GSA Deep Energy Retrofit Program

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GSA Portfolio

• 376 million square feet
  – 182 million owned
  – 194 million leased
• Average age of inventory is 48

• Functional Replacement Value $70B

• Fair Market Value equal to $32.4B

• Reinvestment needs:
  – $3.1 B (short term)
  – $4.6 B (long term)

• Over 9,100 assets
  – 1,500 Owned
  – 7,600 Leased
• Almost 22,000 assignments to agencies/business units

• 2,200 cities, 50 states, 6 U.S. Territories and the District of Columbia

• Housing over 1.1 million federal employees for 65 agencies
DER Project Funding

• Appropriated (public) funding;
• Performance contracting (ESPCs, UESCs);
• Combined funding, combination of public and private funding.
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
GSA National Deep Energy Retrofit (NDER) Program

- Launched 2011, multi-stakeholder workshop
- Focused entirely on ESPC’s
- Program goals:
  1. Move federal facilities towards net zero energy consumption
  2. Implement cost effective retrofits with payback periods of 25 yrs or less
  3. Use Innovative and renewable technologies
  4. Use comprehensive and integrated whole building approaches to determine ECM’s.
- FEMP, Agencies (inc. DOD), ESCO’s all engaged
GSA NDER Rounds I and II

- 73 Buildings, 34M SF
- $21.5 Million Annual Savings
- Doubled Average Savings from 18% →
  - 38% (Phase 1) 30% (Phase II)
- Over $540 Million; 26 Contracts Awarded
- 905,000 MBTUs/year Energy Reduction
- $30 Million Annual Savings
- One Net Zero Energy Project
GSA National Deep Energy Retrofit Rounds I and II

NDER Round 1 & 2 Results

% Energy Savings

- NDER Project % Energy Savings
- NDER Program Average
- Other Federal ESPC Project Average

REGION Round 1 & 2 Results

ENERGY RETROFIT ROUNDS

- Round 1
- Round 2

Energy Exchange: Connect • Collaborate • Conserve
The keys to successful deep ESPC projects are well-understood and achievable strategies.

**Communication**, deliberate **goal setting**, and **holistic design** are key to deep ESPCs.

Deep ESPCs are a **responsible investment** of taxpayer money.

Investing in efficiency today prepares our buildings to become **resilient grid assets** and supports goals like **net-zero energy**.
ESPC Charrette

Workshop discussion topics:
• Analysis and Integrated Design
• Project Economics
• ESPC Delivery Process
• Occupant Behavior
• Measurement & Verification
• Project Delivery
• Transitions/Team Dynamics
• Integrative design and Innovative Technologies
• O&M

High Priority Solutions:
– Reduce time to contract award
– Redefine eligible savings
– Share risk
– Combine funding
– Multi-building projects, bundling
– Consider occupant behavior programs
Best Practices

1. Centralize ESPC contracting
2. Select ‘ripe’ projects
3. Engage all stakeholders
4. Require deep, continually reinforce, and know what you’re getting
5. Retain bundles within 25 year limit
Benefits:

- Expedites timeline: GSA PMO reduced the timeline by 5 months on average compared to typical ESPC projects.
- Time is money, by adhering to timelines and being responsive, ESCO’s will provide better teams and better pricing for project development.
- Centralized legal support - every region still reviews their own ESPC contracts but has support from the agency.
- Supports agency stakeholders and project champions
- Enables bundling of project across locations
- Helps with those less familiar with the ESPC process
- Enables consistency between national and regional offices
2. Select ‘ripe’ projects, blended funding

- **Not required for deep:**
  - High energy prices
  - High energy consumption
  - Advanced ECMs
  - Large payments from savings in implementation period
  - O&M savings

- **Required for deep:**
  - Buildings that have not undergone recent energy retrofit projects
  - Emphasis from agency
  - Thorough audit process to identify ECMs
  - Integrated design approach
  - Realization that deep retrofits cost more (in terms of energy savings per dollar invested)

- Piggyback on current and upcoming projects or needs:
  - Planned functional or aesthetic building renovation, significant comfort issues, significant maintenance issues, disaster recovery or increasing resilience...

- ESPC’s can be combined with appropriated funding as long as it is being used for what it is intended for

- Projects should be designed to stand on their own, without relying on appropriated funds.
3. Engage all stakeholders

- Involve all stakeholders early and often, from the owner-decision making team, occupants, facility management team, legal, financial, procurement, and ESCO entity using multi-stakeholder workshops.
- Include legal so they are not caught off-guard when it comes time to finalize the contract.
- GSA requires more people involved, such as energy managers, property managers, environmental folks.
- M&V Option C helps convince skeptics, since it provides proof that savings have been achieved. It does add cost and should be used short term (i.e. 3 years).
4. Require deep, continually reinforce

- Use qualifications based selection, not a competitive PA
- Create a culture of commitment
  - Respect timelines, set and uphold deadlines
  - ESCO’s as well as Agency stakeholders know you’re serious about deep
  - At each meeting, reinforce that going deep is a priority
- Optimize your NOO or RFQ process:
  - Require compliance with executive orders and other agency goals
  - Clearly state desired outcomes
    - Energy Use Intensity target (EUI), percentage energy reduction
    - Encourage a whole building, integrative design process
      - Require whole building energy modeling to design ECMs
5. Retain bundles within 25 year limit

• Remove artificial project limits, such as maximum ECM payback thresholds and build projects based on a bundled 25 year payback. 25 years is the maximum allowable contract term stipulated by the federal government and Agencies may not arbitrarily limit terms for their sites to under 25 years, per EISA 2007.

• Encourage the project team to bundle short- and long-term measures to maximize synergy between measures and build long-term value.
New Carrollton Federal Building

Building Characteristics:
• Location: Near Washington, DC
• Floor Area: 1.2 million ft²
• Original Construction: 1994
• Tenant: IRS
• Baseline EUI: 121 kBtu/ft²

Project Details:
• ESCO: Ameresco
• Managing Agency: GSA
• Project Duration: 38 months
• Investment Value: $40M
• Projected Energy Reduction: 60%
• Projected Savings: $2.5M per year
• Contract Term: 22 years
New Carrollton FB

South Parking Lot Carport

Geothermal Fields

Chiller Plant Upgrades
Keys to Success

• Integrative Design and Focus on End-Use
• Project Champions
  • National GSA office
  • Building Facility Manager
  • Project facilitator
• ECMs Saved with Design Compromises
  • PV array and rain gardens
  • Window films and roof replacement
• Well-Structured Communication Plan
• NDER Program
  • Standardization of processes
  • Streamlining of legal and logistical hurdles
  • Potential for improvements in commissioning of integrative design
Resources


ESPC Charrette Reports and Case Studies [www.rmi.org/gsaretrofits](http://www.rmi.org/gsaretrofits)

ORNL report Energy Savings from GSA’s National Deep Energy Retrofit Program


ASHRAE Paper: Deep Energy Retrofits in Federal Buildings: The Value, Funding Models, and Best Practices