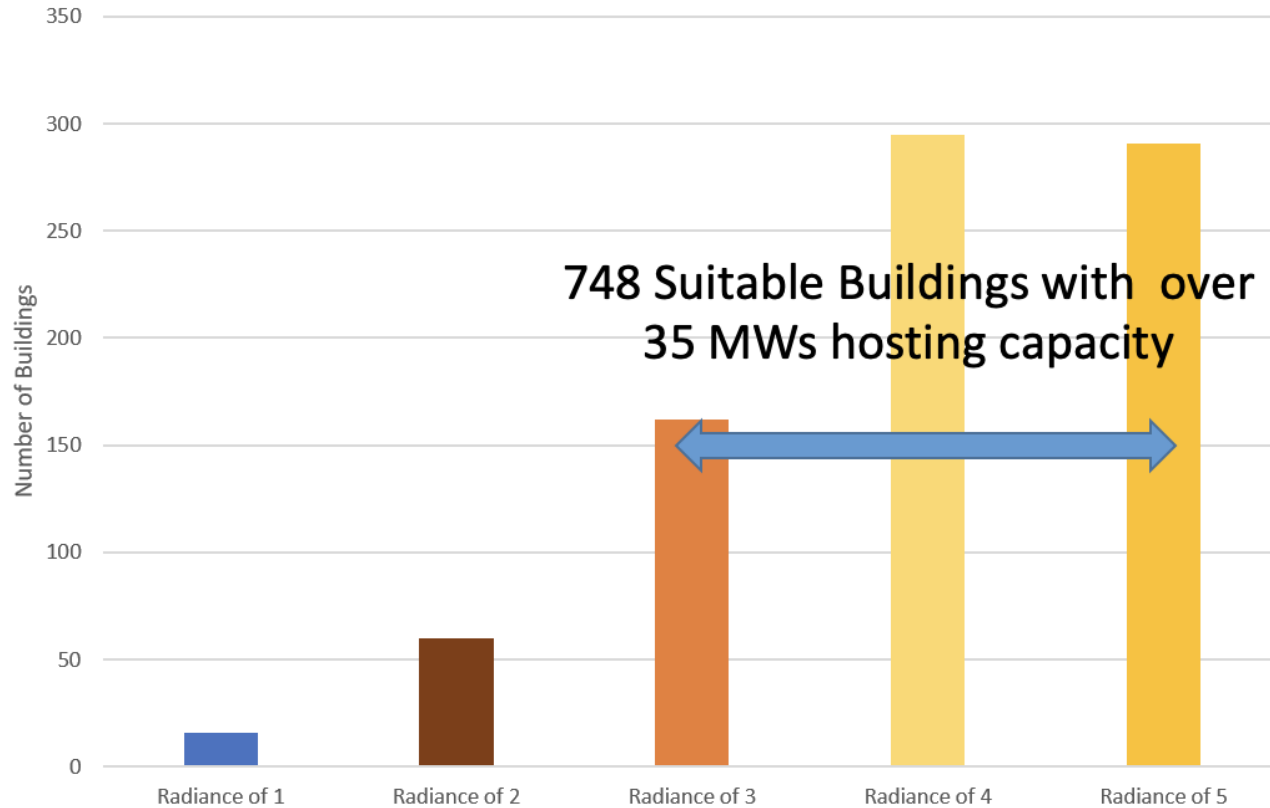




- New LEED-certified Records & Permit Building
- 114 KW solar PV
- First Net-Zero energy facility for Orlando
- \$112,000 net savings over the lifetime

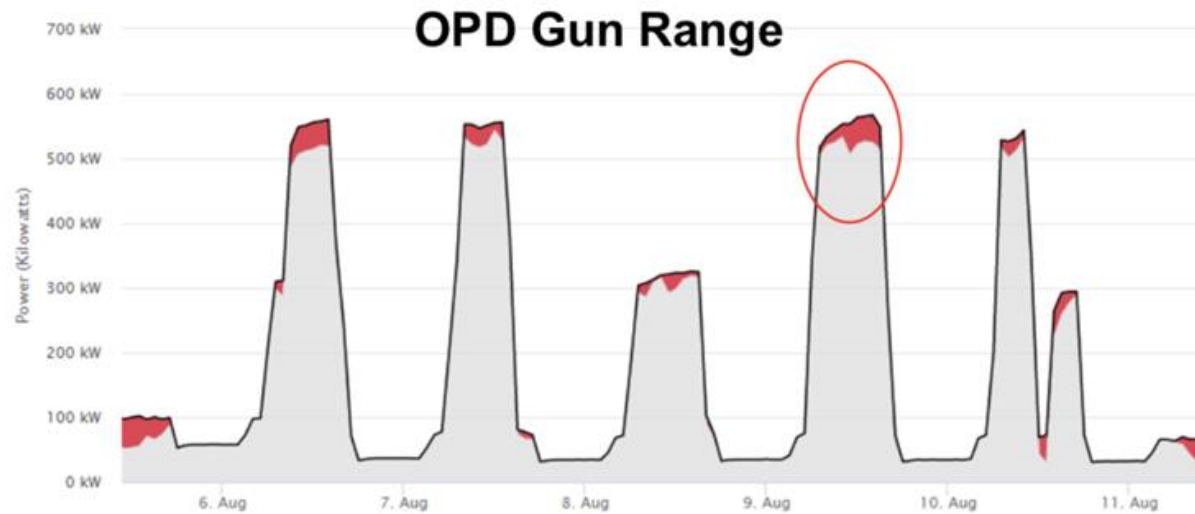
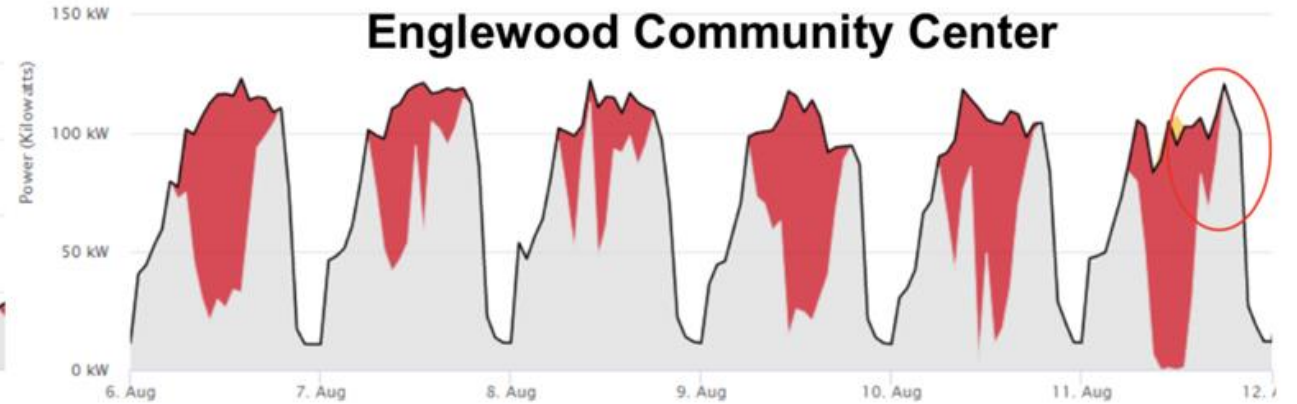
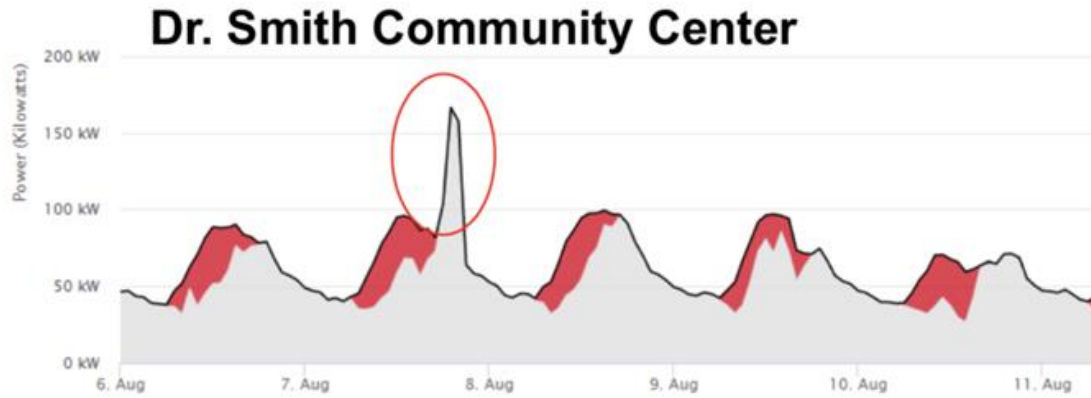


Solar Potential Study – City Ops



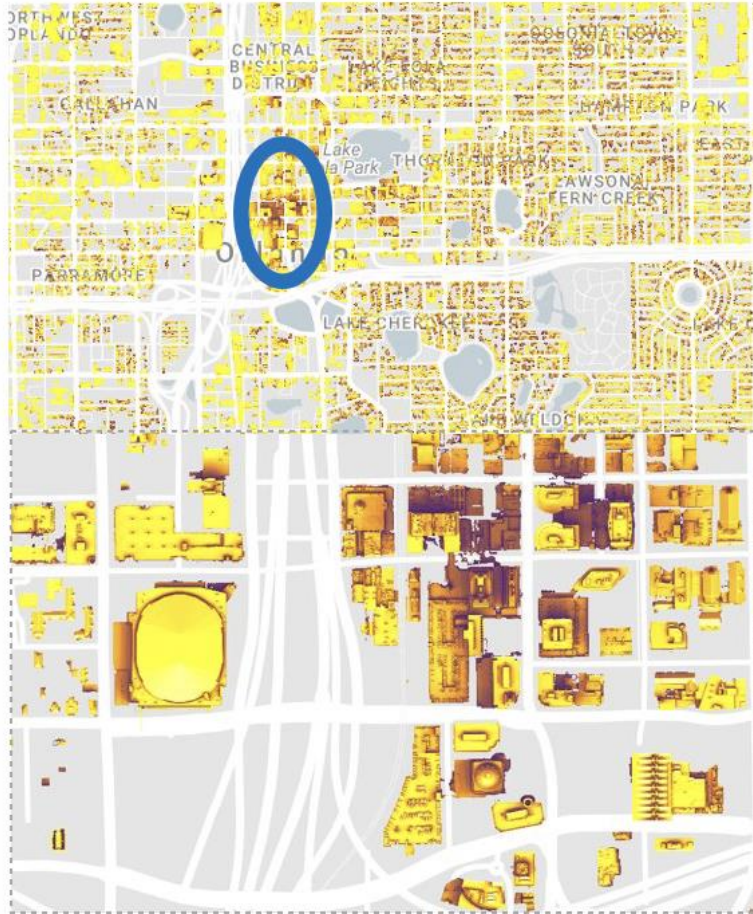
Radiance Score combines current unobstructed rooftop potential with the likelihood for future obstructions. Current potentials are obtained via LIDAR/Satellite data in combination with NREL's PVWatts and SAM tools. Likelihood for future obstructions assessed by the team by observations of recent development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

..and also evaluates solar demand reduction volatility

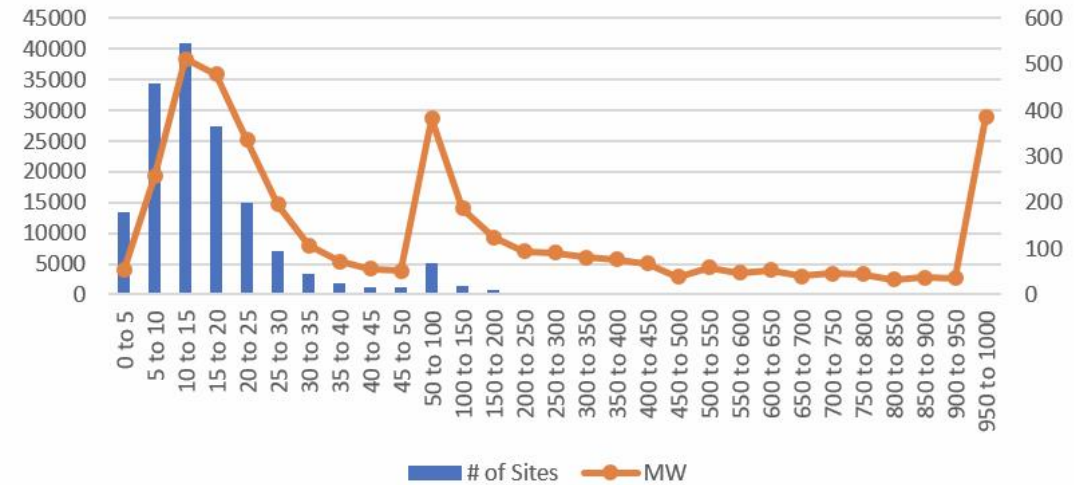




Solar Potential Study – City-wide



Maximum Solar Capacity and Sites



Sectoral Splits	MW
R	822.1
C	3217.4



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

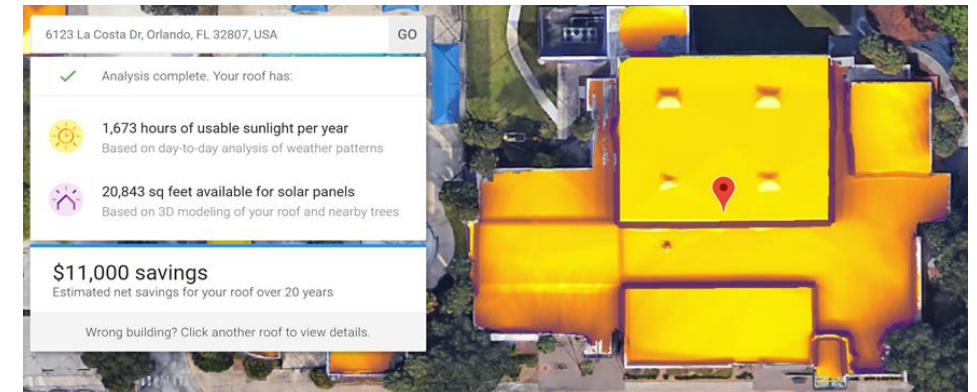


We are on track to add 15 MW of solar across our municipal buildings

30 municipal buildings have been analyzed to assess solar panel suitability. Some of the largest buildings included:

- Engelwood Community Center (163kW)
- Dover Shores Community Center (142kW)
- Rosemont Community Center (79kW)

\$2.3 million allocated in the FY20 CIP for solar PV installations.



Fleet and Facilities will install **250+ kW array** that integrates solar, battery storage, and EV charging (FY19)



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 ATHENA 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.

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

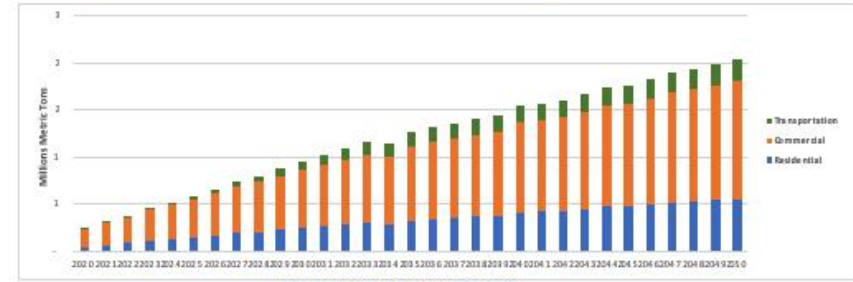
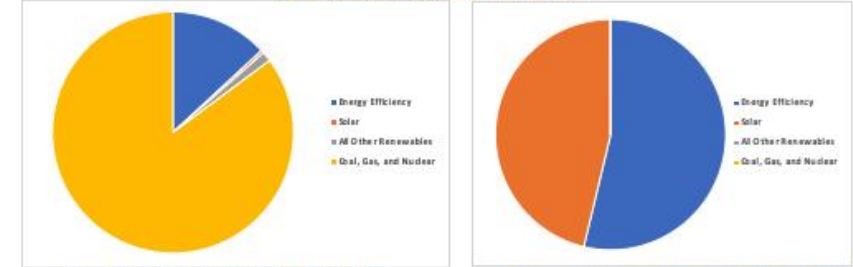
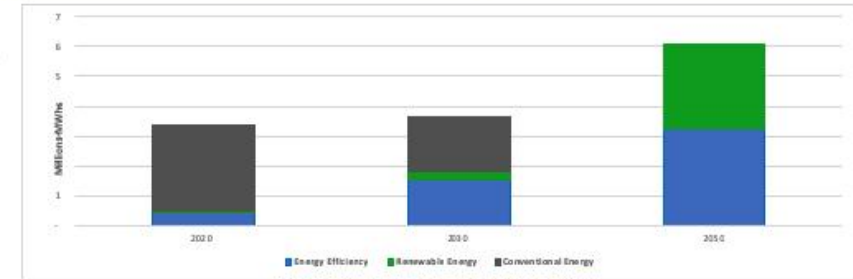
Electric Vehicle	
	ACTION
EV Potential Achieved	100%
	IMPACT
# of Electric Vehicles in Orlando	442,373



Powered by greenlink



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



CO₂ Reduction in Orlando, 2020 - 2050

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



By KEVIN SPEAR
ORLANDO SENTINEL | OCT 07, 2019 | 3:17 PM



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





Transportation

Our last Clean Cities Update


← This was
Since then:

Current Make up		
# of Vehicles	Type	Percentage of Fleet
1125	E85 compatible vehicles	47.09%
748	Bio-Diesel compatible vehicles	31.31%
29	Hydraulic Hybrid/Bio-Diesel Refuse trucks	1.21%
30	CNG Refuse trucks	1.26%
75	All Electric LSEV	PEV 3.14%
21	Propane/LP gas	0.88%
9	2009 Hybrid Ford Escape's	0.38%
10	Eco-Boost Ford F150's	0.42%
12	Eco-Boost Ford Escape's	0.50%
24	Eco-Boost Ford Fusion's	1.00%
1	Eco-Boost Ford Expedition	0.04%
6	Nissan Electric LEAF's	PEV 0.25%
1	Ford Focus Electric	PEV 0.04%
1	Ford Focus C-Max	PHEV 0.04%
5	Chevrolet Volt's	PHEV 0.21%
4	Hybrid Ford Fusion's	0.17%
44	Toyota Camry Hybrid's	1.84%
4	Zero Motorcycles	PEV 0.17%
2,047		

100 Ford F-150's (Rivian Tech)

86% of Fleet On Road Vehicles have some form of Alternative Fuel or Propulsion System already

Lots of new stuff in the making!



- In Bound 2018 Have arrived!**
- A) 30 CNG Refuse Trucks to replace Hyd Hybrids
 - B) 2 Chevy Volts PHEV
 - C) 15 Chevy Bolts PEV
 - D) 10 CNG Ford F150's
 - E) 15 Nissan Leaf's PEV
- Still in work for 2019! The Leaf's will have Bi-Directional Inverters.**
- (Currently Using)**



Hydrogen (Yet to incorporate)

We are also developing Specs for two EV Refuse Trucks

& NREL is going to help us with Hydrogen production





EV & Hybrid Focus

Current Inventory		Currently in Process	
# of Vehicles	Type	# of Vehicles	Type
	179		251
75	All Electric LSEV		
9	Ford Escape Hybrids		
6	Nissan Leafs	15	Nissan Leafs *
1	Ford Focus EV		
1	Ford Focus C-Max		
6	Chevy Volts		
4	Ford Fusion Hybrids		
57	Toyota Camry Hybrids	15	Toyota Camry Hybrids
4	Zero Motorcycles	4	Zero Motorcycles
15	Chevy Bolts	15	Chevy Bolts *
1	Orange EV Yard Dog		
		2	Residential Refuse EV's
		100	Workhorse W-15
		100	Ford F-150's (Rivian Tech)

* Using the Climate Mayors
Electric Vehicle Purchasing Collaborative

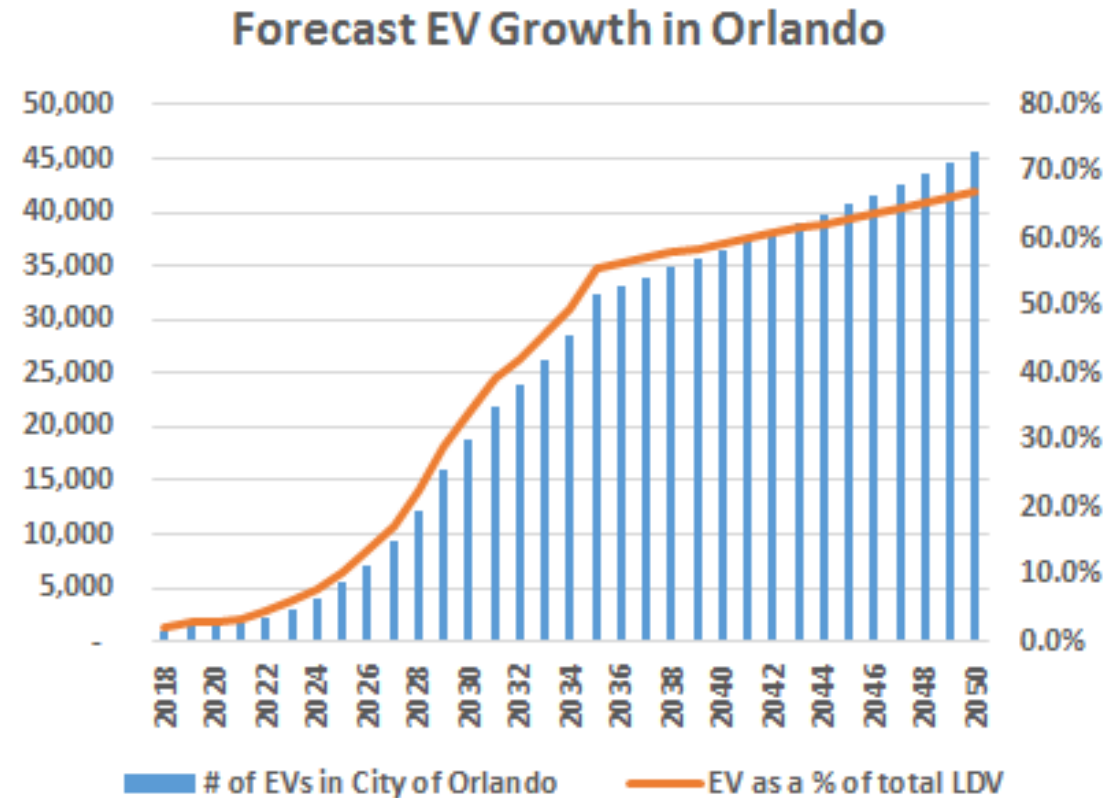


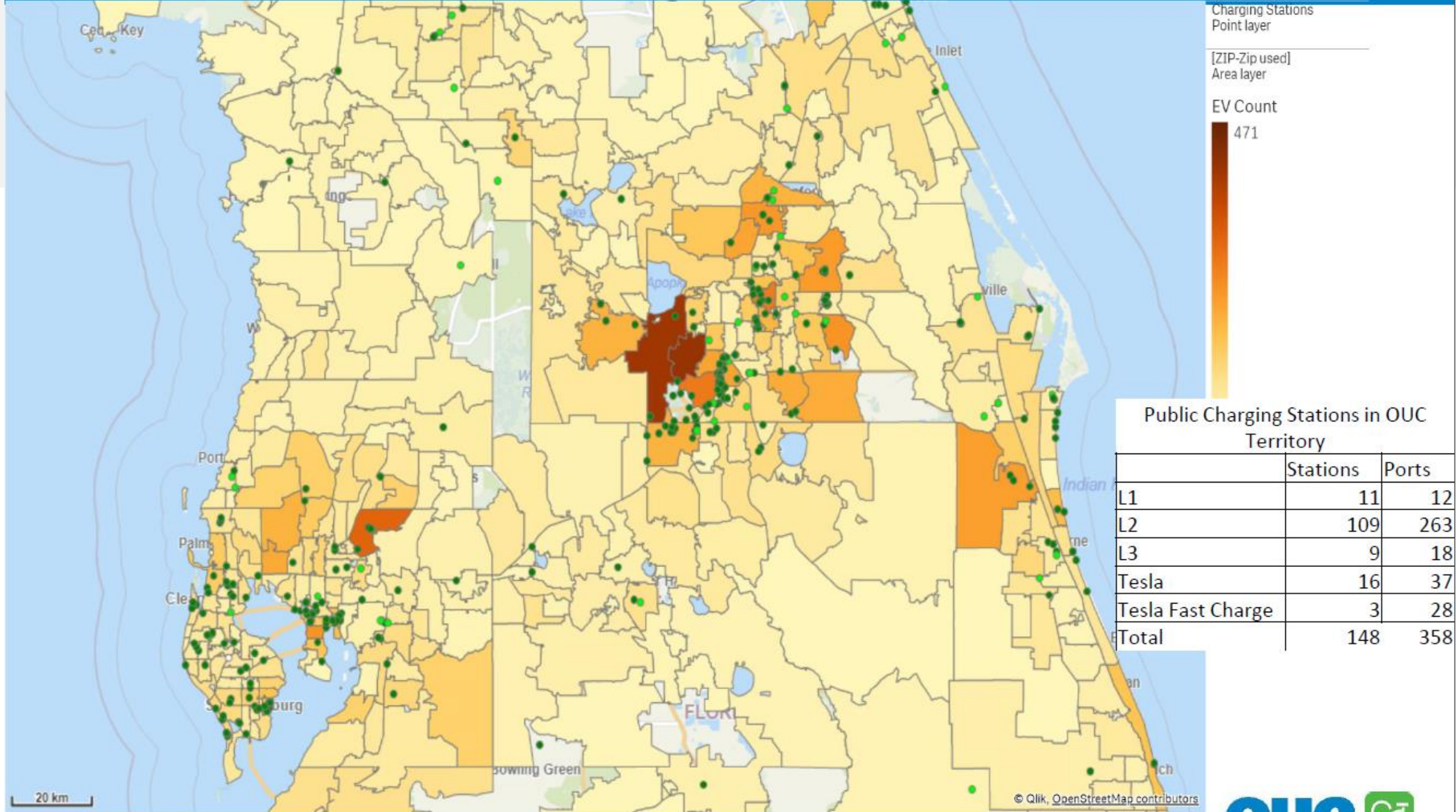
www.electrificationcoalition.org
www.driveEVfleets.org



Electric vehicle adoption in Orlando is projected to have 544,000+ vehicles by 2050.

Orlando Forecast Results	2018	2020	2030	2040	2050
EVs as a % of total passenger vehicles	2%	3%	34%	59%	67%
EV electricity consumption (MWh)	11,148	18,251	226,122	435,393	544,213





* Currently showing a limited data set.

EV Charging Locations - City-Wid...

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

All changes saved in Drive

Add layer Share Preview

EV Charging Locations

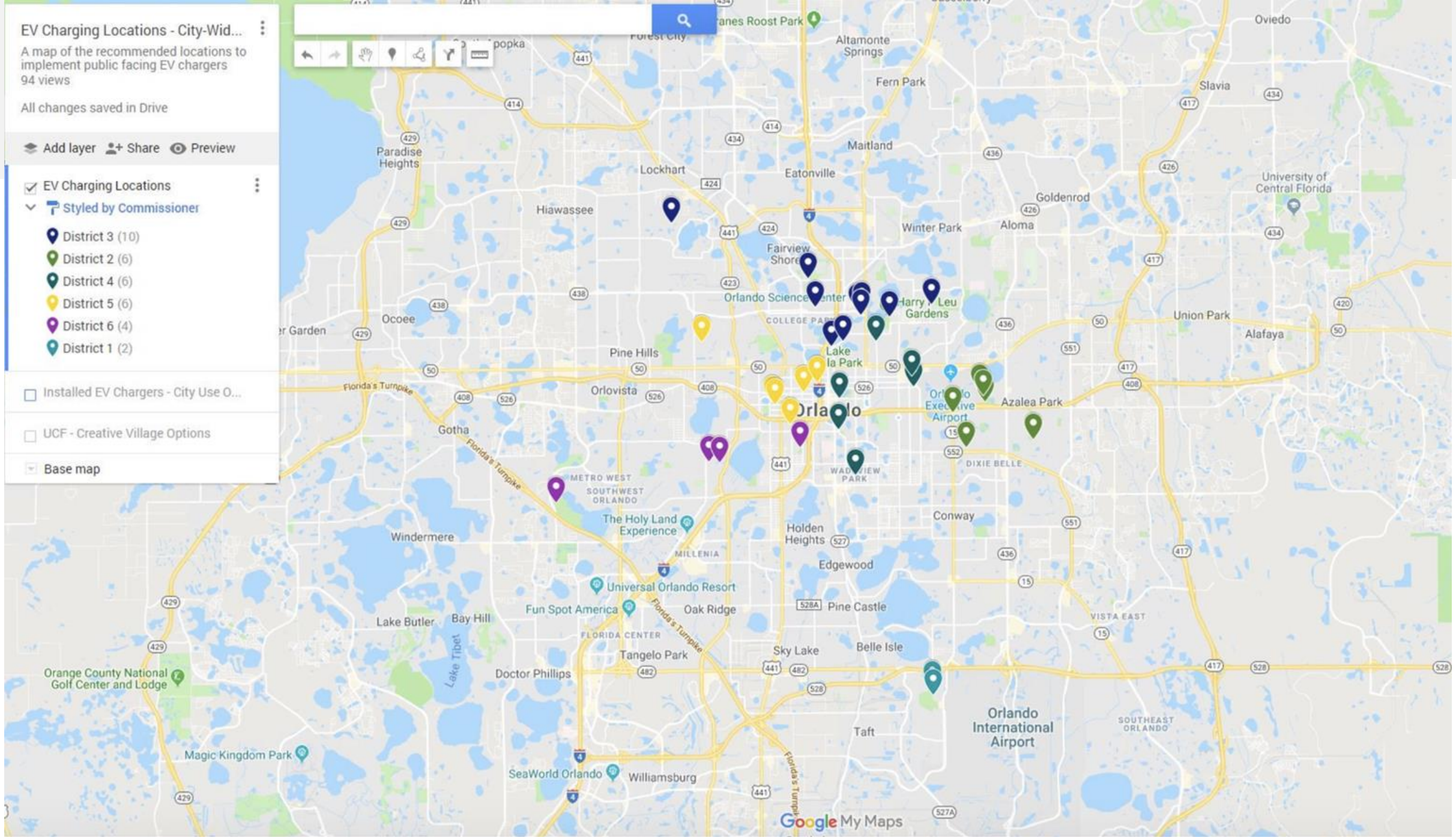
Styled by Commissioner

- District 3 (10)
- District 2 (6)
- District 4 (6)
- District 5 (6)
- District 6 (4)
- District 1 (2)

Installed EV Chargers - City Use O...

UCF - Creative Village Options

Base map





OUCCharge-It Program



- **Charge-It**
OUC Owns, Installs & Maintains Stations
You can obtain electric vehicle charging services from OUC for a fixed monthly fee over a contracted period of time. The fee is based on specific characteristics of your site and the equipment type.
- **Own-It**
OUC Designs, Procures & Installs Stations
You pay for the equipment and installation that OUC provides, then you own it immediately.



CHARGING OPTION	POWER REQUIRED	CHARGING TIME*
Level 2	208 or 240-volt	3.5+ hours
Level 3	480-volt	30+ minutes



Lymmo Electric Bus Expansion





PROUD TO BE FEATURED IN
THE BRAND NEW
DOCUMENTARY



THE CLIMATE FOR CHANGE IS NOW.

PARIS TO PITTSBURGH



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GREEN WORKS ORLANDO

