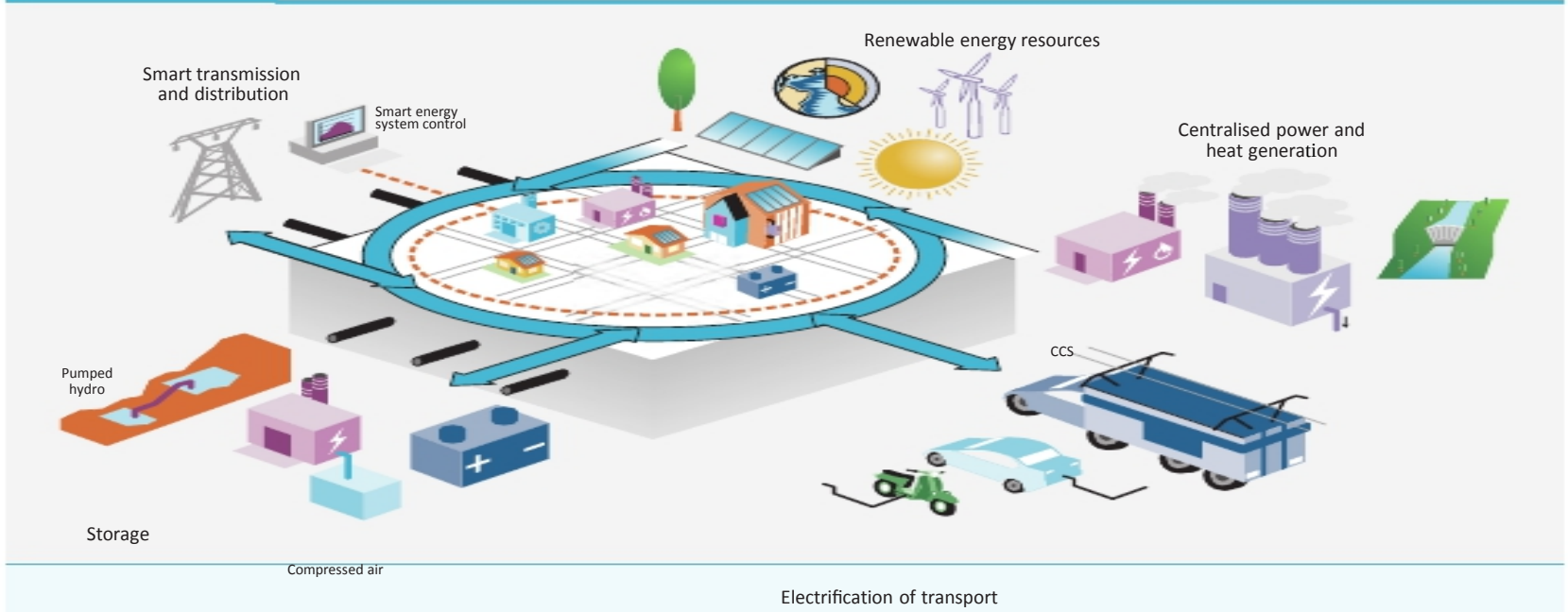
PSC MEDSIS

The Smarter DC Network

Presented by:
Scott Pomery &
Roger Frechette

SMARTER DC NETWORK

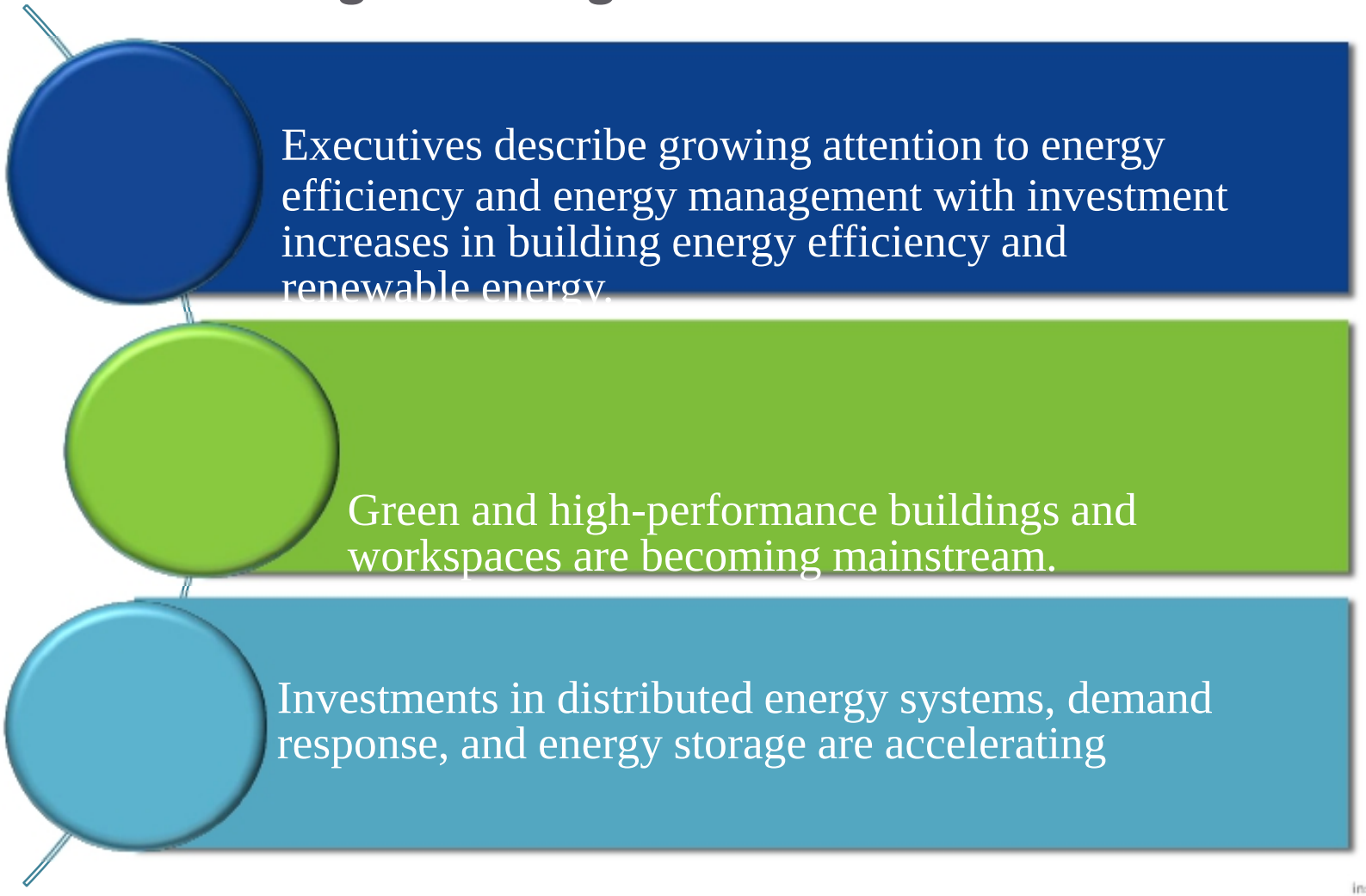
The integrated and intelligent electricity system of the future



To better integrate all elements of electricity systems will increase complexity, but improve operations, efficiency and resilience while optimizing energy resources and investments.

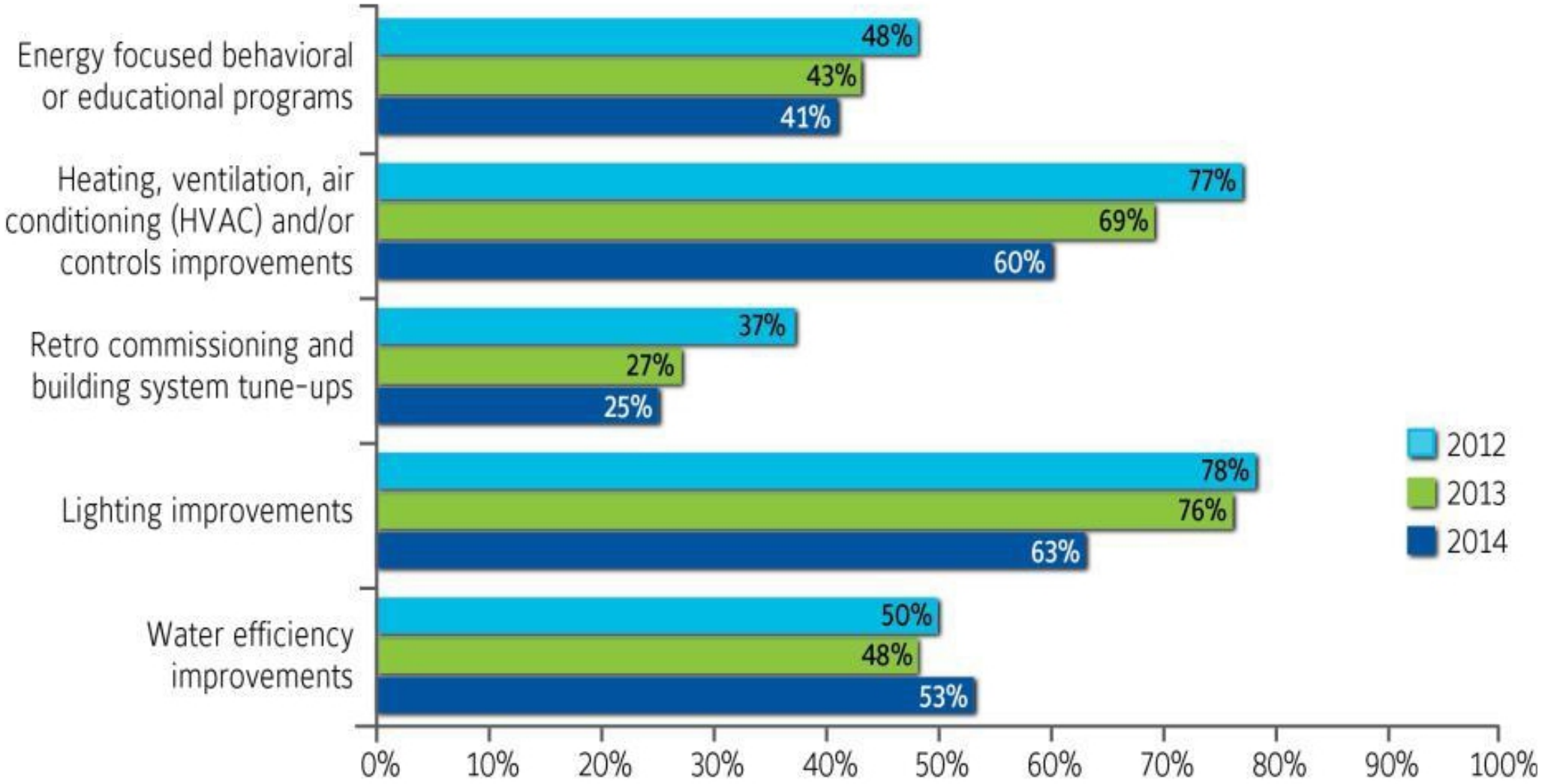
2014 Energy Efficiency Survey

Building owners made major commitments to energy efficiency, high performance buildings, distributed energy systems and smart building technologies in 2014.



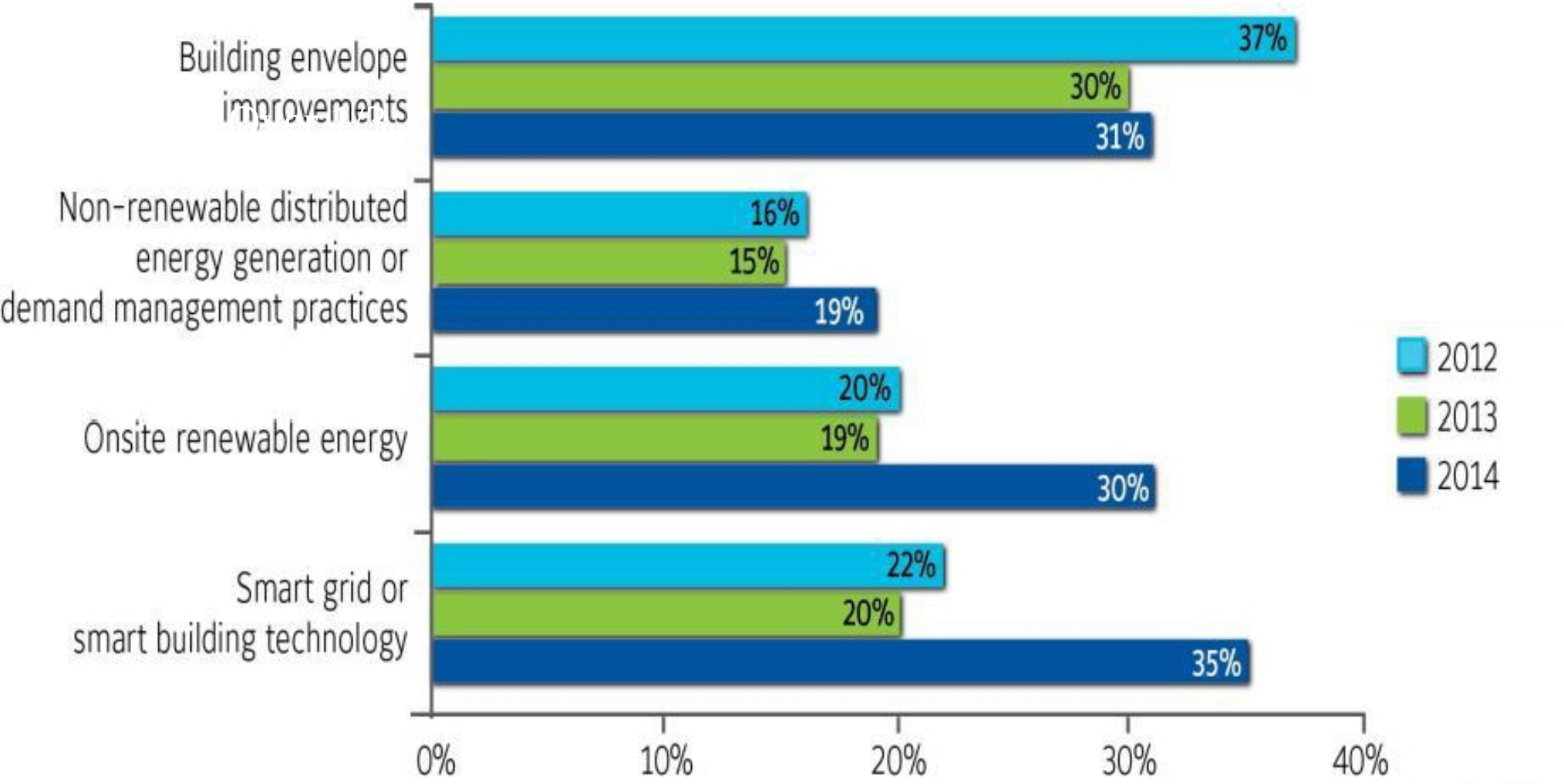
2014 Energy Efficiency Survey

Energy efficiency actions taken – same suite of technologies as in past years...



2014 Energy Efficiency Survey

Beyond lighting and heating/air conditioning, distribut and smart technologies starting to gain ground



District Government Leading by Example

More data. **Less Carbon.** Zero Excuses.

BuildSmart DC

A Public-facing, Municipal Building Efficiency Portal for the District

What Data Gets Mashed Up?

Interval	*Pepco's Green Button Electricity Interval Data is the foundation. Additional interval sources are possible for Natural Gas, Water, and Waste*
Billing	*Electronic Utility Billing is provided by Washington Gas, Pepco and DC Water.*
External Analyses	*BuildSmart DC transmits data via API to multiple third parties, including two-way communication with the EPA's Energy Star Portfolio Manager.*
Building	*DGS-SE works across the District government to collect and maintain up-to-date information on buildings including occupancy rates and hours.*
Project	*DGS-SE collects project information to enhance building data and track project effectiveness.*
Temperature	*BuildSmart DC collects temperature data from the national weather service and directly from temperature sensors on site at some facilities.*

…And Who Uses It?

Operations Engineers / FMs

- Check Load Curves
- Manage Equipment Schedules
- Impact Utility, O&M, and Capital Costs

Energy & Sustainability Division

- Maintains Portfolio Data
- Creates and Tracks Projects
- Engages and Trains other Divisions
- Generates Budget and Forecast Reports
- Manages Supply

Efficiency Experts / Analytics

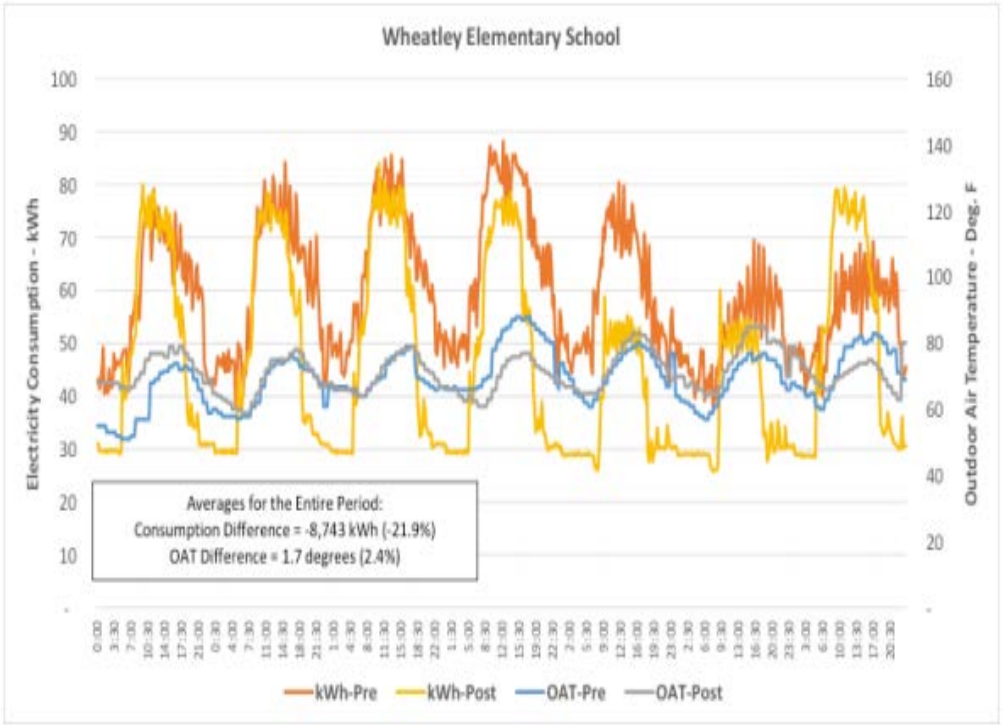
- Access Data via API and Export Tools
- Track Projects
- Recommend Improvements

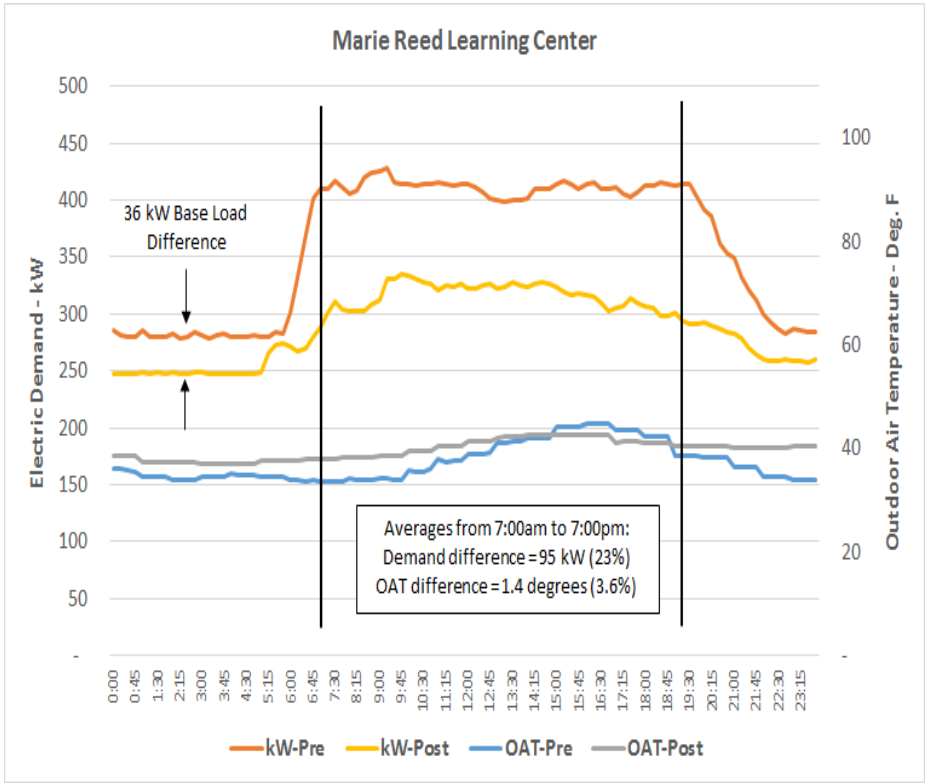
The Public

- Checks Facility Performance
- Uses Data for Research
- Keeps DC Accountable

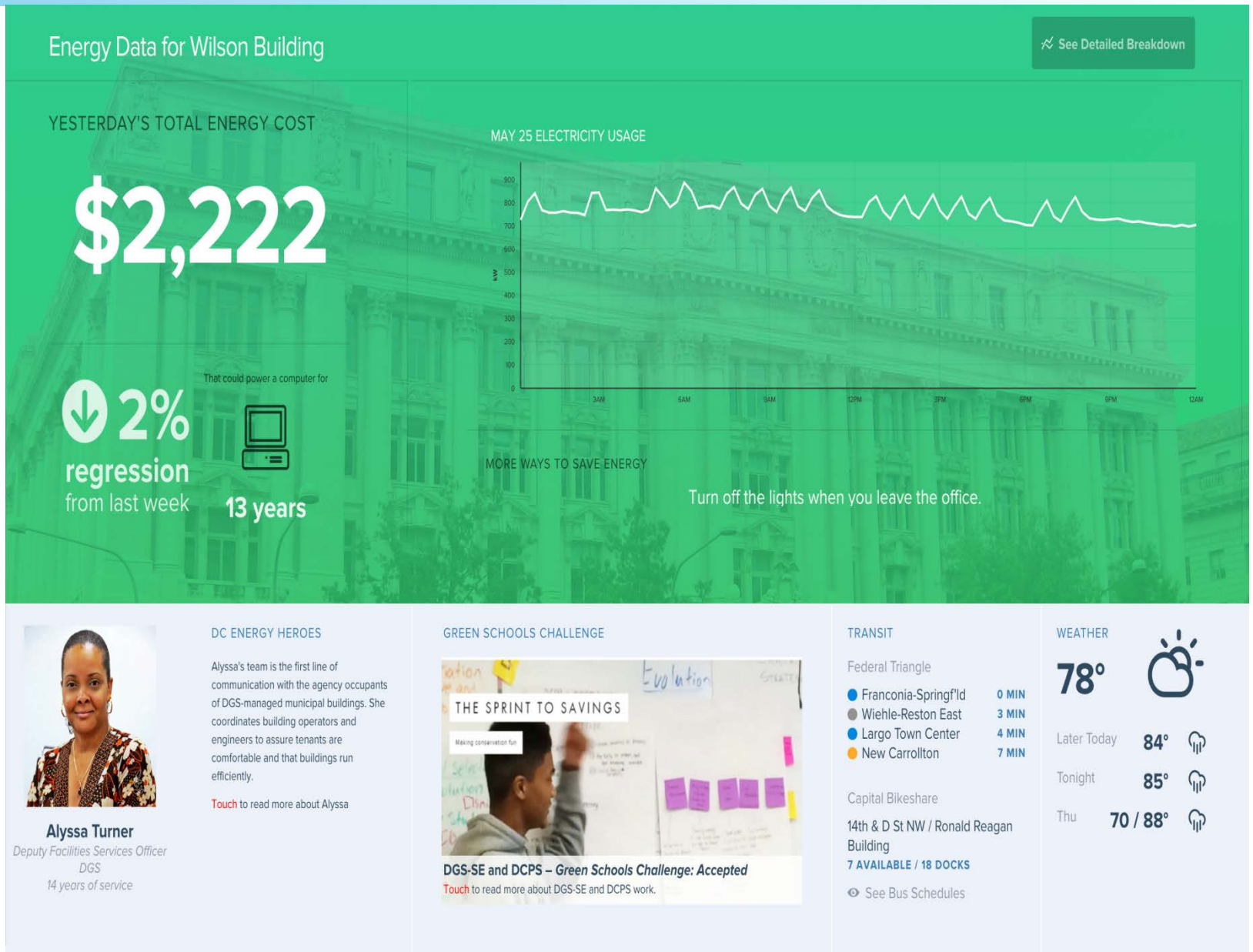
Progress Tracking & Goal Setting

- **Project M&V is currently being built out as follows:**





Engaging Occupants Via Kiosks



managed by:

greenspace

eco:COACH™

SUSTAIN ABILITY DC

sponsored by:

DEPARTMENT OF ENERGY & ENVIRONMENT

Vision & Mission

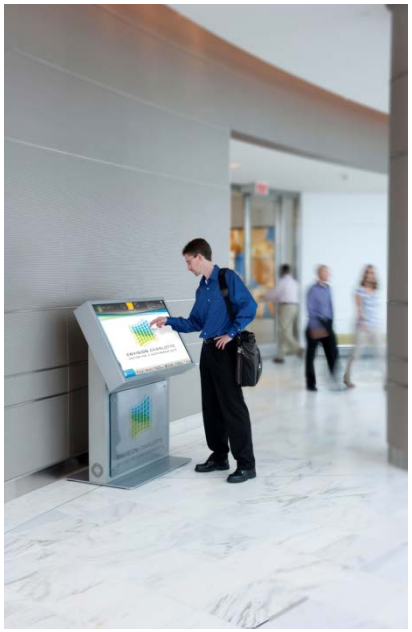
Transform DC businesses, organizations and institutions into innovative sustainability stewards who grow the economy, preserve resources and serve as leaders in the global marketplace.

Through friendly competition and recognition, the Challenge will provide Washington, DC's businesses, organizations and institutions with the data, knowledge, and tools to grow, thrive and contribute to creating the most environmentally sustainable city in the country.

100+ Participants

ENVISION: CHARLOTTE
UNITING FOR A SUSTAINABLE CITY

Access to Dynamic Smart Meter Data



- Monitor aggregated building data,
- Report it in real time using interactive digital kiosks in building lobbies.

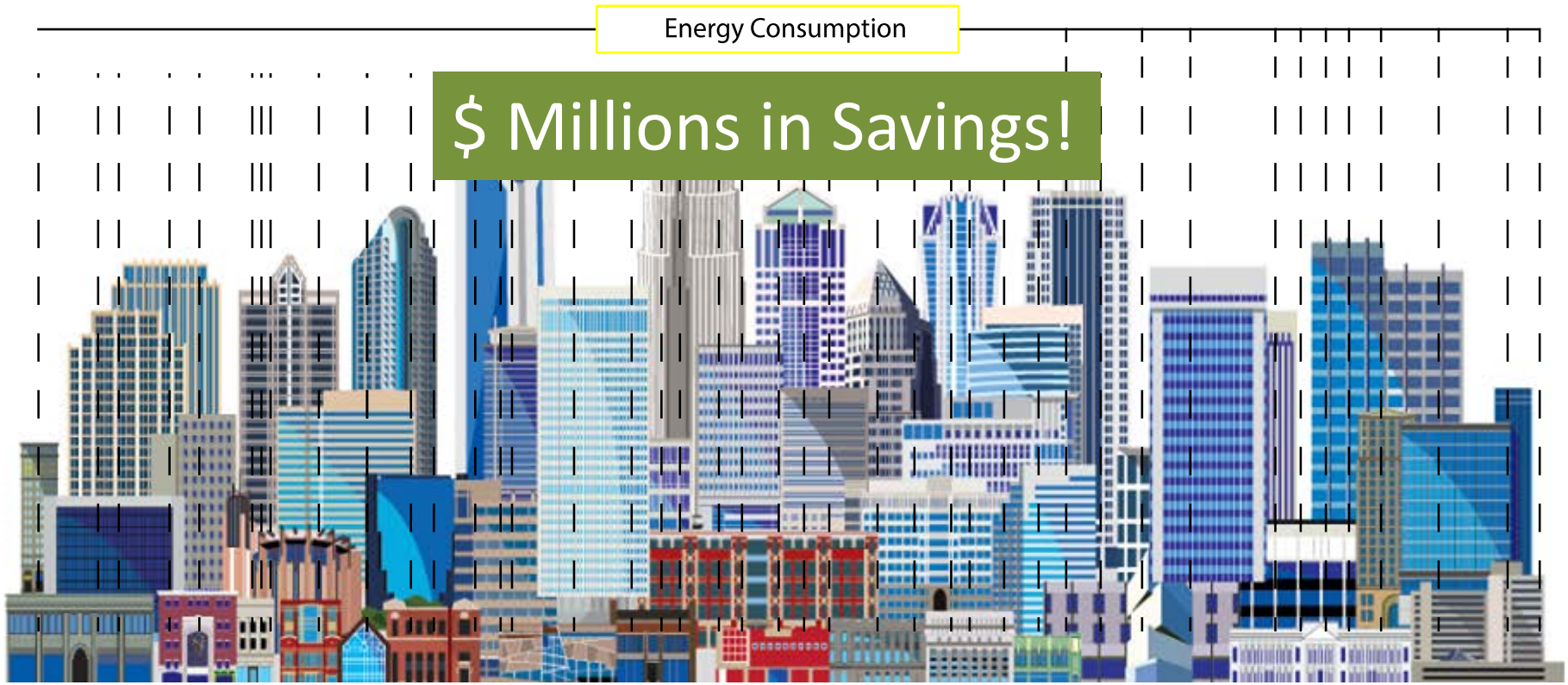
Use this information to work with building occupants and managers to:

- Lower operating costs,
- Attract tomorrow's workforce
- Improve the health and livability

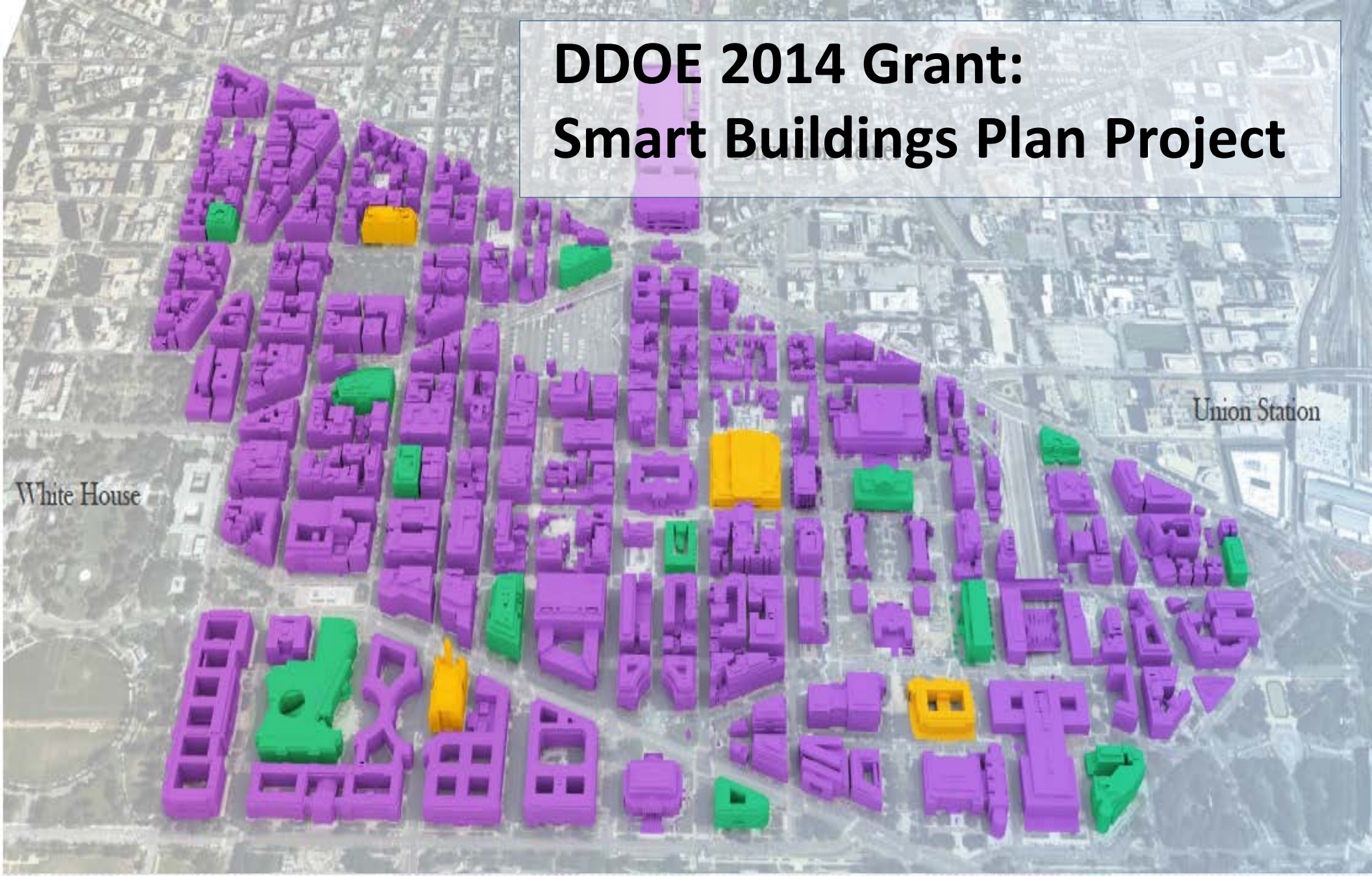
ENVISION: CHARLOTTE
UNITING FOR A SUSTAINABLE CITY

Energy Program Goal – 20% reduction in energy use by 2020

16.1% Reduction in energy use!



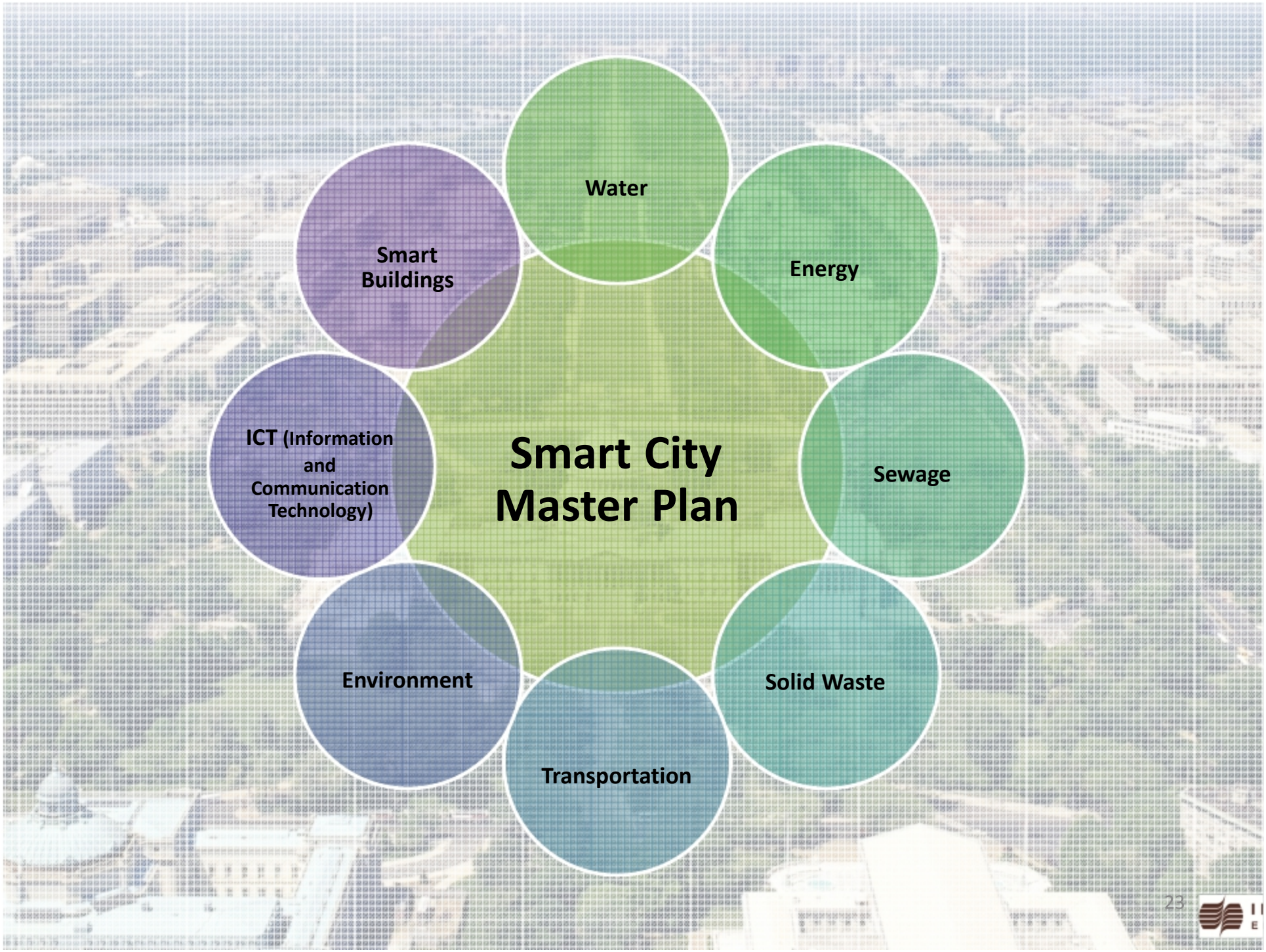
DDOE 2014 Grant:
Smart Buildings Plan Project



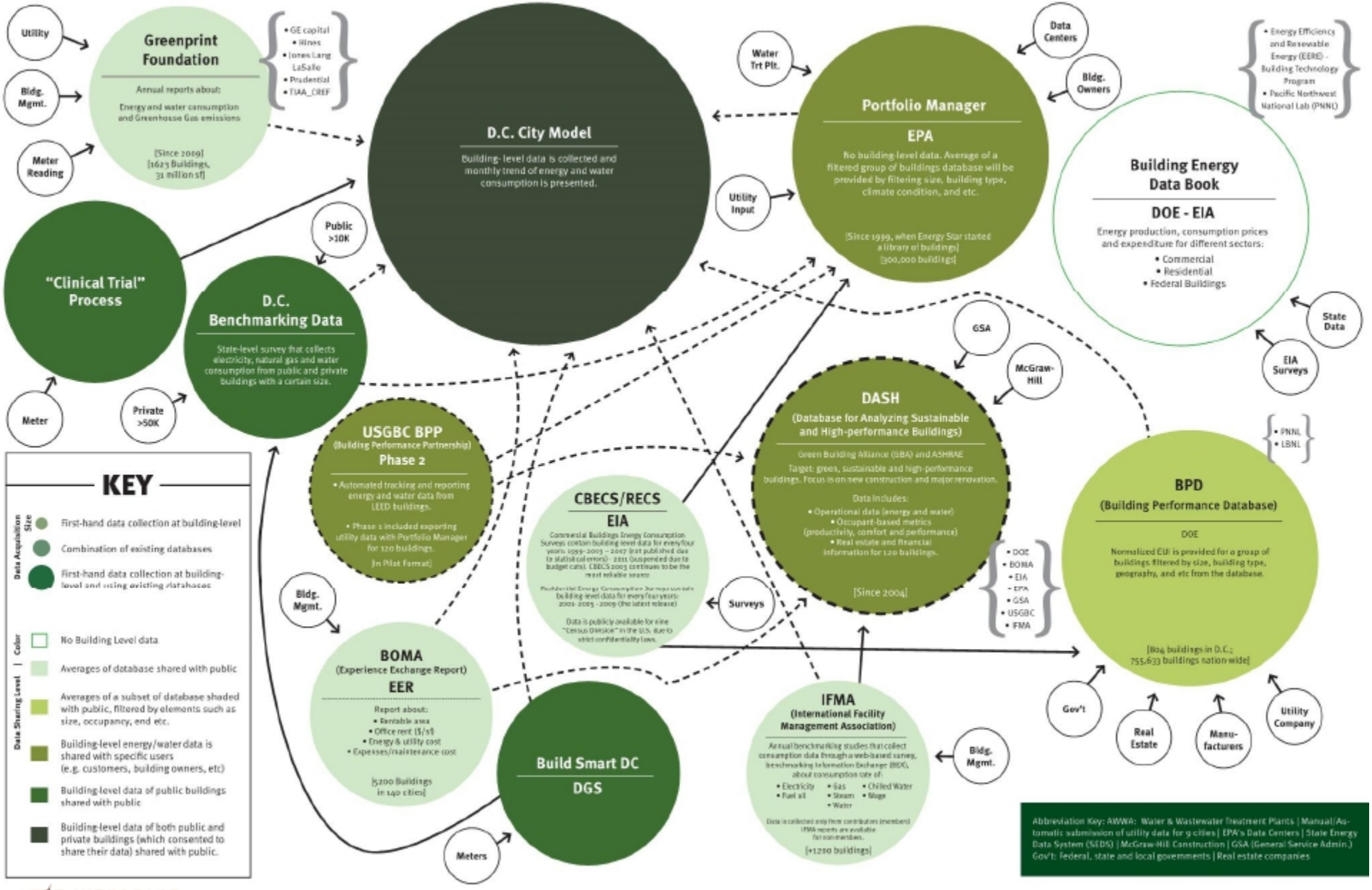
DISTRICT DEPARTMENT OF THE ENVIRONMENT

INTERFACE ENGINEERING

greenNspace


Water
Energy
Sewage
Solid Waste
Transportation
Environment
ICT (Information and Communication Technology)
Smart Buildings
Smart City Master Plan

Big Data Sources of Buildings Energy Consumption

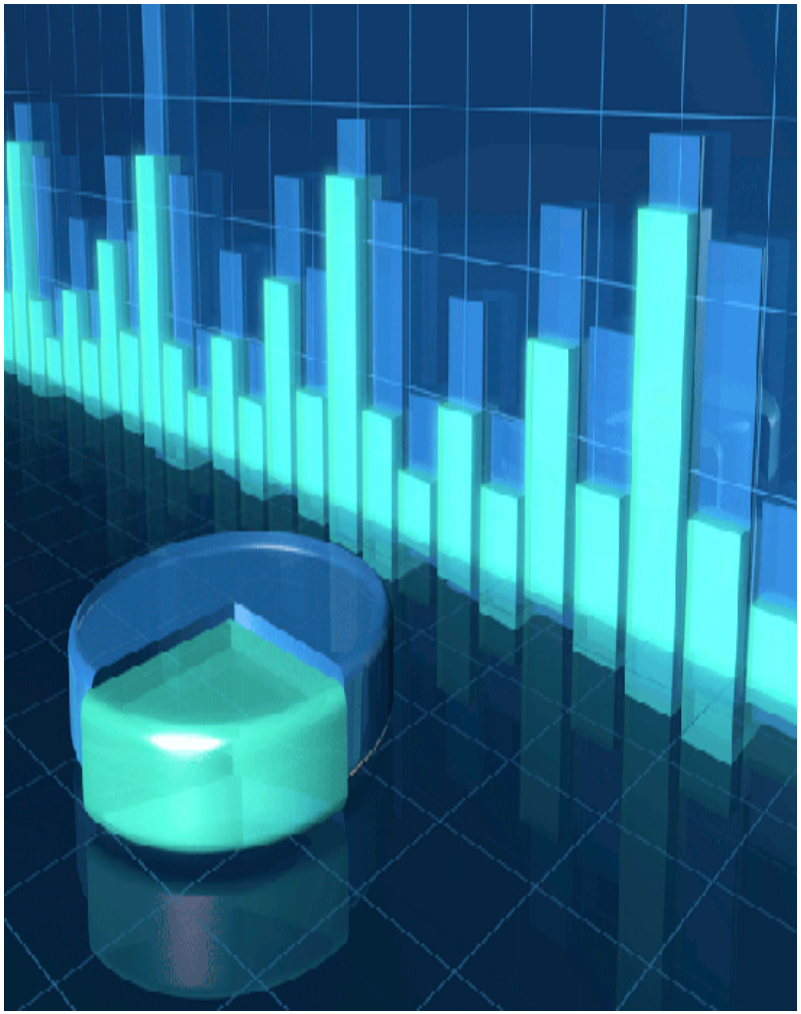


INTERFACE ENGINEERING

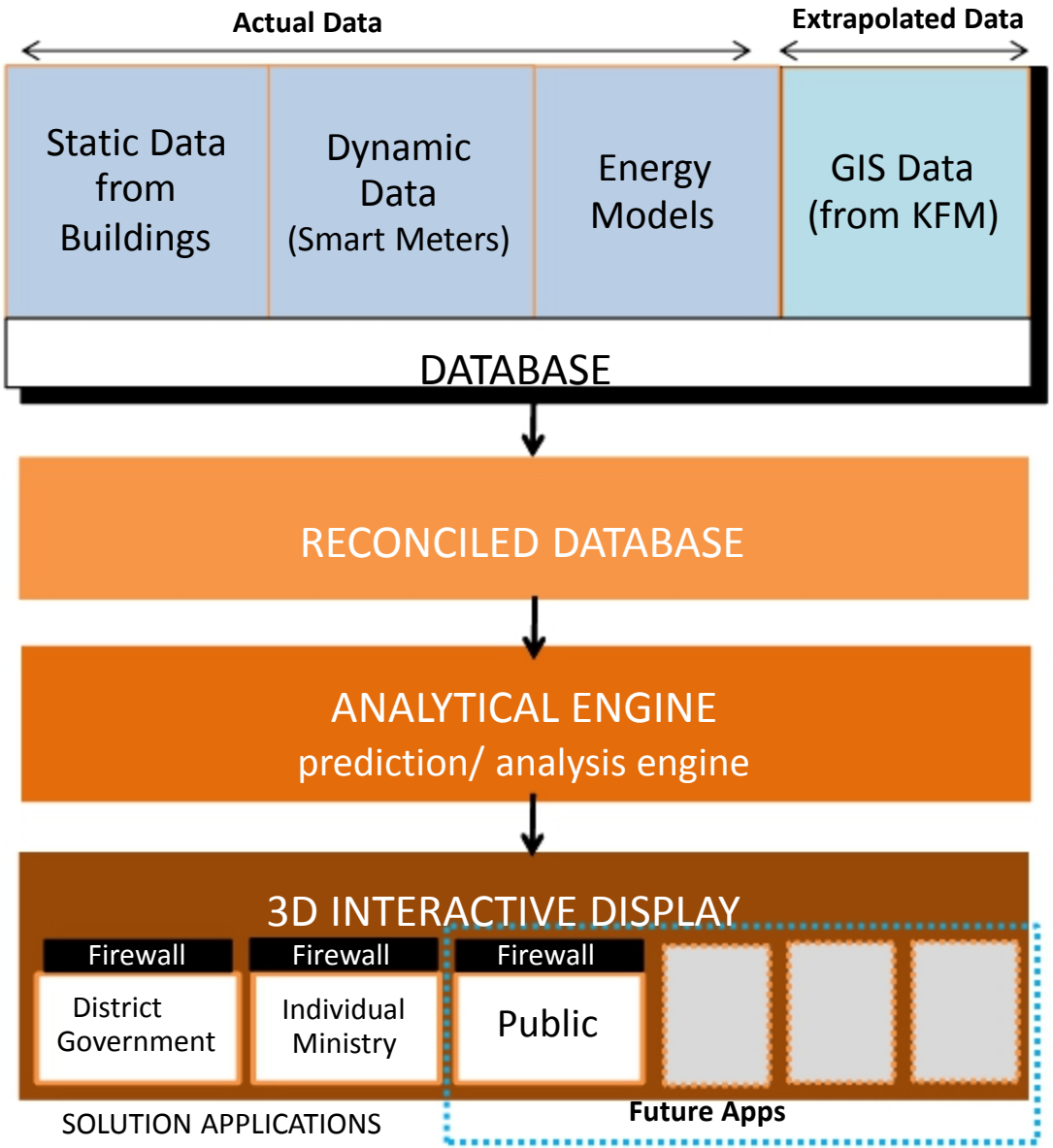
Collection of Static Data

Collection of Dynamic Data

Production of Modeled Data



DC CITY MODEL



INTERFACE ENGINEERING

What is Rapid Energy Modeling?

Capture → Model → Analyze

Satellite & Aerial Images

Photos

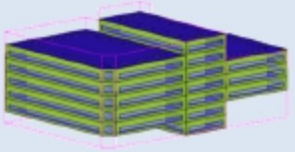
Draw-ings

+ Bldg Data

Laser Scans

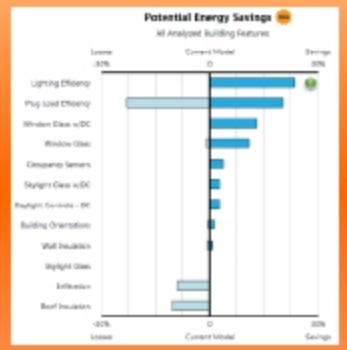
Laser Measure

Conceptual



Detailed

Analysis (Design ECMs)



Analytics (Operational ECMs)

FIRSTFUEL

AUTODESK

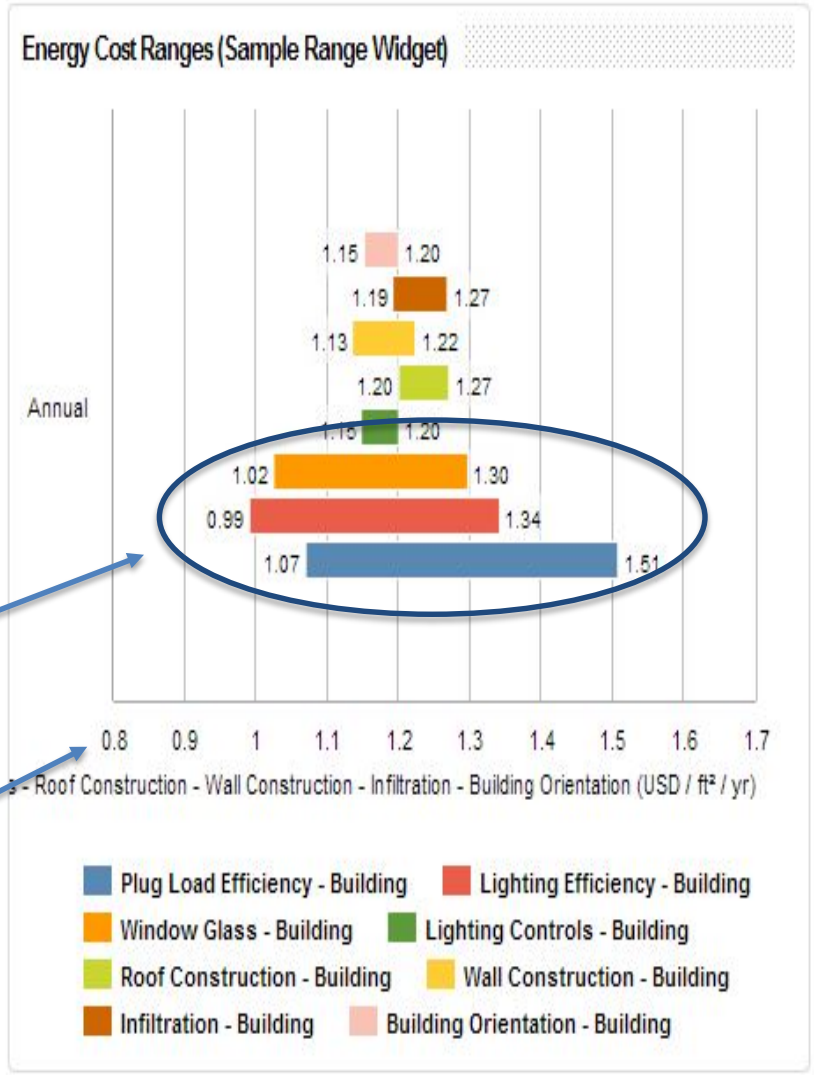
REM SHOWS WHICH SYSTEMS TO RETROFIT

2323 Pennsylvania Ave

Target Windows, Lighting, and Plug Loads systems to retrofit

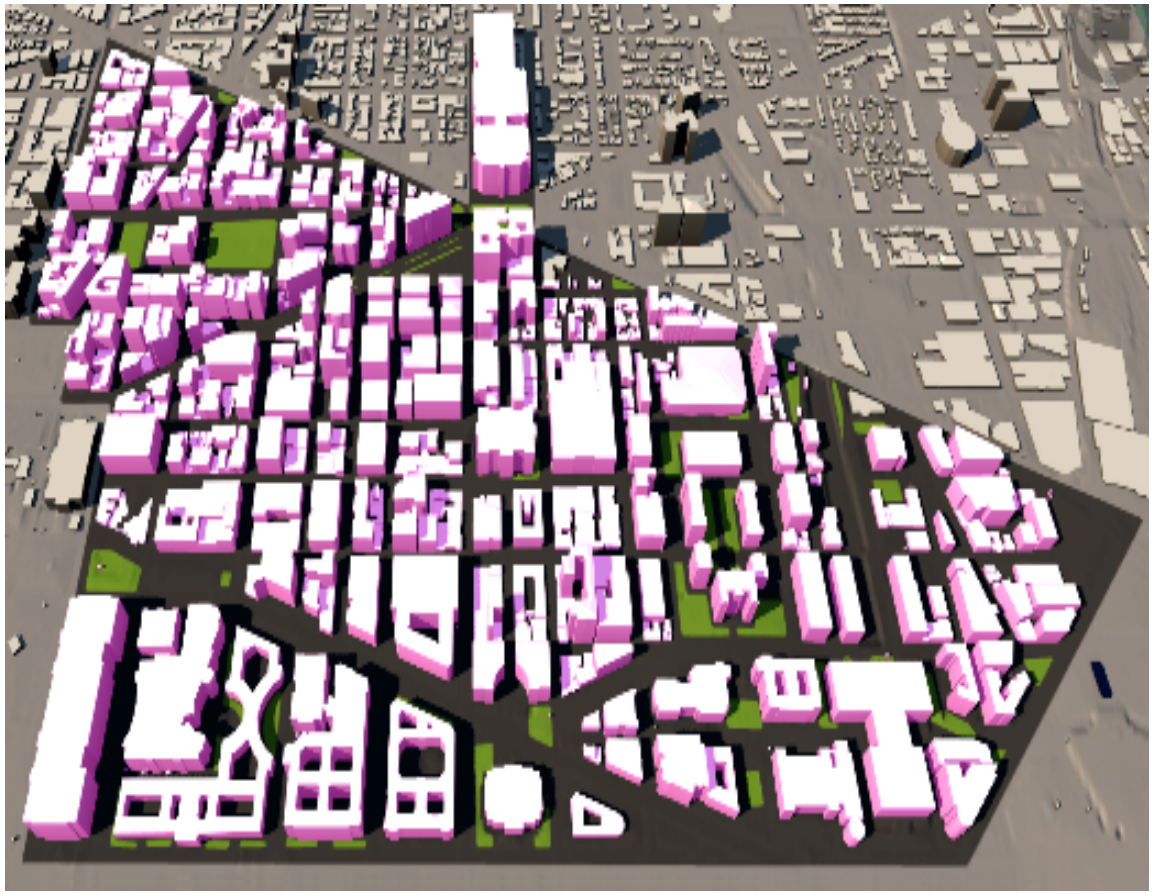
Wider the range, greater the impact a retrofit can have

Range of costs associated with each system



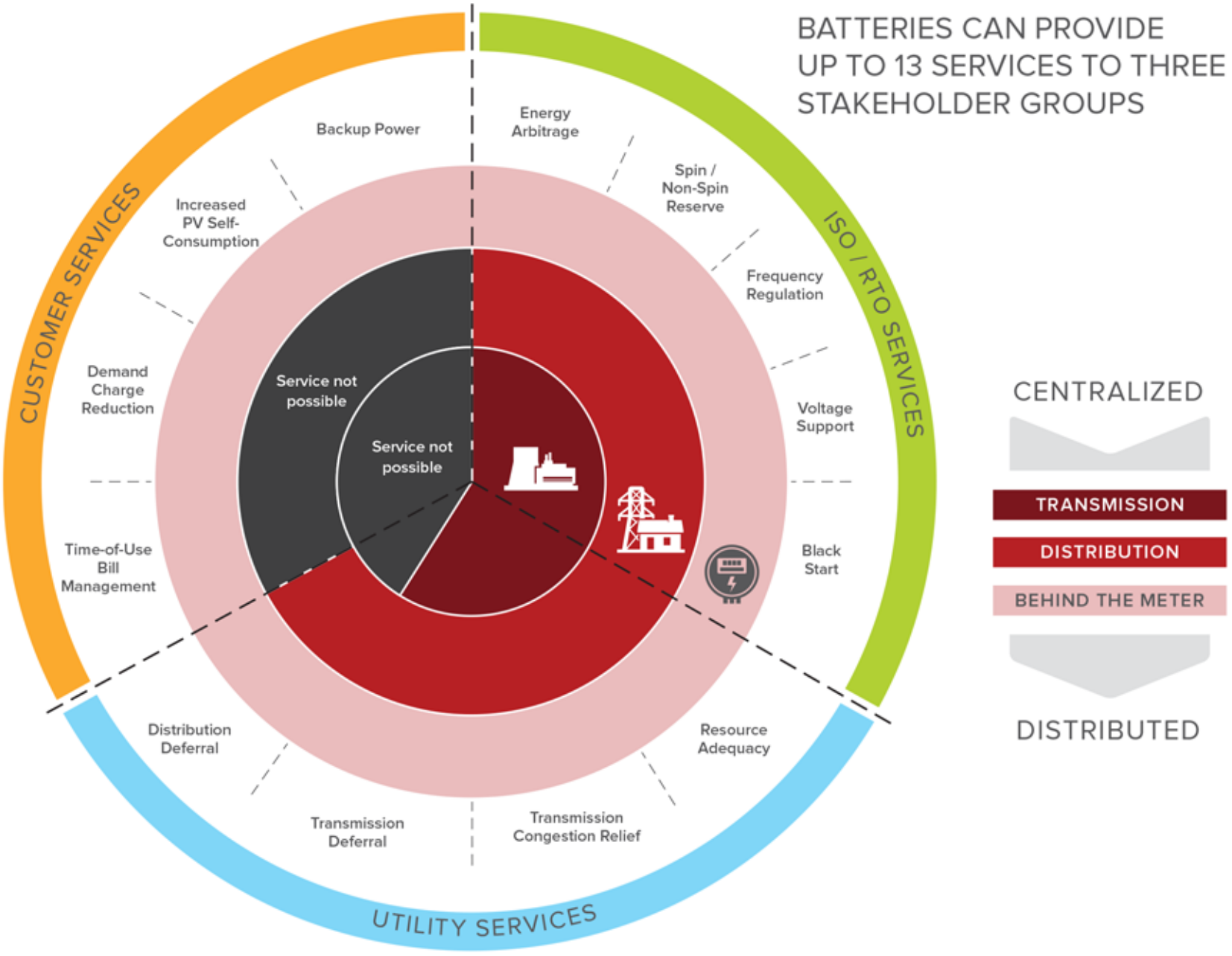
Enhanced REM from single to multi-building to enable wide-scale analysis

Traditional REM was for individual building retrofits



REM within InfraWorks 360 provides cities with a data-driven approach to energy retrofits

THE ECONOMICS OF BATTERY ENERGY STORAGE

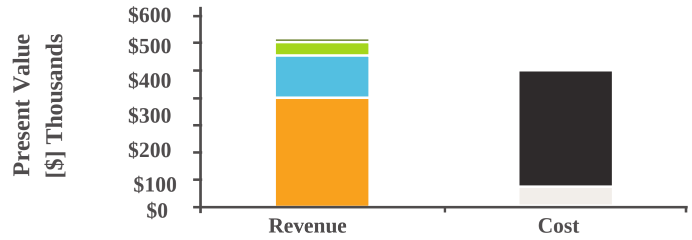


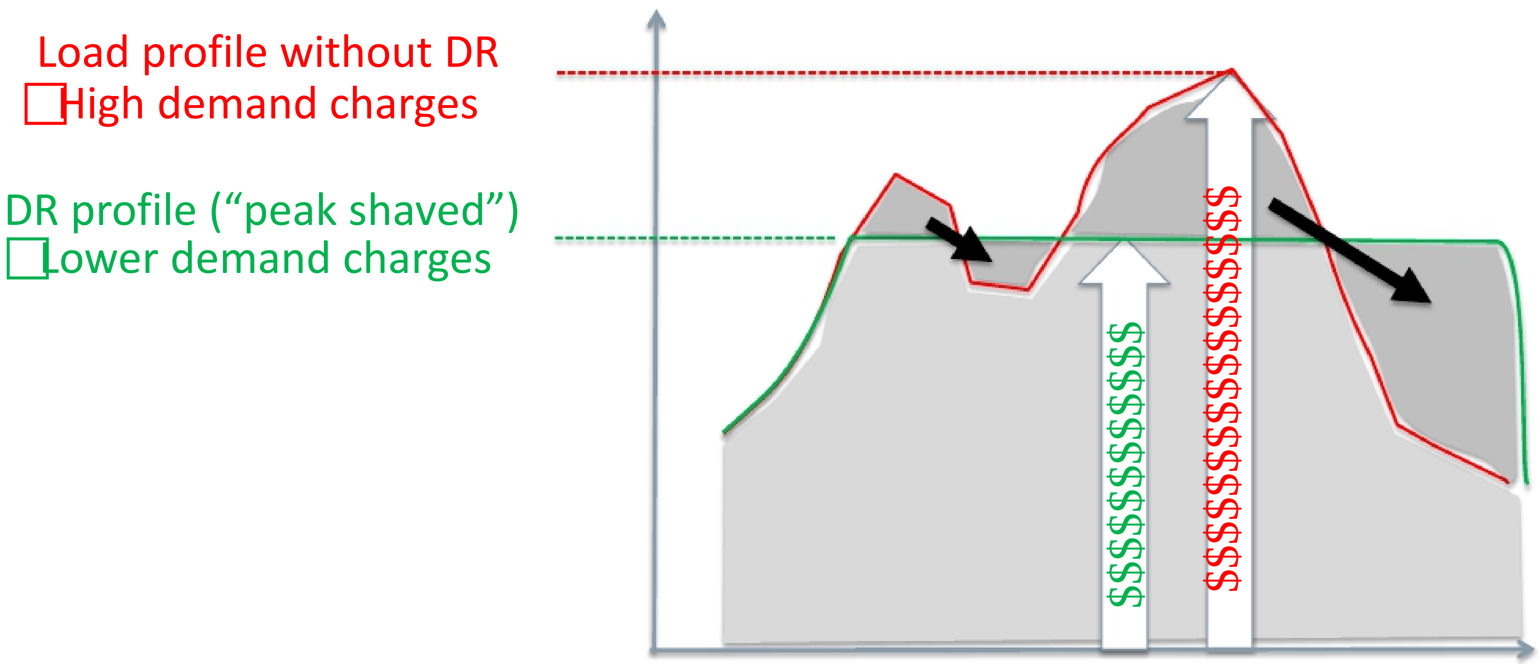
BATTERY ECONOMICS IMPROVE WHEN SERVICES ARE STACKED

USE CASE Commercial demand-charge management in San Francisco

Primary service:
- Commercial demand-charge management

Secondary services:
- Frequency regulation
- Resource adequacy
- Energy arbitrage





ISO/RTO SERVICES: Load Following, Frequency Regulation, Spin Reserve, Non-Spin Reserve, Black Start
UTILITY SERVICES: Resource Adequacy, Dist Deferral
CUSTOMER SERVICES: TOU, Self-Consumption, Demand Charge Reduction
COSTS/TAX: Capital Cost, O&M & Charging, Tax Cost, Tax Benefits

* This analysis is based on a hypothetical scenario in which net energy metering is replaced with a value-of-solar tariff at 3.5 cents per kWh. While RMI does not think this scenario is likely (nor would we advocate for it) we did want to understand the economics of solar and storage under an avoided-fuel-cost compensation model.

REQUIRED ACTIONS

- PROVIDE INCENTIVES
- REMOVE REGULATORY BARRIERS
- BUILD STORAGE INTO ENERGY POLICY
- CREATE LONG-TERM POLICIES
- ALL STAKEHOLDERS HAVE A ROLE TO PLAY
- DEVELOP COST-BENEFIT METHODOLOGIES
- HAVE GOVERNMENT AND INDUSTRY LEAD BY EXAMPLE
- INVOLVE ALL STAKEHOLDERS

QUESTIONS?