Surrey, British Columbia

Description

In October 2012, the City of Surrey began building an organic waste biofuel processing facility to process organic wastes into Renewable Natural Gas (RNG) which will power Surrey's waste collection fleet, creating a closed loop system. This facility is expected to cut operating costs and reduce air pollution and greenhouse gas (GHG) emissions. Along with processing 100 percent of the City's residential organic waste, the biofuel facility will also have an Educational Centre. FortisBC will play a key role in helping Surrey to close the loop by linking the source of the RNG to the City's waste collection fleet by using the existing RNG program to purchase and sell RNG.

Key Points

- In 2012, Surrey entered into a seven-year waste-disposal contract with Progressive Waste Services that requires the exclusive use of natural gas-powered vehicles. This is a first for municipalities in Canada and also for Progressive Waste, a major waste management company.
- The organic waste biofuel processing facility will produce RNG for vehicles and for injection into the FortisBC natural gas pipeline network, as well as digestate to be processed into fertilizer and soil amendment for distribution through local retailers.
- FortisBC will purchase RNG, manage the supply volumes and resell the RNG at the same price back to the City. The cost of managing the RNG supply will be paid by Surrey in the form of a monthly fee.
- Local governments in B.C. are subject to a carbon tax of $30 per tonne. By signing the *Climate Action Charter* and committing to become carbon neutral, the City of Surrey is eligible for the *Climate Action Rebate Incentive* program and will receive carbon credits for the innovative biofuel program.
- Surrey's organic waste biofuel processing facility will enable full implementation of the City's Waste Management Plan, which in turn will help the City achieve the Metro Vancouver regional goal of diverting 70% of all wastes from landfills by 2015. Metro Vancouver has also proposed a regional ban of all organics from landfill disposal.

Technology & GHG Benefit

- The waste collection vehicles incorporate the latest gas-powered engine technology and operate on compressed natural gas (CNG). CNG powered trucks emit 23% fewer carbon emissions and 90% fewer air particulates compared to diesel-powered trucks, while enabling the City to reduce dependence on diesel fuel, which is expensive and subject to volatile price swings.
- Once the biofuel facility is operational, the CNG powered trucks will be fueling using 100% Renewable Natural Gas (RNG) produced at the facility, making Surrey the first City in North America to be operating a carbon neutral waste collection fleet.
- The biofuel facility will reduce GHG's by over 40,000 tonnes per year which is the equivalent of taking 10,400 vehicles off the road annually.

Volume Processed & Energy Production

The facility, which is under construction and will be operational in 2017, will process upward of 115,000 tonnes of organic waste per year and produce 120,000 GJ's per year of RNG.

Cost

The facility will be developed as a *Public Private Partnership*. The Government of Canada, through the PPP Canada Fund, will contribute up to 25% of the capital cost (up to a maximum of $16.9 million) which has been estimated at $68 million. FortisBC will be investing approximately just under $1M in a gate station to monitor and accept RNG into the system.

Saint-Hyacinthe, Quebec

Description

The City of Saint-Hyacinthe and Gaz Métro reached an agreement in 2014 for the purchase and injection of Renewable Natural Gas (RNG) produced in the City's RNG facility. Under the agreement, Gaz Métro will purchase up to 13 million cubic metres of RNG per year for a 20-year period from Saint-Hyacinthe. Saint-Hyacinthe started processing organic waste in 2010, and is installing new anaerobic digesters at the City's wastewater treatment plant. The existing digesters, which were used to treat sewage sludge, are being upgraded to accept multiple waste streams. The facility is under construction and will be operational in 2017.

Key Points

- This is a milestone project for the province as the City of St. Hyacinthe will be the first in Québec to take organic waste and turn it into RNG for its own use and for injection into the local pipeline. It should be noted that this is the first site to inject into a "local" pipeline operated by the local gas distributor. However, EBI Énergie has been injecting a "refined biogas" into the Trans Québec & Maritimes TQM transportation pipeline since 2003 and Progressive Waste has been injecting RNG into the TQM line since 2014. Both are landfills.

Technology

Greenlane Biogas was contracted by Filtrum Construction, a Quebec-based water and wastewater treatment infrastructure construction specialist, to supply two biogas upgrading systems and additional equipment to upgrade the City of St. Hyacinthe's wastewater treatment plant. Installation of this technology will allow the City to purify raw biogas to produce RNG from organic waste. The RNG that is produced by the City will be used to heat and fuel municipal buildings and vehicles. Surplus RNG will be sold to Gaz Métro.

Volume Processed & Energy Production

The Saint-Hyacinthe biogas facility will process 150,000 tonnes of organic waste per year and produce 13 million m^3 of RNG annually.

Cost

Total project cost of the facility was $50 million: $11.4 provided from the Green Municipal Fund; $20 million from the Government of Quebec; and $18.6 from the City of Saint-Hyacinthe.

Terrebonne, Quebec

Description

In September, 2013, Progressive Waste Solutions (formerly BFI Canada), a subsidiary of the Canadian company Progressive Waste Solutions, announced that it was investing $40 million to convert the biogas produced by the waste from Greater Montreal landfilled at the Lachenaie landfill in Terrebonne, Quebec into RNG. About one third of the waste from Greater Montreal is landfilled at the Lachenaie landfill.

Key Points

- The RNG produced will be injected into the Trans Québec & Maritimes Pipeline adjacent to the landfill in Terrebonne.
- This is the largest single RNG facility in Canada and one of the largest in the world, and a significant technological accomplishment.
- Progressive Waste Solutions (BFI Canada) has been injecting RNG into the pipeline since 2014, and in the absence of a viable Canadian market, sells all of the RNG to the U.S.

Technology & GHG Benefits

Progressive Waste Solutions operates the largest fleet of trucks running on compressed natural gas (CNG) in the waste collection and recyclable materials industry. The new plant is expected to reduce GHG emissions by about 1.2 million tonnes of carbon dioxide (CO_2) over a period of ten years.

Volume Processed & Energy Production

The facility is designed to process 10,000 cubic feet per minute of landfill gas and will produce enough RNG to fuel 28,000 homes with natural gas a year. Approximately 17,000 m3/hour will be used to power the equivalent of 1,500 heavy trucks for a period of twenty years, avoiding the consumption of 350,000 barrels of fuel oil per year.

Cost

Progressive Waste Solutions invested $45 million to upgrade biogas into RNG and inject it into the natural gas pipeline.

Hamilton, Ontario

Description

The City of Hamilton, Ontario has been using anaerobic digesters to process sludge from its Woodward Avenue Wastewater Treatment Plant for a half-century. In 2006, it stopped flaring off most of the biogas and began using it to fuel a combined heat and power (CHP) plant that generates electricity, provides space heating and warms the digesters. More recently, it also began purifying the biogas into Renewable Natural Gas (RNG). RNG is identical in performance to the conventional fossil fuel, which is injected into the local pipeline system operated by Enbridge.

Key Points

- The CHP facility is owned, operated and maintained by Hamilton Renewable Power Inc., which is owned solely by the City of Hamilton. The RNG purification plant is owned directly by the City of Hamilton. Both the CHP and the RNG facility are managed by the City's Energy Initiatives team along with its service providers Toromont and HCE energy.
- The City has an M13 agreement with Enbridge. Under this arrangement Enbridge does not pay for the RNG; it charges the city a small fee to transport the gas. The City then buys the remainder of its required natural gas supply for all corporate buildings and operations (~1,800GJ per day) by conventional means, less the amount of RNG is has injected into the pipeline. The City paid for the purification and injection facility built to Enbridge gas quality specifications and pays all ongoing operating and maintenance costs.
- Biogas, CHP and RNG production are all part of the City's ambitious plan to make the Woodward Avenue Wastewater Treatment plant a zero-net-energy user. Additional plans are in place to enhance these systems as market opportunities arise.

Volume

The CHP facility, when operating at maximum capacity, consumes 15,300 cubic meters (m^3)/day of biogas of the current daily biogas production of >20,000 m^3. The RNG facility, with daily capacity of 10,000 m^3 of RNG, was sized to handle the forecasted biogas supply and the modular design enables expansion. The treatment plant's daily capacity is increasing from 108 million to 132 million gallons/day. The expansion will generate additional sludge, so more digesters and dewatering centrifuges are also planned. These changes are expected to raise biogas production by 175 percent, to a daily average of about 30,000 m^3 within 20 years.

Cost

The recently completed *Biogas Enhancement Project* at the Woodward Wastewater Treatment Plant cost approximately $30 million and was undertaken using an Engineering-Procurement-Construction Management (EPCM) project delivery. This project included design and construction of a sludge thickening building, with the RNG facility portion of the project costing under $5 million. The City was able to leverage several initiatives, including innovative planning and design as well as leveraging provincial and federal government infrastructure funding to achieve environmental benefits, create revenue, validate new technology and provide a full-scale demonstration facility for an emerging renewable biogas market in North America.