



# Hatch Hill Landfill

## Methane Landfill Gas 550 kW CHP System

### Site Description

Hatch Hill Landfill in Augusta, Maine was approved by the Maine Department of Environmental Protection (Maine DEP) as a sanitary landfill in 1982. In March 2018, the Augusta City Council approved a Combined Heat and Power (CHP) system to capitalize on available landfill methane gas generated from decomposing waste. A 550-kilowatt (kW) reciprocating MAN engine coupled to a generator was installed to reduce greenhouse gas emissions, supply the facility's electrical needs, and excess generated power supplies the local grid. Additionally, excess heat generated by the engine is harnessed to heat the operations building, and prevent snow and ice buildup on sidewalks and the truck scale, which improves safety and convenience while reducing labor.

### Quick Facts

**LOCATION:** Augusta, ME  
**MARKET SECTOR:** Solid waste; landfill  
**FACILITY SIZE:** 400 acres  
**FUEL:** Methane landfill gas  
**EQUIPMENT:** 550 kW reciprocating engine  
**CHP OPERATION:** 24/7  
**SYSTEM CAPACITY:** 3.9 MWh annually  
**USE OF THERMAL ENERGY:** Building heating; snow removal  
**ENVIRONMENTAL BENEFITS:** Reduced GHG emissions and odor; supplies grid power  
**ANNUAL SAVINGS:** \$320,000  
**BEGAN CHP OPERATION:** 2018

### Reasons for Installing CHP

When Hatch Hill was built in 1982, trash was dumped in the surrounding wetlands, contaminating the land. This caused a build-up of methane around the landfill allowing the greenhouse gas to enter the atmosphere. The city of Augusta saw this to be harmful to the environment and a large waste of energy. To address improving environmental regulations, an idea was proposed to not only collect the methane, but to reduce Hatch Hill's energy costs while lowering emissions by using it as a fuel source to generate electricity. Additionally, the original 1982 electrical service was through a single-phase 208-V power supply line installed through the woods beside the landfill. This line had been very unreliable for the landfill and operations were hindered when power outages were experienced.



Hatch Hill Landfill's CHP system, dehydration skid, and operations facility

PHOTO COURTESY OF NECHP Team

## Equipment and Operation

The City of Augusta hired Woodard & Curran, a Portland, Maine-based national environmental engineering firm, to design and install a landfill gas collection system. The collection system consists of an eight-acre, 40-millimeter high-density polyethylene (HDPE) geo-membrane and vertical wells to trap and collect landfill gas through 1,800 feet of 8-inch underground HDPE pipe and transport it to a gas treatment system near the facility's operations building. A dehydration skid then removes moisture and contaminants from the collected gas. Once treated, the gas is used to fuel the 550 kW reciprocating MAN engine. In the event the landfill produces excess methane, the overabundance is routed to a separate, on-site gas flare. While flaring landfill gas is preferable to allowing methane to escape into the atmosphere, flaring still produces carbon dioxide and wastes a valuable resource. Landfill operators attempt to reduce the need to flare methane, preserve the fuel source whenever possible, and monitor emissions from both generator and flare on a regular basis.

The CHP system produces 3.9 megawatt hours (MWh) of electricity annually, which provides enough power for 40,000 residents. The City of Augusta is able to net meter the power transmitted to the grid through Central Maine Power (CMP). This allows for the comparable cost reduction of powering nine of the city's largest buildings. The project also replaced the existing 208-volt line with a new, three-phase 480-volt transmission along the main entrance road to the facility.

Efficiency Maine and the Landfill Methane Outreach Program (LMOP) helped fund this project. The capital investment for the project was \$2,255,000 with an estimated annual operating cost of \$122,640. With \$320,000 savings annually, the project is expected to have an 11-year payback with a \$1 million return on investment after 17 years.

## System Benefits

Hatch Hill has seen the following benefits from the CHP system:

- Annual net savings of \$320,000 are gained from offset of city-wide energy costs via net metering;
- Landfill waste is leveraged as a useful fuel source for up to 25 years;
- Exhaust heat is used to heat the control building and to melt snow, which contributes to reduced maintenance expense;
- Reduced greenhouse gas emissions; and
- Reduced landfill odors

## Lessons to Share

Hatch Hill was experiencing gas quality issues due to moisture build-up forming in exposed piping prior to entering the generator. To rectify this, a dehydration skid was installed in series with the CHP system. The dehydration skid removes moisture from the collected gas with excess heat from the generator to improve gas quality. Since installation of the dehydration skid, Hatch Hill has seen a noticeable rise in gas quality.

*"Since installation of the geo-membrane cap and the CHP system, there has been a drastic decrease in complaints regarding odor."*

*-Lesley Jones  
Director of Public Works*

## For More Information

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

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### More CHP Project Profiles:

<http://www.nechptap.org>

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