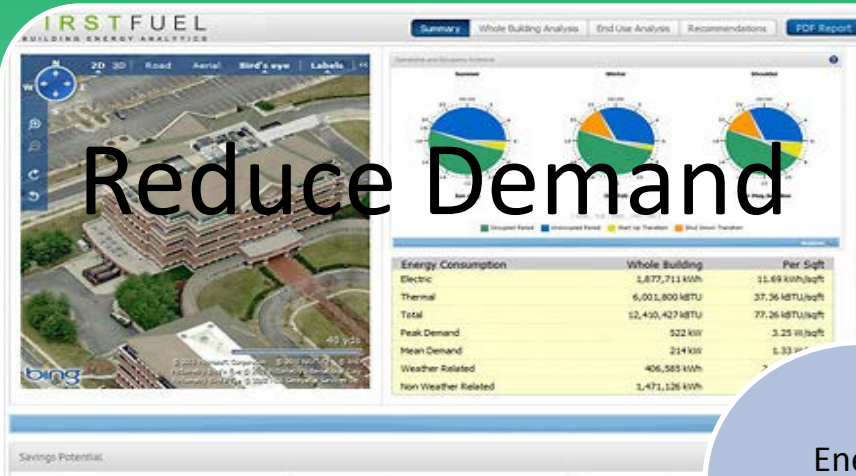


# GSA Building Energy Strategy



Energy Procurement



Mark Ewing  
Director, Energy Division  
GSA, Public Buildings Service  
May 2014

# Overview

- Federal buildings consume \$6.5 billion in utilities each year. GSA plays a large role in this business through its energy procurements, alternative financing mechanism, regulatory intervention and performance benchmarking.
  - Internally, GSA currently spends \$400 million for energy in buildings where it directly pays the bill.
- Through aggressive energy strategies, GSA is currently reporting a 23.54% reduction in consumption compared to 2003.
  - In terms of cost avoidance, this equates to a lower energy bill of \$58 million.
- Additional savings to the utility spend result from securing lower prices due to competitions and mitigating rate increases sought by utilities before State Commissions.
- Continuing to reduce consumption 3% annually, meeting renewable targets and negotiating a volatile energy commodity market will be challenging.

At the very least, if we are to maintain past performance trends, GSA should strategically accelerate its momentum in three key areas:

- Strategic Sourcing
- Validating Performance
- Liberating data

# Strategic Sourcing

- GSA energy contracts comprise \$3.1 billion in government-wide expenditures.
- GSA aggregates loads, segments markets and strategically sources energy management services so that federal customers don't have to staff redundant programs.
- Additionally, GSA utility contracts offer an option to the ESPC program. Since 1992 federal agencies recorded \$1 billion in investments across 651 projects using our unique Utility Energy Service Contract authority.
- GSA monitors all 50 State Commissions for new utility tariff applications. When we see something significant, GSA or our agency partners intervene legally.
  - Looking forward, we expect continued volatility in energy commodity markets, smart grid regulatory initiatives, and climate change adaptation funding requests by Utility Commissions or State law.
  - Key to our success will be a proactive change in tactics focused on our clients prudently accepting more risk to take advantage of opportunities presented by time of use rates and smart grid initiatives.

# **GSA Areawide Public Utility Contracts**

- Currently have 98 areawides available
- Covers approx. 110 operating companies nationwide
- Currently working with 10 companies to get new areawides in place
- Areawide Contracts will be available on GSA website for download by June 1, 2014

# Validating Performance

- GSA is unique among federal agencies in its ability to centrally monitor energy cost and consumption wherever it pays a bill.
  - The Energy Usage Analysis System (EUAS) tracks each utility bill Finance pays, inputs weather data by zip code, and normalizes for measured gross square footage.
    - The system then benchmarks performance at all levels of the portfolio.
- Additionally, GSA's national advanced metering system tracks 91% of electricity consumption in real time across the owned inventory.
- Remote surveillance by GSA staff will ensure energy management capabilities inherent in advanced metering is performed by contractors as stipulated in the new O&M specification.
- While these systems have reached their practical investment limit in terms of portfolio coverage, expansion of this capability has limitless potential under a Green Button structure.

# Liberating Data:

- Effective energy management requires assessing efficiency levels of major end use building loads.
- The export of this data for forensic analysis, corrective recommendations and verification of stipulated results is an essential strategy to achieving our goals in the face of resource limitations.
- By liberating our data in this manner, GSA gains access to virtual assessment tools which, by default, offer a business model which is cheaper, faster and requires less staff resources.
- Obstacles that must be overcome include resolving constraints to exporting live data across the GSA internet firewall, as well as allowing control signals into our Building Automation Systems from Smart Grid programs.

# GSA Energy Efficiency Continuum

(synchronized with procurement/regulatory action)



**ADVANCED  
METERING**

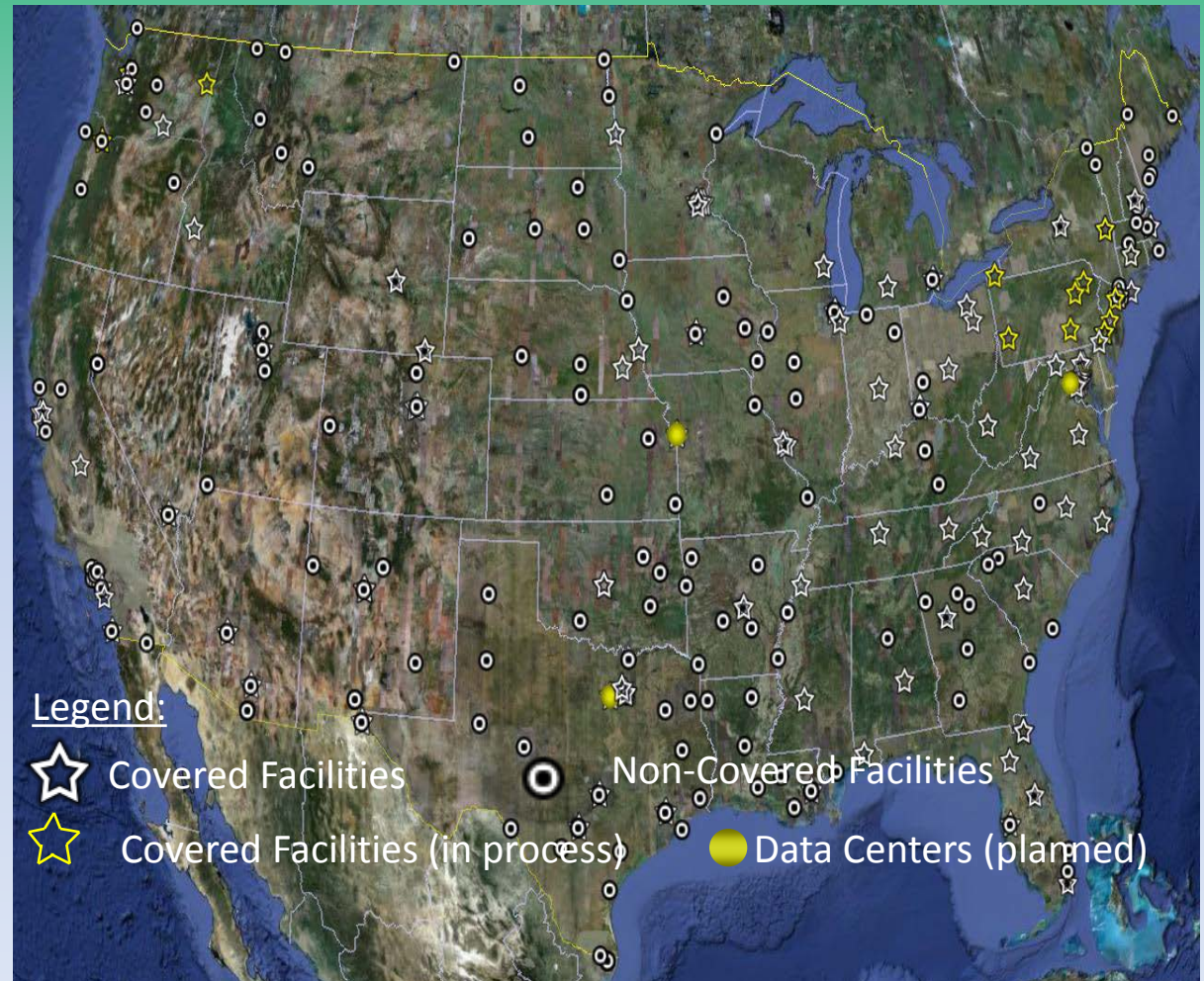
Rapid Building  
Assessments

Green Button



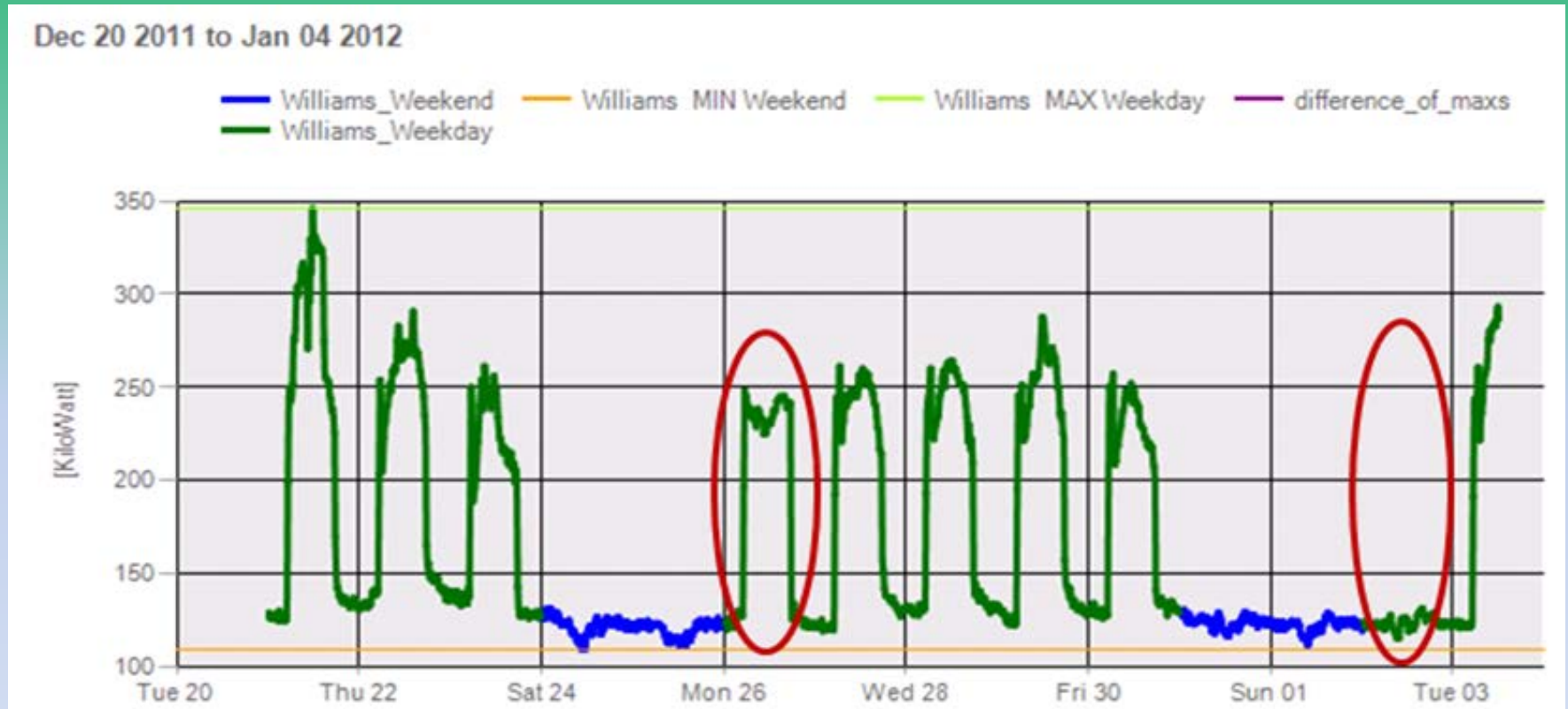
# Advanced Metering

- 450 buildings
- 91% of GSA's total electricity consumption
- ~1900 sources (electricity, gas, water, steam)



# Advanced Metering

## Identify Problems in Individual Buildings



- GSA noticed absence of a holiday setback for Monday, Dec. 26 (2011).
- GSA notified contractor, who discovered holidays were not programmed into the building automation system (BAS).
- Contractor corrected problem by Monday, Jan. 2.

# Advanced Metering

## Compare Buildings in Same Portfolio

Feb 02 2012 to Feb 04 2012

201 Varick St\_NY0128 [No Data] NY0350 290 Broadway Ny0351\_Moyrihan Ny0399\_Roosevelt NJ0056\_VA FB NY0304\_Keating  
Bowling Green\_NY0131\_Lft [No Data] NY0282 Javits Ny0270\_CellarFB [No Data] NY0281\_HarleyFB NJ0145\_Roe FB



Why do the buildings have such different baseloads?

# GSA Energy Efficiency Continuum

Advanced Metering

**Rapid  
Building  
Assessments**

Green  
Button

# First Fuel Dashboard

## Remote Building Analytics Platform

DC0459AF Ronald Reagan Building - [04/01/11 - 03/31/12]

PDF Report

Summary

Whole Building Analysis

End Use Analysis

Custom Analysis

Recommendations

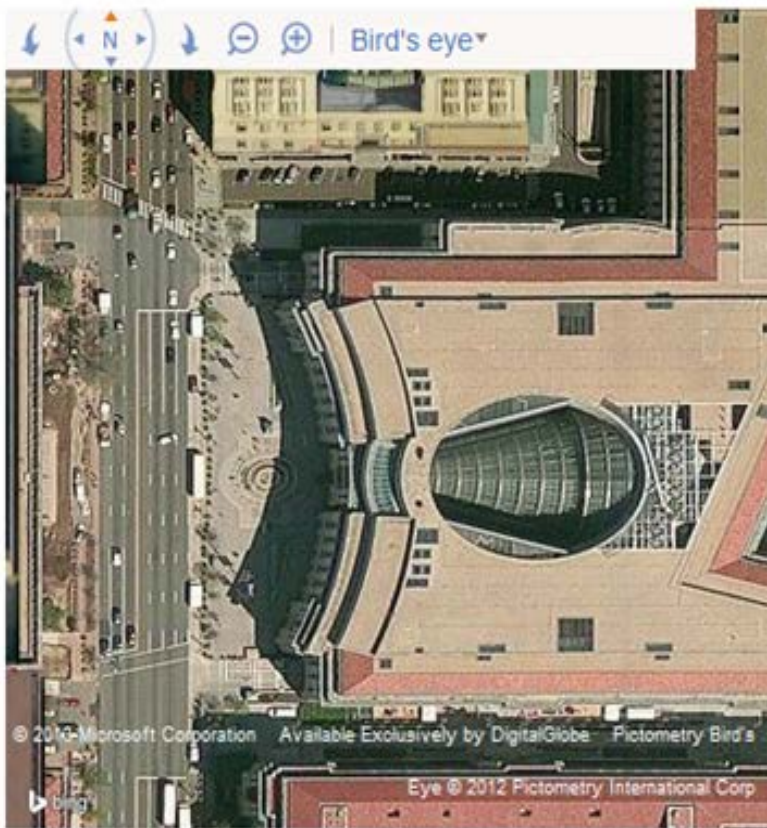
Monitoring

Comments

kBTU

On

Off



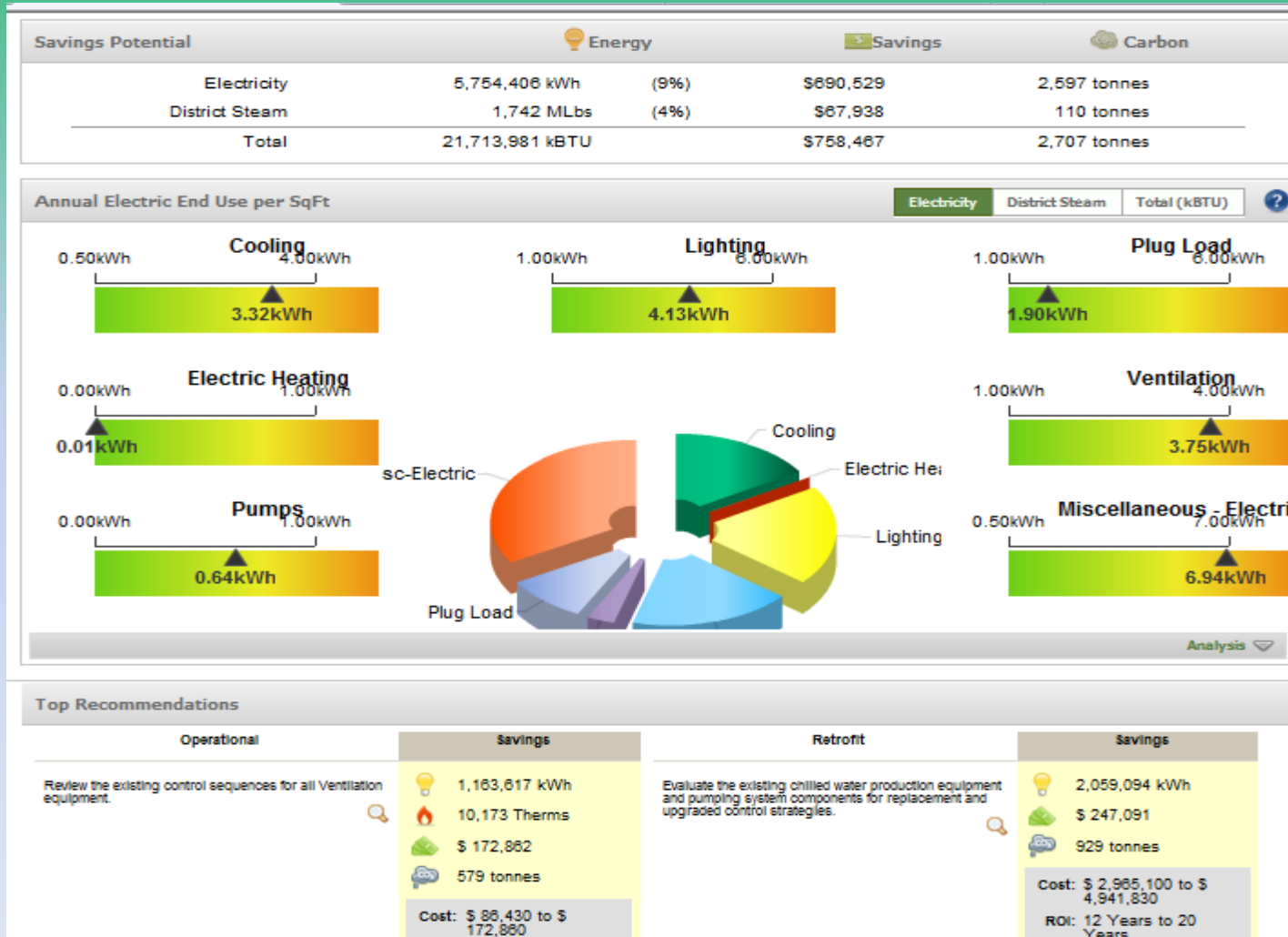
Open in new window

|                       |  |
|-----------------------|--|
| Building Name:        | DC0459AF Ronald Reagan Building  |
| Building Address:     | 1300 Penn Ave NW, Washington, District Of Columbia, 20004, United States |
| Building Size(SqFt):  | 3,100,000 GSF  |
| Primary Activity:     | Office   |
| Heating Type:         | District Steam   |
| Cooling Type:         | Electricity  |
| Average Occupancy(%): | 100  |
| Year Constructed:     | 1998   |
| Last Renovated:       | N/A  |
| Electricity Cost:     | \$7,709,431 at average cost/kWh of <input type="text" value="12 cents"/> |
| District Steam Cost:  | \$1,834,212 at average cost/MLb of <input type="text" value="\$ 39.00"/> |

| Energy Consumption     | Total            | Per SqFt   | Per SqFt     |
|------------------------|------------------|------------|--------------|
| Electricity            | 64,245,256 kWh   | 20.72 kWh  | 70.71 kBTU   |
| District Steam         | 47,031 MLbs      | 0.02 MLbs  | 18.11 kBTU   |
| Total                  | 275,359,915 kBTU | 88.83 kBTU | 88.83 kBTU   |
| Peak Demand (Electric) | 12,399 kW        | 4.00 W     | 13.66 BTU/hr |

# First Fuel Analysis

## Ronald Reagan Detail Summary



Data Center



# First Fuel

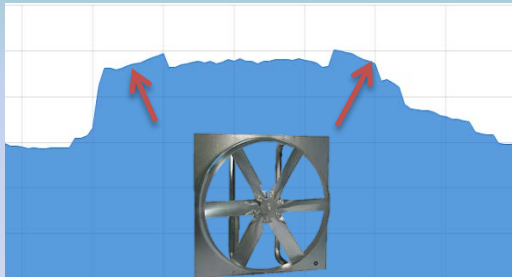
## END-TO-END ANALYTICS FOR RONALD REAGAN BUILDING

AUDIT

PLAN AND ACT

TRACK SAVINGS

*August 12, 2011*



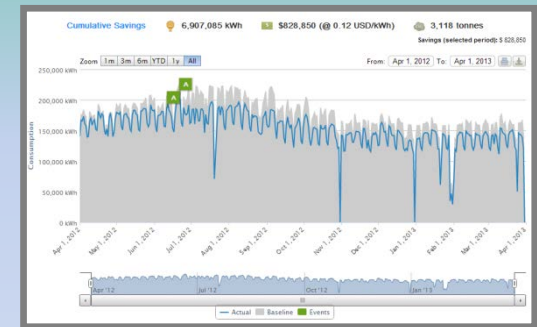
Audit identifies consumption spikes, which investigation shows to be “rogue” garage fans

*June 12, 2012*



FirstFuel coaches building manager on how to modify controls

*FirstFuel portal\**



Result: 6.9 GWh decrease in consumption  
Energy savings: \$825,000/year

\* Energy reduction/savings reflect total across multiple measures

# GSA Energy Efficiency Continuum





# Climate Action Plan Commitment

*“The Administration will leverage the ‘Green Button’ standard – which aggregates energy data in a secure, easy to use format – within federal facilities to increase their ability to manage energy consumption, reduce greenhouse gas emissions, and meet sustainability goals.”*

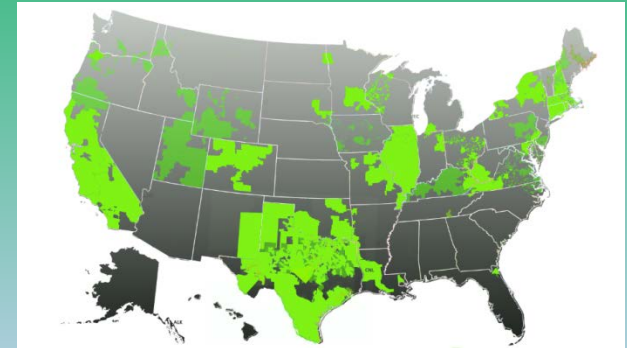
The President’s Climate Action Plan,  
June 25, 2013

# GSA Pilot Overview

- Test Green Button Data Standard as provided by participating utility companies
- Coordinate with Utility (PEPCO) Green Button Connect My Data deployments to receive whole facility Interval Data
- Authorize 3<sup>rd</sup> party to receive Green Button Connect My Data streams from Utility and in-facility meters for 5 target Buildings in DC
- Coordinate with EPA to provide Green Button Connect My Data delivery into ESTAR Portfolio Manager
- Coordinate with DOE to provide Green Button Connect My Data delivery into Building Performance Database

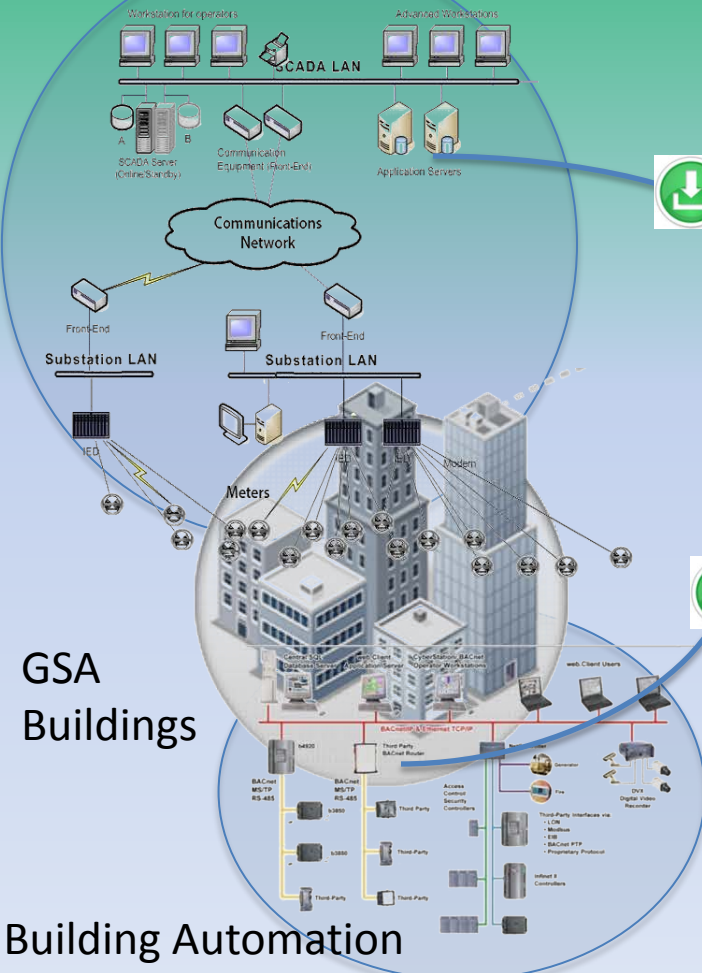
# Green Button Initiative

- Enables electronic consumer access to energy data and supports development of ecosystem (apps)
- Available to 42+ million customers now and 59+ million in the future based on utility commitments
- Result of collaboration among White House, DOE, NIST, state regulators, utilities, vendors, SGIP, and North American Energy Standards Board



# Topologies: GSA Pilot

Utility Infrastructure -  
PEPCO

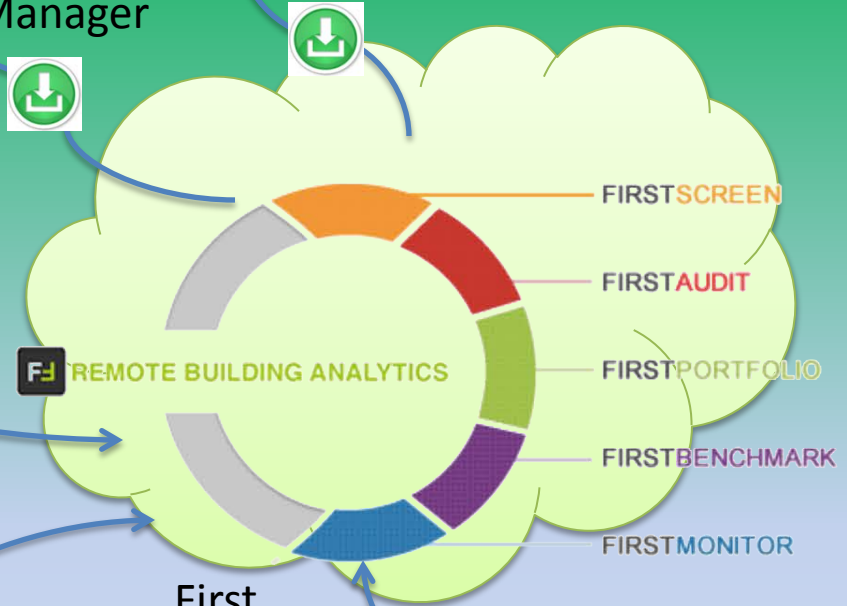


GSA  
Buildings

Building Automation  
and Metering - Schneider EEM

Portfolio  
Manager

Building Performance  
Database

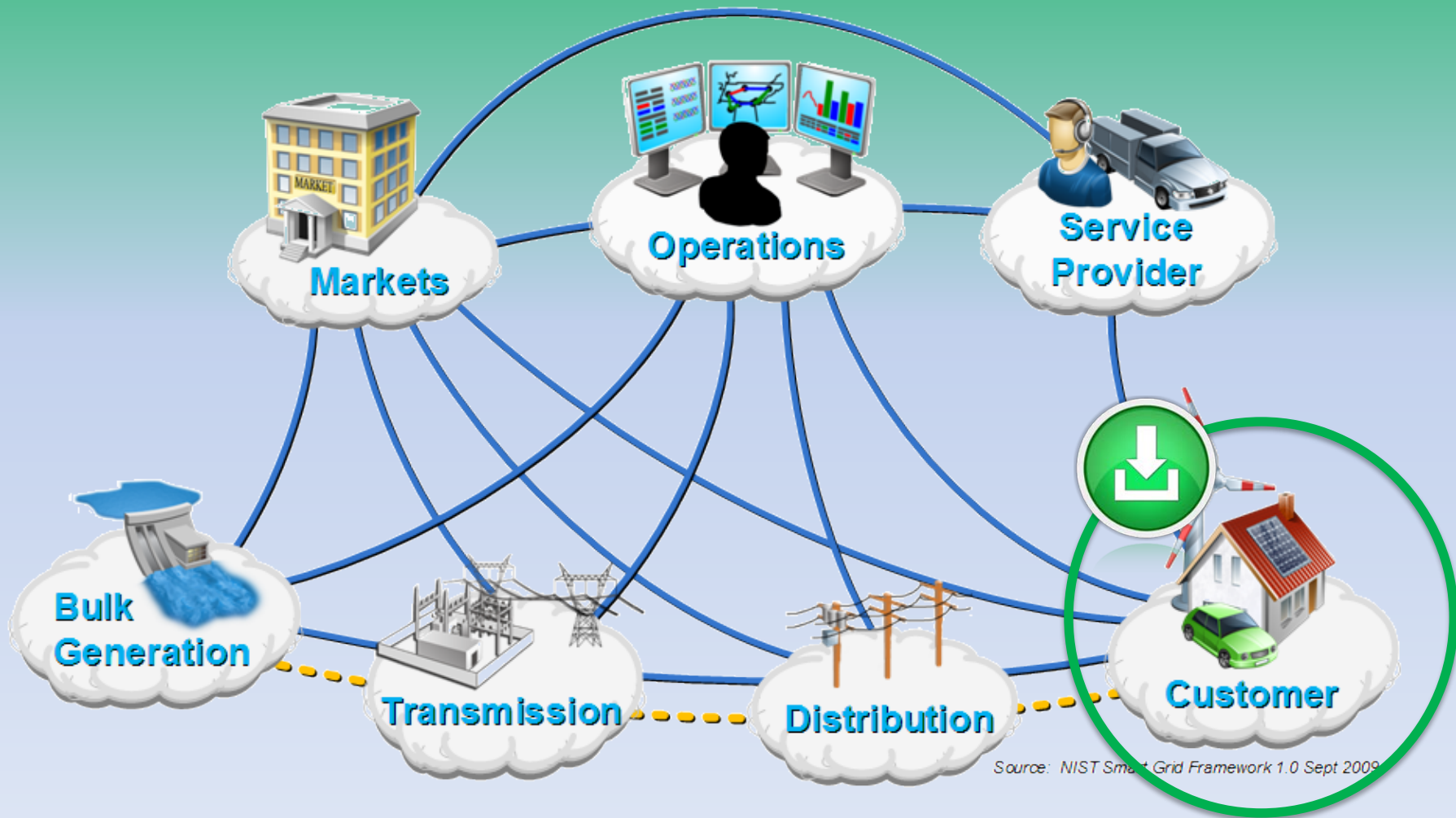


First  
Fuel



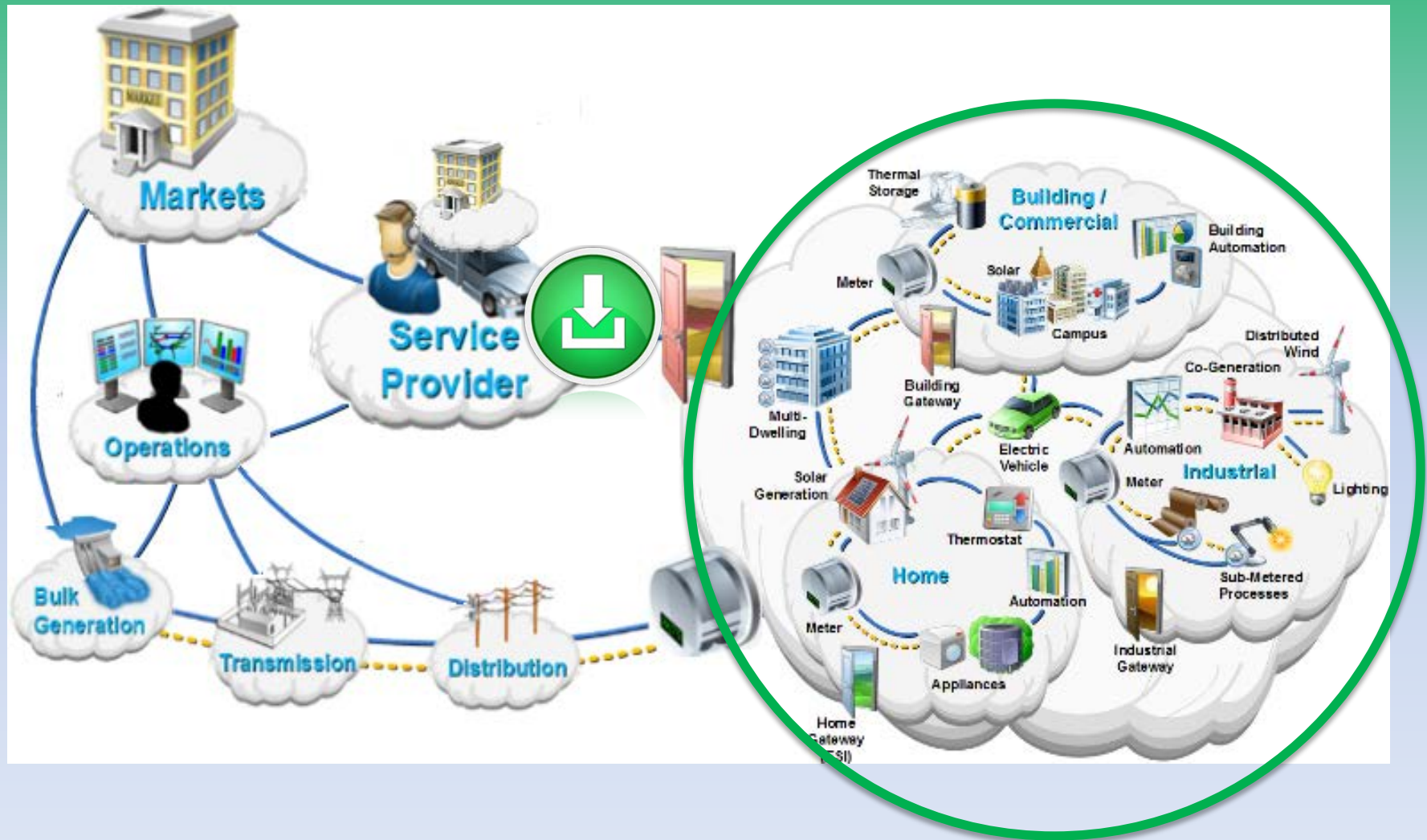
GSA Energy  
Managers

# Topologies: Smart Grid



Source: NIST Smart Grid Framework 1.0 Sept 2009

# Topologies: Customer Domain



# Topologies: Smart Grid - Commercial

