Deep Energy Retrofits with ESPCs in Government Facilities

Kinga Porst, GSA

NEBB
May 3rd, 2013
Overview

• Background on GSA

• Energy Mandates

• High Performance Building Programs
  – Sustainable Facilities Tool (SFTool)
  – Submetering
  – Green Proving Ground (GPG)
  – Smart Buildings

• Energy Savings Performance Contracts (ESPC)

• Case Study
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
Historic 1810 – 1941

Alexander Hamilton Custom House
New York, NY

US Courthouse
San Juan, Puerto Rico
World War II 1942 – 1949

Federal Center
Kansas City, MO

Federal Center
Auburn, WA
Great Society 1950 – 1979

Federal Building
Los Angeles, CA

Federal Building
Casper, WY
Great Society 1950 – 1979 (Modernized)

Edith Green Wendell Wyatt Federal Building
Portland, OR

Rodino Federal Building
Newark, NJ
Contemporary 1980 – 1993

Thomas O’Neill Federal Building
Boston, MA

Alan Bible Federal Building
Las Vegas, NV
Design Excellence 1994 – Present

Federal Courthouse
San Diego, CA

Land Port of Entry
Warroad, MN
Government Mandates

- New facilities, 30% more efficient than ASHRAE 90.1
- 7.5% of electricity consumption from renewable sources
- Directs all federal buildings to be metered

- Established Guiding Principles for HPSB

2007: Energy Independence and Security Act (EISA)
- Reduce building energy intensity 30% by FY2015
- Identification and use of a green building rating system

- Reduce water use intensity 16% by 2015
- Reduce fleet petroleum consumption 2% annually through FY2015 compared to FY2005 baseline
- All new construction must incorporate Guiding Principles
- 15% existing buildings must meet Guiding Principles by 2015

- Develop a base year and complete annual comprehensive inventory of scope 1, 2, 3 GHG emissions; report to CEQ/OMB.
- Each agency shall develop, implement, and annually update an integrated Strategic Sustainability Performance Plan


(a) Definition of High Performance Building

In this section, the term “high performance building” means a building that integrates and optimizes all major high-performance building attributes, including energy efficiency, durability, life-cycle performance, and occupant productivity.

Energy Independence and Security Act of 2007, Title IV, Energy Savings in Buildings and Industry, Section 401, Definitions. (12) HIGH-PERFORMANCE BUILDING - The term “high-performance building” means a building that integrates and optimizes on a life cycle basis all major high performance attributes, including energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations.
High Performance Green Buildings

- Reduces energy, water and material resource use
- Improves indoor environmental quality
- Reduces negative impacts on the environment
- Increases use of environmentally preferable products
- Increases reuse and recycling opportunities
- Integrates systems
- Reduces impacts of transportation
- Considers effects on human health and the environment
The Guiding Principles for High-Performance and Sustainable Buildings

- Use Integrated Design
- Protect and Conserve Water
- Optimize Energy Performance
- Enhance Indoor Environmental Quality
- Reduce Environmental Impact of Materials

www.wbdg.org/sustainableEO

Calls for bold thinking and specific reforms to transform Federal facilities into high-performance green buildings

http://www.gsa.gov/leversforchange
• 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)
Net Zero Strategy

Load Reduction
- Insulation
- Shading
- Plug Load
- Lighting

Passive Strategies
- Daylighting
- Natural Ventilation
- Thermal Mass

Efficient Systems
- Distinct Loop
- Chilled Beams / Ceiling
- CSL3 + Transformers
- LED Lighting

Energy Recovery
- Air Recirculation
- Distinct Loop Recovery
- Heat Pipes

Renewables
- Photovoltaics
- Fuel Cells
- Tri-generation

Continuously Retune
- Reassess your performance and continue to improve.
Green Buildings Perform Better & Cost Less

Phase 2

- Domestic water use: -11%
- Energy use: -25%
- Operating costs: -22%
- General building satisfaction: +21%
- CO₂ equivalent emissions: -34%

Phase 1

- Domestic water use: -26%
- Energy use: -25%
- Operating costs: -13%
- General building satisfaction: +27%
- CO₂ equivalent emissions: -33%

A one-stop portal to empower any government or private sector user to identify and prioritize cost-effective green building strategies that will lead to improved environmental performance in small building projects.

Targeted User Community:

- Facility Managers
- Procurement Professionals
- Leasing Specialists
- Project Managers
- Private Sector Developers
Green Proving Ground

The Green Proving Ground program (GPG) leverages GSA’s real estate portfolio to evaluate innovative sustainable building technologies.

Building Envelope:
• Electrochromic Windows
• Glazing Retrofit Coating
• Vacuum Sealed Roof Insulation

HVAC/Energy Management:
• Central Plant Optimization Strategy
• Wireless Pneumatic Thermostat
• Plug Load Control
• Wireless Sensor Networks

Lighting:
• LED Retrofit Luminaire
• Occupant Responsive Lighting
• Wireless Lighting Control System

On-Site Power Generation:
• Wood-Pellet Biomass Boiler
• Honeycomb Solar Thermal Collector

Water:
• Nonchemical Prevention of Hard Water Scale
• Wireless Moisture Sensing Irrigation System
• Wireless Weather Station Irrigation Control System

www.gsa.gov/gpg
# Submetering

## Submetering Comparison Chart

<table>
<thead>
<tr>
<th>Data</th>
<th>Simple</th>
<th>Enhanced</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unprocessed power and energy information collected by the submeters.</td>
<td>![Simple Data Icon]</td>
<td>![Enhanced Data Icon]</td>
<td>![Advanced Data Icon]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost</th>
<th>Simple</th>
<th>Enhanced</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submetering equipment and installation cost.</td>
<td>$</td>
<td>$$</td>
<td>$$$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>O&amp;M Labor</th>
<th>Simple</th>
<th>Enhanced</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>The labor required to operate and maintain the submetering effort, such as data recording.</td>
<td>![Simple O&amp;M Icon]</td>
<td>![Enhanced O&amp;M Icon]</td>
<td>![Advanced O&amp;M Icon]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Simple</th>
<th>Enhanced</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expertise required to utilize the data and apply it to energy management decisions.</td>
<td>![Simple Analysis Icon]</td>
<td>![Enhanced Analysis Icon]</td>
<td>![Advanced Analysis Icon]</td>
</tr>
</tbody>
</table>
Breakthrough Innovation in Remote Meter Data Analytics

1. **Minimal Data Inputs**
   - Building address
   - 1 yr electric interval meter
   - Local weather data
   - GIS Mapping/Semantic Search

2. **FirstFuel Meter Data Analytics**
   - Patent Pending RBA platform
   - No onsite visits or devices.
   - No building simulations or buildings “like” this one

3. **Deep Building Insight**
   - Annual Electric End-Use per SqFt
     - Miso-Electric
     - Plug Load
     - Pumps
     - Ventilation
     - Lighting

GSA
Using Analytics to Find and Realize Additional Savings in the Reagan Building
| **25 +75** | GSA building energy audits completed and reviewed with the building managers |
| **6** | Weeks to complete |
| **~1 billion** | kBTUs examined, both electric and gas |
| **~$4,500,000** | In savings identified |
| **50/50** | Split between low/no-cost operational and retrofit savings |
| **90%** | Savings to GSA vs. the cost of onsite audits |
| **8,760** | Hourly meter data points per building required to produce the analysis...all waiting in the GSA or utility databases |
| **0** | Number of onsite visits required |
GSA BuildingLink

TRIRIGA
- Energy data
  - Sparks/events
  - Weather data
- Asset information
  - BI (RETA/REXUS)
  - Time Series DB (SkySpark)
  - Schneider Ion (EEM)

SkySpark

Niagara Supervisor

GSA Building Systems Network

Buildings
- Vykon JACE 700
- Vykon JACE 700
- Vykon JACE 700

Building Management Systems
- Siemens
- Johnson Controls
- Schneider Electric

Sensors
Meters
HVAC
Lighting
Energy Savings Performance Contracts (ESPC) are contracts that allow agencies to procure facility improvements with no up-front capital cost and without special appropriations from Congress.

- An Energy Service Company (ESCO) conducts a comprehensive energy audit for the Federal facility and identifies improvements to save energy.
- In consultation with the Federal agency, the ESCO designs and constructs a project that meets the agency’s needs, incurs cost for implementing the project and arranges the necessary financing for the project.
- The ESCO guarantees the improvements will generate energy cost savings sufficient to pay for the project over the term of the contract.
- After the contract ends, all additional cost savings accrue to the agency. Contract terms of up to 25 years are allowed.
ESPCs are Budget Neutral

Project Costs Paid From Existing Utility / O&M Budgets
Key Points about Federal ESPCs

- Projects are Financed
- Savings guarantees are mandatory
  - Energy and water cost savings
  - Energy- (and water-) related cost savings (ex: O&M)
- Savings must exceed payments in each year
- Measurement and verification (M&V) is mandatory
- ESCO’s is often responsible for O&M
- Federally owned facilities worldwide
- Contract term cannot exceed 25 years
ESPC Contract Approaches

• DOE ESPCs are indefinite-delivery, indefinite-quantity (IDIQ) contracts awarded competitively to ESCOs by DOE-FEMP
  – Agencies negotiate and award task orders (TOs) for energy projects under the DOE IDIQ ESPCs (as under any multi-award contract)
  – WHY? To streamline and make as cost-effective as possible the use of ESPC by federal agencies

• Other approaches
  – Stand-alone or individual contracts
    • Business as usual: synopsis, solicitation, etc. Substantial agency effort required

• Other federal ESPC vehicles
  – Army Corps
  – GSA Schedule (Example: “ESPC ENABLE”)
## Energy Conservation Measures (ECMs)

Scope covers measures from A to Z:

<table>
<thead>
<tr>
<th>Measures</th>
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</thead>
<tbody>
<tr>
<td>Boiler and chiller plants</td>
<td>Renewable energy</td>
</tr>
<tr>
<td>Energy management control systems</td>
<td>Energy/utility distribution</td>
</tr>
<tr>
<td>Building envelope</td>
<td>Water and sewer</td>
</tr>
<tr>
<td>HVAC</td>
<td>Electrical peak shaving/load shifting</td>
</tr>
<tr>
<td>Chilled/hot water and steam distribution</td>
<td>Rate adjustments</td>
</tr>
<tr>
<td>Lighting</td>
<td>Energy-related process improvements</td>
</tr>
<tr>
<td>Electric motors/drives</td>
<td>Commissioning</td>
</tr>
<tr>
<td>Refrigeration</td>
<td>Advanced metering</td>
</tr>
<tr>
<td>Distributed generation</td>
<td>Appliance/plug load reductions</td>
</tr>
</tbody>
</table>
ECMs in ESPCs

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

ECM’s included in ESPC’s by investment (Source: John Shonder, Oak Ridge National Laboratory, 2011)
Phases of the ESPC Project

Phase 1 – Acquisition Planning

Phase 2 – ESCO Selection / Preliminary Assessment

Phase 3 – Investment-Grade Audit to Task Order Award

Phase 4 – Construction and Project Acceptance

Phase 5 – Performance Period
Why Do Agencies Use ESPCs?

- To fund energy improvements in absence of appropriations
- Bundle longer and shorter payback of Energy Conservation Measures
- To have Operations and Maintenance (O&M) included as part of package
- 16 ESCOs to choose from
- Take advantage of ESCO (and DOE FEMP) expertise
- To meet Federal Energy Goals (EO 13423 and EISA 2007)
- Because they deliver guaranteed improvements, savings, and performance.
GSA Utilization of ESPCs

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


The Federal Government shall enter into a minimum of $2 billion in performance-based contracts in Federal building energy efficiency within 24 months from the date of this memorandum.

GSA’s commitment is $175 million in improvements

GSA’s Strategy to Meet our Commitment

The National Deep Energy Retrofit (NDER) project is a pilot to see if we can attain deeper energy retrofits than are generally seen in ESPC projects.

NDER Project covers 32 facilities in 8 regions dispersed in 18 states/territories covering approximately 20 million s.f.

Additionally, five regions are doing independent ESPC/UESC projects, covering 75 buildings and over 21 million s.f.
High Priority Solutions from Boulder Charrette:

– Reduce time to contract award
– Redefine eligible savings
– Share risk
– Combine funding
– Multi-building projects, bundling
– Consider occupant behavior programs
In support of the GSA ESPC Effort:

- Created a Program Management Office (PMO) to:
  - Provide Guidance and capture Best Practices
  - Provide Subject Matter Experts to support regions during ESPC development
  - Provides quality assurance to regional ESPC contracting
  - Develop system to ensure essential EPSC administration during contract performance period

PMO membership includes Portfolio, budget, finance, energy team, contracting, and regional representatives and subject matter experts
National Deep Energy Retrofit - NDER

- 32 facilities
- 20 million square feet
  - Based on Preliminary Audits:
  - 38% average energy reduction (range 6 – 82%)
  - $127 million implementation cost
  - $15.5 million annual savings
Deep Energy Retrofit

Process Differentiators
- Building Owner Involvement
- Integrative Design
- Advanced Auditing, Modelling, LCCA
- Ongoing M&V
- Occupant Engagement

Results:
- Larger Energy Savings
- Improved Project Economics
Deep Retrofits with ESPCs

What drives “depth” of savings?
  – Current EUI of buildings
  – Energy prices
  – Something else

\[ S = k(P)(EUI) + \varepsilon \]

What factors into \( \varepsilon \)?
  – Number of ECMs available
  – Process for discovering ECMs?

Given that building \( P \), EUI are fixed, how do we maximize \( \varepsilon \)?
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
- Building Operations: $127 M
- Space Rental: $108 M
- Office of High Performance Green Buildings: $4.0 M
- Apprenticeship Program: $3.0 M
- High Performance Green Building: $4,274 M
- Full & Partial Building Modernizations: $3,168 M
- Limited Scope (Including Energy Projects): $806.9 M
- Small Projects: $298.5 M

Total Distribution: $5.55 B
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

CO, Grand Junction Wayne N. Aspinall Federal Building & US Courthouse

www.gsa.gov/portal/content/121123
History

Designed by Office of Supervising Architect - James A. Wetmore in 1915

Third floor addition in 1916

Original construction completed in 1918 @ $250K

1938 Expansion @ $216K

Named after Congressman Wayne N. Aspinall in 1972

Listed on the National Register of Historic Places in 1980
Utilizing Historic Resources
Interior Preservation

Restoration of lobby spatial experience and repurposing west portion as a tenant and visitor amenity.

Accurate recreation of historic lobby lighting fixtures based on Wetmore’s period designs.

Restoration of corridor character, spatial volume, and finishes including restoration of historic floors.

Create openness and continuity in upper floor circulation, reconfiguring the fire separation assembly separating elevator lobby and corridor.

Use of Conservator to identify historic finishes to inform restoration palette.

Avoidance of exposed infrastructure.
Historic Postal Lobby - 1939
Existing Interior Conditions

Current Conditions:

Poor Lighting
Window Coverings Limit Views Outside
Low Ceilings
Poor Ventilation and Filtration Conditions

Suspended Ceiling and Covered Up Windows
USACE’s Office
Existing Interior Conditions

Current Conditions:

 Poor First Impression  
 Historic 1st Floor Windows Covered  
 Poor Finishes  
 Poor Lighting

*Dropped Ceilings Covering Historic Windows*

*Lobby Reduced to a 15’ x 15’ Vestibule*
Existing Interior Conditions

Low Ceiling and Poor Daylighting
US Attorney’s Office
Interior Preservation

Source: WRL Design
Interior Preservation

Source: WRL Design
Project History

• Original Scope
  • $12-15 M project cost, 42,000 gsf
  • HVAC Life-Cycle Cost Analysis
    • 4-pipe FCU
    • WSHP
    • Air-source VRF
  • LEED Silver, 30% below

ASHRAE 90.1-2007
Sustainability Goals for the Wayne Aspinall Federal Building Modernization:

- Net-Zero Energy Building
- LEED Platinum
- Improved Indoor Environmental Quality and Thermal Comfort
- Water Use Reduction
- Use of Sustainable Construction Practices
- Effective Use of Technology
Leadership in Energy and Environmental Design

- LEED-NC v3.0 Platinum Target
- Project will meet all High-Performance Building Guiding Principles and ARRA Minimum Performance Criteria

<table>
<thead>
<tr>
<th>Category</th>
<th>Yes</th>
<th>Maybe</th>
<th>No</th>
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<tbody>
<tr>
<td>Sustainable Sites</td>
<td>21</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Water Efficiency</td>
<td>4</td>
<td>2</td>
<td>4</td>
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<td>Energy and Atmosphere</td>
<td>33</td>
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<td>2</td>
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<td>Materials and Resources</td>
<td>8</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Indoor Environmental Quality</td>
<td>13</td>
<td>0</td>
<td>2</td>
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<tr>
<td>Innovation in Design</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Regional Priority</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td>88</td>
<td>6</td>
<td>16</td>
</tr>
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</table>
What is a Net-Zero Building?

Renewable energy class:
- Class A – all production on the building
- Class B – adjacent to building
- Class C – biomass
- Class D – green power
The Net-Zero Design Process:

Participants:
1. Owner
2. Tenants
3. Construction Manager
4. Architects/Engineers
5. Commissioning Agent
6. Utility Company (xCCEL)
7. NREL and CBE
Compatible Treatments:

The roofline of a historic building is often a distinctive feature. Therefore, the installation of solar panels should conform to guidance regarding rooftop additions, i.e. that they be minimally visible, to avoid altering the historic character of the building.

Historic buildings with a flat roof or parapet can usually accommodate solar panels because the panels will be hidden, while properties with a hipped or gabled roof are generally not good candidates for a rooftop solar installation.

Solar panels on historic buildings should not be visible from the public right of way such as nearby streets, sidewalks or other public spaces.
Net Zero Approach – Initial Proposal

Provides 100% of the buildings energy requirements by use of a 140 kW photovoltaic array.

Meets 100% building’s hot water demand by use of solar thermal under the canopy at the building’s south parapet wall.

Secretary of Interior Standards

New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

Source: WRL Design
The Net Zero Energy addition will have minimal impact on existing materials and features. Careful architectural detailing and design work will be used to minimize the impact on the existing structure’s spatial relationship with the surrounding context. New materials will show a clear differentiation with the historic materials.

New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Approach: The Net Zero Energy addition has been approached as an additive process that will allow for its eventual removal without adverse impact on the historic property.

Canopy sits within the footprint of the building. Recognizes the light well of the north elevation.
Optimize Building Envelope:

Spray Foam Insulation
Interior Storm Windows with High Performance Solar Film
Upgrade to R-38 Roof Insulation
White Membrane Roof

Reduce Internal Loads

Design High Efficiency System

Match Building Load with On-site Renewable Energy

Source: WRL Design
Reduce Internal Loads:

- Energy Efficient Lighting
- Wireless Lighting Controls
- High Controllability of Lighting
- Increased Daylighting
- Graphical Display of Building Consumption
- Plug Load Reduction

Source: WRL Design
Effective Use of Technology – 100 W

Total PV array production: 176,995 kwh

Typical Office – Plug Load Breakdown

- Desktop: 407 kwh/yr
- Laptop: 96 kwh/yr
- CRT monitor: 220 kwh/yr
- LCD monitor: 132 kwh/yr
- Laser printer: 280 kwh/yr

Electrical Strip with Motion Sensor
Effective Use of Technology

Personal and Departmental Ownership of Energy Consumption

Much like the Toyota Prius, software packages allow tenants to view past and real time energy consumption of building.
Effective Use of Technology

Building Automation System (BAS)

- Electronic Direct Digital Control (DDC) system with new Operator’s Workstation
- BACnet compatible system
- Monitor, schedule and alarm MEP systems
- Advanced energy meters for electricity and water reporting via the BAS
- Lighting controls integrated into BAS system
- Demand controlled ventilation system utilizing CO2 sensors and DOAS
- Sub-metering of building resources and on-site generation
- Use of wireless technology to minimize impact on building
- GSA Smart Building Initiative
Advantages of Wireless Lighting Controls:
- Flexible placement of sensors
- Integrated with building automation system
- Occupancy sensors with solar cell
- High levels of controllability

Source: WRL Design
Design High Efficiency System:

- Water-Source Variable Refrigerant Flow (VRF) System
- Air Quality Monitoring
- Advanced Controls System
- Evaporative Cooling
- Airside Free Cooling

Plate and Frame Airside Heat Exchanger

Source: WRL Design
Geo-Exchange Concept:

Use the consistent temperature of the earth to provide heating, cooling and hot water.

Design:

32 vertical wells with well depth of 500 feet. Water pumped between heat pumps, water-cooled condensing units and well field. 25-ton evaporative closed circuit fluid cooler to balance energy in to/out of well field.

Source: WRL Design
Net Zero Approach – Reduced Canopy

Minimizes street views on the north, east and west elevations.

Places the photovoltaic canopy to the north elevation which is considered the “least prominent view”

Source: WRL Design
Solar PV Array Design

Optimize Building Envelope
Reduce Internal Loads
Design High Efficiency System
Match Building Load with On-Site Renewable Energy

Solar PV Array Concept:

- HIT Double 185 (228 Panels) – Blue
- HIT Power 205 (306 Panels) – Green

Front View
Back View
Stair Tower
Opening in PV Array
Dedicated Outside Air Handling Unit

Vertical PV Array
Opening in PV Array
Vertical PV Array
Estimated Energy Performance

- 64% improvement over ASHRAE 90.1-2007
- 106% on-site power generation
- 100% green power purchase – watch-it
Indoor Environmental Quality

Post Renovation Conditions:
1. Daylight and Views
2. Reduced Pollutants
3. Smart Building
4. Commissioning
5. IEQ Surveying - CBE

Wayne Airport Federal Building Modernization Pre-Renovation Thermal Survey

Instructions: please respond to the following questions to the best of your ability, based on your experience as a tenant in the Wayne Airport Federal Building. When you move back to the renovated building, we will ask you to complete this survey again. This information will be used to develop sustainable design case studies that will help shape modernizations of other historic properties across the United States and allow the teams to make adjustments to building systems for optimal comfort.

1. What is your tenant agency?
2. Which floor is your workspace located?
3. Which part of the building is your workspace?
4. Are you near an exterior wall that will be shaded?
5. Are you near a window (within 10 ft.)?

6. Which of the following does your control in your workspace check all that apply?
   - Windows blinds or shades
   - Room air conditioner
   - Portable heater
   - Permanent heater
   - Door to exterior space
   - Door to exterior space
   - Adjustable or non-adjustable
   - Curtains
   - Adjustable desk vent
   - Portable fan
   - Thermostat
   - Variable air volume
   - None

Please use this space to provide general comments about your workspace environment.
The Project Today

Re-dedicated in February 2013

www.gsa.gov/portal/content/163707
References and Resources

- Whole Building Design Guide [www.wbdg.org](www.wbdg.org)
- Sustainable Facilities Tool [www.SFTool.gov](www.SFTool.gov)
- Green Proving Ground [www.gsa.gov/gpg](www.gsa.gov/gpg)
- Notice of Opportunity was posted on March 20, 2012 [https://www.fbo.gov/index?s=opportunity&mode=form&id=4b0bad41db8c614459b21b0c015e3628&tab=core&cview=1](https://www.fbo.gov/index?s=opportunity&mode=form&id=4b0bad41db8c614459b21b0c015e3628&tab=core&cview=1)
- NDER Press Release [http://www.gsa.gov/portal/content/129983](http://www.gsa.gov/portal/content/129983)
- DOE FEMP ESPC IDIQ [http://www1.eere.energy.gov/femp/financing/espcs_doeescos.html](http://www1.eere.energy.gov/femp/financing/espcs_doeescos.html)