

## **Engineering Creates Opportunity from Waste**

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Canadian households generate nearly 13 million tonnes of waste every year, more waste per capita than any of our peer countries, even the US. Recycling programs reduce a small portion of garbage that goes into landfills, but the trash keeps piling up and so has the cost of managing that waste: Canadian taxpayers spent a total of \$2.6 billion in 2008 on waste management. In addition to the expense comes a concern for the impact our garbage has on the environment, and cash strapped local governments are now being pushed to find ways to make disposal and treatment of garbage both cheaper and more sustainable.

Engineering that uses waste to create gas and generate clean power provides the most cost effective and environmentally friendly way to deal with the mountains of trash we create. However, if trash disposal is going to be made cheaper and more sustainable, engineering entrepreneurs need to first provide proof of concept before these solutions will be employed on a large scale. Partnerships between BC area businesses, institutions, and municipalities are in the forefront of implementing technologies that are transforming the way we handle waste.

### **Metro Vancouver's Waste-to-Energy Facility**

As part of its Zero Waste Challenge, Metro Vancouver is on the way to achieving the goal of diverting 80% of its trash by 2020. Through a partnership with Covanta Energy Corporation, 285,000 tonnes of garbage is used to generate steam and electricity every year at the region's Waste-to-Energy facility in Burnaby. The steam is then sold to a paper recycling facility, and the electricity, enough to power 15,000 homes, is fed into the BC Hydro grid.

### **Harvest Power Energy Garden**

Collaboration is often necessary to offset the initial costs of implementing new technologies. Harvest Power partnered with regional stakeholders and, using its own financing as well as supporting grants from the Government of Canada's Clean Energy Fund and the BC Bioenergy Network, built an Energy Garden in Richmond that biologically turns organic waste into power. The plant is expected to be fully operational by April/May 2013, with the facility initially taking 27,000 tonnes/year (with a capacity of 40,000 tonnes/year) of food scraps and yard trimmings collected from local residents and commercial clients. The Energy Garden will generate 2 MW combined heat and power with the majority of the electricity being fed into the BC Hydro grid. As a byproduct, the process produces compost, a natural soil amendment for use in public works, gardens and landscapes.

## **UBC's Bioenergy Research & Demonstration Facility**

UBC's 27 Million dollar Bioenergy Research & Demonstration Facility is the first exhibition of a large scale heat and power system fueled entirely by biomass. The facility is run in collaboration with Vancouver-based Nexterra Systems Corporation and GE Energy. Gasification technology developed by Nexterra turns biomass into a clean synthesis gas that is then burned to produce steam. Impurities in the gas can also be filtered out and the conditioned gas fed into a GE Jenbacher engine that drives a generator to produce electricity.

## **The Cowpower Initiative**

Cowpower's initiative allows anyone in BC to voluntarily pay 4 cents more per kWh to support the installation of anaerobic digesters on dairy farms, equipment that is too expensive for individual farmers to purchase. With a similar process to the Harvest Power Energy Garden, cow manure and food waste are used to create methane gas. The methane gas drives an engine to generate electricity and heat to provide for the farm's own energy needs, with a sizable amount of surplus electricity fed back into the grid. Currently, Cowpower supports one farm, the Bakerview EcoDairy farm in Abbotsford with 55 dairy cows.

The business models of traditional garbage hauling and landfill companies are typically dependent on per tonne tipping fees. Forward thinking companies, however, are looking for resourceful ways to increase revenue streams from the waste they collect by turning rubbish into sources of renewable energy. The collaborations and partnerships happening in the BC area are providing proof of concept that these new methods are economically feasible, helping to make waste management more sustainable while creating lucrative business opportunities for the waste management industry.

Waste management solution providers can be found at: [www.greenpagesdirectory.net](http://www.greenpagesdirectory.net).



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