Achieving Deep Retrofit with ESPC in Government Facilities

GSA ESPC Net Zero Renovation Challenge
Overview

- Background on GSA
- Energy Mandates
- American Recovery and Reinvestment Act
- Deep Retrofits
- GSA ESPC Net Zero Renovation Challenge
GSA consists of:
Public Buildings Service (PBS)
Federal Acquisition Service (FAS)
Office of Governmentwide Policy (OGP)
other staff offices

9,624 buildings in 11 regions
1,530 owned and 8,094 leased (2010)
370.2 million rentable square feet, or 34.4 million square meters

Landlord for 400 federal agencies, bureaus and commissions with space for over 1,000,000 tenants
GSA Energy Profile

- Currently represents 9.3% of civilian agency energy usage, 3.7% of Federal total
- Has achieved ~16% in energy reduction from 2003 baseline (source: FY2010 OMB Scorecard on Sustainability/Energy)
GSA Office of Federal High Performance Green Buildings

Established under EISA 2007 Section 436 to:

- Coordinate and disseminate high-performance green building research
- Establish green practices to be used throughout the life of a Federal facility
- Coordinate with other agencies to identify opportunities to demonstrate innovative and emerging green building technologies and concepts
Sustainability & Regulations

Laws
- National Environmental Policy Act, 1969
- Clean Air Act, 1970; amended 1990
- Energy Policy and Conservation Act, 1975

Executive Orders
- 13101 Greening the Government through Waste Prevention, Recycling & Federal Acquisition
- 13123 Greening the Government through Efficient Energy Management
- 13134 Developing & Promoting Biobased Products and BioEnergy
- 13148 Greening the Government through Leadership in Environmental Management
- 13327 Federal Real Property Asset Management
- 13423 Strengthening Federal Environmental, Energy, and Transportation Management
- 13514 Federal Leadership in Environmental, Energy, and Economic Performance
American Recovery and Reinvestment Act (ARRA)

• **Green Building Modernizations**
  • Focused On High-Performance Green Building Projects $4.3 B
  • Full and partial building modernizations $3.2 B
  • Limited scope projects (including energy projects) $800M
  • Small projects $300M

• One overarching criteria used by GSA to select the best projects for accomplishing the goals of ARRA:
  • Transforming Federal buildings into high-performance green buildings
  • Increased GSA’s capability to construct and transform federal buildings into high-performance green buildings
  • Jump-started GSA’s effort to meet mandated energy and water conservation targets in the years to come.

• **Performance Criteria for Whole and Partial Building Modernization**
American Recovery and Reinvestment Act (ARRA)

TRANSFORMING FEDERAL BUILDINGS INTO HIGH-PERFORMANCE GREEN BUILDINGS

- Border Stations/ Land Ports of Entry: $300 M
- Federal Buildings/ U.S. Courthouses: $733.7 M
- Full & Partial Building Modernizations: $3,168 M
- Limited Scope (Including Energy Projects): $806.9 M
- Small Projects: $298.5 M
- Building Operations: $127 M
- Space Rental: $108 M
- Office of High Performance Green Buildings: $4.0 M
- Apprenticeship Program: $3.0 M

Total Distribution: $5.55 B
The combined Recovery Act portfolio of Major Modernization and Limited Scope projects will be 30% more energy efficient than the CBECS\textsuperscript{2} national average.

Recovery Act projects are expected to reduce energy consumption by 18% across 447 buildings (for Major Modernization, Limited Scope, and Small Projects).

Average annual cost savings is an estimated $44.4M per year.

\textsuperscript{2} Commercial Building Energy Consumption Survey (CBECS) national average energy intensity 990 kBtu/sq. ft PBS 2003 and 2009 baseline energy intensity on Recovery Act projects from GSA's Energy Usage Analysis System (EUAS)
A deep retrofit is a modernization that is anticipated to achieve an energy reduction of at least 50%.

- Of the 45 Recovery Act modernization projects, **six** are anticipated to reduce overall energy consumption by at least 50%.

- **Five** of the deep retrofits are projected to reduce overall energy consumption from 53%-68%.

- **Five** of the deep retrofit modernizations are utilizing renewable energy technologies to reduce overall energy consumption.

- An additional **twelve** limited scope and modernization projects anticipate achieving an energy reduction between 40% and 50%.

- All Recovery Act buildings undergoing Major Modernization projects are expected to achieve enough gains in energy efficiency to meet EISA 2007 requirements.
Recovery Act Case Study

- Net-zero energy target
- Platinum LEED rating goal
- Historic Building
- 123 kW PV array to produce 170,000 kWh a year (greater than 50% of the building’s historical annual electricity use)
- Ground source heat pumps
- ECMs: lighting control and monitoring, demand controlled ventilation, plug load management measures, thermally improved building envelope.
- Building physics analysis used
Approach to Net Zero
Recommended Approach

Reduce Demand + On Site Renewables = Net Zero

Source: RMI
Deep retrofits are one key

Deep = fundamental

Large savings, increased value

Financeable project economics

Retrofit adoption

Eroding performance
5-20%, must repeat
30-60%+ no repeat

% change

Source: RMI
<table>
<thead>
<tr>
<th>“Deep Energy” Retrofit</th>
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<tr>
<td><strong>Process Differentiators</strong></td>
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<tr>
<td>– Building Owner Involvement</td>
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<tr>
<td>– Integrative Design</td>
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<tr>
<td>– Advanced Auditing, Modelling, LCCA</td>
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<tr>
<td>– Ongoing M&amp;V</td>
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<td>– Occupant Engagement</td>
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<tr>
<td><strong>Results:</strong></td>
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<tr>
<td>– Larger Energy Savings</td>
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<td>– Improved Project Economics</td>
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Energy Savings Performance Contract (ESPC)

Zero or positive net impact on existing budgets.
Timing is Key to Profitable Deep Retrofits

- Planned Capital Improvement
- Major Occupancy Change
- Major System Replacement
- Upgrades to Meet Code
- Fixing an “Energy Hog”
Zero Environmental Footprint

GSA’s moon shot

Supply Chain
People
Assets

(Product-Waste-GHG) ≥ (Supply Chain + People + Assets)
GSA proposes to employ a Net Zero ESPC Challenge as a tool to further accelerate the use of ESPC’s by the GSA regions in addressing energy reduction goals.

- $440M invested in ESPC since 1999
- Renewed GSA interest and investment in ESPC ($262M in FY10-11)
ECMs in ESPCs

- EMCS: 15%
- Lighting: 16%
- HVAC: 13%
- Chiller: 11%
- Piping dist: 8%
- Renewable heat: 8%
- GHP: 7%
- Cogen: 5%
- Boiler: 5%
- Water: 3%
- Renewable elec: 3%
- Motors: 2%
- Envelope: 1%
- Process: 1%
- Other: 1%

ECMs included in ESPC's by investment (Source: John Shonder, Oak Ridge National Laboratory, 2011)
Background

• October 20, 2011 Administrator Johnson’s Announcement: GSA Challenges Private Sector to Reduce Energy Use at Federal Buildings

• October 27-28, 2011 ESPC Charrette

• December 2, 2012 Presidential Memorandum
  – $2 billion in performance-based contracts within 24 months
  – Report planned implementation schedule by 1/31/2012
  – Issue NOO in March, 2012
GSA Challenge Goals

• Demonstrate best practices for maximizing overall ESPC project energy savings;
• Advance progress toward EISA goals;
• Accelerate deployment of underutilized and renewable technologies;
• Further expose GSA regions to DOE ESPC IDIQ contract process and resulting improvements in ESCO selection;
• Identify and understand processes necessary to get to net zero energy;
• Identify structural, contractual and technical impediments.
GSA Challenge Framework

- **Site Selection**: GSA selected 30-35 buildings for competition across multiple regions
- **Award Process**: Buildings to be awarded with DOE’s streamlined competition process
- **Recognition**: Projects to be evaluated by a panel of independent experts to identify and recognize exceptional performance in a number of technical categories
  1. absolute energy savings of pre-retrofit energy use
  2. progress towards Federal Government goals for energy, water, fossil fuel, renewable energy, and sustainability
  3. financial and technical creativity
  4. ability to extend best practices to other Federal buildings.
1. Analysis and Integrated Design
2. Project Economics
3. Delivery Process
4. Occupant Behavior
5. M & V
Analysis and Integrated Design

- Deep savings may not be cost effective over contract term
- Lack of information on existing buildings
- Typical ESPC process looks at individual ECMs
- High risk to guarantee deep savings
Project Economics

- High financing costs
- Integration with planned improvement projects
- Inclusion of avoided future costs in ESPC including capital and maintenance
- Contract duration limits longer payback measures
ESPC Delivery Process

**Best-Expedited Schedule**
- **Project planning (28-63 days)**
  - Work w/FFS
  - Form Acq. Team
  - Request PF
- **Prelim. Assessment — ESCO selection (132-246 days)**
  - Notice of Opp.
  - Select ESCO
  - Evaluate PA
  - Send NOIA
- **TO-RFP (15-35 days)**
- **IGA & Final Proposal (105 – 150 days)**
- **Site/Agency Review (30 days)**
- **GFO Review (14 days)**
- **Final Reviews, Negotiations, and Award (45-55 days)**

**Longer Schedule**
- **Project planning (63 days)**
- **PA – ESCO selection (246 days)**
- **TO-RFP (35 days)**
- **IGA & FP (19.5 mos.)**
- **Final nego’s & award (150 days)**
- **Site/Agency Review (30 days)**
- **GFO Review (14 days)**
- **19.5 mos.**

Source: DOE/FEMP
Occupant Behavior

- Difficult to quantify energy/cost savings
- Limited good examples of “Behavior ECMs”
- Hard to incentivize all occupants
- ESCOs have no control over occupants
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<tr>
<td>• Uncertainty/variability of how building is operated after installation</td>
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<td>• Cost, level of effort, and complexity for whole building M&amp;V</td>
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<td>• Consistency across GSA offices, agencies and regions</td>
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<td>• Improved baseline performance data</td>
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High Priority Solutions

- Reduce time to contract award
- Redefine eligible savings
- Share risk
- Combine funding
- Multi-building projects, bundling
- Consider occupant behavior programs
ESPC Challenge Buildings

- 30-35 Buildings
- 18 million sqft
- 100,000 – 800,000 sqft
- $150-250 million potential project size
- $7 million annual savings potential
Resources

Kinga Porst
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www.gsa.gov

Administration Martha Johnson’s Press Release
http://www.gsa.gov/portal/content/114711

President Obama’s ESPC Announcement

Administrator Johnson Statement on President’s ESPC Announcement
http://www.gsa.gov/portal/content/118471

GSA ESPC Charrette Report and Presentation

Notice of Opportunity was posted on March 20, 2012
https://www.fbo.gov/index?s=opportunity&mode=form&id=4b0bad41db8c614459b21b0c015e3628&tab=core&cview=1

DOE FEMP ESPC IDIQ
http://www1.eere.energy.gov/femp/financing/espces_doescos.html
Questions?

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