

Leading by example
saving energy and
taxpayer dollars in
Federal facilities

TEAM Renewable Energy Projects at NREL

The Department of Energy's (DOE) National Renewable Energy Laboratory (NREL) is far ahead of schedule and poised to exceed DOE's Transformational Energy Action Management (TEAM) Initiative commitment to reach the Energy Policy Act of 2005 (EPACT) goal of 7.5% renewable source electricity by 2013. NREL is also poised to exceed DOE's goal to meet 7.5% of its thermal energy use with renewable energy. The projects described below will have a combined electric capacity of 2,350 MW and will provide 23% of NREL's total electricity requirements and 46% of its heating

load. Furthermore, the Mesa Top Photovoltaic Array provides a model for implementing a long term power purchase agreement (PPA) and a Renewable Energy Certificate (REC) swap.

Renewable Fuel Heating Plant (RFHP)

Technology: A biomass thermal plant will be fueled by urban woodwaste and forest thinnings from the Colorado Front Range.

Financial: Ameresco, an energy service company (ESCO), financed the construction of the plant and will own, operate, maintain, and buy the fuel under an Energy Savings Performance Contract (ESPC). NREL will repay Ameresco with the proceeds from natural gas utility cost savings, which are expected to be \$400,000 in the first year alone. A-1 Organics will supply fuel at an initial cost of \$2.42/MMBTU, a cost savings compared to average natural gas costs of \$9.97/MMBTU over the past two years. Under the ESPC the plant capital cost of \$3.3 million and financing costs will be paid off in approximately 25 years, or sooner if natural gas prices escalate.

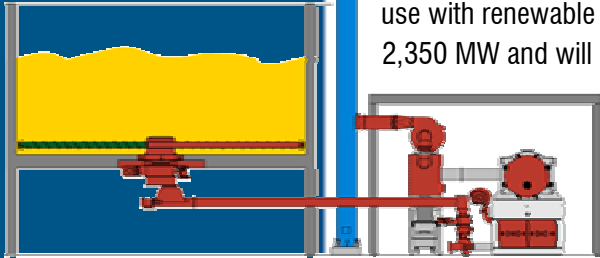
DOE/NREL Energy Impact: The 29 billion BTUs of energy from the plant will displace 41 billion BTU of natural gas, equal to 46% of NREL's total heating load. This is well in excess of DOE's goal to provide 7.5% of thermal energy from renewable resources. It also contributes to the EPACT goal to reduce energy intensity by 30% and to reduce greenhouse gas emissions across all DOE sites.

Mesa Top Photovoltaic (PV) Array

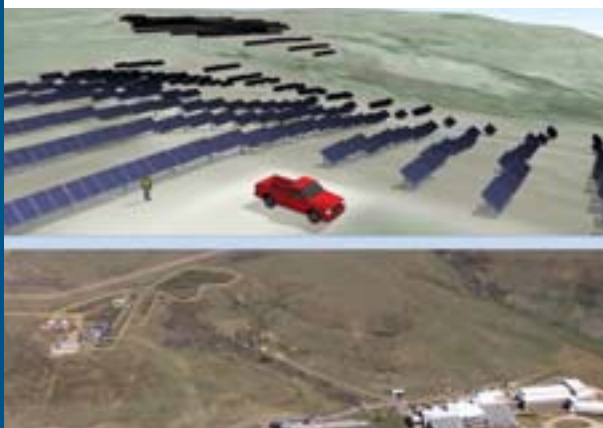
Technology: A ground-mounted PV array will use a single-axis tracker rated at 750 kW of capacity generating 1,200 MWh annually. Completion is planned for Fall 2008.

Financial: SunEdison will finance, build, own, and maintain the system. They will be paid for the electricity they deliver under a 20-year power purchase agreement (PPA) with Western Area Power Administration (Western) acting on behalf of DOE/NREL. By working with Western, DOE/NREL can use Western's long-term contracting authority to make the

project economically feasible. The solar RECs are being sold to the local utility through the Xcel Energy Solar*Rewards program. NREL is purchasing replacement RECs as allowed under the renewable energy guidance REC swap provisions. This will allow DOE to claim the bonus for on-site generation and use.



An diagram of the RFHP and a photo of the fuel loading bin.



An artist's rendering of the Mesa Top PV array and an aerial view of the site.

DOE/NREL Energy Impact: The array will generate enough electricity to meet approximately 7% of NREL's total electricity requirements. Including the bonus for producing and using electricity from renewable sources on a Federal site, the project will exceed the Energy Policy Act (EPACT)/TEAM goal of using renewable energy to meet 7.5% of the site's electricity use.

Phase II Photovoltaic Projects

Technology: PV arrays of 1.1 MW and up to 500 kW will be installed at NREL's National Wind Technology Center and South Table Mountain Campus, respectively. A 1.1 MW capacity PV array will be installed at NREL's National Wind Technology Center and up to 500 kW of PV on NREL's South Table Mountain campus.

Financial: These projects are being funded through PPAs with Western and SunEdison similar to the Mesa Top project. For these projects as well, the solar RECs are being sold to the local utility, and NREL is purchasing replacement RECs. This will allow DOE to claim the bonus for on-site generation and use. Western is scheduled to sign a PPA and DOE will sign associated agreements during September 2008.

DOE/NREL Energy Impact: The total annual energy output of 2,754 MWh expected from these projects will account for almost 16% of NREL's electricity use, far exceeding the TEAM Goal of 7.5% of facility electricity use from renewable energy.



A platinum LEED (Leadership in Energy and Environmental Design) certification for new construction at NREL's National Science and Technology Facility. This is the first Federal building to achieve platinum LEED, partly as a result of the Renewable Fuel Heating Plant (RFHP).