



Smart ORL

*The future of urban sustainability
and smart cities*

Chris Castro, LEED GA, CPB

Director of Sustainability, Co-chair of Smart Cities



Happiness



Safe



Fun Social Interactions

Clean and Healthy



All over the world,
cities are transforming
rapidly



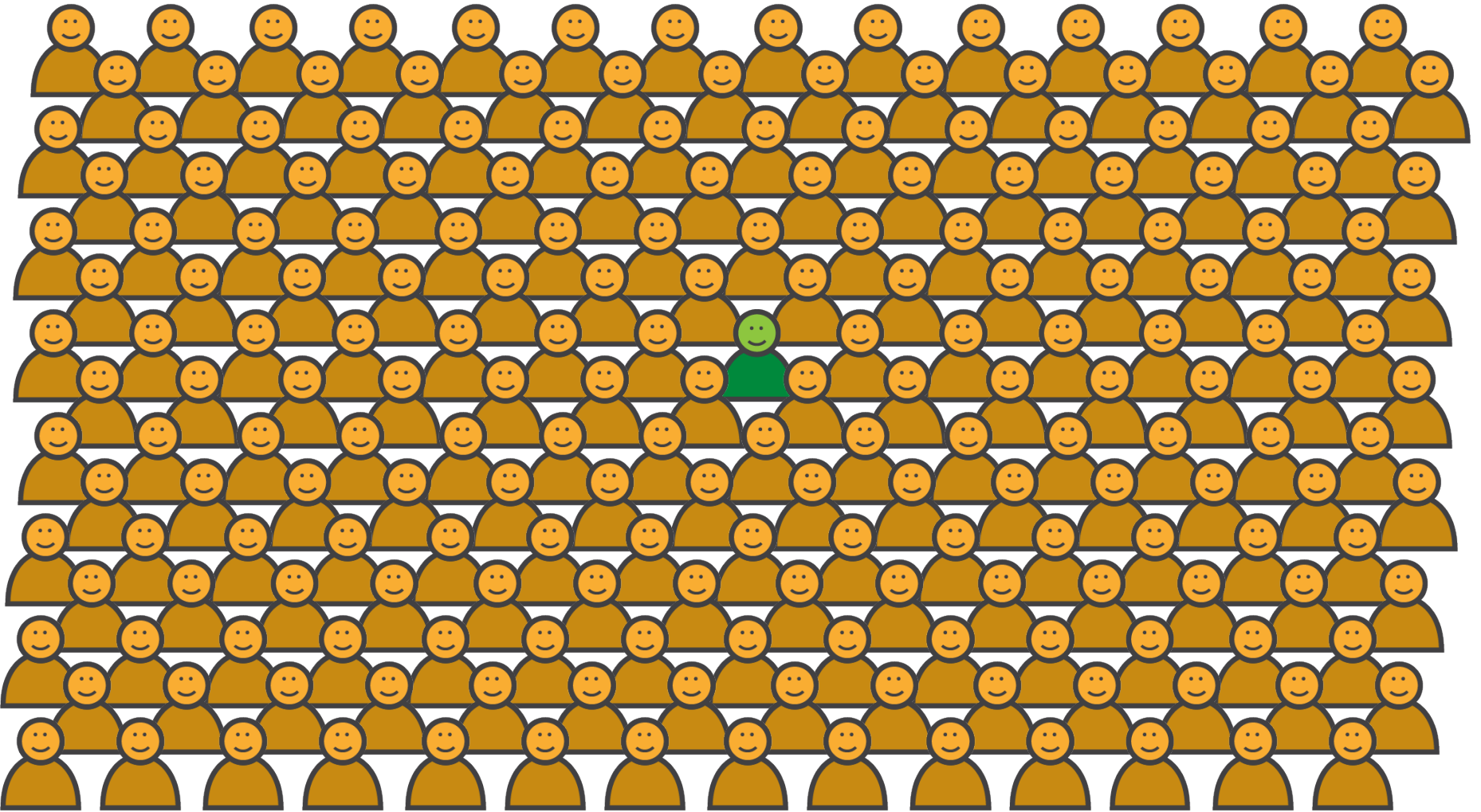
Orlando's population grows 1,000 people per week



4th fastest growing MSA in the U.S. – Forbes 2018

Population Vs Visitors

1 Resident to 255 Tourists



WELCOME TO
SMART CITIES
ORLANDO



CITY OF ORLANDO

“Our vision is to become the most environmentally friendly, socially inclusive, and economically vibrant city in the Southeast...we strive to be one of the most sustainable and resilient cities in the U.S.”



– Mayor Buddy Dyer, City of Orlando



- Award-winning sustainability program launched by Mayor Buddy Dyer in 2007



- Focuses on 7 key areas:

- Clean Energy
- Green Buildings
- Local Food Systems
- Zero Waste
- Livability
- Clean Water
- Multi-modal Transportation

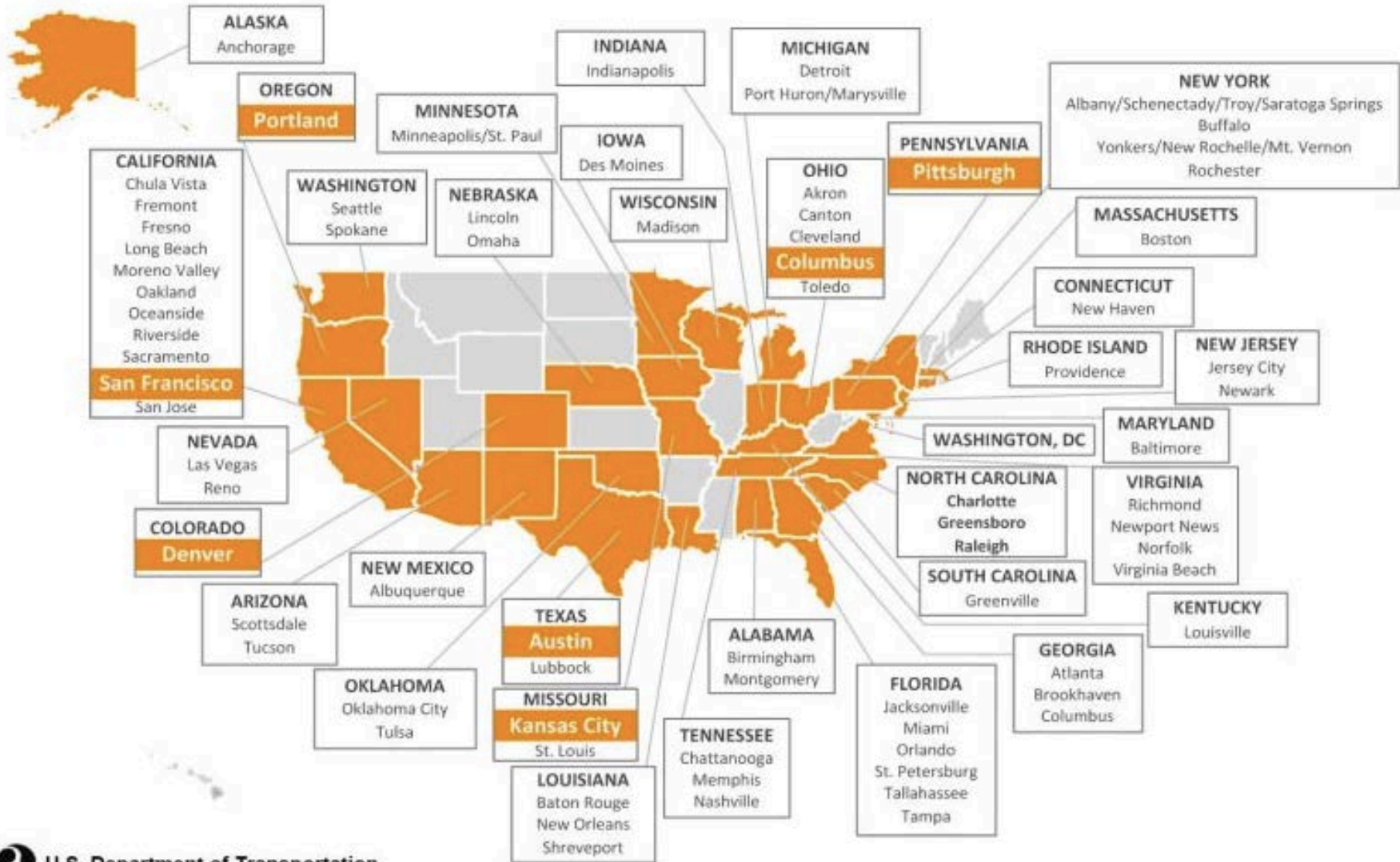


- Implemented more than 100 strategies throughout municipal operations & city-wide





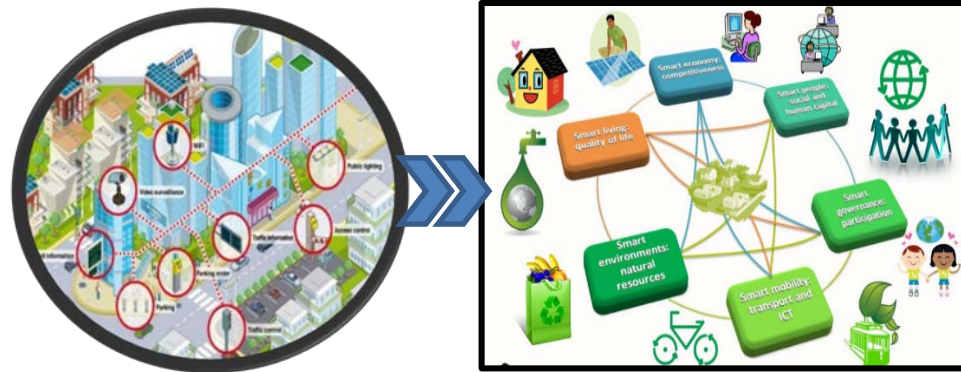
Smart City Challenge Finalists



What is a “Smart & Sustainable City” to Orlando?

Solving urban problems using technology and data to enhance our collective quality of life, make government more efficient, engage citizens more meaningfully, protect the environment, and create a diverse and robust economy.

A city that uses information and communications technology (ICT) to enhance its livability, workability, sustainability and resilience.



Uses **technology** to make critical infrastructure and City services more intelligent, interconnected, and efficient.



3 key benefits




LIVABILITY

Clean
Safe
Healthy
Vibrant
Mobility



WORKABILITY

Competitive
Connected
Digital
Jobs
Prosperous



SUSTAINABILITY

Renewables
Resilient
Regenerative
Carbon Neutral
Water





2017 Smart Cities Council Readiness Challenge WINNER!

- 1 of 5 cities nation-wide
 - Orlando, Miami, Austin, Philadelphia, Indianapolis
- Develop comprehensive 'smart cities' roadmap and framework



2017 Smart Cities Council Readiness Workshop!



- Hosted on June 6th, 2017 workshop in partnership with Smart Cities Council
- Focus on Energy, Built Environment, Transportation, Public Safety, Water, Digital Divide, Affordable Housing, Open Data
- Gathering community input to develop and define our goals, objectives, KPI's, etc.



SMART CITIES ORLANDO

FOCUS AREAS

- Stakeholder Engagement
- Digital Infrastructure / ICT
- Public Safety
- Built Environment
- Energy & Utilities
- Transportation
- Water & Wastewater
- Waste Management



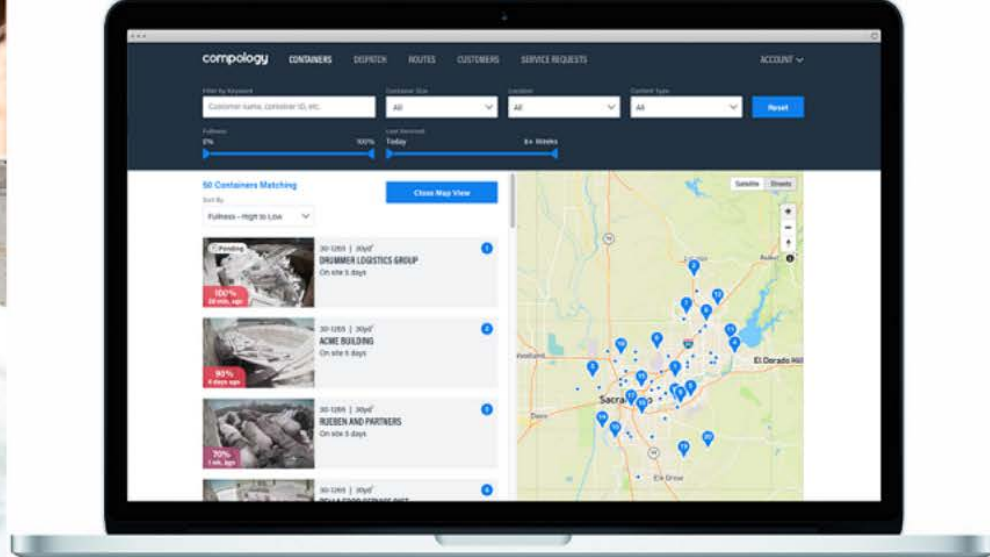


Soild Waste

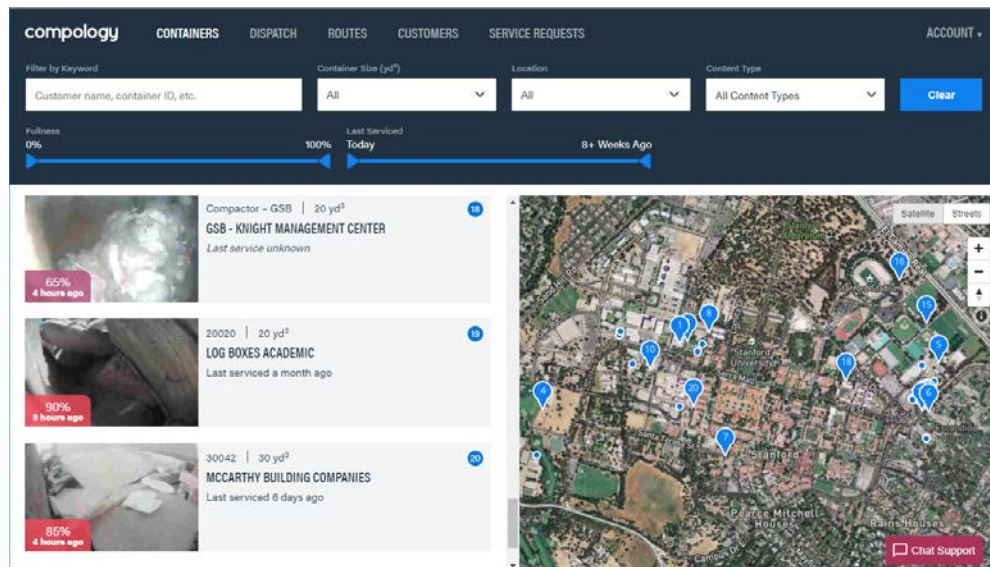




Smart Dumpsters



- **Smart Dumpster sensors provide:**
 - Real-time monitoring of commercial dumpsters
 - Save businesses money on collection
 - Save City money on improving efficiency





Orlando Collects





Commercial Food Waste Collection Program

Nearly
2.5 MILLION
pounds of
Food Waste
diverted from
the landfill
since August
2016





Commercial Food Waste Collection Program





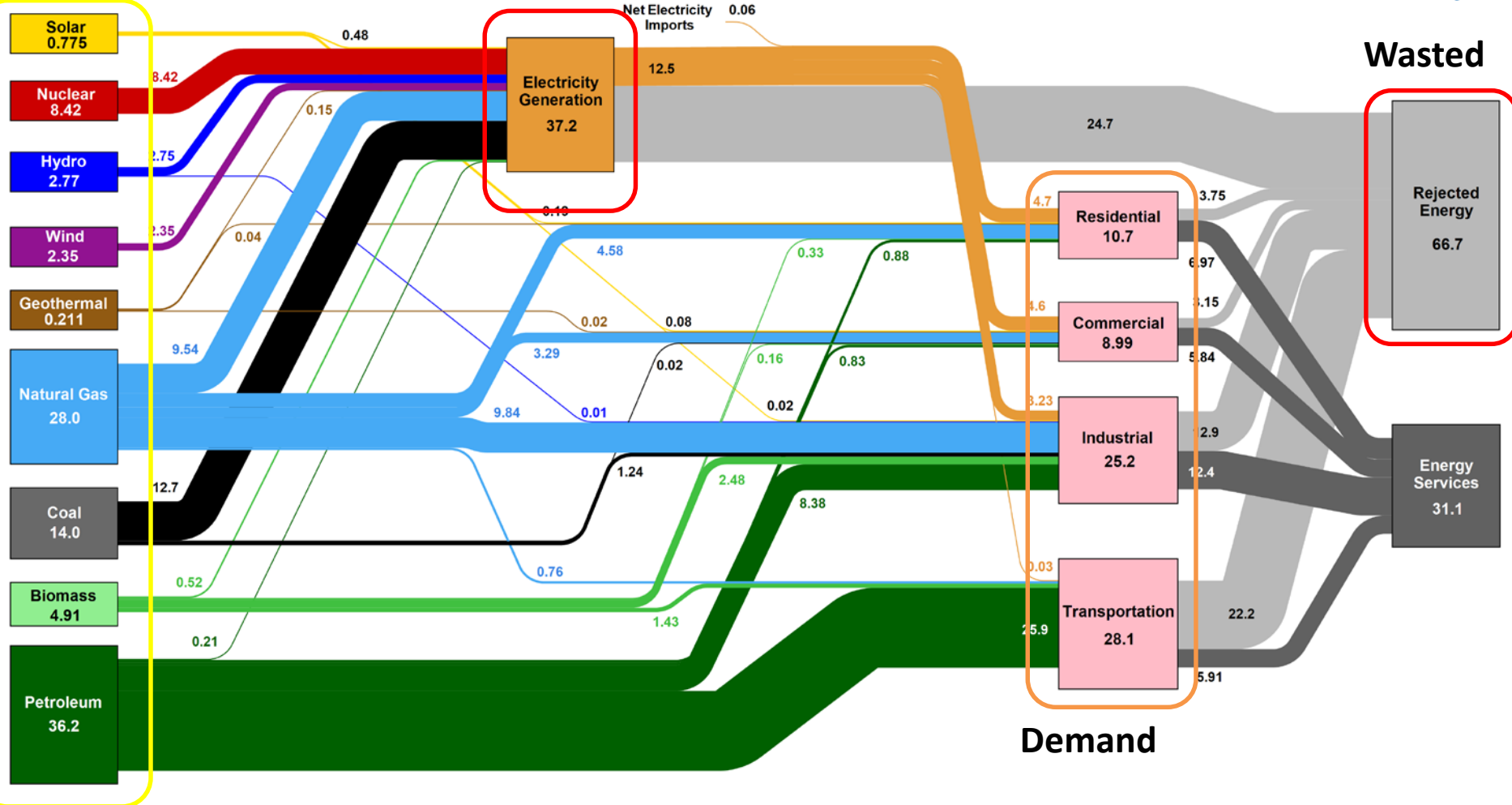
Green Buildings

The vast majority of the energy we use is wasted

Estimated U.S. Energy Consumption in 2017: 97.7 Quads



Supply



Source: LLNL April, 2018. Data is based on DOE/EIA MER (2017). 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. This chart was revised in 2017 to reflect changes made in mid-2016 to the Energy Information Administration's analysis methodology and reporting. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy



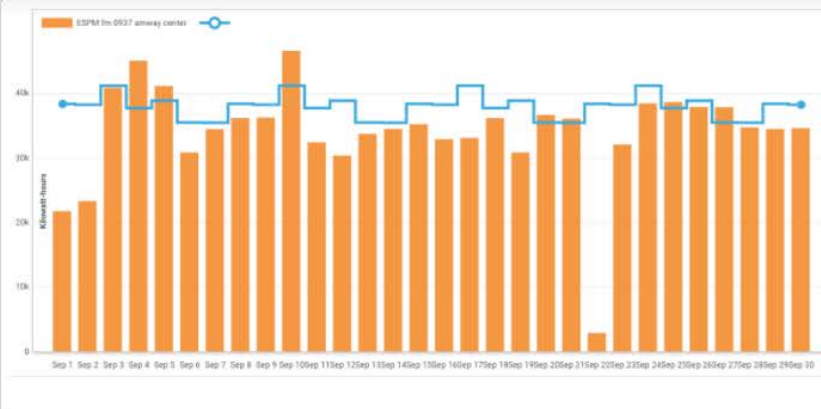
Municipal Energy Efficiency

- **LEED Silver 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**
 - **\$2.2 Million annual savings to date**
 - Pay down bond debt
 - Fund future EE investments





Municipal Energy Efficiency cont.



1,019,181 kWh

consumption over the selected period

1,136,988 kWh

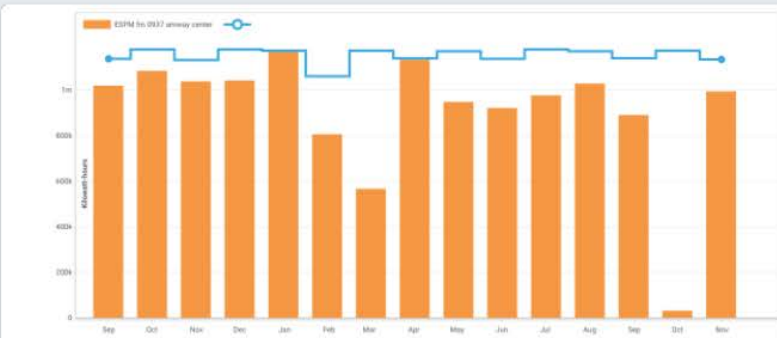
consumption (baseline)

10%

lower than baseline

10% Energy Savings Realized in the First Month

Using historical electricity trends at the Amway Center, a weather normalized pre-LED lighting retrofit baseline was created. This graph shows the electricity use for the first month after the LED retrofit was completed compared to that baseline.



13,655,105 kWh

consumption over the selected period

17,232,845 kWh

consumption (baseline)

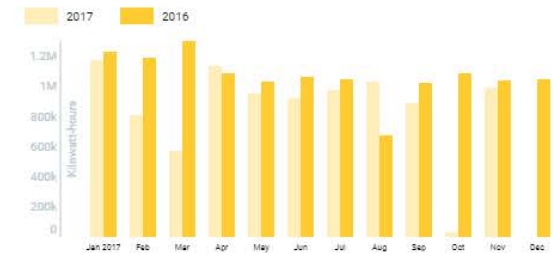
11%

lower than baseline

Persisting Savings

12+ months after the completion of the LED retrofit, the electricity savings are persisting. In that first year, 11% electricity savings - or 3,577,740 kWh have been realized. That is enough energy to power the average household for over 332 years!

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



Jan 1-Dec 31, 2017

9.47M kWh

Jan 1-Dec 31, 2016

12.79M kWh

Difference

↓ 26%

Amway Center's Electricity Use Post LED Retrofit

Last 12 months

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



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

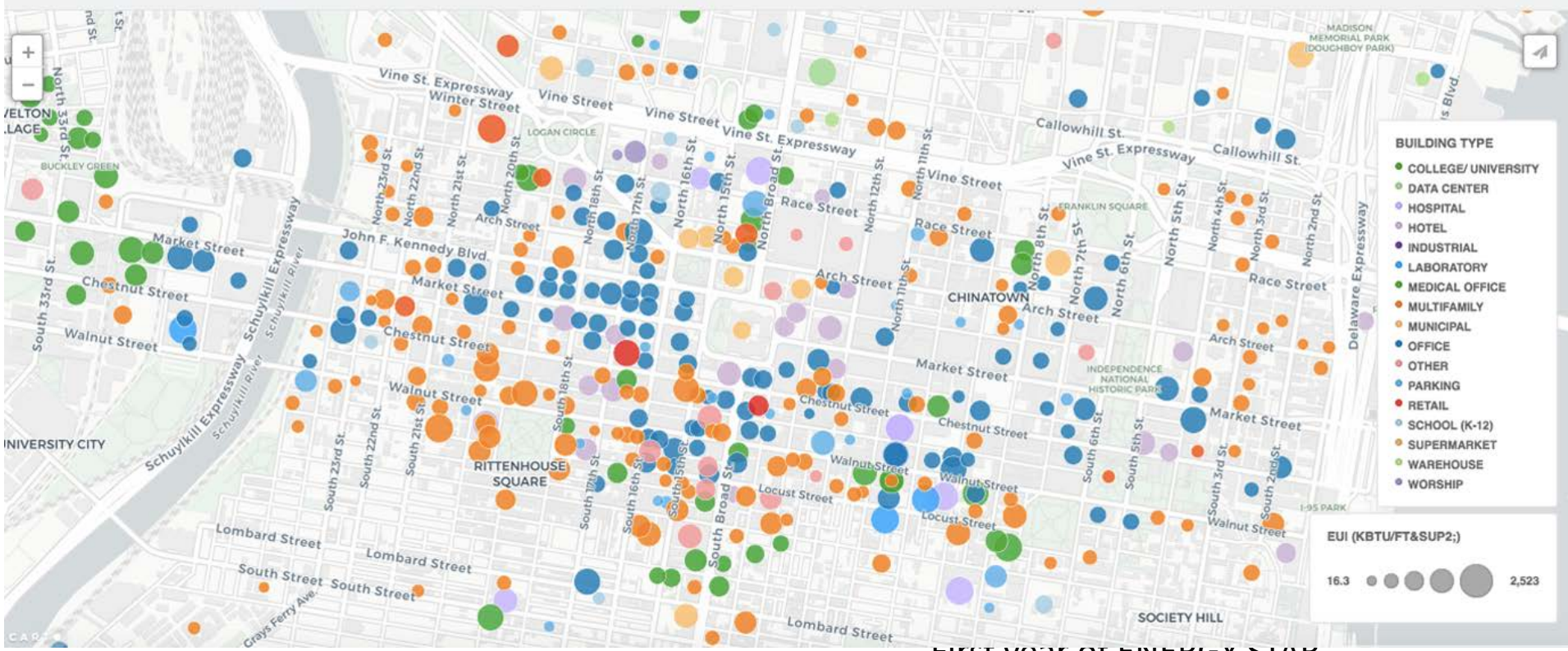


THE CITY OF PHILADELPHIA
OFFICE OF
SUSTAINABILITY

2016 Charts Map Data Info

Search Filter Category Usage
Address or Building ID All types Building Type EUI (kBtu/ft²)

Compare (3)



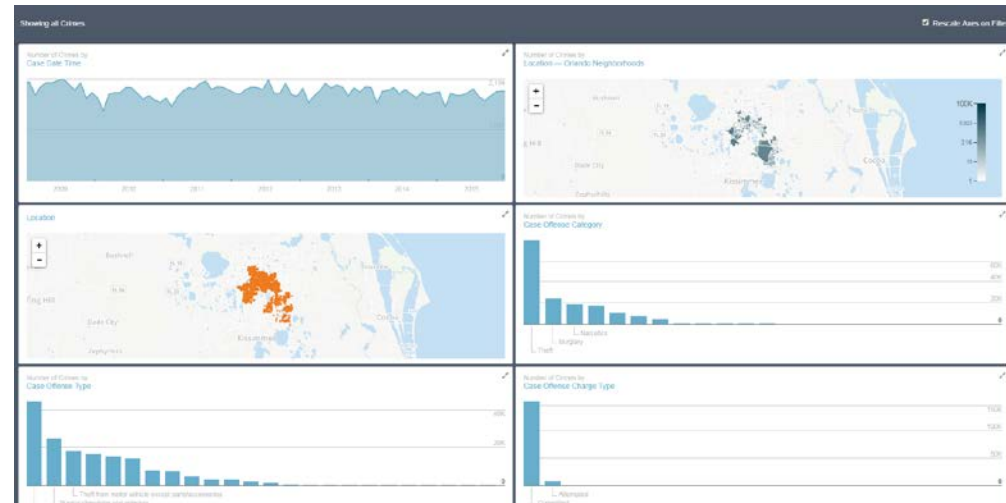
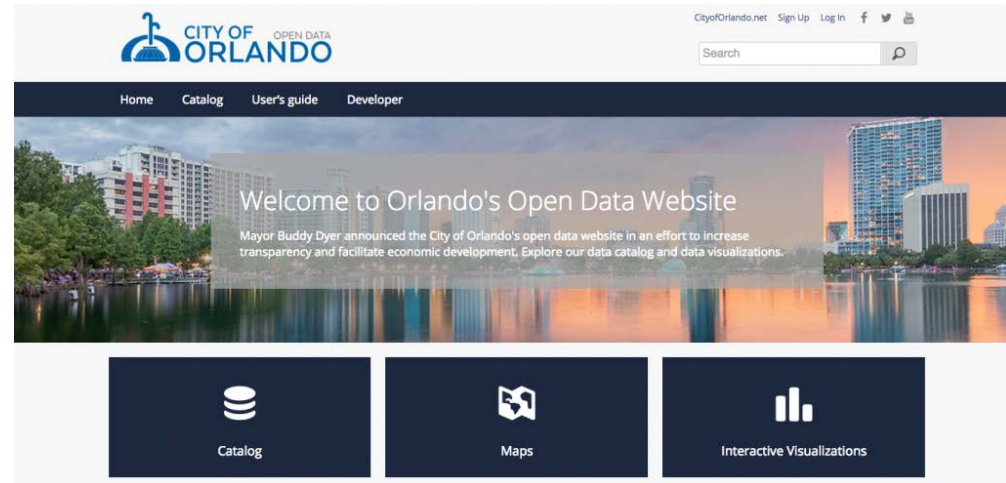
FIRST YEAR OF ENERGY STAR benchmarking report, August 2018

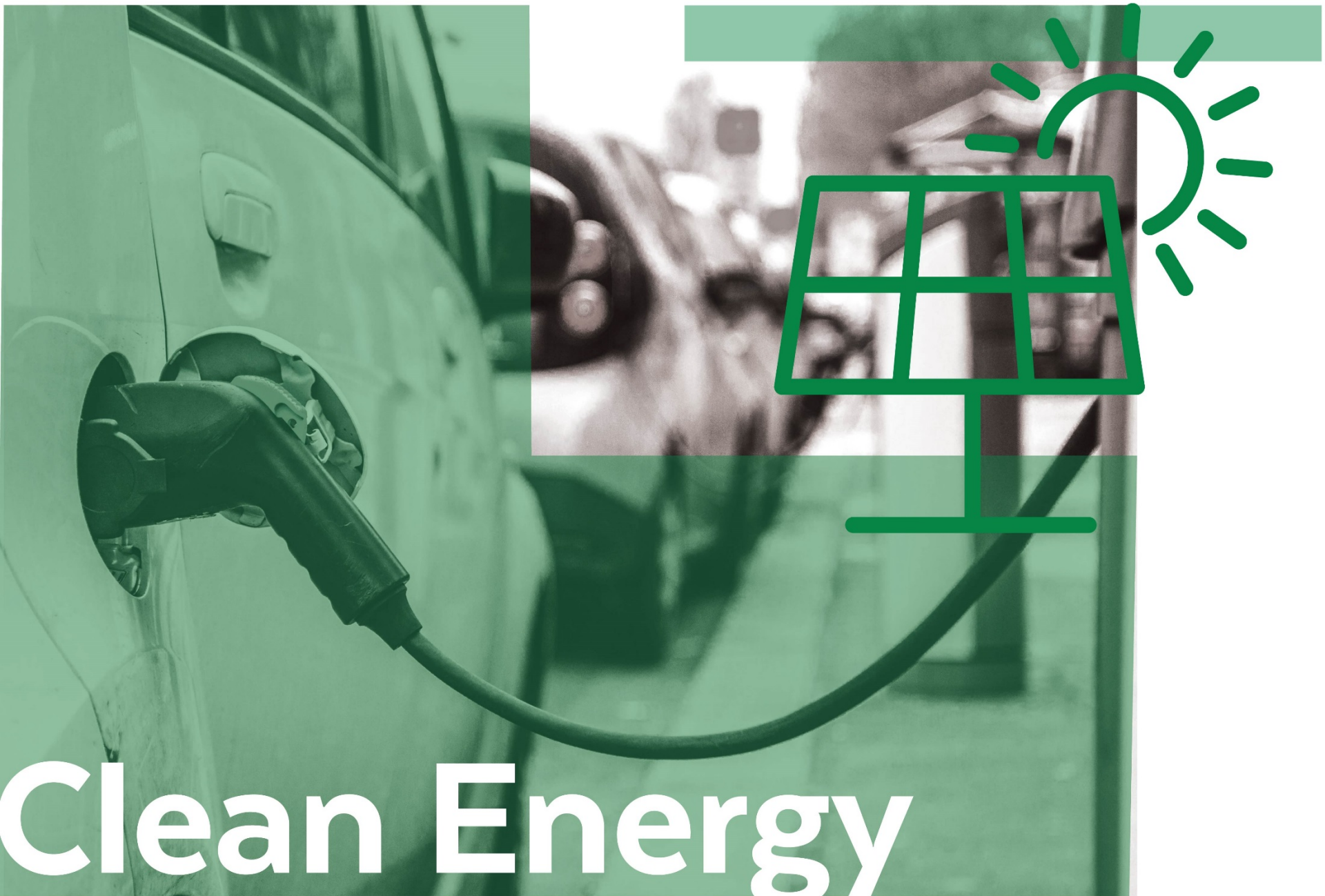
Orlando

Open Data Initiative & Digital City Hall



- **Launched Orlando.gov (alpha)** to interface with residents via 'Digital City Hall'
- **Open Date Initiative helps to:**
 - Increase transparency and facilitate economic development
 - Analyze crime data in Orlando Neighborhoods
 - Access GIS Maps and Interactive Visualizations
 - Provide access to energy and water use information in buildings (BEWES)





Clean Energy



Smart Energy Generation

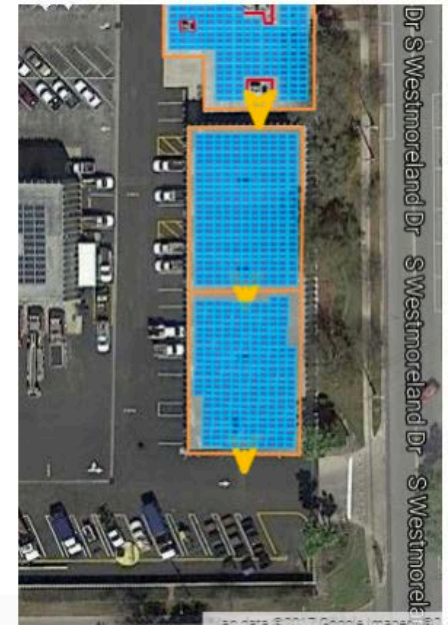


- **GOAL: 100% Renewable Energy by 2030 for Municipal Operations, 2050 for City-wide**
- 420 KW solar PV array
- 11 KW SEE Art Orlando array
- 30 KW Reliable Plaza array
- 6 MW Stanton Solar farm
- 400 KW Gardenia Community Solar Farm
- 12 MW Stanton Community Solar Farm



Exploring On-site Solar PV

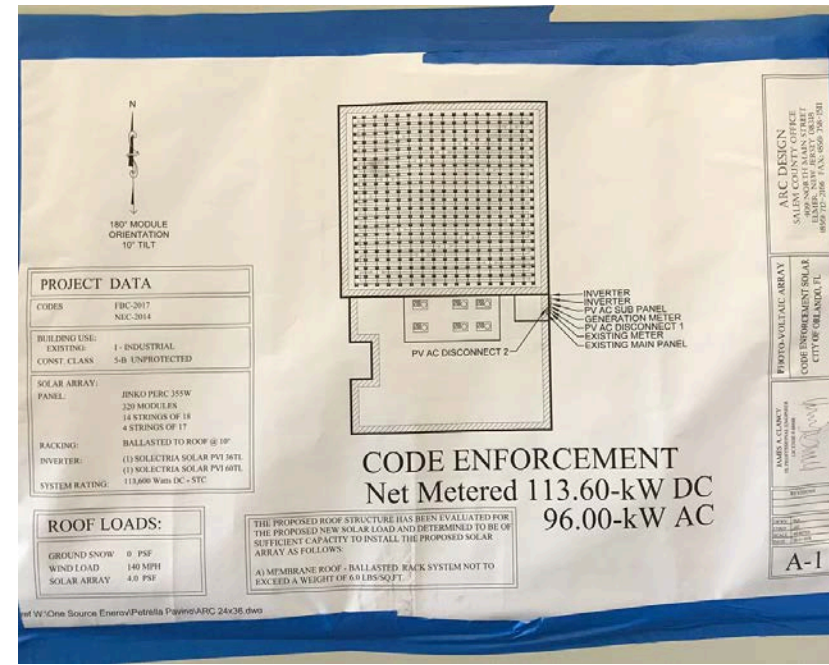
- Net-zero Records Building (114KW)
- City Hall Solar R&D Platform
- 2+ MW of rooftop PV on City community centers, fire stations, OPD Headquarters, and more.
- 4 MW brownfield community solar farm
- 10 MW+ solar farm at Iron Bridge WWTP





Over 500 KW of Solar PV installed on City buildings,
4 MW+ in the pipeline





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



13MW Community Solar Farm – Dec 2017



**Currently 10%
Renewable
Energy**

**5.2 Megawatt
solar energy
procurement**

- Orlando
City Hall
- Orlando
Police HQ
- 17 Fire
stations

Prevention of
5,912,000
pounds of coal from
being burned

Reduction of
12,216,000
pounds of CO2 emissions





Water



Real-time Lake Level Monitoring

- Enable City staff to monitor the lakes in real-time
- **Remotely control lake basins** before storm events to help mitigate flooding of critical infrastructure and significant residential communities.
- This information will be used to create an **Orlando Unit Hydrograph curve** to model storm events





Transportation



TravTek: In-vehicle Navigation Systems



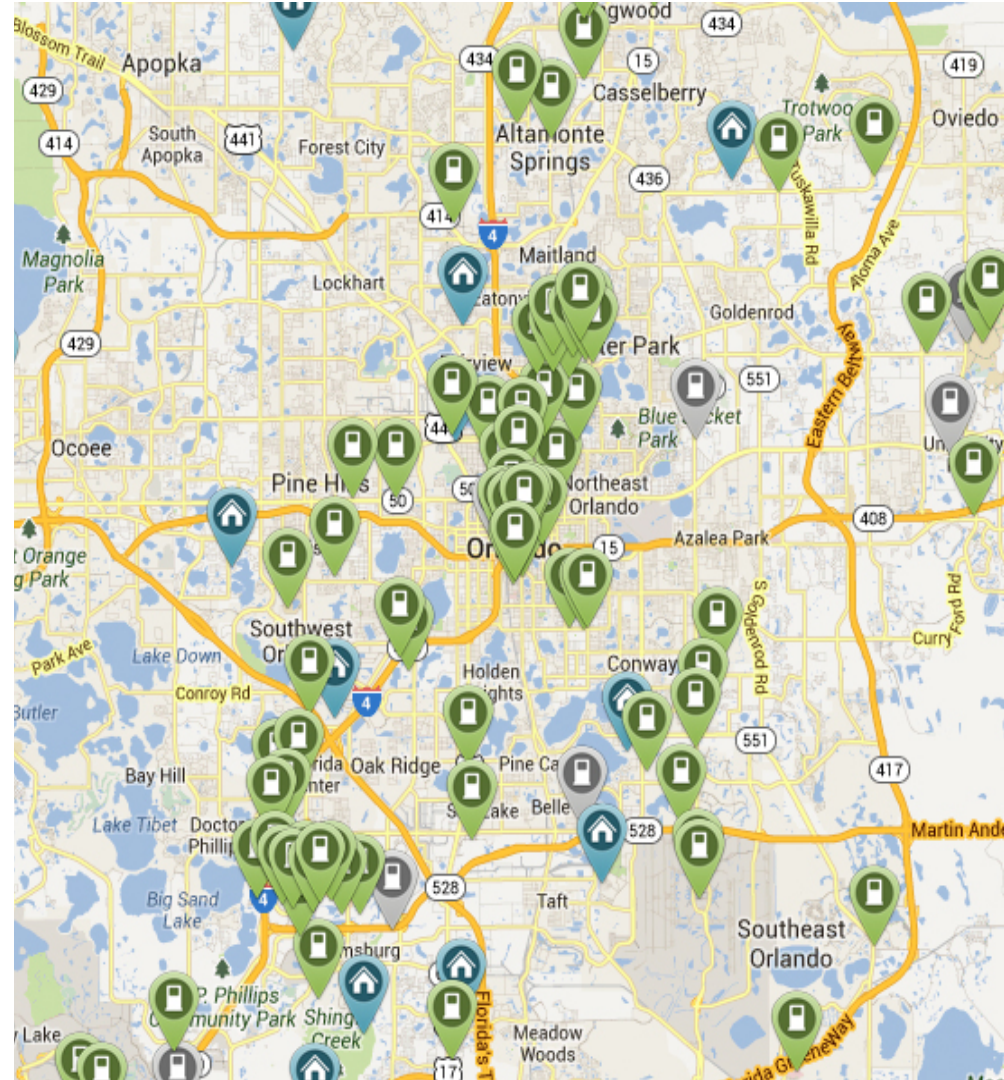
Orlando was the pioneer for in-vehicle navigation system R&D



EV-Ready

- Drive Electric Orlando expansion
- 15 new Chevy Bolts EV's for City Hall motor pool
- 15 Nissan Leafs
- 4 EV Motorcycles for OPD

Next step: Deploying an additional 100+ EV charging stations around City parks, facilities, and public spaces





Smart Parking



ParkMe [BROWSE](#) [HOW IT WORKS](#) [PROMOTE PARKING](#) [FAQ](#) [LOG IN](#) [SIGN UP](#)

[Daily](#) [Reserve](#)
[Monthly](#) [Street](#)

Duration: 1 hour

	Church St. - Garland Av... \$1.00 Garland Ave to Orange Ave undefined
	Church St. - Orange Ave... \$1.00 Orange Ave to Magnolia ... undefined
	Pine St. - Orange Ave to... \$1.00 Orange Ave to Court Ave undefined
	Pine St. - Court Ave to ... \$1.00 Court Ave to Magnolia Ave. undefined

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Central Florida Automated Vehicle Partnership





Lymmo Electric Bus Pilot



Autonomous Vehicle Mobility Initiative (AVMI)



- **GOAL:** travel by autonomous vehicles makes up 10% of total urban, public transit travel by 2040.
- **Research and development** of autonomous transit vehicle technology using Lymmo lanes;
- **Design, building and testing** of autonomous transit vehicles infrastructure on exclusive and shared rights-of-way; and
- Development of **data and communication protocols** for all AVMI systems and infrastructure; and
- **Workforce development** strategies (retention, recruitment and training) to support AVMI;





Smart District:

Creative Village / Downtown UCF / SED



KEY LESSONS LEARNED WITH SMART CITY TECHNOLOGIES





Next Steps / Priorities

- Welcomed our new Smart Cities Project Manager, **Michael Hess**
- **Smart Cities Master Plan + Roadmap RFP**
- **Smart Streetlight pilot with OUC**
- **AVMI Concept of Operations with LYNX**



