RE-Powering America's Land:
Siting Renewable Energy on Potentially Contaminated Land and Mine Sites
Lawrence Livermore National Laboratory – Livermore, CA Success Story
Solar Panels Power a Ground Water Treatment System

United States Environmental Protection Agency

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EPA is encouraging the development of renewable energy facilities on potentially contaminated land and mine sites. This series of stories highlights successful projects and the benefits of siting renewable energy facilities on potentially contaminated land and mine sites.

Site Description

Established in 1955 as a non-nuclear explosives test facility, Lawrence Livermore National Laboratory Site 300 is an experimental test site operated by the Lawrence Livermore National Security, LLC, for the Department of Energy (DOE)'s National Nuclear Security Administration. The property covers 7,000 acres of rural foothills near the town of Livermore in Northern California. The site's lab is primarily used as a high-explosives and materials testing range in support of nuclear weapons research and Livermore Laboratory's national security mission.

Property History

The 11-square mile Lawrence Livermore National Laboratory Site 300 has approximately 350 people who work in the area and obtain drinking water from an area ground water source. This aquifer also provides water to State of California employees working in a nearby vehicular recreation area, adjacent ranch houses, and a state fire station.

DOE owns the site and is responsible for implementing the cleanup and remediation activities. Oversight responsibilities are shared by the California Department of Toxic Substance Control, the Regional Water Quality Control Board and the U.S. Environmental Protection Agency (EPA). Through the years, as a result of onsite tests and other activities—as well as inadvertent spills, leaking pipes and leaching from underground landfills and pits—the ground water became contaminated with solvents, volatile organic compounds (VOCs), tritium, uranium-238, nitrate and perchlorate. Cleanup and mitigation of these contaminates began in 1991, with significant progress to date.

Renewable Energy Development

To preserve the integrity of the area's drinking water, ground water pump and treatment systems have been put into place at several locations. Some of these systems are equipped with solar panels capable of generating up to 800 watts of self-sustaining power. These solar treatment units (STUs) are low-flow systems that power pumping and treatment of ground water at a rate of about 5 gallons per minute from depths of 75 to 100 feet. During the summer months, these STUs can run for an average of 17 hours per day. During winter, operational time is reduced to an average of 10 hours per day.

QUICK FACTS:

Location:	EPA Region 9, Alameda and San Joaquin Counties, CA
Property Size:	7,000 acres
Site Ownership:	U.S. Department of Energy
Former Use:	Ranch land, weapons testing range
Cleanup Type:	Superfund
Contaminants:	Solvents, VOCs, Tritium, Uranium-238, Nitrate and Perchlorate
Type of RE:	Solar PV (non-grid)
RE Capacity:	800 watts per unit
Project Cost:	$2,000 per unit
Key Partners:	U.S. Department of Energy, California Department of Toxic Substance Control (DTSC), Regional Water Quality Control Board (RWQCB)

PROJECT HIGHLIGHTS:

- 800 watt PV solar treatment units power the pumping and treatment of contaminated ground water.
- Onsite treatment systems can run up to 17 hours per day exclusively on solar power, reducing the power consumption of long-term water treatment.
- Self-powered solar treatment units allow ground water treatment at remote areas of 7,000-acre site without the installation of costly power lines or generators.

As of 2009, Lawrence Livermore National Laboratory Site 300 has five ground water treatment units in place that are partially or fully solar powered. While some ground water treatment facilities have been powered through the electrical grid for continuous operation, self-powered STUs offer the flexibility for placement in remote locations that are difficult and costly to connect to grid power. Renewable energy technology has allowed the DOE to strategically place treatment facilities to maximize the benefits of their cleanup efforts.

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