

**DEPARTMENT OF THE INTERIOR  
ANNUAL REPORT ON ENERGY MANAGEMENT  
FISCAL YEAR 2009**

This report presents the Department of the Interior (Interior) energy consumption data; progress toward meeting building energy reduction goal; and initiatives undertaken in fiscal year 2009 to comply with mandated energy requirements in accordance with the National Energy Conservation Policy Act, the Energy Policy Act of 2005 (EPAct 2005), the Energy Independence and Security Act of 2007 (EISA 2007), and Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*.

## **I. MANAGEMENT AND ADMINISTRATION**

### **A. Energy Management Infrastructure**

**1. Senior Agency Official.** The Assistant Secretary - Policy, Management and Budget is Interior's Senior Agency Official responsible for meeting the goals of EPAct 2005, EISA 2007 and EO 13423.

**2. Agency Energy Team.** Implementation of the Energy Management and Conservation Program within Interior is the responsibility of the Assistant Secretary - Policy, Management and Budget and is delegated to the Office of Acquisition and Property Management through the Deputy Assistant Secretary – Budget and Business Management. Interior's Energy Management Team consists of Senior Bureau Asset Management Officers who are responsible for managing Interior's real property assets. In addition, the Departmental Energy Conservation Committee (DECC), comprised of bureau representatives ranging from property management specialists to engineers, is a forum to communicate information regarding energy management and water conservation issues; discuss best management practices; and provide advice and recommendations to senior leadership on energy management initiatives and policies as well as guidance on bureau energy management operations.

Departmental organizations and bureaus with responsibility for energy and water management at Interior facilities include the following:

- Office of the Secretary, National Business Center (NBC);
- Bureau of Indian Affairs (BIA);
- Bureau of Land Management (BLM);
- Bureau of Reclamation (BOR);
- National Park Service (NPS);
- U. S. Fish and Wildlife Service (FWS); and
- U. S. Geological Survey (USGS).

## B. Management Tools

**1. Awards.** Interior bureaus take advantage of incentive programs to reward their exceptional employees. In addition, Interior actively participates in the Department of Energy's Federal Energy Management Program, "You Have the Power" awareness campaign, and the Federal Energy and Water Management Awards Program.

Six Interior projects were recipients of the Department of Energy's FY 2009 Federal Energy and Water Management Awards:

- ***BIA's Southwest Indian Polytechnic Institute (SIPI) Photovoltaic Roof Project*** in Albuquerque, New Mexico, received an Organization Award for Renewable Energy. The 70 kilowatt building integrated photovoltaic roofing system on SIPI's gymnasium offset its overall annual electricity consumption by an estimated 127 megawatt hours saving \$7,620 annually. This is the largest photovoltaic system in New Mexico. In addition, under the school's renewable energy curriculum, this new photovoltaic system allows the students to monitor its renewable electricity generation as well as the system's operations and maintenance.
- ***FWS' Rapids Lake Education and Visitor Center, Minnesota Valley National Wildlife Refuge***, in Minnesota, received a Small Group Award for Sustainable Design/High Performance Buildings. Key energy performance features of the building include the 24-ton ground-source geothermal system, high efficiency lighting, occupancy sensors and daylighting sensors, low-e glass, super insulated exterior envelope, waterless urinals, a "fire-proof" standing seam metal roof, cement board siding, and numerous other sustainable features. Building performance is expected to be 60 percent better than the American Society of Heating, Refrigeration, and Air Conditioning Engineers energy code requirements, which results in annual energy and cost savings of 122 megawatt hours and \$10,400, respectively.
- ***FWS' Ohio River Islands National Wildlife Refuge Administration Building and Visitor Contact Facility***, in West Virginia, received a Small Group Award for Sustainable Design/High Performance Buildings. The building utilizes a ground source heat pump system which provides 27.3 Million BTUs of renewable energy to the facility each year. Designers took a whole-building approach to sustainability with extensive use of regional, recycled, low-emitting, and non-toxic materials. These features resulted in an annual energy savings of 29,400 kilowatt hours and cost savings of \$1,840.
- ***NPS' Blue Ridge Parkway Destination Center*** in Asheville, North Carolina, received an Organization Award for Sustainable Design/High Performance Building. This building was certified as a LEED Gold facility. The passive solar Trombe walls harness the sun's energy in winter and night cooling in summer (generating 128.5 MMBTU annually) while 100% of the purchased energy (94 megawatt hours purchased for electricity only) is from green sources. A 10,000-square-foot green roof is planted with native, drought tolerant plants. On-site cisterns are utilized to

capture rainwater for landscape irrigation. All materials were made in the USA, and many were found within a 500 mile radius. Annual energy and cost savings were 285 megawatt hours and \$24,410, respectively.

- ***NPS' Lassen Volcanic National Park Visitor Center*** in Redding, California, received a Small Group Award for Sustainable Design/High Performance Building. This building was recently certified by the U.S. Green Buildings Council as a LEED Platinum facility. Numerous sustainability features have been incorporated into the facility including a 30 kilowatt photovoltaic system, a 10 ton ground source heat pump in addition to the purchase of renewable energy, super insulation, daylighting, dual flush toilets and waterless urinals, low emitting and high recycled content materials, LED exhibit lighting and other energy efficient features. Annual energy cost savings at Lassen Visitor Center is \$14,700.
- ***USGS' John W. Powell National Center*** in Reston, Virginia, received a Small Group Award for Water Conservation. The National Center's facility management personnel implemented various water conservation projects that resulted in a savings of 2.9 million gallons of water, or 14.4 percent, as compared to FY 2007. In addition, FY 2008 water costs were reduced by \$21,700, or 25 percent of annual water costs. These projects include a closed-loop cooling water retrofit for laboratory test equipment, a low-flow plumbing fixture replacement, landscape irrigation modification, cooling tower process improvements and cafeteria sustainability measures.

In addition, the Interior's Energy and Transportation Management team received a Presidential Award for Leadership in Federal Energy Management for exceeding the goals established in Executive Order 13423; specifically, reducing energy intensity, using renewable energy, reducing water intensity and reducing petroleum use in covered fleet.

Interior's Environmental Achievement Awards recognize exceptional achievements that conserve our Nation's natural resources, including energy and water conservation projects as well as on-site renewable energy projects. The FY 2009 Interior Environmental Achievement Awards Program recognized the following projects:

- ***NPS' Eielson Visitor Center, Denali National Park and Preserve***, Alaska, received a DOI Environmental Achievement Award for Sustainability. This building was recently certified by the U.S. Green Buildings Council as a LEED Platinum facility. This high efficiency building utilizes photovoltaics, daylighting, and recycled content material throughout. It provides educational kiosks which focus on climate change issues and sustainability.
- ***USGS' Great Lakes Science Center***, Ann Arbor, Michigan, was recognized as a High Performance, Sustainable Building. An Energy Savings Performance Contract was implemented to improve energy and water consumption at the Science Center. These improvements include the replacement of the heating, ventilating, and air conditioning system with a ground source heat pump, retrofitting existing lighting,

and installing low flow water fixtures. This resulted in a 60 percent reduction in energy consumption and a 37 percent reduction in water consumption.

- ***NPS' Marsh-Billings-Rockefeller National Historic Park, Forest Center*** in Woodstock, Vermont, received a honorable mention under the High Performance/Sustainable Buildings category. This building was recently certified by the U.S. Green Buildings Council as a LEED Platinum facility. The facility incorporates both photovoltaics and biomass heating. The Center serves as a classroom, meeting, and interpretative space to promote sustainability issues and green design.

**2. Performance Evaluations.** Interior recognizes the Energy Management Program responsibilities of facility managers, energy managers, designers, and senior leadership through the identification and incorporation of their responsibilities in performance evaluations and position descriptions.

**3. Training and Education.** In FY 2009, energy management training was provided for 556 appropriate personnel. Events such as the BLM-sponsored Energy Summit and GovEnergy 2009 contributed greatly to educating Interior's energy managers, field personnel, and contracting officers. In addition, Interior energy managers provided information to personnel on available energy management training, and encouraged them to attend as much training as operational requirements and funding permitted. Energy managers involved in building energy efficiency and water conservation have attended training and workshops offered by DOE's Federal Energy Management Program (FEMP). Several personnel have also attended training offered by other organizations such as the Office of the Federal Environmental Executive, the Environmental Protection Agency (EPA), the Association of Energy Engineers, American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), U.S. Green Buildings Council (USGBC), and public utilities; on topics such as green power purchase, the Leadership in Energy and Environmental Design (LEED) rating system, building insulation advances, and water conservation. Interior energy personnel attended on-site training and satellite broadcasts of FEMP courses on meeting ASHRAE sustainable performance and design requirements, metering technologies, power purchase agreements, energy saving performance contracts, and utility energy savings contracts.

Energy management training and awareness presentations were conducted at BOR Denver offices for energy coordinators. Presentations included energy management requirements, scorecard, utility energy service contracts, renewable energy strategies, and completing the bureau's annual energy report.

In FY 2009, one Interior employee attained accreditation as a Certified Energy Manager.

Energy managers disseminated relevant information concerning emerging technologies, alternative means of financing, and energy efficient practices; and developed employee outreach programs to educate building occupants about energy and water management programs.

## II. ENERGY EFFICIENCY PERFORMANCE

### A. Energy Intensity Reduction Performance

**1. Goal Subject Buildings.** The Energy Independence and Security Act of 2007 established the FY 2009 energy intensity reduction goal of 12 percent relative to the FY 2003 baseline for goal subject buildings.

In FY 2009, Interior's goal subject building energy consumption was **73,727 Btu per gross square foot** without the renewable energy purchase credit. This represents a total reduction in energy consumption per gross square foot of 21 percent relative to a revised FY 2003 baseline. The FY 2003 baseline was revised after review and correction of BLM, BOR, and FWS energy consumption and gross square footage data. Interior's revised FY 2003 energy intensity baseline is 93,563 Btu per gross square foot. A corrected FY 2003 energy intensity baseline spreadsheet is included in the attachments. Interior received credit for purchases of 151 billion Btu of renewable energy for its goal subject buildings, which lowered the energy intensity of these facilities from 73,727 Btu per gross square foot to 71,458 Btu per gross square foot. This represents a 23 percent reduction relative to the FY 2003 baseline.

**2. Excluded Facilities.** In accordance with "*Guidelines Establishing Criteria for Excluding Buildings from the Energy Performance Requirements of Section 543 of the National Energy Conservation Policy Act, as amended by the Energy Policy Act of 2005*", Interior has categorized energy usage primarily from pumps, aerators, fish feeders, hatchery production, exterior lighting and security at FWS facilities as an "assumed exclusion of structures and processes not qualified as Federal buildings." These energy processes do not have an associated building gross square footage and will significantly skew building energy usage. In addition, these processes are driven by mission and operational requirements. In previous reporting years, this energy consumption was reported in Table 1-3 classified as 'Other Equipment.' In FY 2009, this energy consumption, 526.2 billion Btu, is reported in Table 1-2, Goal Excluded Facilities. The revised FY 2003 baseline also incorporates this change. A complete listing of excluded facility processes is included in the attachments. A revised FY 2008 Energy Data Report will be submitted to establish the appropriate greenhouse gas emissions baseline.

**3. Non-Fleet Vehicle and Equipment Fuel Use.** In FY 2009, Interior used 3.58 million gallons of auto gasoline, diesel, and propane for use in vessels, heavy equipment, standby generators, all terrain vehicles, blowers, mowers, outboard motors, and other small equipment not reported on-line via GSA's Federal Automotive Statistical Tool (FAST). A total of 722,000 gallons of aviation gasoline and jet fuel were used.

### B. Renewable Energy

Interior is dedicated to fulfilling the renewable energy goals of the EAct 2005 and EO 13423 by purchasing and generating electricity from renewable sources. In FY 2009, Interior used 58,227 megawatt hours of renewable electricity from self-generation and through renewable electricity purchases and credits. This represents 8.1 percent of Interior's total

facility electricity use and exceeds the EAct 2005 goal of 3 percent of facility electricity use. Of the 8.1 percent, 2.2 percent represents on-site renewable energy generation; 3.4 percent represents renewable electricity purchased through the utility company; and 2.5 percent represents the purchase of renewable energy certificates. The use of on-site renewable energy sources is encouraged if the development of the resource is economically, environmentally, and technically feasible.

**1. Self-Generated Renewable Energy.** Interior has implemented 2,001 on-site renewable energy projects including stand-alone and grid connected photovoltaic systems, solar thermal (hot water) projects, geothermal (ground source) heat pumps, incremental hydropower, and wind projects. During FY 2009, Interior bureaus continued to inventory and update their respective on-site renewable energy components. The bureaus' efforts in gathering the information for this inventory and resultant renewable energy generation contributed tremendously toward meeting the renewable energy consumption goal.

According to the DOE Renewable Energy Guidance, "new" renewable energy is from projects placed in service after January 1, 1999. Under this definition, Interior has a total of 676 "new" renewable electricity projects, which include 644 solar projects, 4 incremental hydropower upgrades, and 28 wind projects. These "new" projects generate 6,761 megawatt hours of electricity. Interior has 1,049 "old" renewable electricity projects, placed in service prior to January 1999, which generate 2,180 megawatt hours of electricity.

The following new renewable electricity projects were implemented or studied in FY 2009:

BLM completed the installation of a 5 kilowatt grid connected photovoltaic system at the *Vale District Office* in Oregon. A 3.4 kilowatt grid connected photovoltaic system was installed at the *Wild Horse Corral* in Hines, Oregon. Solar powered well water pumps were installed at various locations throughout Oregon.

BOR recently purchased and began installing photovoltaic streetlights at the *Dale Street Complex* in Boulder City, Nevada. Two of the 13 lights were installed in FY 2009. The remaining fixtures will be installed in FY 2010.

In FY 2009, FWS installed photovoltaic systems at the *Bosque del Apache National Wildlife Refuge*, New Mexico. A 6 kilowatt array was installed on the fire shop, and a 12 kilowatt array was installed on the farm maintenance shop. In addition, 3 solar hot water heaters were installed on Quarters 1 and 3, and the Volunteer Lounge. Two 6 kilowatt photovoltaic systems were completed at the Fire Cache, the Fire Vehicle Storage Building and Office at the *Buenos Aires National Wildlife Refuge* in Arizona. These systems are grid connected. Three solar powered pond aerators were installed at the *Inks Dam National Fish Hatchery*, Texas, to replace diesel powered paddlewheels. A 32 kilowatt photovoltaic system was installed at the *Visitor Center Headquarters, Parker River National Wildlife Refuge*, Massachusetts.

NPS installed an 18 kilowatt photovoltaic system at the *Grand Canyon South Rim Visitor Center*, Arizona. This system will offset 30 percent of the Visitor Center's electricity use. In

addition, this system will provide visitors with a unique opportunity to learn about clean energy alternatives. A monitor will allow them to watch in real-time how much electricity the sun is generating for the Visitor Center. A 6 kilowatt photovoltaic system was installed at the *Crystal Cave, Sequoia and Kings Canyon National Park*, California. In addition, lights in the cave were replaced with LED technology, reducing power needs and inhibiting plant growth around the lights. The University of Washington and the *Klondike Gold Rush National Historic Park*, Washington, have partnered to conduct an energy audit at the park and install a 3 kilowatt photovoltaic system. The University of Akron and *Cuyahoga Valley National Park*, Ohio have partnered to conduct an energy audit and install a 2 kilowatt wind turbine at the park's Energy Center campus.

USGS has used photovoltaics in several small projects including photovoltaic outdoor lighting, emergency call boxes, and remote river gaging stations. Approximately 10,000 gaging stations are powered by photovoltaics. The *Florida Integrated Science Center* in Gainesville, Florida, recently completed the installation of a 5 kilowatt photovoltaic system as part of an energy savings performance contract.

Under DOE's definition of renewable thermal energy, Interior has implemented 276 geothermal heat pumps, solar hot water heaters, solar ventilation air preheating, and biomass heating systems. These non-electric renewable energy systems generate over 12.8 billion Btus; 103 projects are considered "new" renewable energy projects and generate 7.1 billion Btus.

BOR replaced a coal burning heating system at the *McClusky Field Office*, North Dakota, with three 6-ton geothermal heat pumps significantly reducing greenhouse gas emissions associated with coal.

**2. Purchased Renewable Energy.** Interior continues to purchase energy from renewable sources. In FY 2009, Interior bureaus purchased a total of 42,678 megawatt hours of renewable energy from utility providers and through renewable energy certificates.

BIA, BLM, NPS, and USGS purchased 18,000 megawatt hours of renewable energy certificates.

BLM continued to purchase wind-generated renewable energy for its *Moab Field Office*, Utah, as well as for the *Escalante Science Center*, Utah, during FY 2009. These purchases were made under the Blue Skies Program offered by Utah Power and Light.

BOR and USGS purchased 31.3 million Btu of geothermal heat at the *Snake River Area West* office building in Boise, Idaho. The geothermal heat (purchased hot water) is the primary heating source for several buildings on campus.

The National Business Center purchased 15,884.3 megawatt hours of renewable electricity through a GSA area-wide contract from landfill gases and wind-generated power, which provided 100 percent of the *Main Interior Complex's* electricity.

Twenty eight National Park units purchased 8,795 megawatt hours of renewable energy from their utility companies. Most notably: the *National Mall*, Washington, DC; *Grand Teton National Park*, Wyoming; *Rocky Mountain National Park*, Colorado; *Mesa Verde National Park*, Colorado; and *Badlands National Park*, South Dakota.

### C. Water Conservation

EO 13423 established the FY 2009 water intensity reduction goal of 4 percent relative to the FY 2007 baseline. In FY 2009, Interior reported potable water consumption of 3,887 million gallons at a cost of \$17.5 million. This established Interior's FY 2009 water intensity at **60.6 gallons per gross square foot**, which represents a 5.7 percent reduction relative to a revised FY 2007 baseline. The FY 2007 baseline was adjusted after a review of water consumption activities within BOR, FWS, and NPS. The revised FY 2007 water intensity baseline is 64.2 gallons per gross square foot. Updated water use intensity data and cost for FY 2007 is provided in Table 1-9A of the attachments.

Potable water use includes water used for drinking, bathing, toilet flushing, laundry, cleaning, food services, watering of landscaping, and process applications such as cooling towers, boilers, and building fire suppression systems. This does not include water use for agricultural irrigation, wildland firefighting, wetland reclamation, hatcheries, or wildlife production and research purposes. These processes, which are integral components of Interior's mission, are heavily dependent on the weather and other parameters outside Interior's control. The associated water use from these processes can vary significantly from year to year, which tends to make traditional water conservation efforts ineffective.

Interior continues to design and install low-flow or ultra low-flow plumbing fixtures in all new facilities. Landscaping design and construction has emphasized the use of native plant species, minimization or elimination of artificial irrigation, and maximizing efficiency of necessary irrigation through the use of drip systems, precipitation detection systems, and optimal timing. Public information related to drought and water conservation is available at many facilities and is recognized as a Best Management Practice in the FEMP guidance.

BIA is auditing water consumption in BIA facilities and placing a major focus on conservation in lavatories and kitchen fixtures in its schools, dormitories, and detention centers.

BLM performed water audits at 67 facilities that will implement water conservation measures as part of its ongoing energy savings performance contract. BLM continues its efforts to screen all facilities through study of water meter records for the year.

BOR installed low flow water fixtures, including waterless urinals at the restrooms of the *Oak Shores Day Use Area*, Lake Berryessa, California. A flow meter, auto-shutoff, and main valve shutoff were installed at the *Lower Colorado Region* office building complex to reduce water consumption for lawn irrigation.

In FY 2009, FWS completed water line repairs at the *Mattamuskeet National Wildlife Refuge*, North Carolina; *Pocosin Lakes National Wildlife Refuge*, North Carolina; *Cameron Prairie National Wildlife Refuge*, Louisiana; *John Heinz National Wildlife Refuge*, Pennsylvania; and *Sand Lake National Wildlife Refuge*, South Dakota. Water improvement projects were completed at the *Carson National Fish Hatchery*, Washington; low flow fixtures were installed at the newly constructed Office Complex at *Dungeness National Wildlife Refuge*, Washington. Recent upgrades of the restrooms at the *Santa Anna National Wildlife Refuge*, Texas; and *Wichita Mountain National Wildlife Refuge*, Oklahoma; included the installation of low flow water fixtures and instantaneous water heaters.

NPS' *Wilson Creek Battlefield*, Missouri, retrofitted its restrooms with waterless urinals and automatic faucets to save the park an estimated 10,000 gallons of water annually. Water conservation technologies are routinely incorporated into facility improvements and renovations.

#### **D. Metering of Electricity Use**

Interior bureaus are making progress in identifying and installing electric meters in all appropriate buildings by October 2012.

Interior issued Electric Metering Implementation Guidance in March 2006, which supplemented the DOE's Guidance for Electric Metering in Federal Buildings. It established criteria to determine where installation of meters would be cost effective and practicable. The Interior guidance is flexible in order to accommodate the diverse missions of the bureaus, yet provides a solid framework for Interior-specific information to be included in the bureau Electric Metering Implementation Plans.

Interior bureaus continue to review building and energy consumption databases and conduct site visits to identify existing building metering systems and buildings appropriate for new metering. Interior has identified 9,615 appropriate buildings. This includes buildings currently metered for electricity with both standard and advanced metering systems and buildings where the annual electricity cost exceeds \$40,000. In FY 2009, 7,438 buildings were reported as individually metered for electricity, which is approximately 77 percent of the appropriate buildings. Metering systems are being installed through new construction and major renovations, energy savings performance contracts and utility company upgrades.

#### **E. Federal Building Energy Efficiency Standards**

Interior requires all new building designs to comply with the Federal Building Energy Efficiency Standards of Section 109 of EPA Act 2005. This standard requires buildings to be designed to achieve energy consumption levels that are at least 30 percent below the levels established in the 2004 90.1 ASHRAE Standard or the 2004 International Energy Conservation Code (IECC), as appropriate, if life cycle cost effective.

One hundred twenty one new building designs were initiated after October 1, 2006. The complete list is included in the attachment. Fifty three building designs achieved or

exceeded the ASHRAE or IECC building performance standards. Sixteen building designs achieved the highest level of energy efficiency that was life cycle cost effective. The remaining 52 building designs are ongoing, with building energy consumption to be determined, but will design to achieve the maximum level of energy efficiency that is life-cycle cost-effective.

The National Renewable Energy Laboratory provided technical assistance to enhance the design of BIA's *Nazlini Community School Fire Station*, Nazlini, Arizona, to be a net zero energy building. The Nazlini Fire Station will optimize energy efficiency and utilize an on-site 10 kilowatt photovoltaic system and natural gas as its energy sources. The construction contract was awarded in the fourth quarter of FY 2009. Building commissioning, weather monitoring, photovoltaic electricity generation, and energy consumption will be monitored to assess building performance. If successful, the resulting net zero energy fire station design could be replicated at subsequent fire station sites.

### III. IMPLEMENTATION STRATEGIES

#### A. Life Cycle Cost Analysis

Interior utilizes life-cycle cost analysis in making decisions about investments in products, services, construction, and other projects to lower costs and to reduce energy and water consumption.

Interior actively manages a portfolio of construction capital investments in order to maximize the return on investment to the taxpayer and Government at an acceptable level of risk. Interior's Asset Management Plan outlines the process whereby Interior is moving from a current reliance on a project-based review process to a life-cycle, asset-based portfolio management process. Effective capital planning within Interior requires improved long range planning and a disciplined budget process as the basis for managing a portfolio of assets to achieve performance goals and objectives with minimal risks, lowest life cycle costs, and greatest overall benefits to the business of the bureaus and the Department.

Interior has developed and continues to refine its approach to establishing a more consistent, structured, performance-based, integrated approach to its Construction Capital Planning Investment Control (CPIC) process. As Interior's portfolio-based approach matures, the Department and the bureaus will continue to improve their ability to manage risks and returns of capital assets throughout their life cycles necessary to ensure that Interior's investments are well conceived, cost-effective, and support strategic mission and business goals. The analysis of these investments is a living tool that will be continually revisited, refined and updated. It is articulated in a business case, the extent of which is commensurate with the cost and impact of the investment on the organization and mission.

## B. Retrofits and Capital Improvement Projects

In FY 2009, Interior implemented \$9.493 million in facility energy and water efficiency improvements through direct obligations, and \$1.05 million through energy saving performance contracts, which accounts for 9.5 percent of facility energy costs.

BIA completed energy and water evaluations with retro-commissioning at four school campuses in FY 2009, which include *Flandreau Indian Boarding School* in South Dakota, *Nay-Ah-Shing School* and *Fond du Lac Ojibwe School* in Minnesota, and *Hannahville Indian School* in Michigan. These evaluations and retro-commissioning identified many energy saving improvements that can be implemented at the sites, including scheduled equipment maintenance, improvements in building envelopes, lighting retrofits, and installation of occupancy and water pump sensors. The use of alternative energy was also assessed at these locations, but was ruled out due to the initial costs of installing ground source heat pumps and limited wind and solar resources.

In FY 2009, BLM completed the construction of the *California Trails Center*, near Elko, Nevada. Many sustainable features have been incorporated in the building including ground-source heat pumps, occupancy sensors, low-flow plumbing fixtures, and an elevated water tank and gravity-feed to the structure, thereby avoiding the need for emergency generators and fire pumps in the event of a power outage. Construction continues on the *Red Rock Visitor Center Redevelopment* at Red Rock Canyon National Conservation Area outside of Las Vegas, Nevada. A 10 kilowatt photovoltaic array and solar water heating will be showcased to the expected 1,000,000 visitors to the site. Reclaimed water for use in flushing toilets and landscape irrigation has been incorporated. Design Development continues for BLM's *Mojave Discovery Center* (located adjacent to the Red Rock Visitor Center Redevelopment) at Red Rock Canyon National Conservation Area outside of Las Vegas, Nevada. A 10 kilowatt photovoltaic array will provide power as well as provide an example/opportunity to interpret the use of renewables for the visitors. Construction is underway for the new LEED Gold *Fillmore Field Office*, Utah. The building will utilize tubular skylights for daylighting, a transpired solar wall for pre-heat of ventilation air, as well as a photovoltaic array to net meter/offset power usage. Construction will begin in FY 2010 on the *Farmington Field Office*, New Mexico. This facility is designed to be certified at the LEED Gold level.

BOR installed energy efficient windows and a new roof with increased insulation at the *Provo Area Office*, Utah. A lighting retrofit was completed at the *Yuma Area Office*, Arizona, and a computerized lighting management system was implemented at the *Phoenix Area Office*, Arizona. The heating, ventilating, and air conditioning system was upgraded and an improved control system installed at the *Lower Colorado Region Annex Building*, Nevada.

In FY 2009, FWS implemented energy projects at 94 field stations. A sampling of these projects includes the replacement of a 25 ton water chiller system at the *North Attleboro National Fish Hatchery*, Massachusetts, to a higher efficiency model. ENERGY STAR® heat pumps, appliances, office equipment, lighting, and computer monitors were purchased and installed at the *Eastern Shore of Virginia National Wildlife Refuge*, Virginia. A

tankless hot water heater was also installed. Reflective roofing was installed on the Aquarium building and Lake Sturgeon building at **Warm Springs National Fish Hatchery**, Georgia. This replacement roofing resulted in a 13 percent reduction in energy use. A new heating, ventilating, and air conditioning system, and direct digital control system was installed at the **DeSoto National Wildlife Refuge**, Iowa. New administrative buildings were completed at the **Dungeness National Wildlife Refuge**, Washington, which included many energy efficient features such as high efficient lighting, heat pumps, and low flow water fixtures. Twenty eight energy audits were conducted at various FWS field stations.

NPS **Mount Rainier National Park**, Washington, completed the replacement of the Paradise Visitor Center with an updated, energy efficient building. This new building is one third the size of the former building and is expected to save over 70 percent in energy costs. **Rocky Mountain National Park** installed sun tubes to increase daylighting in numerous buildings, installed ENERGY STAR® appliances and tankless water heaters, and continued to switch from incandescent and T-10s to T-8s and compact fluorescent lamps. **Chickamauga & Chattanooga National Memorial Park** replaced the boiler and large heating, ventilating, and air conditioning unit in the administrative offices with high efficiency units.

USGS **Columbia Environmental Research Center**, Missouri, retrofitted the lighting in the main building corridors with T-8 fixtures. A water saving project removed six concrete raceways and replaced with smaller plastic tanks. **Yankton Field Station**, South Dakota, replaced the evaporator coils for the heating, ventilating, and air conditioning system. **Earth Resource Observation Sciences Center**, South Dakota, completed a lighting retrofit project which is expected to save over 4,000 kilowatt hours with a simple payback of 3.6 years. The **National Wetlands Research Center**, Louisiana, has increased its energy efficiency with a heating, ventilating, and air conditioning project by replacing supply actuators, reconnecting and calibrating return air actuators, installing variable frequency drives, calibrating thermostats to damper actuators, and insulating condenser lines to prevent line losses. These improvements and balancing of the system created an immediate savings of 15 percent in energy demand. **Idaho Water Science Center**, Idaho, installed a tankless water heater, and conducted a pilot project to retrofit the lighting from T-8 lamps to new LED lamps. This pilot project is a collaborative effort by USGS, BOR, and Idaho Power. The **Western Fisheries Research Center**, Washington, renovated the hot process water system by replacing PVC schedule pipe with stainless steel, and added a control valve on the heat exchanger to reduce the demand on the boiler loop. This resulted in a reduction in the facility's natural gas consumption.

In addition to stimulating the economy and maximizing job opportunities with the enactment of the American Recovery and Reinvestment Act of 2009 (ARRA), the Secretary of the Interior established project selection criteria to include the implementation of energy efficient improvements and on-site renewable energy components. DOI bureaus responded to this selection process by incorporating sustainable practices, including the use of renewable energy components, energy improvements, metering, and facility auditing in ARRA deferred maintenance and construction projects. Bureaus are utilizing conventional acquisition and performance contracts to execute these projects. The majority of these energy and renewable

energy projects will be obligated in FY 2010. Approximately \$126 million is planned for FY 2010. Notable projects include:

BIA's ***Crow Creek Tribal Replacement School***, South Dakota, will support 378 academic students in grades K-12, including 100 residential students in grades 1-12. The new facilities will be designed using Leadership in Energy and Environment Design (LEED) Silver guidelines and green building products, and to the greatest extent possible, will conserve water and energy resources. Approximately 18 old buildings will be removed from the Indian Affairs facility inventory.

NPS' ***Yellowstone National Park*** plans to construct a micro-hydro facility at ***Mammoth Hot Springs***, Wyoming. Yellowstone has a tradition of using clean energy, dating back to 1911 when it installed a Pelton water wheel to generate power from the existing water supply infrastructure at Mammoth Hot Springs. While the original system is defunct, recent studies have determined that a new micro-hydropower system could once again provide clean energy to the Park. A new 115 kilowatt hour micro-hydropower system would be installed in the area's existing water supply infrastructure.

BLM's ***Empire Ranch Complex***, Arizona, will install solar power systems for five buildings within the complex: The Vail House, Tack Room, Huachuca House, Field Station and Garage. The systems will be sized using net-zero energy principles and will connect to the existing utility grid through the electrical service meter.

FWS' ***Izembek National Wildlife Refuge***, Alaska, will install helical wind turbines to supply electricity to the Refuge's housing area. ***Willow Beach National Fish Hatchery***, Arizona, will improve facility energy efficiency by retrofitting lights, increasing insulation, installing programmable thermostats, and replacing windows and appliances.

USGS' ***Columbia Environmental Research Center***, Missouri, will demolish nine buildings in poor condition and construct a single, efficiently designed, state-of-the-art office and laboratory. LEED Silver certification is targeted to ensure the constructed asset is an efficient sustainable structure that encompasses current technologies in air handling, climate control, electrical distribution, lighting and water distribution to achieve maximum efficiency. Construction materials will consist of recycled and renewable source materials to the maximum extent practicable. The ***National Wildlife Health Center*** (NWHC), Wisconsin, is participating in an Energy Savings Performance Contract (ESPC) with DOE. The NWHC is using ARRA funding to support very specific energy conservation measures (ECMs). The seven specific ECMs that will be funded by ARRA are: two lighting projects, two exhaust fan replacement projects, replacement of three furnaces and one boiler, replacement of four air handlers, and replacement of building control systems. The value of the ECMs is estimated to be approximately \$6.5 million. NWHC will also address other energy related projects and finance them through energy savings. Potential projects that might be funded with energy savings are replacement or repair of an existing hot water solar system, replacement of old chillers and air conditioning systems, replacement of waste treatment controls, replacement of cooling towers, and installing a photovoltaic solar array on Main Building.

## C. Use of Performance Contracts

**1. Energy Savings Performance Contracts (ESPC).** BLM began using ESPC in FY 2006 for a pilot project with Johnson Controls, Inc., at the *National Interagency Fire Center* and *BLM's Boise District Complex*, Idaho. BLM awarded Phase Two of the ESPC task order for 105 facilities across six States in FY 2007. The 3<sup>rd</sup> phase of ESPC work had been scheduled to commence in the 1<sup>st</sup> quarter of FY 2009. BLM received several go/no-go letters from DOE and ultimately wound up having to utilize the new DOE ESPC IDIQ contract, which required an all new advertisement and selection. Eight ESCO's expressed interest, submitted proposals and were interviewed for BLM's 3<sup>rd</sup> phase of ESPC work. Ultimately, Johnson Controls was selected in May 2009 and project development commenced in July. BLM is still finalizing its Interagency agreement with DOE for project facilitation support. It is anticipated that the phase 3 Investment Grade Audit will be submitted in February 2010, and negotiated and awarded by April 30, 2010. This project phase will improve facilities in Alaska, Arizona, California, New Mexico, Texas, and Utah.

In FY 2009, USGS completed energy improvements at the *Great Lakes Science Center*, Michigan, through an ESPC. The major improvements for the project include installation of a geothermal heat pump system for heating and cooling; installing a building automation system to ensure efficient building operation; and lighting retrofits. The ECMs are projected to reduce the energy consumption by 30 to 35 percent. The total estimated project cost is \$1.5 million. The USGS avoided \$400,000 in emergency repairs for the old cooling towers and an additional \$2.3 million in deferred maintenance and capital improvement project costs. An ESPC was awarded and completed at the *Florida Integrated Science Center*, Florida. The major ECMs for the project include installation of heating, ventilating, and air conditioning and control systems; installation of energy efficient lighting; installation of a new energy efficient white roof; and a 5 kilowatt photovoltaic system. The ECMs are projected to reduce the Science Center's energy consumption by 37 percent. The total estimated project cost is \$1.053 million. The USGS avoided \$637,000 in deferred maintenance and capital improvement project costs.

**2. Utility Energy Savings Contracts (UESC).** In FY 2009, Washington Gas Light conducted an extensive energy audit at the *Main Interior Building*, Washington, DC. Final audit results are forthcoming.

The Tennessee Valley Authority conducted an energy audit at NPS *Great Smoky Mountains National Park*. Final audit results are forthcoming.

Preliminary discussions are being conducted with Pacific Gas and Electric to develop a project by bundling energy conservation improvement at National Parks in the San Francisco area.

FWS' *Patuxent Research Refuge*, Maryland, has initiated discussions with Washington Gas Light and PEPCO Energy Services.

## D. Energy Star and Other Energy-Efficient Products

Interior selects ENERGY STAR®, FEMP Designated, and other energy-efficient products when acquiring energy-consuming products. Energy efficient technologies include high-efficiency lighting and ballasts, exit signs, energy efficient motors, and the use of packaged heating and cooling equipment with energy efficiency ratios that meet or exceed Federal criteria for retrofitting existing buildings.

## E. Sustainable Building Design and High Performance Buildings

Interior is striving to be a government leader by implementing sustainability policies that meet or exceed EO 13423 and 13514 requirements and integrate the five Guiding Principles into the design, construction, operations, and maintenance of Interior-owned and leased buildings. Sustainable building design principles have been incorporated into the siting, design, and construction of Interior projects. Energy managers work closely with their engineers, architects, and design offices to address energy conservation retrofits and new building designs, and ensure that buildings comply with Federal energy laws and regulations. All cost effective, energy conservation opportunities are analyzed for consistency with resource management objectives. Energy conservation efficiency standards are included as an integral part of all engineering design and construction project technical specifications. In FY 2009, Interior finalized a draft of its Sustainable Buildings Assessment and Compliance Tool.

Interior has 18 LEED certified buildings:

- BIA *Baca Dlo'ay Azhi Community School*, Prewitt, Arizona – LEED Certified
- BIA *First Mesa Elementary School*, Polacca, Arizona – LEED Certified
- BIA St. Francis Indian Middle and High School, St. Francis, South Dakota – LEED Certified
- BIA Turtle Mountain High School, Belcourt, North Dakota – LEED Silver
- BLM *Escalante Science Center*, Escalante, Utah – LEED Gold
- BLM *Gateway III Office Tower* (leased), Salt Lake City, Utah – LEED Certified
- BLM *Rawlins Field Office*, Rawlins, Wyoming – LEED Gold
- FWS *Nulhegan Basin Administration Building and Visitor Contact Facility*, Silvio O. Conte NFWR, Brunswick, Vermont – LEED Silver
- NPS with the GSA *Carl T. Curtis Midwest Regional Headquarters*, Omaha, Nebraska – LEED Gold
- NPS *Blue Ridge Parkway Destination Center*, Asheville, North Carolina – LEED Gold
- NPS *Entrance Area Visitor Center*, Denali National Park, Alaska – LEED Silver
- NPS with Xanterra Parks and Resorts *Annie Creek Gift Shop*, Crater Lake National Park, Oregon – LEED Silver
- NPS *South Rim Maintenance and Warehouse Facility*, Grand Canyon National Park, Arizona – LEED Certified
- NPS with Xanterra Parks and Resorts *Employee Housing*, Yellowstone National Park, Montana – LEED Certified
- NPS Apgar Transit Center, West Glacier, Montana – LEED Gold

- NPS Eielson Visitor Center, Denali National Park, Alaska – LEED Platinum
- NPS Mill Complex, Forest Center and Wood Barn, Woodstock, Vermont – LEED Platinum
- NPS *Lassen Volcanic National Park*, Redding, California - LEED Platinum

Recent projects that are LEED registered or under development include:

FWS *Administrative Headquarters Building and Visitor Center*, Desert National Wildlife Refuge, Nevada, is currently under design with anticipated construction completion in FY 2011.

BIA projects for which LEED certification is a goal include *Pueblo Pintado School* in Cuba, New Mexico, *Crow Creek Tribal School*, South Dakota, *Rough Rock Community School*, Arizona, and *Kaibeto Boarding School*, Arizona.

BLM projects for which LEED certification is a goal include the *Kanab Field Office*, Utah, *Mojave Discovery Center*, Nevada, *Fillmore Field Office*, Utah, and the *Farmington Field Office*, New Mexico.

NPS projects currently under design, construction or have been registered for certification include the *Old Faithful Visitor Education Center* in Yellowstone National Park, Wyoming; *Beaver Meadows Visitor Center*, Colorado; *Mesa Verde Research and Museum Collection Center*, Colorado; *Twin Creeks Science and Education Center*, Tennessee; and the *Marina Service Building*, Cottonwood Cove, Nevada.

#### **F. Energy Efficiency/Sustainable Design in Lease Provisions**

All new building lease solicitations include a preference for buildings that meet the goals of the Guiding Principles, where applicable, in the selection criteria for acquiring leased buildings. Build-to-suit lease solicitations incorporate criteria for sustainable design and development, energy efficiency, and verification of building performance in accordance with the Guiding Principles.

LEED certification is being pursued on all new BLM leased facilities. The standard leasing solicitation has been revised in FY 2009 to require LEED certified facilities in addition to previous revisions to require energy efficient (T-8 or better) lamps and light fixtures in all interior and exterior lighting, use of occupancy sensors, and scheduled programmed controls or daylight dimming controls for all lighting applications. The provisions also contain glazing, cladding, and thermal break requirements for windows, as well as compliance with the International Energy Conservation Code. Green operational practices were also added to the standard leasing agreement.

#### **G. FEMP ARRA Technical Assistance**

In FY 2009, Interior received 5 DOE FEMP Technical Assistance projects with FEMP ARRA funding. These projects include: Support for Development of Large-Scale Projects

on DOI Lands, Strategic Green Energy Design for the Main Interior Complex in Washington, DC, Evaluate Renewable Energy Potential at Fish and Wildlife Service Facilities, Evaluation of Helix-Type Wind Turbine Technology at Quivera National Wildlife Refuge, Kansas, and Energy Audit of Grand Canyon National Park, Arizona. The results of these projects will be finalized in FY 2010.

