



The following seventeen Renewable Energy projects have been invited to go to the CCEMC's full project proposal stage.

### **Lancaster Wind Systems Inc.**

#### Taber Validation Project

Lancaster Wind System (LWS) is a state of the art wind generation and energy storage system. Through the use of proprietary Compensating Transformers, LWS converts wind hydraulic energy to nitrogen energy for storage and release at a future time. The initial project will be a 3.15 MW (3.5 MVA) electrical generation demonstration project located in the Taber area of Alberta.

### **Strathcona County**

#### Strathcona County's Community (District) Energy System - GHG Reduction Strategy via Biomass Combustion (Bioheat) Demonstration and Testing Facility

This project will accelerate the pace of BioHeat (energy from surplus biomass) adoption in Alberta by utilizing agricultural (straw, oat hulls and feed mill residues) and other biomass (commercial waste wood) residues currently available for energy production. This will demonstrate simple and cost effective systems for converting biomass to energy. The overall objective is to set up and operate a BioHeat demonstration and testing system, a first of its kind in Alberta, incorporating densification of feedstock (pelletizing), thermal heat generation and distribution from a biomass combustion boiler as a base load in the existing district energy system in Strathcona County that provides heat to municipal, commercial and residential buildings.

## **Lafarge Canada Inc.**

### Replacement of Fossil Fuel with Renewable Energy from Biomass

Lafarge proposes to use a biomass based fuel as a partial replacement for coal that is currently used in the cement manufacturing process. The biomass based fuel will be produced from materials currently being landfilled.

To utilize this Renewable Energy, Lafarge will need to install purpose built equipment at its Exshaw cement plant to allow for the delivery, unloading, storage and feeding of the renewable fuel to the cement kiln.

The main benefits of this project are as follows:

- 1) The diversion of waste from landfill resulting in reductions of future methane emissions from the landfill and,
- 2) The partial displacement of fossil fuels with renewable fuels used in the manufacture of cement at Lafarge's Exshaw plant.

## **West Fraser Mills Ltd.**

### Bio-Methanation with Power Generation

The project encompasses capturing the stored carbon energy within the wastewater generated at the mill. This carbon rich stream is anaerobically digested as a pre-treatment step ahead of the aerobic treatment system to produce a methane rich biogas. The remaining wastewater is aerobically treated, requiring less energy. The biogas is then processed through turbo generation to produce electrical power. This generated power offsets coal power currently drawn from the grid. The waste heat from the power generation is captured and utilized directly in the pulp dryers to displace natural gas. Thermal energy recovered from cooling the generators reduces the natural gas required to make hot water via the boilers. GHG's reduced by 25,145 tCO<sub>2</sub>e/yr.

## **Alberta Newsprint Company**

### Kaybob Oil and Gas Green Energy Partnership

This project creates a cogeneration facility integrated into an existing remote natural gas processing plant. Logging waste residuals from the ANC and 4 surrounding FMA's (up to 241,500 BD Tonnes/year on a sustainable basis) will be burned generating both steam and electricity for the natural gas plant. The cogeneration facility will generate a net output of 11.4 MW of electricity and reduce natural gas consumption by 440 Million Btu/hour, and run at approximately 65% efficiency. Annual estimated CO<sub>2</sub> offsets are 194,000 tonnes for natural gas reduction and 61,600 for electricity from the grid (less 4,737 tonnes due to transportation of biofuel and ash). This represents a first integration of the Forest Products and Oil & Gas Industries.

## **Canadian Bioenergy Corporation**

### Lloydminster Biodiesel Joint Venture Project

Canadian Bioenergy and Archer Daniels Midland Company plan to construct a 265,000 litre/year canola biodiesel production facility at ADM's oilseed processing facility in Lloydminster, AB. The activities in this EOI will enable the capital equipment purchase, construction and commissioning of this advanced facility. This project will address the problem of increased emissions from the diesel fuel pool by providing a sustainable replacement fuel of high quality. The project will create approximately 778k tonnes of CO2 reductions/year when operating at full capacity. This project will help create a viable canola biofuels industry that will not detrimentally impact food availability in Canada or abroad.

## **Genalta Power Inc.**

### Geothermal Heat from Water Cut

Genalta Power proposes in conjunction with Pengrowth Energy and Pennwest Petroleum to demonstrate commercially viable technology to produce electrical power from the co-produced geothermal fluids produced from oil batteries. The project proposes to use the geothermal heated water brought to the surface as a bi-product of oil production in conjunction with a technology that reduces or eliminates the heat exchange pinch point of traditional organic rankine cycle geothermal-based systems. By eliminating the pinch point the project estimates that 20% to 40% more energy can be extracted thus returning the geothermal fluids to the formation at a much lower temperature.

## **Nexen Inc.**

### Nexen Hand Hills Wind Power Project

The Nexen Hand Hills Wind Power Project is a proposed renewable energy development of up to 80 MW. The Project is well advanced from a technical, environmental and public consultation perspective. An extensive multi-tower wind data collection and analysis program has occurred over a period of four years, and detailed engineering design work is largely completed. The Project is targeting construction in 2012, subject to the availability of a transmission expansion program that is well underway. The Project will be balance sheet financed by Nexen, Inc. Final sanctioning and a decision to proceed is contingent on acceptable Project economics, which are challenged by high capital costs and depressed power prices in Alberta.

## **Coastal Hydropower Corporation**

### Carseland Very Low Head (VLH) Small Hydro Project

Coastal Hydropower Corp (CHC) is an Alberta company founded to develop small-scale hydro facilities using a new, highly efficient, fish friendly Very Low Head (VLH) water turbine technology invented in France. CHC has undertaken a program to adapt the VLH technology for commercial deployment in North America starting with a demo project at Alberta Environment's Carseland Weir on the Bow River. This project will take 2 years and \$5.5 million to modify the VLH turbine design for cold climate operation; and retrofit two 390 kW VLH units in the weir sluiceway, requiring only minor modifications. The project will generate 6,630 MWh /year and GHG reductions of 5,834 tonnes CO<sub>2</sub>e/year (233,360 tonnes CO<sub>2</sub>e over the 40 year life of the project).

## **Kyoto Fuels Corp.**

### Kyoto Fuels Corporation Biorefinery Expansion - K2

Kyoto Fuels (Kyoto) is expanding their present biodiesel production with a 70 MLY facility to be co-located with their present operation undergoing commissioning. The \$30M facility will commence construction in early 2011, taking 18 months to complete. Support for the project consists of a significant investor placement, provincial governmental grants, and both provincial and federal incentives. The proposed facility will help meet the demand set in place by the RFS of Alberta, BC, Manitoba and federal governments. In addition to biodiesel, Kyoto will generate a significant quantity of saleable carbon offsets. A 3rd party pre-validation has been conducted on the existing plant, indicating an offset generation potential of 191,000 MT/yr.

## **High North BioResources Limited Partnership**

### High North RTP Project

High North BioResources LP will construct, own and operate a 400 tpd biomass pyrolysis facility at the Tolko High Level sawmill in High Level, AB. The project will utilize wood waste from the sawmill which is currently incinerated in a conical burner with no energy recovery. Wood waste will be converted into pyrolysis oil using Ensyn Renewables' proprietary RTP technology. Pyrolysis oil will then be used to generate power in a series of modified diesel engines. Waste heat will be recovered and used for drying lumber, displacing natural gas currently used. The project will reduce GHG emissions in Alberta by 142,005 t CO<sub>2</sub>e/yr. The project will enable the sawmill to decommission the conical burner, resulting in improved local air quality.

## **Growing Power Hairy Hill Lp**

### Growing Power Hairy Hill Integrated bioRefinery

The Growing Power Hairy Hill (GPHH) Integrated bioRefinery project is the union of a large scale bioGas (waste to energy) production facility with a small-scale bioFuels production facility - as well as other operations such as fertilizer manufacturing and bioFuel feedstock production - where interoperational synergies maximize the environmental performance and minimize the operating costs. In other words, GPHH will produce ethanol with an unmatched energy balance of 7.6:1 and an equally unmatched carbon intensity of -8g/MJ, making GPHH a net offsetter well in excess of 100,000MTCO<sub>2</sub>e/year, all while demonstrating that bioFuel production can be profitable at any scale if operations take advantage of available synergies to reduce their costs

## **MASCOMA Canada**

### Cellulosic Ethanol and Xylose Production

Mascoma Canada and its partners propose to construct a facility that will produce cellulosic ethanol and coproducts from hardwood biomass. The facility will demonstrate ethanol production from biomass feedstocks, with specific attention to Alberta-hardwoods. The project will be the first phase of a commercialization strategy in Alberta. The project will demonstrate improved environmental benefits, including a reduction in greenhouse gas emissions and a reduction in water consumption from conventional processes, as well as continue development of the renewable energy sector in Alberta and Ontario.

## **CleanGen Power Corporation**

### CleanGen/HFH 6 MegaWatt Wood Gasification Power Project

CleanGen Power Corp., jointly with Habitat For Humanity, is going to design and construct a six megawatt wood-gasification power plant located on our 45-acre site at Enoch First Nation. Using wood pyrolysis, we will consume 60,000 to 80,000 tonnes of construction, renovation, and demolition (CR&D) waste wood each year. Diverting this waste wood from landfill has a significant effect on greenhouse gas emissions, as wood decomposing in landfills produces methane gas, which is a much more effective greenhouse gas than carbon dioxide. Our first six megawatt plant will reduce the equivalent amount of CO<sub>2</sub> released into the atmosphere by 241,700 tonnes per year.

## **Greengate Power Corporation**

### Halkirk I Wind Project

The 150 MW Halkirk I Wind Project is being developed on 28,000 acres of private land in Central Alberta. The project has an excellent wind resource based on over three years of on-site meteorological data. The Project is 11 km from a 240 kv transmission line with available capacity and Greengate has obtained approval to connect to this transmission line from the AESO. The project is fully permitted, including approval by the Alberta Utilities Commission the anticipated in-service date is 2011. The Halkirk I Wind Project will be Alberta's largest operating wind energy project and will provide clean electricity to 50,000 Alberta homes. The Project will create more than 100 jobs during construction and 10 full-time jobs during operations.

## **Biosphere Technologies Inc.**

### Lacombe Biorefinery

Biosphere Technologies Inc. is developing the Lacombe Biorefinery, an international demonstration project. The Alberta company has invented a new "BioRefinex" process designed to reduce the disposal of animal carcass materials and food wastes which are now landfilled or incinerated, creating serious greenhouse gas emissions and soil and water pollution. This "thermal hydrolysis" process utilizes saturated steam reactors to denature organic materials and create safe, value-added fertilizers and nutrient feedstocks for anaerobic digester biogas production. The process, certified internationally for the destruction of all disease agents, is now the safest, validated process in the world providing health, environmental and economic benefits.

## **Parks Canada Agency**

### Saskatchewan Crossing Propane Displacement Hydrokinetic Project

The Saskatchewan Crossing Propane Displacement Hydrokinetic Project will install a low flow, off-grid, 25 kW capacity, in-stream turbine in Banff National Park.

The objective of this project is to demonstrate the capabilities of this hydrokinetic system to deliver safe, reliable, clean, quiet and low maintenance alternative to the current propane generator. Parks Canada is using this project to determine the feasibility of propane and diesel displacement in other park sites.