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THE EDGE

The right people needed to operate a successful bio-energy system

By Tony Kryzanowski

The success or failure of a bio-energy project to provide heat and/or power to municipal buildings or rural businesses can come down to one critical factor: people. Without getting buy-in from the individuals tasked with operating bio-energy systems on a daily basis, no amount of technology will result in a successful project.

Toso Bozic, Bioenergy Specialist and Agroforester with Alberta Agriculture and Rural Development, appreciates the genuine enthusiasm that is often expressed by political leaders and business owners who are eager to implement bio-energy systems. But they should be wary of proceeding simply because there is financial support to do so without considering carefully who—within their organization—will actually run the system. This can lead to challenges down the road. It is important to ensure upfront that there is the same level of enthusiasm among employees given the tasks of investigating how to properly tie a bio-energy system into the electrical grid as well as those charged with operating the system. Bozic says this is often where projects struggle if "buy-in" among employees is lacking.

First, because operating a bio-energy system is different from a conventional fossil fuel system, employees require adequate training to operate a bio-energy system on a consistent basis. Second, they must have adequate time to operate the system. If they are already busy with their normal duties, they may be less than enthusiastic about accepting additional responsibilities. Third, it helps if they have a strong belief in the value of a bio-energy system as a greener alternative to a conventional fossil fuel system.

Bozic points out that with technical advances in proven bio-energy systems, operating these systems is not particularly complicated—but it is different. For example, consistency and dependability of the fuel supply chain is critical for the boiler to operate at optimum performance, and someone has to monitor it on a daily basis to ensure that this occurs.

In terms of committing human resources to operate a bio-energy system, municipalities and rural businesses have two options. Each option should be considered carefully during a project's study phase. The first option is to operate the bio-energy system internally, but carefully select employees who are enthusiastic about bio-energy, have some technical skills, and who are willing to learn to operate both the supply chain that supplies the fuel to the system as well as the system itself.

Bozic says under this scenario, system owners should ensure that the supplier will provide adequate and ongoing training to employees, as well as after-sales support in the operation of their systems as part of the supply agreement. This includes having local individuals who are qualified and trained to repair the system if a problem should occur.

"A bio-energy system is a mechanical project," says Bozic. "It's not like natural gas where you have a pipe leading to the property."

The second option may be to install and operate a bio-energy system on a turnkey basis, with the company that supplies the system both installing and operating the system. Under this scenario, a variety of options are available. The most basic

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is for the municipality or business to simply supply the space to install the system and the wood resource at a cost to the system installer, with no further participation.

A more involved relationship is where the supplier and system purchaser have a partnership arrangement where there is shared liability and profit, but where the equipment supplier still operates the system, thus relieving the municipality or business of committing staff to operate it.

Bozic adds that there are at least a couple of well-established, credible, bio-energy equipment suppliers who have shown an interest in doing business in Alberta and Canada, and they have gone a long way to help those pilot projects that have been established to succeed.

“It is important to ask for references, ask what they offer in terms of training and after-sales support, and what guarantees they can provide in terms of the performance of the technology,” says Bozic. “Any serious business will actually provide you with that in advance.” He adds that supply companies will often also offer to train local tradespeople, so they can help maintain the system.

The right equipment is certainly needed, but a successful bio-energy project requires motivated employees to run the operation.

For more information about the steps required to establish a successful bio-energy project and potential support for conducting a pre-feasibility study in Alberta, contact Toso Bozic at toso.bozic@gov.ab.ca

Canadian Wood Fibre Centre unveils new Resource Assessment Program for FPInnovations

By Tony Kryzanowski

The Canadian Wood Fibre Centre (CWFC) has unveiled its 2012-2017 Resource Assessment Program for FPInnovations. It will guide CWFC upstream research in the forest value chain over the next five years. The program will focus specifically in the areas of resource characterization, production, and optimization.

CWFC is one of four divisions at FPInnovations, Canada’s forest products research institute, and its mandate is to conduct research in the area of resource assessment. The new research program is a framework developed under the guidance of a National Program Advisory Committee consisting of industry and government representatives.

The purpose of the program is to help the forest industry develop a more comprehensive understanding of Canada’s wood basket in terms of its location, quantity, attributes, intended use, best practices and cost with the goal of maximizing the value of the wood fibre and enhancing the competitiveness of the Canadian forest sector.

“Research within the Resource Assessment Program is being conducted in all different forest types and in all regions of Canada,” says Derek Sidders, CWFC Regional Coordinator for the Prairies, and a member of the committee that developed the research program. “The CWFC is national in scope but we are regional in our delivery. In fact, many of our projects span right across Canada.”

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He adds that CWFC wants to become the national authority on wood fibre as it relates to resource characterization, production and optimization by 2017.

Because many of the CWFC's 70 staff members are housed within the same facilities as Canadian Forest Service (CFS) researchers in centres across Canada, there are ample opportunities to collaborate on both CFS and FPInnovations research projects as it relates to resource assessment. CWFC also leverages its research activity with other organizations by developing provincial, industrial and academic partnerships, where there are areas of common interest.

The new FPInnovations Resource Assessment Program builds on many research projects established in the last program launched in 2009. But it has a more refined focus on future outcomes, based on what has been discovered so far as well as the launch of new research identified as priorities by industry. It has set specific research objectives in all three areas of resource characterization, production and optimization.

Regarding resource characterization, which relates specifically to Canada's forest inventory, research will focus on accurately assessing Canada's forests in terms of growing capacity, principal fibre attributes and how the fibre will change over time. This will be accomplished by developing tools and techniques, in some cases featuring technologies such as Light Detection and Ranging (LiDAR) remote sensing data, for semi-automated species identification, improved inventory resolution, development of spatial productivity measures and spatial supply forecasts, and enhanced forest inventory systems and inventory tools for stewardship.

In the area of resource production, the research focus will be on wood fibre genomics, biotechnologies and short rotation woody crops for producing desirable fibre attributes. Outcomes from research in this area will result in tools and techniques for identifying genetic markers associated with desirable wood traits, somatic embryogenesis systems to produce trees with desirable fibre attributes and uniform quality, and management regimes to supply fibre for existing and emerging product streams.

And with regards to resource optimization, the research focus will be on applied research solutions for improving forest management decision making and enhancing the forest value chain. Researchers will focus on developing robust wood fibre attribute yield curves for natural and managed stands, models to evaluate and optimize silvicultural systems, decision support tools that optimize harvesting systems and logistics, and forest management models that incorporate experimentally-verified models.

For more information about the CWFC's Resource Assessment Program for FPInnovations, contact Derek Sidders at (780) 435-7355 or dsidders@nrcan.gc.ca.

Industry provides direct input into Biorefining Conversions Network research plan

By Tony Kryzanowski

Forestry-related research conducted by the University of Alberta-based Biorefining Conversions Network (BCN) has entered a new phase with five well-defined projects now approved for the coming year, based on direct feedback from some of Alberta's largest forest products manufacturers.

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Alberta Innovates Bio Solutions (AI Bio) has provided BCN with $3.8 million over three years to help with its bioconversion research program focused on forestry and agriculture feedstock.

“AI Bio’s investment in the Biorefining Conversions Network helps to advance Alberta’s bioeconomy,” says Dr. Christine Murray, Director of Agricultural Technologies at Alberta Innovations Bio Solutions. “The network’s strong relationships with industry are important in spurring innovations across the agriculture, forest and oil and gas sectors.”

Forestry projects make up nearly half of the network’s entire approved research work plan for the coming year. They were identified as priorities through a series of roundtable meetings beginning last fall with five of BCN’s forest industry partners. These companies were very involved in developing Alberta’s new Forest Products Roadmap, a strategy developed by industry and the Alberta government to help shape the sector’s future. The industry partners working with BCN are Weyerhaeuser, Al-Pac, Daishowa-Marubeni International (DMI), West Fraser Timber, and Alberta Newsprint.

“The roundtables were both an introduction of the forest companies to the research community on how we might work together and to encourage them to think about what byproduct streams they have at their facilities, which we might be able to investigate or extract additional value,” says Dr. David Bressler, Executive Director of BCN. He adds that the network welcomes any company interested in joining the industry guidance group to help establish and implement BCN’s research agenda.

What the network has focused on historically is technologies to convert biomass to fuels and chemicals that are compatible with Alberta’s non-renewable resource industries, using biological, thermal and chemical processes to achieve those conversions. The network also conducts economic analyses on how feasible it is to implement the technologies.

As part of the roundtable process, BCN also reached out to potential end-users of the chemicals and fuels that could be captured from forestry byproduct streams.

“We talked to some of the major, multinational energy and petrochemical companies about what they saw as opportunities, and what it would take for them to be interested in products coming from the forestry space,” says Bressler. These ideas were shared with the network’s forestry partners.

“We were able to identify five strategic projects that interested the forest industry, would have the interest of other stakeholders in other sectors, and where we answer some of the research questions with teams formed through our Campus Alberta approach,” says Bressler. All projects were scientifically vetted to establish their validity and value as research projects.

The largest project under the current work plan is an effort to characterize wood industry byproducts such as forest slash and the turpene chemical stream to the level of detail that is required by the chemical industry, so that it can evaluate the potential use of these raw materials in the production of bio-fuels and bio-chemicals.

“Creating this level of detail is like stage one to seeing what kind of opportunities exist for what else we can convert the byproducts into,” says Bressler.

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The second project investigates tall oil, a byproduct of pulp manufacturing that is currently recovered from the wood fibre and burned as a low value fuel. The purpose of this BCN research project is to investigate the opportunities to convert the tall oil into higher value hydrocarbons, solvents and even jet fuel.

The third project investigates potential, higher value uses for the ash generated by biomass burners used by forestry companies to produce power and heat in their operations. Researchers will look specifically at opportunities through collaboration with the aggregate and cement industry to use that ash to produce building materials.

The fourth project takes particular aim at turpene byproducts generated from the pulping process, which historically have been used to produce products like turpentine. At present, most of the material is burned.

The fifth project investigates a unique way to pull lignin, cellulose and hemicellulose apart. All three are byproducts of the pulping process and have the potential to be converted into higher
value bio-products.

For more information about the BCN research work plan and potential forest industry participation, contact Dr. David Bressler at (780) 492-4986 or david.bressler@ualberta.ca. For more information about BCN, visit http://www.bcn.ualberta.ca/.