

## DOI FY 2011 Renewable Energy Projects

BIA **Southwestern Indian Polytechnic Institute (SIPI)**, Albuquerque, New Mexico, (right) installed a 40 kilowatt (KW) photovoltaic (PV) system on the Administrative Building using ARRA funding. This system will offset SIPI's purchased electricity by 72 megawatt-hours (mWh) annually. SIPI also replaced three large steam boilers with five hot water boilers which greatly reduced the natural gas consumption. The project included replacement of 1200 feet of leaking chlorinated polyvinyl chloride piping with steel piping.



BIA **Nazlini Community School Fire Station**, Arizona, (left) opened in May. With technical assistance provided by the National Renewable Energy Laboratory, this building is BIA's first net zero energy building. The Nazlini Fire Station will optimize energy efficiency and utilize an on-site 9.9 KW PV system which will produce at least 75% of its electricity.

BLM **Rawlins Field Office** in Wyoming (right) completed construction of a 100 KW wind turbine as part of BLM's multi-phased energy savings performance contract. This system will generate 300 mWh of electricity annually. BLM's **Fillmore Field Office** is a brand new 10,000 square foot LEED Gold building. The owned building includes an 18 KW solar installation, solar water heating, and daylighting that includes tubular skylights throughout.



BOR in partnership with Xcel Energy installed a 9.8 KW PV system at **Alamosa Field Division**, New Mexico. This system will produce enough electricity to offset approximately 10% of the Field Division's electricity use.



In FY 2011, FWS completed many renewable energy projects. **Stillwater National Wildlife Refuge (NWR)** near Fallon, Nevada, (right) completed the second half of a 2-phase 15 KW photovoltaic system installed at the refuge maintenance shop. The finished system consists of 72 solar panels that save an average of 1.7 lbs of CO<sub>2</sub> per KW of power generated.



The new **Necedah NWR**, Wisconsin, Visitor Center (left) is a state-of-the-art energy efficient facility featuring a 46 KW photovoltaic array. The solar system was funded through the American Recovery and Reinvestment Act. The Refuge also features an interactive display on solar-powered energy at the visitor center as part of its environmental education programming.

Numerous ARRA-funded renewable energy projects were completed in FY 2011. Some highlights include solar photovoltaic arrays at **Arrowhead NWR**, **Bear River Migratory Bird Refuge**, **Cibola NWR**, **Ottawa River NWR**, and many others; ground source heat pumps at multiple locations including **Jordan River National Fish Hatchery** and **Audubon NWR**; solar forced air heating at **Agassiz NWR**; solar hot water at **Neosho National Fish**

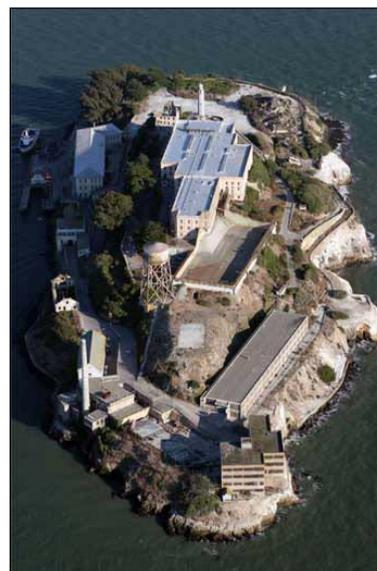
**Hatchery**, and six 5 kilowatt wind turbines at **Izembek NWR**. All told, ARRA funds were used for more than 150 renewable energy projects at FWS locations.

Using ARRA funding, NPS has dramatically increased its renewable electricity generating capacity in FY 2011. NPS completed the construction of a 539 KW photovoltaic system at **Yosemite National Park** in California. This system is the largest grid-connected photovoltaic system in the National Park Service and will generate nearly 970 mWh of electricity annually. The solar panels are installed at the **El Portal Maintenance Complex** (right) on the roofs of existing buildings and on newly constructed shade structures under which government vehicles are parked.



NPS installed a 50 KW rooftop photovoltaic array at the **Kennesaw Mountain National Battlefield** Visitor Center in Marietta, Georgia (left). This system will generate approximately 90 mWh of electricity annually.

**Alcatraz Island Golden Gate National Recreation Area**, California (right) will complete a multi-phased installation of 285 KW photovoltaic system to replace diesel generated power on the island. Phase 1 (188 KW) is scheduled for completion in March 2011. Phase 2 (97 KW) is scheduled for completion by the end of calendar year 2011. These systems will generate over 500 megawatt-hours of electricity annually.



Solar photovoltaic arrays were also installed at **Craters of the Moon National Monument** (below) and **Gateway National Recreation Area**. Meanwhile, a 115 KW incremental hydro power project was constructed at Mammoth Springs in **Yellowstone National Park**. ARRA created a boom of renewable energy projects in national parks, with 42 projects receiving over \$28 million in funding. In FY 2011 the NPS completed the remaining 7 ARRA funded systems which together added over 1,000 KW of new capacity. Together all ARRA projects have increased the NPS's total installed renewable electrical capacity by 170 percent, or 1,740 KW of new capacity. Geothermal heat pumps and one wind system were also installed as part of the ARRA funded projects.



Two other NPS highlights include net-zero buildings. The Painted Hills house is a solar-powered employee home at the **John Day Fossil Beds National Monument** (right) and is the first net-zero home in the National Park Service. It was designed and built with the goal to generate as much or more energy than it uses. The house generates energy through photovoltaic solar panel system, solar hot water heater, and produces enough energy to not only cover the residents use but also to charge the occupant's electric vehicle.



At **Santa Monica Mountains National Recreation Area**, the Intern Center (left) is the first newly-constructed facility in the national park system to meet the NPS "net zero" standard, which is required for all new government buildings beginning in 2020. To eliminate the project's carbon footprint, avoid impacts to climate change, and achieve a high level of energy efficiency, numerous

sustainability features were integrated into the \$2.1M design/build project. Site location, building orientation, roof design, a 36 KW photovoltaic system, no incandescent lamps, a geothermal heat pump system, solar hot water heating, extensive daylighting, natural ventilation, window shading, minimal outdoor lighting, and selected landscape features all minimize the use of energy. The building will achieve the net-zero standard 10 years ahead of schedule.

USGS **Great Lakes Science Center** in Ann Arbor, Michigan recently completed the installation of an innovative 70 ton geothermal heat pump hybrid system with variable frequency drives. The **National Wildlife Health Center** in Madison, Wisconsin (below) is currently constructing a 60 KW photovoltaic system which will generate 107 megawatt-hours of electricity annually. This project was completed using ARRA funding and an energy savings performance contract.

