

Leading the industry forward

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Across the country, biomass research is moving forward at a strong pace. Most provinces now have extension personnel and research projects relating to a variety of topics, and some have one or more dedicated research centres, where cutting-edge technology and ideas can be tested and developed. This support for the bio-energy industry is important, says Dr. Fernando Preto, executive director of the Canadian Bioenergy Association. “These projects help move the sector forward, supporting the private sector to continue to innovate and build Canada’s reputation as a bio-energy leader.”



Alberta Agriculture and Rural Development supports many ongoing biomass projects. One of note involves the fractionation of cereal grains and pulses to separate proteins and starches. Fractions not used in food products have a variety of uses in the production of ethanol, plastics, films and cosmetics.

One of these projects, in Alberta, will help drive development of new biomass products by connecting developers with those who can supply feedstock. Through Alberta Innovates (an agency described as a new “collaboration system for innovation”), the final touches are being put on the Bio-Resource Information Management System (BRIMS). This easy-to-use, web-based resource will identify all potential available sources of forestry and agriculture biomass in the province, in support of stimulating the development of new bio-industrial projects that depend on a reliable source of raw materials.

Alberta Innovates is also supporting research into how wood pulp fibre can be incorporated into plastic suitable for moulding into automotive parts. In partnership with the former Alberta Forest Research Institute and other players, a new facility in Alberta will soon be generating parts for vehicle interiors made of wood and agricultural fibre.

Also in the arena of composites, a sister agency called “Alberta Innovates Technology Futures” (AITF) has just launched a \$5.5-million Nanocrystalline Cellulose (NCC) pilot plant. The Edmonton facility was opened in September 2013. Made from plant material, NCC has properties that include electro-magnetic response and, at the nano-scale, a large surface area. One ounce of NCC added to a pound of plastic makes a composite material up to 3,000 times stronger than the plastic alone. The pilot facility will produce up to 100 kilograms of NCC a week at the quality researchers need to fully explore its potential. Beyond using NCC in automotive components and packaging, other products that can be developed from this forest industry-derived material include paints, health care products and energy extraction devices.

With support from AITF, hemp is now being used to make insulating, breathable building materials which meet or exceed the functional properties of current building materials and insulation. Hemp is also being investigated for use in plastic composites. In addition, AITF is supporting Quebec-based firm Logistik Unicorp (a manufacturer of uniforms for police and emergency services personnel) to test AITF-grown hemp as a textile fibre. The agency, in conjunction with the Alberta Biomaterials Development Centre, is also helping Alberta-based firm Stemia establish North America’s first hemp fibre processing plant near Lethbridge.

Alberta Agriculture and Rural Development (AARD) supports many ongoing biomass projects. One of note involves the fractionation of cereal grains and pulses to separate proteins and starches. Fractions not used in food products have a variety of uses in the production of ethanol, plastics, films and cosmetics, says AARD Program Manager Carol Sauchuk. Another project, called “Waste Reduction and Utilization,” involves matching Alberta companies with agricultural byproducts in higher-value applications such as energy, fertilizers and materials. This initiative has recently included the testing of oat hulls (a byproduct of the milling process) for energy applications, and value-added applications for biodigestates (manure biodigester residuals).

British Columbia

FPInnovations is involved in forestry and biomass research projects in several regions of Canada. In B.C. (although the company is doing similar work in Quebec as well), staff is currently looking into how to establish better bioenergy supply chains. For example, the integration of chippers is being investigated to help boost chips as a use for biomass alongside products like hog fuel and pellets. Dr. Dominik Roser, an FPInnovations research leader in the company’s forestry feedstock division, says this project is very important as there is a large disconnect between current B.C. wood chip production and the market demand in Europe. The company is also looking at how harvest residues can be used in pellet production.

In addition, Roser and his colleagues are also looking into how to remove salt contamination from B.C. logs that have floated in sea water. He notes that residues from these logs have the potential to be used for pyrolysis, pellets, hog fuel and more if the salt can be removed.

Ontario

One biomass research project of note funded by the Agricultural Adaptation Council and recently

implemented by the Ontario Federation of Agriculture (OFA) was focused on developing an innovative agricultural biomass value chain. OFA spokesperson Charlie Lalonde says this project enabled farmers to much better understand how to process straw and other materials to fill the needs of existing biomass companies, such as ethanol and pellet manufacturers, and how to best process materials for future use, perhaps in automobile manufacturing, biochemical production and more. The project, in turn, also allowed companies to better understand what biomass materials Ontario farms have to offer. A second specific technological study looked at how farmers should be positioned to enter the pyrolysis (biochar) market. Lalonde says this project found that mobile on-farm charring looks to be the best bet.

The Biomass Innovation Centre at Nipissing University in North Bay provides technical and business support to small and medium-sized firms in northern Ontario at very attractive rates. It allows these businesses, many of which don't have the resources to be able to conduct pre-feasibility/baseline studies to determine if an idea is worth investigating further. The Centre has also just finished "A Roadmap for Biomass Industry Development in the Blue Sky Region of Ontario," which identifies opportunities, product options and more.

Maritimes

At the Canadian BioEnergy Centre at the University of New Brunswick in Fredericton, many biomass projects are on the go. One involves a practical look at growing Canada's domestic pellet heating market through assessing how much can be saved through using new European heating systems. A 56 kW state-of-the-art pellet-fired hot water heating system was installed at a rural New Brunswick recreational hall and monitored over one year. The hall had been heated by oil and electricity previously. The study results show that with the new pellet system, annual savings of between \$1,500 and 2,000 per year could be expected, with further savings of about \$800 per year once bulk delivery of pellets becomes available in the area.



In a recent study conducted by the Canadian BioEnergy Centre (CBEC) at UNB, a 56 kW state-of-the-art pellet-fired hot water heating system was installed at a local rural New Brunswick recreational hall and monitored over a one-year period.

The study also found that system has excess capacity and can be easily expanded. Creating a small local district heating system and selling hot water to adjacent buildings would create a new revenue stream and further savings. In the larger picture, the study found that if only five per cent of the oil or electrically heated buildings in Canada were converted to pellet-fired systems, this would translate into 1.4 million tonnes of new pellet demand, 1400 jobs and \$378 million into the Canadian economy. The Canadian BioEnergy Centre will also complete a three-year study to evaluate the potential of using coppice as a biofuel in the Maritimes in March 2014.

Innovacorp is Nova Scotia's early-stage venture capital organization. The Innovacorp Demonstration Centre (IDC), just getting up and running near Liverpool, is said to be unlike any facility in Canada. This facility will allow innovators and researchers to do large-scale tests on products before bringing them to market. The 88-acre industrial site offers thermomechanical (Tmp) lines, a chip handling system, liquid storage tanks, environmental effluent system and more.

The Centre will also offer access to the raw materials needed to demonstrate and develop bio-resource technologies. The province's Crown-owned land in the western region is now 1.5 million acres. IDC will have access to allocations from these lands, and a significant fibre supply is also available from the private woodlot owners in the region.

- See more at: <http://www.canadianbiomassmagazine.ca/news/leading-the-industry-forward-4459#sthash.6A6tPunG.dpuf>