Interior Energy Management News

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Rising to the Challenge

Bureau Efforts Keep DOI Sustainable as Goals Increase

Sustainability, according to the Environmental Protection Agency, "creates and maintains the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations."[1] Harmony implies balance, but achieving this balance requires active management, forward thinking, and going above and beyond the status quo. Ensuring that the Department of the Interior (DOI) operates as sustainably as possible will therefore always be a challenge. DOI's bureaus and offices will have to be vigilant to maintain that balance between what they provide and what they protect. This issue of *Interior Energy Management News* focuses on these challenges and highlights the noteworthy responses of hardworking energy and facility managers across the Department.

Inside this Issue:

The issue features an overview of a National Renewable Energy Laboratory (NREL) audit of one of DOI's unique facilities, the Bureau of Land Management's Helium Plant. The Helium Plant by virtue of its operations is a major energy consumer. However, BLM has already done much to ensure that it operates as efficiently as possible. Also featured in this issue are several of the 2013 DOI Environmental Achievement Award Winners—each exemplifying a unit or an individual striving harder to make their operations more environmentally friendly.

All of this hard work is paying off and the numbers show it. DOI remains ahead of its targets in most areas of energy and water conservation and greenhouse gas (GHG) reduction, as demonstrated in the featured review of the Annual GHG and Sustainability Data Report. But the challenges keep coming. The White House has recently issued a new Presidential Memorandum that increases the target for renewable energy use by agencies and has set a new goal for agencies to increase their use of Energy Savings Performance Contracts. DOI must continue to meet these challenges to remain as sustainable as possible.

[1] http://www.epa.gov/sustainability/basicinfo.htm

Energy Conservation at the BLM Helium Plant

NREL Conducts Audit

The Department of the Interior is sometimes humorously referred to as the Department of Everything Else. From managing parks and refuges to developing energy resources to administering lands held in trust for American Indians, Indian tribes, and Native Alaskans, Interior's responsibilities are nearly as diverse as the nation it serves. DOI's inventory of assets is likewise diverse. It includes visitor centers, warehouses, dormitories, detention centers, and—a helium plant. The Bureau of Land Management (BLM) owns and operates a helium plant in Amarillo, Texas, extracting gases from the Bush Dome reservoir and processing them into crude helium. A helium plant is a major operation and, unsurprisingly, a major consumer of energy. BLM is taking steps to minimize the energy consumption and the environmental impact of its helium plant.

In striving to comply with Federal energy and greenhouse gas (GHG) reduction requirements, BLM requested the Department of Energy's National Renewable Energy Laboratory (NREL) to identify energy and water conservation measures (ECMs) and renewable energy opportunities at the helium plant. A team led by NREL conducted the assessment in September 2013.

As a facility that generates more than 25,000 metric tons equivalent of carbon dioxide (CO_2) per year, the helium plant is required to report on its GHG emissions to the Environmental Protection Agency. Approximately 75% of these emissions result from natural gas processing, including blowdown from the vent stacks, flare stack emissions, emissions from equipment leaks, and CO_2 venting. The rest of the emissions come from electricity consumption (18.6%) and stationary fuel combustion (6.5%).

Helium Plant, Amarillo, Texas. Credit: BLM

Reducing energy use at the helium plant is no easy task. The BLM Helium Plant is occupied and operated 24 hours a day, seven days a week, 365 days a year. Second, all ECMs must be considered in light of the fact that the reserves of helium at the site are limited and therefore the operational life of the plant may be limited to 10 years. In such a short timeframe, many ECMs are not life cycle cost effective. Third, the industrial process portion of the helium plant makes up 99% of the electricity use, while the building loads only make up 1% of the electricity use.

From FY 2010 through FY 2012, the helium plant averaged 33,071 Megawatt-hours (MWh) of electricity consumption per year for industrial processes at an annual cost of $1,557,182.

Electricity is supplied from the grid and some natural gas is consumed for plant operations such as compressors, burners, and for space heating in buildings. The natural gas is a by-product of the helium production and is used free of charge.

While emissions from electricity and stationary fuel combustion are significant, opportunities to reduce these emissions are limited. Much of this has to do with the proactive steps already taken by the helium plant. For example, the plant utilizes efficient motors, relatively new HVAC systems, adequate wall and roof insulation, double pane windows, skylights, and white roofs in the majority of its buildings.

NREL used building energy modeling to identify additional ECM opportunities, calculating energy use and energy cost savings from various ECMs. After its analysis, NREL recommended several viable

Renewable Energy Goal

In December, the White House issued a new Presidential Memorandum, "Federal Leadership on Energy Management," challenging agencies to increase their use of renewable energy. Currently, Federal agencies are required to obtain 7.5% of the electricity consumed in their facilities from renewable energy. The Memorandum boosts this goal to 20% of facility electricity in FY 2020 with increasing targets over the intervening fiscal years:

- 10% in FY 2015
- 15% in FY 2016 and FY 2017
- 17.5% in FY 2018 and FY 2019
- 20% in FY 2020

The preferred method of meeting this target is through the installation of on-site renewable energy, and bureaus are encouraged to pursue on-site renewable energy to the extent economically feasible and technically practicable. Agencies will continue to receive double credit (bonus) for on-site generation and consumption. If installing on-site renewable is not feasible, the target can also be met through contracted on-site renewable energy (such as a Power Purchase Agreement), green energy purchases, and Renewable Energy Certificate (REC) purchases. Ownership of RECs must stay with the renewable energy to count toward the goal. For net-metered on-site systems where excess renewable energy is provided to the utility company, bureaus must check their interconnectivity agreements to determine REC ownership. More than likely the utility company owns the RECs and bureaus may only report what is consumed. It is not yet clear how thermal energy will be counted. Updated renewable energy guidance from FEMP is forthcoming.

ECMs for the BLM to consider. NREL's recommendations include replacing 32 Watt T-8 lamps with 26 Watt T-8 lamps, replacing 34 Watt T-12 fixtures in the headquarters building with 26 Watt T-8 fixtures, and installing occupancy sensors throughout the campus's buildings. These ECMs are projected to save approximately 33,930 kilowatt-hours per year of electricity, a non-trivial amount but only a fraction of the electricity consumed on-site.

Because of the limited ECM potential, BLM is investigating installing renewable energy to offset the electricity demand from the helium plant. Options for renewable energy include photovoltaics (PV) and wind energy. The wind resource is relatively good at the site and initial results show promise for further development, while the solar PV does not look to be as economically viable. The PV opportunity is limited due to its inability to reduce monthly demand charges (as noted above, the site has a constant demand even through the nighttime hours when PV does not generate any power). Therefore, the PV system would have to generate power that is cost-competitive with the low energy-consumption charges, which does not appear possible given current PV costs and incentives. The NREL team is also evaluating the potential for on-site electricity generation using a natural gas reciprocating engine. A final report from NREL detailing renewable energy viability will be issued soon.

The NREL audit and the ECMs already taken by the helium plant illustrate BLM's commitment to save energy and reduce emissions, and set a great example for the rest of the Department that all DOI assets can be managed sustainably.

Environmental Achievement Awards

Winners Reduce DOI's Energy, Water Use

DOI's annual Environmental Achievement awards recognize outstanding contributions in the areas of sustainability, pollution prevention, and environmental remediation. FY 2013 winners were announced in November. Several of the winning entries (described below) focused on energy and water conservation.

Bureau of Reclamation – Steven Holland won an Individual Award for his contributions to energy reduction at the Bureau of Reclamation's (BOR) Brackish Groundwater National Desalinization Research Facility (BGNDRF), New Mexico. In FY 2012, the BGNDRF reduced its energy intensity by 53.6%, measured in British thermal units (btu) per square foot, from the previous year's baseline through improvements that totaled only $784.00. The impressive reduction helped the BGNDRF earn recognition as the winner of the Department of Energy's 2012 Better Buildings Federal Award.

U.S. Fish and Wildlife Service – Neosho National Fish Hatchery (NFH) Visitor Center, Missouri, is a Leadership in Energy and Environmental Design (LEED) Gold-rated facility that employs extensive energy and water conservation measures and is built from environmentally friendly materials. A 3.36 kilowatt (kW) net-metered solar photovoltaic (PV) array produces 4.8 megawatt hours (MWH) per year of renewable electric power, which, along with solar water heaters, helps save 68 metric tons of greenhouse gases annually.

U.S. Fish and Wildlife Service – Dworshak National Fish Hatchery (NFH), Idaho. Dworshak NFH staff identified and implemented infrastructure improvements and operational flexibility, which allowed the Hatchery to save an average of 8,621,000 kilowatt hours (kWh) per year in FY 2011 and FY 2012 when compared to FY 2010. Dworshak NFH staff developed a new model for spawning, incubation, and nursery operations that allowed the hatchery to significantly reduce the operation of electric boilers. The hatchery partnered with the Bonneville Power Administration, who provided $600,000, and the U.S. Army Corps of Engineers, who provided engineering support to implement the improvements.

U.S. Fish and Wildlife Service – San Luis National Wildlife Refuge Complex Headquarters and Visitor Center, California, is a new, high-performance, net-zero energy, 16,500 square-foot building. It is the first U.S. Fish and Wildlife Service (FWS) building to earn a LEED Platinum certification from the U.S. Green Building Council, making it a consummate example of sustainability. Nine net-metered solar PV arrays totaling 59.2 kW provide renewable electricity for all energy needs. This building received an FY 2013 Federal Energy and Water Management Award (see the Fall 2013 issue of *Interior Energy Management News* for more information).

The Brackish Groundwater National Desalination Research Facility. Credit: BOR.


Neosho National Fish Hatchery Visitor Center. Credit: Janice Eaton, FWS

Dworshak National Fish Hatchery. Credit: Steven Hanks, Lewiston Tribune

San Luis National Wildlife Refuge Headquarters and Visitor Center. Credit: Jack Sparks, FWS.

GHG and Scorecard Results

DOI on Target to Meet Goals

In FY 2013, the Department continued to make progress towards the energy, water, and GHG goals stipulated by law and executive order. Thanks to the hard work of energy and facility managers, facility operators, maintenance staffs, and employees of all walks, DOI's bureaus are making their operations more sustainable and helping to protect the natural and cultural resources the Department is charged to preserve.

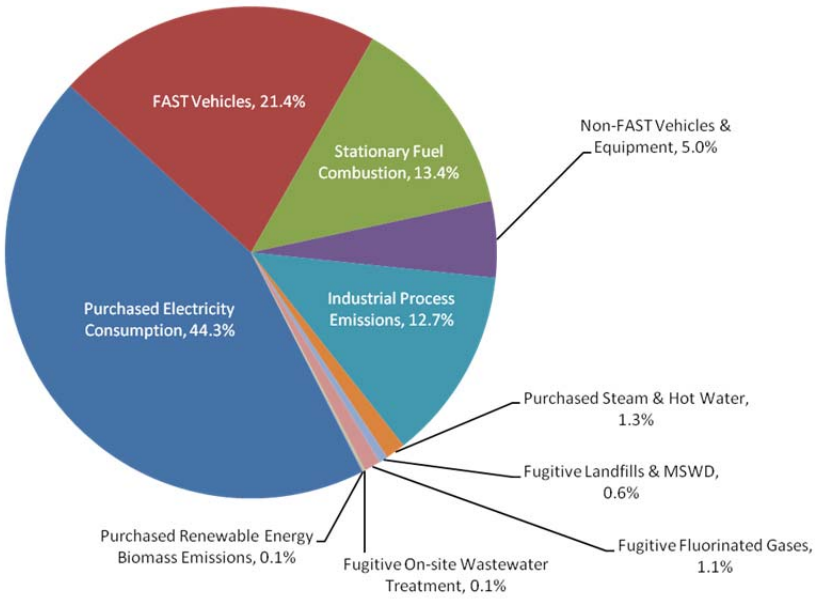
The Department has reduced its energy intensity 33.8% from its FY 2003 baseline, already exceeding the 30% energy intensity reduction target by FY 2015 required by law. Beginning in FY 2013, Federal agencies were required to draw 7.5% of their facility electricity from renewable resources, a goal which DOI has also exceeded, with 10.1% of its facility electricity coming from renewable resources. Of the 10.1%, 5.2% represents on-site renewable energy generation including bonus; 1.9% represents renewable electricity purchased through the utility company; and 2.98% represents the purchase of renewable energy certificates. The Department continues to be on track for its water reduction target as well. From the FY 2007 baseline, Interior has reduced its potable water intensity (measured in gallons per gross square foot) by 13.9% out of a required 26% by FY 2020.

The Department is putting up impressive GHG reduction numbers as well. As of FY 2013, DOI has reduced its Scope 1&2 GHG[2] emissions 18.2% from its FY 2008 baseline, putting it solidly on track to achieve its 20% reduction goal by FY 2020. DOI is also faring well in reducing Scope 3 GHG emissions, reducing its emissions 26% below FY 2008 levels, which beats the FY 2020 goal of 9%.

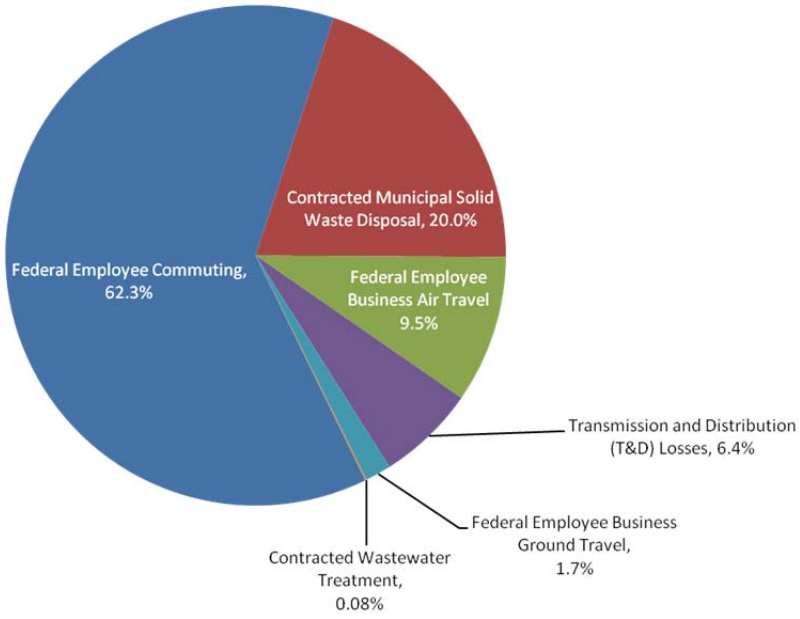
Electricity consumption accounts for about 44% of the Department's Scope 1&2 GHG emissions and about 30% of its combined Scope 1, 2, & 3 GHG emissions—more than any other source. (See the figures below for a breakdown of emissions sources.) However, the Department has seen a steady decline in absolute GHG emissions from electricity since it began tracking its GHG output in FY 2010. This decline is due in part to a changing mix of energy sources across the country as less carbon-intensive natural gas displaces coal. But the decrease is also a tribute to the energy efficiency and renewable energy work that is being done throughout the bureaus. In FY 2013, DOI's bureaus spent nearly $17.5 million in direct obligations and energy savings performance contracts (about 20.4% of total facility energy costs).

It is anticipated that these investments will yield an annual energy savings of more than 49 billion Btus. The Department and its bureaus can be extremely proud of these results; however, challenges lie ahead. The December 5th Presidential Memorandum on Energy Management (see page 3) calls for agencies to obtain 20% of their facility electricity consumption from renewable energy in FY 2020, a significant increase over the current requirement. Meanwhile, the Federal energy intensity reduction requirement is likely to be increased or replaced as its FY 2015 target date approaches. DOI's bureaus will therefore need to build upon the successes already achieved.

[2] Scope 1 GHG emissions include vehicles and equipment, stationary combustion, on-site landfills and wastewater treatment, and fugitive emissions. Scope 2 GHG emissions include purchased electricity, purchased heating and cooling, and purchased steam. Scope 3 GHG emissions include business travel, employee commuting, transmission and distribution losses, and contracted solid waste disposal and wastewater treatment.



DOI FY 2013 Scope 1&2 GHG Emissions



DOI FY 2013 Scope 3 GHG Emissions

Bureau Notes

Sustainability Updates from around the Bureaus

Bureau of Land Management:

Through the use of ESPC contracts, the BLM has developed an Energy Efficiency Metering (EEM) system to measure and verify specific performance of ESPC ECMs (from lighting and control retrofits, to water retrofits and renewable performance). The EEM system displays facility consumption usage as Energy Use Intensity as well as Energy Cost Intensity which quickly helps to clarify where limited energy improvement dollars can be utilized most effectively. BLM's new ***Ely Seed Warehouse***, Nevada, was designed with a Solar Domestic Hot Water System to supply its hot water needs.

Bureau of Reclamation:

The ***Alamosa Field Division***, Colorado, installed on-demand hot water heaters in two restrooms and a break room and replaced two water heaters for the office building with a tankless water heater. These actions will decrease water waste and usage as well as electricity to run the two hot water heaters. BOR completed generator rewinds at the ***Upper and Lower Molina Power Plants***, Colorado, allowing the units to generate at higher MW levels during peak periods without experiencing excessive unit heating. This allows BOR to reduce cooling requirements for the Power Plants. BOR retrofitted incandescent spot lights and fluorescent tubes with LED bulbs at the ***Carl Hayden Visitor Center***, Arizona, and achieved a 5% reduction in energy use using the 2003 baseline.

Ely Seed Warehouse, Nevada. Credit: BLM

Carl Hayden Visitor Center, Arizona. Credit: BOR.

U.S. Fish and Wildlife Service:

FWS completed a variety of energy conservation measures, including duct insulation, programmable thermostats, heat pump installation, bathroom heater upgrade, lighting retrofits at the Headquarters Building and Visitor Center Building at ***Great Swamp NWR***, New Jersey. At the ***Las Vegas NWR***, New Mexico, FWS replaced six mechanical windmills on water wells with solar PV power for a total capacity of 3.78 kW. Finally, FWS installed a 20 kW solar PV system and completed an energy retrofit at the Headquarters of ***Big Stone NWR***, Minnesota.

Helen C. Fenske Visitor Center, Great Swamp NWR, New Jersey. Credit: FWS.


Marsh-Billings-Rockefeller National Historic Park, Vermont. Credit: NPS.

National Park Service:

In FY 2013, ***Marsh-Billings-Rockefeller National Historical Park***, Vermont, completed the conversion of a historic barn to an artist-in-residence studio. The project is off-grid and includes a 230 watt solar PV system. The park refurbished the interior with reclaimed wood found within the grounds. The solar panels provide electricity and a wood stove provides heating. ***Great Sand Dunes National Park and Preserve***, Colorado, replaced toilets and faucets in visitor facilities to reduce water usage. Significant progress was made in FY 2013 to map park utility meters. The NPS distributed a Metering Tool to parks to catalog existing meters and map the buildings served by each meter. As a result, the NPS was able to load more than 8,000 meters into the Financial and Business Management System (FBMS).

Office of Facilities and Administrative Services:

The Office of Facilities and Administrative Services (OFAS) selected Ameresco to perform an investment grade audit for an Energy Savings Performance Contract at the ***Main Interior Building***, Washington, DC.

U.S. Geological Survey:

The ***Northern Appalachian Research Laboratory (NARL)***, Pennsylvania, upgraded the building automation system, and new devices were installed to increase the number of control points for enhanced scheduling. Major infrastructure changes are being introduced to control and measure systems for water use reduction with a goal to decrease water use about 40% and reducing electricity use by 10%. The ***Idaho Water Science Center*** in Boise, Idaho, removed T-12 lights and replaced with T-8 lights and ballasts.


Northern Appalachian Research Laboratory, Pennsylvania. Credit: USGS.

Announcements

(1) Federal Energy and Water Management Awards: The Department submitted four nominations for the 2014 Federal Energy and Water Management Awards. The Department of Energy's Federal Energy Management Program (FEMP), in conjunction with the Federal Interagency Energy Management Task Force, sponsors this annual competition. The awards recognize individuals and teams that have made significant contributions towards energy and water efficiency, sustainability, renewable energy, and vehicle fleet management. Over the past several years, many DOI staff, teams, and facilities have been recognized by these awards for their outstanding efforts. This year, the Department's nominations were:

- Visualizing Water Savings, ***Oklahoma-Texas Area Office*** (BOR, Program Award)
- Wet Laboratory Upgrade, ***Great Lakes Science Center***, Michigan (USGS, Project Award)
- Headquarters and Visitor Center at ***Upper Mississippi River National Wildlife and Fish Refuge - La Crosse District***, Wisconsin (FWS, Project Award)
- Net Zero Energy Residences at ***USFWS Patuxent Research Refuge and USGS Patuxent Wildlife Research Center***, Maryland (FWS-USGS, Project Award)

Winners will be announced later in the summer and honored at a ceremony in November.

(2) EISA Covered Facilities Compliance Tracking System (CTS) – EISA requires Federal agencies to complete energy and water evaluations of its designated covered facilities annually so that all covered facilities are evaluated once every 4 years. Bureau reporting templates, pre-populated with covered facilities information, evaluation due dates, and previous submissions of evaluation findings, have been forwarded electronically to bureau energy managers. These templates should be updated to incorporate the results of new evaluations for covered facilities with evaluation dates of June 30, 2014 or sooner. Updated templates should be submitted electronically to Mary Heying at mary_heying@ios.doi.gov no later than June 13, 2014.

Implemented Projects: EISA also indicates that Federal agencies may implement any energy or water conservation measure that was identified in the covered facility evaluation that is life cycle cost effective. Project information can be inputted into CTS by bureau energy managers at any time throughout the year either individually by covered facility or through spreadsheet uploads. DOI's Energy Management Program will conduct spreadsheet uploads at the end of each quarter. To participate in this process, please electronically submit completed project templates to Mary Heying no later than March 31st, June 30th, September 30th, and December 31st, 2014. All bureaus should input or provide implemented project data for at least 10 covered facilities semi-annually but no later than June 30th and December 31st.

Benchmarking Metered Buildings: Lastly, EISA and the Presidential Memorandum – *Federal Leadership on Energy Management* – issued on December 5, 2013 require Federal agencies to annually benchmark individually metered buildings that are part of a covered facility into Energy Star® Portfolio Manager. To date, the bureaus have reported 4,308 buildings within covered facilities which are individually metered for electricity. Of this total, only 204 buildings are currently benchmarked. Please ensure that covered facility buildings benchmarked in Portfolio Manager have been uploaded into CTS. All bureaus should strive to benchmark 10 percent of their covered facilities metered buildings by December 31, 2014.

(3) Energy Savings Performance Contracts: The White House has extended and expanded the President's Energy Performance Contracting Challenge. DOI's CY 2016 goal will be $15 million for a total of $20 million including the CY 2013 goal.

The Department of Energy's ESPC ENABLE program is well-suited to DOI's many small sites that may be interested in addressing energy conservation measures such as lighting, HVAC equipment, HVAC controls, water, and small solar PV. More information on the ESPC ENABLE program may be found at http://www1.eere.energy.gov/femp/financing/espc_enable.html.

(4) Training: The Federal Energy Management Program (FEMP) continues to expand their selection training courses. Many of these courses are available on demand at http://apps1.eere.energy.gov/femp/training/. Many of these courses also will assist Federal energy and facilities personnel in meeting the core competencies of the Federal Buildings Personnel Training Act.

(5) Earth Day 2014: On Wednesday, April 23, 2014, DOI, the Office of Personnel Management, and the General Services Administration hosted a tri-agency Earth Day event in Rawlins Park. The theme of this year's event was Green Cities.

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