



CHP  
TECHNICAL ASSISTANCE  
PARTNERSHIPS

# St. Mary's d'Youville Pavilion and Residences

## 150 kW CHP System

### Project Overview

The St. Mary's d'Youville is one of the largest nursing homes north of Boston and the flagship component of elder care services offered through St. Mary's Health System, located in Lewiston, Maine. It contains a state-of-the-art rehab center, specialized memory care unit, skilled and long-term nursing care and more. In 2016, St. Mary's d'Youville contracted with Efficiency Maine to install a 150 kilowatt (kW) combined heat and power (CHP) system to serve its electricity and thermal loads. Prior to the installation of CHP, the building's heat load was serviced by two hot water boilers and they continue to supplement heat and hot water. The new CHP system powers d'Youville Pavilion and supplies hot water for St Mary's Residences, providing electricity for the Nursing home and domestic hot water to a kitchen, laundry room, and independent living units for 128 residents. The new system is responsible for roughly 40,000 gallons of hot water, which assists in processing one million pounds of laundry each year. The system produces 150 kW at full capacity totaling 75 percent of the building's power consumption in the colder months, and 60 percent during the warmer months.

### Quick Facts

**LOCATION:** Lewiston, ME  
**MARKET SECTOR:** Independent living  
**FACILITY SIZE:** Approximately 210 beds  
**FUEL:** Natural gas  
**EQUIPMENT:** Co-Energy Amerigen-8150 150 kW CHP System  
**OPERATION:** 24/7  
**SYSTEM CAPACITY:** 150 kW  
**USE OF THERMAL ENERGY:** Domestic hot water  
**ANNUAL SAVINGS:** \$80,000  
**BEGAN OPERATION:** 2016  
**PAYBACK:** 2.6 years with incentives

### Reasons for Installing CHP

Energy accounts for a large portion of St. Mary's operating budget, so the staff continually works to make the facilities more efficient to reduce their energy costs. Through a feasibility study from Efficiency Maine, St. Mary's proved to be an ideal candidate for CHP based on their electrical and thermal loads. Efficiency Maine provided St. Mary's with half of the "all-in" project costs, including but not limited to relocation of plumbing and utility fees in the amount of roughly \$280,000. The system has saved St. Mary's more than \$80,000 per year in net savings. Based on the initial cost of the system, Efficiency Maine incentive, and yearly savings, the system was paid for in 2.6 years after installation, which exceeded expectations.

A video describing the St. Mary's project can be found at:

[St. Mary's CHP Case Study](#)



St. Mary's d'Youville Pavilion

PHOTO COURTESY OF NECHP Team

## System Design and Operation



**150 kW CHP system prior to installation at St. Mary's d'Youville Pavilion, a non-profit nursing home.**

PHOTO COURTESY OF [coenergyamerica.com](http://coenergyamerica.com)

In 2016, St. Mary's and Efficiency Maine contracted with Co-Energy America to install a 150 kW CHP system to provide electricity and hot water to the building. The system is an Amerigen-8150 reciprocating engine, generating 150 kW with a thermal output of 0.79 MMBTU/hour. The components include a natural gas-fueled reciprocating engine, heat exchangers to transfer heat from the engine exhaust to domestic hot water, and a control panel to monitor necessary variables. The generator operates year-round, with two back-up boilers when the system is offline for maintenance and to supplement winter loads. St. Mary's maintains a 150 kW diesel generator in the event of a power outage. The CHP system is not capable of operating in island mode due to financial constraints at the time of installation.

The installed system cost was approximately \$560,000. Efficiency Maine paid for half of this hoping more prospective end-users will be incentivized to install a CHP system at their facility. The Co-Energy Amerigen-8150 has an electrical efficiency of 33.4 percent, a thermal efficiency of 51.5 percent, totaling for a combined efficiency of 84.9 percent ( $\pm 9.5$  percent).

***"Having an experienced contractor was a huge key in permitting and installation."***

***-Scott Young,  
Director of Facilities***

## System Benefits

St. Mary's has seen the following benefits from the CHP system:

- Average annual energy and O&M costs have reduced significantly, producing an annual net savings of over \$80,000
- The system uses 100% of its produced electricity; if more electricity is needed, it is bought from Central Maine Power
- Exhaust heat is used for domestic hot water, increasing efficiency and lowering emissions
- The system has paid for itself (2.6 years after installation) and is operated/maintained by Co-Energy America

## Lessons to Share

When speaking with Scott Young, director of facilities at St. Mary's, he said the biggest lesson he learned from doing this project is that he wishes St. Mary's had investigated CHP earlier. There were and still have been very few issues with the system since its installation in 2016.

## For More Information

### U.S. DOE NEW ENGLAND CHP TECHNICAL ASSISTANCE PARTNERSHIP

Director – David Dvorak, Ph.D., P.E.  
University of Maine  
207-581-2338  
[dvorak@maine.edu](mailto:dvorak@maine.edu)

### ST. MARY'S REGIONAL MEDICAL CENTER

Director of Facilities - Scott Young  
St. Mary's  
207-777-8927  
[syoung@covh.org](mailto:syoung@covh.org)

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