



# Finley Buttes Landfill

## 4.8MW Landfill Gas CHP System



### Quick Facts

- LOCATION:** Boardman, Oregon
- MARKET SECTORS:** Municipal Solid Waste & Food Processing (thermal)
- FACILITY SIZE:** 1,800 acre landfill (second largest in the state of Oregon)
- FACILITY PEAK LOAD:** 4.8 megawatts (MW)
- EQUIPMENT:** 3- 1.6 MW Caterpillar Gen-sets
- FUEL:** Landfill gas for power and steam
- USE OF THERMAL ENERGY:** Steam sold for Industrial heating and food dehydration processing (13.5 MMBTU/hr)
- CHP TOTAL EFFICIENCY:** 80+ %
- ENVIRONMENTAL BENEFITS:** CO<sub>2</sub> reduction equal to more than 43,000 barrels of oil consumed and NO<sub>x</sub> reductions
- TOTAL PROJECT COST:** \$9.7 million
- CHP IN OPERATION SINCE:** 2007
- SIMPLE PAYBACK:** 4 years – Realized 2011

### Site Description

The Finley Buttes Landfill Gas to Energy facility is located ten miles south of Boardman, Oregon at the Finley Buttes Regional Landfill (FBRL). Owned and operated by Waste Connections, Inc. (WCI), the landfill began operations in 1991. It receives over 500,000 tons of municipal solid waste annually. FBRL is the second largest landfill (1,800 acres) in the state of Oregon. The landfill gas (LFG) collection and control system is made up of vertical extraction wells and a high-density polyethylene (HDPE) piping network.

### Reasons for CHP

By the late 1990s, Finley Buttes Landfill was in need of expansion. Until their expansion in 2004, the landfill owners were flaring landfill gas. The expansion, however, put them in the “large” landfill category under EPA’s landfill guidelines (NSPS and Emission Guideline Fact Sheet – 40 CFR 60); requiring the landfill owners to install a gas collection system for controlling the emissions, or prove the landfill emitted less than 50 Megagrams (Mg) per year of non-methane organic compounds. A gas collection system was installed. Controlling emissions involved drilling collection wells and routing the gas to suitable energy recovery systems or combustion devices. Finley BioEnergy was formed through an agreement with WCI to manage Finley Buttes potential LFG emission liabilities by utilizing the LFG as an asset. Implementing a CHP system allowed for additional revenue streams through the sale of 25 million kWh/year to the local utility (Pacific Power) through a 15 year Power Purchase Agreement (PPA) and the sale of steam to a local food processing plant (Cascade Specialties).

**Finley Bioenergy CHP System Configuration. The photo to the right captures the operational monitoring with a real-time representation of each generator's electric and thermal output.**

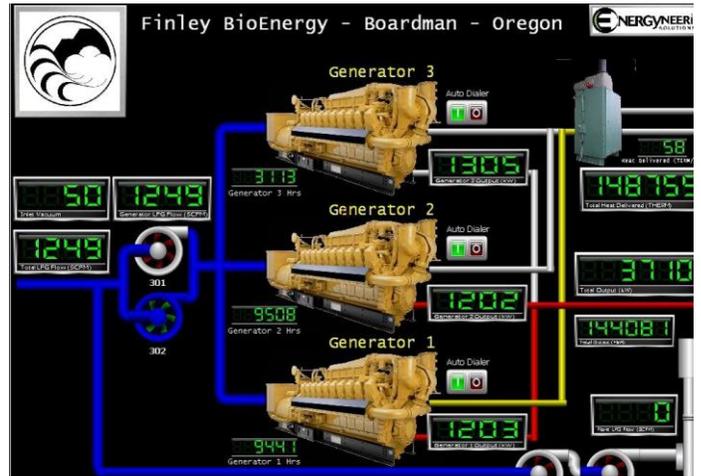
PHOTO COURTESY Of Energy Solutions, Inc.

## CHP Equipment & Operation

Main components of the CHP landfill gas system:

- Three 1.6 MW Caterpillar reciprocating engines, Model #3520C. This model was chosen because it was designed to handle dirty gas and can burn low Btu gas.
- Three Cain exhaust heat recovery units, Model # HSR-348D26SSS
- Three Ameridex flat plate heat exchangers, Model # X-55-83

Gas is collected through a series of vertical wells throughout the landfill site and transported via a 3-4 mile pipeline to the gen-set at approximately 5 psi.



## Project Benefits

- Revenue from electricity sold to Pacific Power and heat sold to Cascade Specialties;
- Beneficial use of landfill gas including a 111.7 and 15.1 ton per year reduction in CO<sub>2e</sub> and NO<sub>x</sub> emissions respectively;
- Sale of Renewable Energy Credits (RECs) and carbon credits;
- Energy savings to Cascade Specialties – purchaser of the supplemental heat as steam. Cascade reduced daily natural gas usage by 25-30% during the eight-month season from 1000 MMBTUs to under 700;
- Helps meet Oregon Renewable Portfolio Standard (RPS) requirements for renewable energy and EPA's New Source Performance Standards (NSPS) requirements for greenhouse gas reductions.

## Lessons To Share

- There was a longer staff learning curve for simultaneous heat recovery from jacket water and exhaust stack than anticipated, as well as automated performance reliability – work with system installers to ensure training time.
- Information about financing coordination and options and tax credits is available from Oregon Department of Energy.
- Utility barriers: Due to the need to 'wheel' power through the local electric cooperative to BPA, the project was held up over concerns about transmission line capacity – a special exemption for systems under 4MW to be allowed was required. Early planning for this would have sped up system implementation.

## For More Information

### U.S. DOE NORTHWEST CHP TECHNICAL ASSISTANCE PARTNERSHIP (CHP TAP)

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More CHP Project Profiles:

<http://northwestchptap.org/>

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