

Université Sainte-Anne

Church Point, NS

The technology

Substitution of local woodchips and solar thermal panels for imported oil as heating source.

On Sainte-Anne's main campus in Church Point, Nova Scotia, some 18 interconnected buildings totalling about 360,000 square feet are heated by hot water from a central heating plant. A new biomass gasification furnace and boiler, built to supplant an aging oil-fired system, went into operation in December 2009. An on-campus storage bunker (approximately five-days' storage of woodchips) feeds a gravity hopper on the boiler. Particulates in the exhaust stream are filtered out and some waste heat is vented through the storage bunker for drying and warming of fuel.

Chip production is from locally sourced trees on woodlots formerly harvested primarily for pulpwood.

The biomass heating plant is part of a "combined technologies project," which includes a large array of solar thermal panels and two wind turbines (one operational, the other being installed in 2011). The solar system produces domestic hot water for nine student residences; it is complementary to the heating plant in that it reduces the need for burning fuel for hot-water production. Each net-metered wind turbine displaces about 300 MWh of purchased electricity.

Specifications

- Furnace/hot-water boiler: 1 MW thermal gasification unit by Ideal Combustion (Sherbrooke, Quebec); ultra-low emissions, meeting CSA-recommended particulate limit of 0.137g/MJ; 80-foot stack equipped with multicyclone and auto ash remover
- Fossil fuel displacement: Replacement of 500,000–550,000 L of #2 light furnace oil (note: oil-fired facility still available for backup)
- Woodchip supply: approximately 2000 t annually supplied from woodlots in Digby County and stored 7 km from the campus
- Direct annual heating energy cost savings: approximately \$200,000, based on current fuel prices

Environmental benefits

- Annual reduction of CO₂-equivalent emissions in the order of 1,350 t (assuming sustainably managed wood supply)
- Solar domestic hot water eliminates CO₂ emissions otherwise produced by burning fuel
- Each installed 50 kW wind turbine can reduce CO₂ emissions by up to 300 t annually, depending on source of displaced electricity

Applications

commercial and institutional central heating

Advantages

Elimination of fossil fuel for heating; direct financial savings on fuel costs; employment of local workers to harvest sustainably renewable woodchips; biomass fuel production and supply become available to other users in the area as cost-effective alternative fuels; potential for using waste materials as fuel; keeping energy expenditures in the local economy; savings on fuel and electricity costs available for reallocation to educational purposes; potential to transfer knowledge, technology, and skills training to the community

Partners

Operations and planning: Spec Resources Inc. (Digby Co) provides woodchips and partnered with Ideal Combustion to install the system; Municipality of the District of Clare; West Nova Investment Co-op Ltd.

Financing: ecoNova Scotia; ecoEnergy for Renewable Heat program; Knowledge Infrastructure Program (KIP) and its provincial counterpart, the Provincial Infrastructure Fund.