PROJECT REPORT

Bioenergy Solutions for Community Sustainability

After the Mountain Pine Beetle: Developing an Economic Base for the Future

Workshop Proceedings

Prepared for:
Resources North Association

Prepared by:
FORREX – Forum for Research and Extension in Natural Resources

FORREX
Supporting Sustainable Natural Resource Management Decisions

Bioenergy Solutions for Community Sustainability

After the Mountain Pine Beetle: Developing an Economic Base for the Future

Workshop Proceedings

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FORREX
Supporting Sustainable Natural Resource Management Decisions

CONTENTS

EXECUTIVE SUMMARY **3**
ACKNOWLEDGEMENTS **6**
1 CONFERENCE PRESENTATIONS – MARCH 3, 2010 ..... **7**
Conference Opening ~ Welcome to the Territory **7**
Setting the Stage **7**
The New Low-Carbon Economy: Where does energy development through forest fibre fit in? **7**
Bioenergy and Community Heating Overview: Opportunities and Challenges **9**
Accessing Forest Fibre **10**
BC Treaty Commission Perspective on Treaties, First Nations, and the Forest Industry **11**
Case Study: Baldy Hughes Heating System **11**
Case Study: City of Yellowknife – Community Energy **13**
Pool/arena complex business case *14*
Under the Microscope: A Review of Biomass Energy Projects **18**
Case Study 1: City of Revelstoke, BC: District heating system *19*
Case Study 2: Nakusp, BC: School heating project *19*
Case Study 3: Oujé-Bougoumou, QC: First Nations community: District heating system *19*
Case Study 4: Edmonton, AB: Wood working facility implements industrial biomass heating system *19*
Case Study 5: Council, Idaho: School heating system *20*
Case Study 6: Craig, Alaska: Aquatic centre heating system *20*
Case Study 7: Burns, Oregon: Small hospital heating system *20*
Case Study 8: Nazko, BC: School heating system *20*
Community Engagement: Lessons from the Trench **21**
Finding the "Best Fit" for your Community **21**
Community Information Guide: A Review **23**
Community Needs and Values: Adapting your Projects to Meet Expectations **24**
Case Study: Pristine Power *24*
Case Study: Tsilhqot'in Bioenergy Project *26*
2 CONFERENCE PRESENTATIONS – MARCH 4, 2010 ..... **28**

Future Forest Strategies to Support Bioenergy Solutions **28**
Tools for Accessing Fibre **31**
Burns Lake Energy Working Group **32**
Feedstock Supply Logistics: Challenges and Opportunities **33**
Partnership Models – What are the Possibilities? **35**
Case Study: Lhtako Energy Corporation- Partnering for Success **36**
A Community in Action: Integrating Biomass Conversion into Green City Planning in Quesnel **37**
Review of Technologies **39**
Combustion *39*
Gasification *39*
The Economics of Biomass Energy **40**
Funding Opportunities through BC Hydro **41**
Funding Opportunities through Community Futures **42**
Funding Opportunities through All Nations Trust **43**
Funding Opportunites and Financial Considerations **44**
Resources and Follow-up Support **45**

EXECUTIVE SUMMARY

On March 3 and 4, 2010, Resources North Association and FORREX held a workshop in Prince George, BC, to explore bioenergy opportunities for Northern communities facing the impacts of the Mountain Pine Beetle epidemic. Approximately, 100 attendees discussed the current and future position of the biomass energy sector in the context of the current low-carbon economy, as well as this emerging industrial sector's challenges and opportunities.

A number of speakers addressed the difficulty in accessing fibre and discussed strategies to overcome this challenge. Options presented included partnering with existing licensees to take advantage of sawmill residuals or to mutually benefit from "stand-as-a-whole" pricing strategies and/or receiving licenses. In addition, participants discussed using BC Timber Sales Innovative Timber Supply Licenses as a resource.

The take-home message for effective fibre planning was to keep operations small and to diversify one's fibre supply plan. Access to fibre after the supply of beetle-killed wood has been exhausted was also a source of concern, and future forest strategies were discussed as a way of securing new bioenergy fibre sources. Future management plans could include accessing bioenergy fibre from standing timber due to fire or insect kill, residuals from silvicultural activities or fibre plantations containing short-rotation crops. Fibre access was also explored from a First Nations perspective in the context of treaty negotiations.

When considering a biomass energy project, communities should engage in planning exercises to determine their existing assets and capacity for these types of projects. Understanding the economics of the project was an important topic at the workshop that fuelled much discussion among audience members. What is the true value of the biomass asset in the context of energy potential, and what are the true costs of converting that biomass to energy? Leasing equipment versus ownership to improve project feasibility was also a topic of interest. A number of organizations were present to provide support for these planning processes.

Although many community representatives attended the workshop to gather information about opportunities that may exist for their community, many communities had already moved forward and presented their case studies. The Village of Burns Lake presented the results of its planning exercise and project feasibility study, as did the City of Quesnel. Both communities are planning to implement new district heating systems through biomass conversion technology to heat one or more of their municipal buildings. Representatives from the Baldy Hughes Addiction Treatment Centre and Therapeutic Community discussed the decisions that led to the design and construction of their current district heating system, as did the staff from the City of Yellowknife. Other communities, such as Tsilhqot'in First Nation and Lhtako Dene Nation, had engaged in projects to create power generation and pellet production projects with external partners.

The importance of partnership was identified as a pivotal step in the success of any project. Each part of a project will require reaching out to a different set of stakeholders or partners that will help improve a project. Communities should also consider the local "public" a stakeholder and consider how to engage community members in the planning process from the beginning to ensure they are on board. It is imperative to consult with local First Nations in a meaningful way as well.

As noted above, many communities have adopted various biomass conversion technologies to meet their community needs, but understanding the technologies can be a challenge for communities in the project planning stage. Fernando Preto, PhD, of the National Research Council, provided a summary of numerous available technologies, including their benefits and challenges. Cost and efficiency were the most important criteria when choosing a technology. A decision support tool created by the Ministry of Energy, Mines and Petroleum Resources was presented that includes an orientation to the various technologies and the many decision matrices associated with implementing them. This tool will be of interest to communities interested in becoming involved in the bioenergy sector.

The two-day workshop provided a great deal of information for attendees to consider, as well as sources of potential funding and other resources. These proceedings are intended to extend that knowledge to both individuals and community representatives who were not at the workshop but would benefit from this information. The PowerPoint presentations and resource materials are available from the Resources North website, under the Bioenergy tab: www.resourcesnorth.org.

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FORREX – Forum for Research and Extension in Natural Resources

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1 CONFERENCE PRESENTATIONS – MARCH 3, 2010

Conference Opening ~ Welcome to the Territory

Chief Dominic Frederick of Lheidli T'enneh welcomed guests and presenters to the Lheidli T'enneh's traditional territory and prayed for a pleasant stay in the community.

Setting the Stage

Zandra Wycotte-Ross - moderator

Mountain Pine Beetle has had a large impact on northern communities. With this in mind, Resources North Association proposed a series of gatherings to bring information about possible opportunities forward to northern resource-based communities. We are pleased to bring this conference forward with funding and in-kind support from our partners FORREX, Green Heat Initiative, and the University of Northern British Columbia, and thank our primary funder, Western Economic Diversification Canada.

Participants received a resource binder containing the speaker biographies, Biomass Energy Resource Center (BERC) case study sheets, An Information Guide on Pursuing Biomass Energy Opportunities and Technologies in British Columbia, a checklist for financing bioenergy projects, and a copy of the Jan/Feb 2010 issue of *Canadian Biomass Magazine*.

The New Low-Carbon Economy: Where does energy development through forest fibre fit in?

Cameron Stonestreet – Pacific Carbon Trust

Pacific Carbon Trust (PCT) is a new crown corporation that will supply up to 1,000,000 annual tonnes of carbon offsets to the public sector by March 2011. Currently PCT is sourcing 15 different projects to offer 300,000 annual tonnes of offsets and is aggressively sourcing new offsets projects outside of government to meet demands.

Who is buying PCT offsets?

PCT has supply relationships with many BC companies that are taking advantage of the high quality, made-in-BC offsets. There is considerable value to clients that follow triple-bottom line accounting and want to demonstrate to shareholders that they are contributing to helping other companies in BC become carbon-neutral. In addition, there are significant co-branding and co-marketing opportunities for companies operating in the "green economy."

Who is supplying PCT offsets and how can my company participate?

For offset projects to be considered they must meet stringent BC Emissions Regulations based on 5 criteria. The offsets must be: 1) real and quantifiable, 2) in addition to regular "business as usual," 3) permanent (i.e., 100+ years), 4) verifiable, and 5) "counted once," meaning the project has a single, identifiable owner. In addition to meeting these emissions regulations, the project must be financially viable and lead to significant offsets. Considering the significant protocol and validation costs, as well as yearly reporting and auditing costs, a project must generate at least 4,000–5,000 tonnes of offsets to be viable. Although most eligible projects will involve fuel switching, energy efficiency, and terrestrial carbon sequestration, PCT is open to being innovative when looking at projects and will also consider aggregate projects that generate significant offsets. PCT is currently considering offsets generated from municipal landfill gas projects, fuel switching projects in the forest sector and beyond, transportation fuel switching, fertilizer carbon sequestration capture, anaerobic digestion, (offsets from cow manure-methane extraction), and forest and range type conservation (sequestration projects).

Can PCT help me assess the eligibility of my project or overcome protocol related barriers?

PCT is willing to help at any time in the project lifecycle. Often engaging early on in the process is beneficial, as PCT has a wide network across the province and can link you to other support or advocate on your behalf. When assessing the financial viability of a carbon-lowering project always account for potential offset revenue, as well as the carbon tax incentives. Often, this will change the economics of potential projects. If you are interested in purchasing offsets, contact PCT, it is probably more affordable than you think, and offsets are very important for the carbon economy.

Question & Answer Session

When is PCT going to release the protocol for forestry projects?
PCT has been negotiating with the BC Ministry of Forests and Range to develop forestry protocol and hope that it will be ready by early April. It is currently in the government's hands as to when it is released.

Can you comment on the aggregation of projects for those that have smaller projects less than 5,000 tonnes?
A number of similar projects can be aggregated together to gain economies of scale. The benefit of aggregating similar projects is that the offsets generated become much larger and the protocol costs are only paid once, making a previously unviable project viable. This aggregation strategy is possible in a number of sectors. For example, you could aggregate a number of projects that involve smaller companies switching over from natural gas to biomass or aggregate a number of houses that have gone through similar energy efficiency upgrades. In the transportation sector, you could implement switching to a proportion of biofuel and aggregate across the fleet. There are numerous opportunities with this type of strategy.

Bioenergy and Community Heating Overview: Opportunities and Challenges

Sandy Ferguson – BC Bioenergy Network

Who is the BC Bioenergy Network?

BC Bioenergy Network (BCBN) is a not-for-profit network created in 2008 with $25 million in capitalization from the BC Ministry of Energy, Mines and Petroleum Resources. The Network's mandate is to maximize the value of BC's biomass resources, facilitate the reduction of GHG emissions, create links between industry and universities, and help drive mission-critical research. BCBN is also charged with leveraging funding to facilitate small and large-scale demonstration projects and has funded 10 projects since its inception. Networking and partnering with a diverse range of British Columbian, Canadian, and international stakeholders is also a significant focus for the organization.

What are the drivers for bioenergy in BC?

As the price of fossil fuels increases, the environment for bioenergy development becomes more inviting. Although bioenergy development is not as mature as in the European market where fossil fuel prices are soaring in comparison, BC's market is being stimulated by the government's stand to adopt a carbon tax. British Columbia is also stimulating bioenergy development by implementing technology development incentives and a supportive policy and regulatory environment.

On the technology side, innovation is a driver. There are some very good European technologies as well as some good made-in-BC solutions being applied. Thermal energy technology is also migrating from the cogeneration projects in the forest sector to community heating. Feedstock availability in BC is also benifitting from the development of this sector, although access and cost continue to be issues.

From a community perspective forest-based bioenergy is an opportunity for communities looking to meet their BC climate action goals, support economic development, or achieve real cost reductions on energy production (i.e., high diesel or propane costs).

Opportunities in BC

As the cap and trade environment develops and fossil fuel prices continue to rise, biomass residuals will be a real opportunity. Numerous existing and evolving technologies that are supported by government investors are available. Silos between sectors are beginning to fall and there are more opportunities for collaboration. The most important challenge to bioenergy development continues to be the lack of value put on carbon.

British Columbia environment

Policy is also setting the stage for bioenergy development: BC climate action plan, BC energy plan, BC bioenergy strategy, carbon tax, and signatory to the provincial and state/international climate change mitigation agreements.

Challenges

Society has not put a price on carbon and there is no unified global climate change policy and/or regulation. Even our national and provincial approaches are different; this could be a risk at a provincial level. The recent financial crisis adds to the economic question by making it difficult to find capital funding for these types of projects, but this may be changing. The forest sector is also going through transition. The low-level energy prices continue to make it difficult to gain economic feasibility for many projects here that would be feasible in places with higher energy costs.

Benefits of using biomass?

Biomass is deemed carbon-neutral and is a local renewable source. Modern technologies burn biomass very cleanly and the cost of biomass fuel is less than half the cost of oil. The most important benefit is that investment stays in the local economy.

There are many examples of successful biomass projects in Austria and British Columbia. The BC Bioenergy Network will continue to support the development of new bioenergy projects in British Columbia to facilitate a thriving BC bioenergy sector.

Accessing Forest Fibre

Don Gosnell – BC Ministry of Forests and Range

There are two things that you can count on when it comes to accessing fibre: it is a highly "dynamic" environment and not all fibre is created equal. In light of this, what can you do to minimize the supply risk factors inherent in your project? Stick to a smaller sized endeavour and plan for a diversity of feedstock sources. Also, be sure to do your homework and include others. A strong business plan with strong community linkages will serve your project well. Overall it is important to anticipate potential sources of risk and plan around them with a nimble, adaptive, and resilient risk management strategy.

What are the sources of influence in the regulatory regime that influence my ability to access fibre?

The level of the annual allowable cut (AAC), the authority to harvest merchantable versus non-merchantable fibre, cut control policy, and stumpage will all contribute to the dynamic nature of the access environment.

Where will the fibre come from once the mountain pine beetle fibre is exhausted?

The future may be in short-rotation crops, but BC's interior is not well suited to an "agroforestry" approach, where native species seem to do best. There is, however, potential in species such as yellow pine and red alder. Trembling aspen also has a similar volume to lodgepole pine.

When considering your future biomass supply, it is important to recognize that fibre supplies and costs are very dynamic and, therefore, pivotal to manage uncertainty proactively. Access to fibre will primarily be through two mechanisms: business- to-business arrangements and forest tenures. To take advantage of these opportunities will require some creative thinking and strong partnerships. Although short rotation crops may be another opportunity for future fibre supply, pay close attention to costs and timing of harvest to make it more economically feasible.

BC Treaty Commission Perspective on Treaties, First Nations, and the Forest Industry

Shana Manson – BC Treaty Commission

No presentation material was available for the Proceedings.

Case Study: Baldy Hughes Heating System

Fred Spinola – Del-Tech Manufacturing Ltd.

Greenhouse gas (GHG) reduction and the generation of renewable clean energy are an important consideration for many organizations, including the Baldy Hughes Addiction Treatment Centre and Therapeutic Community. The society owns a closed, residential community, located a 30 minute drive from Prince George, and was struggling to meet its heating needs with the antiquated, pre-1930s, propane boiler system that existed. The system was no longer efficient, produced unacceptable GHG levels, and would subject the society to significant carbon taxes in the future due to propane use. In response to these drivers, the society commissioned Deltech Manufacturing, also located in Prince George, to undertake the design, manufacture, and installation of a wood-pellet based centralized heating system for the facilities.

The main criteria when designing the system were that it had to be virtually self-operating and facilitate the delivery of heat into a number of buildings on-site from a central point. Some of the design considerations were:

1. What type of feedstock should be used?
   - A wood pellet system made overall sense in the design because pellets are readily available in Prince George and are very consistent as a feedstock.
   - Using local pellets allows local economy to grow, by using local pellet suppliers.
   - Removal of propane does generate an economic off spin into the area.

2. What does the capacity of the heating system need to be?
   - R-values were collected for each building as well as the external seasonal temperatures to calculate the full temperature change and determine heat loss values for each building in the system.
   - A 2.5 M BTU net value system.

3. What type of piping system is required?
   - To determine this, it was important to consider where the buildings are in relation to the heating source
   - There are 22 buildings on site, but only 8 are being heated by the system at this time. The plan is to include the remaining buildings to the system at some point in time.
   - Whether 50 metres or 20km, distance determines the piping system.
   - Steel and polyvinyl chloride (PVC) piping were considered, however, PVC piping was chosen because it is pre-insulated and slightly flexible, affording the ability to move the hot water throughout the system with a minimum of loss of heat.
   - Prince George's frost level, which is about 5ft., was a factor. Using steel pipes may result in rupturing in a few years, therefore PVC piping was a better option.

4. How will feedstock be delivered?
   - In a European model, a similar system delivers feedstock through a blow system. In BC there is no infrastructure to do this because there is no market yet, so a transport/delivery system had to be designed that could deliver the feedstock as quickly and efficiently as possible. The final system had the capacity to deliver 50 tonnes of material within 15 minutes

5. How will feedstock be stored?
   - Needed to consider the capacity that was required to get through the most extreme winter conditions.
   - Decided that capacity for about 15 days of operation was needed, considering minimum temperatures of 40 degrees below zero.
   - Site operator has done a very good job at assessing their needs and we have a contract with a local supplier that delivers feedstock every 2 weeks.

6. What kind of system will require minimal maintenance from the site operator?
   - This was a challenge because there were no examples to look at. In the end a standard boiler system (made in Saskatchewan), along with the remaining combustor and control panel, was required to make it a self-operating system, installed in position.
   - A buffer area that holds about a day's worth of feedstock was also included. Often if the silo is empty, people won't realize that they need to reorder right away.

Overall the project achieved about a 190 tonnes per year carbon reduction. The decision was made, however, not to pursue selling carbon offsets to the Pacific Carbon Trust. The costs of certification and verification, when compared to the payment of $10-15 per tonne were not worth it. The project would have to generate $250 per tonne to be able to take advantage of the carbon offsets. If this project could be aggregated with another project it could make sense to sell the offsets.

The savings in terms of fuel costs was significant for this project. This is the type of project that could be adapted to other areas, taking into account capital costs and the distance of the buildings from the heat source as factors.

Case Study: City of Yellowknife – Community Energy

Mark Henry – City of Yellowknife

In the past 3 to 4 years the City of Yellowknife has become fairly aggressive at adopting wood pellet heating systems. A local entrepreneur from Switzerland facilitated this movement, bringing over experience in the European wood pellet heating industry.

The need to switch from oil and propane was fairly straightforward. The City was spending an exorbitant amount (approximately $113 million/annually), supplying the growing energy needs of a population of 20,000, and most of that investment was flowing out of the community. Simultaneously, Yellowknife was producing almost twice the national average of CO^2 emissions. These two problems drove the need for alternative heating. Initially it was important to identify how the City of Yellowknife used its energy. Fifteen percent was used for electricity that was hydro-based, 15% was used for transportation, which was relatively low to other communities because of the compact nature of Yellowknife, and the majority, or 70%, was used on space heating (generated by mostly oil and some propane).

Once it was identified that the majority of the cost savings would be generated by addressing the space heating needs and that wood pellet heating systems could achieve those cost savings, local installations began to take off. Since late 2006, eleven large wood pellet conversion boilers (740kW) from Europe have been installed in the community, each displacing approximately 300,000 litres of diesel. There have also been many installations of medium and smaller residential boilers, and there is now a growing market for residential wood pellet stoves. Currently the City uses approximately 10,000 tonnes of wood pellets annually. Although long-distance transportation of wood pellets would cause a project to become uneconomical in most areas south of Yellowknife, the City's previous dependence on high-cost oil and propane make the transportation costs feasible. Currently, wood pellets are being brought in from Northern Alberta about 600 km away, via B-train truck.

As part of the community energy plan, the City of Yellowknife adopted two significant targets: to reduce community emissions by 6% by 2014; and to reduce municipal operational emissions by 20% by 2014 over the 2004 level. It was realized very quickly that installing a wood pellet heating system that was considered carbon neutral by the experts, was a quick and easy way to achieve targets. The first municipal installation was a district energy system that serviced three recreational facilities. The City is currently in the development phase for installing a boiler system at the solid waste facility that will initially run on wood pellets but will also have the capacity in the future to run on waste wood. The City also has two residential sized boilers that are installed to demonstrate the capacity on a residential scale.

The majority of local boilers are KOB and Binder boilers, sourced from Europe. These boilers are located beside the buildings and handle the peak load, which is approximately 90% of the building energy demands. The previous oil boiler remains and handles the peak demand overload. Each of the large boilers uses a 50 tonne grain bin that is equivalent to a B train of pellets.

Pool/arena complex business case

The capital cost of the district-heating project was $540,000, which included about $350,000-400,000 for the boiler, bin, and augers and the remainder for the district energy piping. The comparison fuel costs for the project were $0.85 for oil versus $240 per tonne local price range for wood pellets (wood pellet cost would be much lower in BC – a lot of cost comes from transportation). Pellets were chosen as the fuel of choice because there is no wood nearby to use a chipped wood alternative. Additional labour costs also had to be included for operating a wood pellet boiler. These labour costs included daily maintenance of ash removal, as well as regular annual maintenance. With these cost estimates the annual savings of the district heating system were calculated to be in the range of $65,000 and the payback for the project about 8 years.

Although the heating system made economic sense there were other challenges. Pellet supply security continues to be a variable. Right now the pellet fibre is considered a waste product and pricing reflects that, but costs may rise as the industry develops. Additionally, the biomass boiler market was not well established in North America and the boilers had to be outsourced to Europe. There was a 4-6 month lead-time needed to get them installed. There were also issues to overcome relating to the local regulatory process. Many biomass boiler installations were underway early on, and the local fire marshals were not comfortable with some of the technical issues. Subsequently, there was some time needed for them to familiarize themselves, which was met with some frustration from the boiler industry.

Overall this strategy has enabled the City of Yellowknife to achieve cost-savings of 50% and attain greenhouse gas emission targets and its other sustainability goals. Cost-drivers continue to sustain establishing this energy strategy in Yellowknife.

Question & Answer Panel

Questions to Mark Henry

What is the closest fibre source to Yellowknife and have you looked at your urban waste as a fuel source?
Our closest fibre source is the High Level area of Alberta, which is 600 km by road. Hay River or Fort Smith would be the location of the nearest trees and thus the closest secure source of fibre. We have considered other fuel options from a local source, and are currently exploring chipped, local, waste wood. Paper fibre has also been considered, however the challenge is regulatory. There is no boiler manufacturer that builds their product with the ability to consume paper waste therefore the CSA approval is nullified. Local regulators don't feel comfortable overriding that.

How did you finance the project?
For the recreational facilities district-heating project, our largest project, financing was secured through a contribution agreement with the government of the Northwest Territories and the federal government. In addition, as part of the community energy plan, Yellowknife has set aside $500,000 per year, which flows from the gas tax for clean emissions initiatives. This money can be financed for community clean energy projects.

Can you make a comment on the emissions issues that you are having about particulate going into the environment?
Biomass boilers have a siphon before the exhaust system that reduce the particulate matter. In Yellowknife there are no existing issues with the accumulation of particulate matter in the air. Unlike Whitehorse, Yellowknife has no barriers that keep emissions local. However, these biomass boiler systems are designed to significantly reduce particulate matter. There was a problem at one point where we were not getting enough air into the boiler and there was a lot of particulate matter emitted; however, this was fixed. When the boiler is run properly there is no problem with emissions.

Questions to Don Gosnell

Have you considered the fibre coming from interface fire treatments as a potential fuel source for biomass projects?
Absolutely, but at a local level, it is more a periodic exercise rather than one you can sustain long-term. However, if you have a community heating system, and you want a cheap biomass source and have to do some urban interface fire hazard mitigation, you will want to take advantage of that opportunity.

Perhaps a market for the fibre would help to sustain more regular activity?
Perhaps, but sometimes there is only so much you can do. However, if you can plan these two activities together, it can be beneficial.

There was talk about replanting and maximizing return on growth, and tying that together with medicinal plants, which are often overlooked. Has any thought been put into a more

permanent cultural approach of more diversified planting or growing that would be more self-sustaining as compared to a monoculture approach?
Terrace is an area that has incredible tree growth; the Kitimat Valley and Nass Valley are perfect places for multi-stage, multi-species type harvesting or silviculture regimes. Producing sawlogs and biomass, and a lot of different products (sawlogs, biomass, medicinal products…), takes a lot of management and a really good growing site for the economics to start to make sense. In the right conditions, however, that is exactly what you want to do. The more diversity you have, the more opportunity you have to adapt to different markets and market conditions over time. If you have the commitment to manage your forests in a long-term sort of way by all means approach it that way; you will have a much more resilient forest in the long run.

First Nations Forestry Council (FNFC) feels like it's living the hypothesis about ecologically always trying to keep up. Could you shed some light on two recent announcements that were made by the BCMinister of Forests and Range about two policy changes that were made in January? One was this policy of the receiving license and the second, stand-as-a-whole pricing—the Minister indicated that these changes were going to be in place by the end of the year as incentives to better utilize the wood waste. With First Nations tenures, First Nations basically have 50% of the tenure offered and 58% of that will expire by 2012, do you have any insight into what the Minister is doing to get tenure back into the hands of First Nations? It will be very difficult for them to take advantage of the receiving license if they don't have access to tenure.
The Forestry Roundtable recommendation was replaceable area-based tenures for First Nations, and that remains a priority for our ministry. That is still the priority of government. The group I work with are turning their thoughts to what is an appropriate form of tenure for First Nations, different than a Tree Farm License (TFL).

What's a receiving license and how's it going to help?
Here is the concept of a receiving license as we understand it: Two people holding licenses, one out there harvesting, the other perhaps an IPP (independent power producer), who doesn't have a background in harvesting, can work together to leverage the value of their two licenses for mutual benefit. One person is out there harvesting timber, and there is a component of the forest that they have access to that they don't particularly want but this other individual (IPP) is quite interested in that component. An incentive for them to do business together is that the volume harvested by the one person can be provided (sold) to the other person. The cut control charges for that approach, because there is regulated amount of harvesting you can do with a license, can be transferred from the person who did the harvesting to the person who received the wood. We already have that authority under the cut-control regulation, so if you have a non-replaceable forest license, for example, you are working with someone with a forest license who can take advantage of that part of the regulation and use your license as a receiving license without ever having to go into the woods. You do not have to do Forest Stewardship Plans (FSPs), do not have to build roads, do not have to get into harvesting, you simply have to work with that other person to receive wood that they do not want, although you are probably going to have to pay them for it, but the incentive for them is

that it frees up some of the cut that would have been charged against their license and allows them to go out and get more sawlogs.

What is "stand-as-a-whole billing" and "cruise-based pricing?"
Another initiative is that the government has to try and reduce the cost of harvesting, particularly in damaged mountain pine beetle stands. This would allow you to avoid anything to do with scaling and waste assessments to achieve a bit of a cost savings and can be significant. This pricing eliminates any incremental stumpage of wood that you might have otherwise left in the forest but are now deciding to take because at the beginning of the process you have agreed to pay a lump sum to log the area. Once that lump sum is established you pay based on the percentage of the area you have harvested; i.e., if you have paid $100 to log 100 hectares and you log a hectare; you pay one dollar, whether you log all the wood or none of it is up to you. For example, normally you would cut 60% of the stand that is sawlog content and leave the other 40% because you do not want it, and because you know that if you do take it you are going to have to pay stumpage on it. Now, you are going to pay that dollar whether you take it or not, so maybe now there will be an incentive to take it. There are no incremental stumpage charges to make under this pricing system. We are looking at using this both within BC Timber Sales and on replaceable licenses. Cutting permit type harvesting will also have an option to go with this type of billing option.

I'd like to discuss your comment that "we cannot afford to go and get the wood fibre" I do not disagree that it might not be affordable for electrical, sawlogs, or pulp chips, but you do a great disservice to the bioenergy industry by making this comment when you do not think about the price per Gigajoule that we are actually paying in this province and what the value of the energy in our forests sits at right now. Western Silviculture comments that "we spent 115 million dollars this year on forest fire fighting," releasing 8 million tonnes of CO^2. When the province wants to be carbon neutral, and when they count their emissions, they do not even count the forest fire emission numbers. I do not think we can afford to do nothing. I think there are economic numbers that indicate that we can go in and get that fibre– if it was uneconomical why are we trucking fibre 400km all the way to Howe Sound pulp and paper, the greenhouse industry is also transporting fibre over 100 km. It is a great disservice to say that it is uneconomical, a broad generalization that you need to straighten out.
The only constant is a change in terms of economics; we have to understand how dynamic it is, we have to do the economic analysis and anticipate how things may change in the future. Where I come from there is a lot of excitement around this MPB opportunity, but it is not here forever, and you need to think beyond that.

Question to Fred Spinola
Could you comment on what the installed cost of a Baldy Hughes facility would be in a commercial application? If someone wanted to go forward with a similar system what would the installed cost be?
There is a 7-10 year payback, in some cases it looks like 20 years. Every situation is different, and I am not permitted to divulge the Baldy Hughes installation costs, but if we took the same situation in a similar scenario, installation costs would be very similar to

the Yellowknife example given in that presentation, although the $500,000 price tag would supply a lot more buildings here than just 2 arenas and a pool.

Question to Don Gosnell

MPB killed fibre—yes, there is lots of it and the economics are questionable—700 M bone-dry tonnes in BC in an area of 27 million acres, or 25 tonnes of bone-dry per acre. Economic issues aside, even if it is a breakeven on the boardroom ledger we cannot afford not to move forward on dealing with this wood and the massive reforestation effort. Do we have a massive reforestation plan ready to move into action here in BC, and in that process what will we do with all this fibre?

My second question is around tenure. 50% of the fibre is allocated to the forest industry, and the forest industry consists of 3 companies in BC—Tolko, Canfor, and West Fraser—that basically follow an up and down business cycle—lumber and pulp—with no bioenergy sector in BC. Pulp and paper is a dying industry in North America. The question is: when is there going to be a major shakeup in the forest tenure system in BC so that bioenergy players can get involved and access some of this fibre and stabilize the system? There used to be a use-it-or-lose-it clause in BC that doesn't seem to be there any longer.

The Minister would love to see a large silviculture program in this province, but he is only one voice in cabinet; there are less dollars in the budget. Regarding the wildfires and CO^2 contributions, these are all good business case scenarios for doing more of this kind of thing, but society has not reflected a desire for that yet that outweighs the desire for better education and better hospitals. Society has to make a shift to go where we need to go, but it is going to take some sacrifices.

In terms of when there is going to be a shakeup? The Minister has commented on more than one occasion that he is losing patience with the existing industry. However, he has not said what he will do if he loses total patience, but has noted that he is not satisfied with the actions they have taken to date. The Forest Products Association of Canada just completed phase one of a 3- or 6-part project around diversification under bio-pathways reporting; it would be worthwhile for you to take a look at the part that has become public. Diversification will take some time, since they are also cash-strapped.

Under the Microscope: A Review of Biomass Energy Projects

David Dubois – Green Heat Initiative

This presentation of relevant case studies began by providing some perspective about the scale of the projects. A typical propane barbeque supplies 13-17 kW or 44,000-58,000 Btus per hour; a typical household furnace supplies 30 kW or 100,000 Btus per hour. These projects are smaller scale.

Case Study 1: City of Revelstoke, BC: District heating system

The City of Revelstoke has installed a district heating system with a heating capacity of 5.1 million Btu or 1500 kW, using a combination of sawmill and wood waste as feedstock. This is a unique system because thermal oil is being used to heat water and steam. This type of system was installed to overcome the technical, operational requirement inherent with a typical European system, a requirement that rural and remote communities could not fulfil. Using a thermal oil system allowed them to overcome the operational requirement of a typical boiler system. A second challenge was the quality of fuel. Fuel of mixed species origin had varying moisture contents and was made for operational challenges. The benefits, however, made the project worthwhile; the City was able to reduce propane use and form effective partnerships with industry.

Case Study 2: Nakusp, BC: School heating project

The pellet-fired boiler installed at the school in Nakusp, BC supplied 180 kW of energy or 0.6 million Btu/hr. This system provided hot water to the high school and was appended with a solar component to supply electricity. The boiler system fulfils the heating needs of the 1,000 square foot school and replaced 25, 000 gallons of liquid propane. Previously, school administrators were spending 40 cents per litre, for a total cost of $38,000 per year, which they've now been able to save. This system has proven very attractive because it is a modular system that has minimal associated infrastructure. The system was initially scrutinized to ensure that it met emissions standards that were integrated into the feasibility plan.

Case Study 3: Oujé-Bougoumou, QC: First Nations community: District heating system

This community had an existing district heating system from the early 90s, which supplied 1000kW or 3.4 million Btu per hour to the community. The community has now added a second system that supplies an additional 1700kW or 5.8 million Btu per hour. Currently, the system uses sawmill and wood waste as a fuel to generate hot water. Interestingly, this community was actually relocated back to the location of the original district heating system where they have seen large savings. The amalgamated district heating system is currently servicing about 140 homes and 20 public buildings and has over 2300 metres of polyethylene piping and 600 metres of steel piping. The community has realized a 200 tonne reduction in carbon dioxide emissions.

Case Study 4: Edmonton, AB: Wood working facility implements industrial biomass heating system

This Albertan wood working business put together a business case to reduce heating costs. They considered implementing a 1.8 million Btu per hour, or 540 kW, industrial heating energy supply system for their building. The industrial heating system would convert their own manufacturing wood waste to hot water. They soon realized that the payback periods were attractive and made economic sense and later installed the system.

Case Study 5: Council, Idaho: School heating system

Council is a small community of 900 people that supported a school of only 240 students. Administrators recognized that the heating costs for the school were significantly impacting the quality of education and actively solicited the engagement of the community members in solution-building. Together they decided to implement a 440 kW school heating system, converting hogfuel to hot water and reduced their heating costs from $56,000 per year to $6,000 per year. Additionally, they engaged in an energy purchasing agreement with a local contractor to whom they could sell their excess energy. Lessons learned in this case? Have a strong energy contract in place, if you are going to go to energy contracting. Sometimes the fuel type can become an issue to the contract, and you have clear deliverables in terms of emissions and usage.

Case Study 6: Craig, Alaska: Aquatic centre heating system

Craig, Alaska is a remote location and was subject to extremely high heating costs. The City overcame this economic challenge by installing a 4 million Btu/hr boiler system that used wood chips to heat water. Although they had abundant wood resources nearby, there were challenges with the quality of that fuel source. The moisture content was very high and therefore made conversion to energy very inefficient. However because of the exorbitant cost of their existing fuel source, it made economic sense to come up with a wood chip pre-heating system to gain the efficiencies. The paybacks for this project were very good. In the City's first season with the new system, they used about 800 tonnes of wood chips at a cost of $20 per tonne, or $16,000–a savings of about 70% of their traditional heating bill.

Case Study 7: Burns, Oregon: Small hospital heating system

This is a case of a community facility that contributes to the well-being of the community, wanting to implement a clean and environmentally-friendly heating system. The Nishli system is a .51 million Btu per hour system, which converts wood pellets to hot water, a system very similar to what some communities would be looking at for some of their facilities. This application is unique because in addition to producing heat, the needs of the hospital dictated a straight hot water requirement as well. The hot water load of this system is critical because there is a need for hot water throughout the whole year. The annual fuel costs for this system were $9,000 for wood pellets, which provides for about 80-90% of their heating load. The hospital continues to require small amounts of propane because of how the system was set up. Initially the hospital had calculated a 15-18 year payback period, but with traditional fuel prices on the rise, the payback period is diminishing.

Case Study 8: Nazko, BC: School heating system

Nazko school, one hour west of Quesnel, has implemented a 1 million Btu per hour boiler system. In one year of operation they have reduced their heating costs from approximately $38,000–$40,000 per year in propane to $5,000 per year in wood pellets.

Community Engagement: Lessons from the Trench

Mel Rothenburger – Kamloops Daily News

Community engagement is an important part of any company's intent to locate in any new city, especially a company that is implementing a new technology. Although not available, the original PowerPoint presentation contained a chronology of the community action that was covered by the Kamloops media over the intent of the Aboriginal Cogeneration Corporation to locate their new gasifier of railway ties in Kamloops, BC. Suggestions for improving community engagement that were derived from this experience are listed below:

1. Effective communication by proponents is essential. Do more than the minimum when it comes to the environmental permitting process public consultation rules. Engage the public through public meetings, press releases, open houses, et cetera.
2. Proponents should familiarize themselves with the history of the community and what has taken place to shape their beliefs and values. A good understanding of the concerns and issues of the environmental and social justice community is also helpful.
3. A basic understanding of the history of other proponents with similar projects in the community, and how they communicated with citizens is helpful.
4. Expertise in public relations is imperative, even for those smaller companies without a lot of capacity looking to put a seemingly simple project in place.
5. Don't be reactive; be proactive.
6. Be conciliatory and respectful of community values.
7. Provincial government environmental process regulations are insufficient regarding public engagement. Although good at communicating, the BC Ministry of Environment could be more proactive in getting messages to the public when there is a project of concern.
8. The public has a responsibility to educate itself more thoroughly with facts when there is a project of concern.

Finding the "Best Fit" for your Community

Peter Robinson – Community Energy Association

The Community Energy Association is a not-for-profit organization that was established 15 years ago through a memorandum of understanding between the BC government and the Union of BC Municipalities. Our mandate is to work on energy sustainability and climate action for local governments and First Nations in BC.

Community energy emissions planning is an effective way to design a "best fit" energy plan for your community and up to 50% of planning costs may be eligible for funding through the BC Hydro "Sustainable Communities Program" or the Federation of Canadian Municipalities (FCM) Green Municipal Fund. The process of energy planning identifies existing and projected energy supply and demand in community design and

development, and considers the energy budgets in land-use, transportation, buildings, infrastructure, and energy supply. This type of process is an effective way to gather community input, which will be reflected in the community energy sustainability goals and may include such things as emissions reductions, energy security, diverse local economy, or community health. Input can be gathered through open houses, on-line questionnaires, et cetera.

When engaging in the energy planning process, local governments will have to consider and document the obsolescence cycle of their community's infrastructure. Questioning and quantifying the lifespan of public buildings, streets, and other infrastructures as well as the unavoidable surprises, such as rising oil prices and greenhouse gas targets and taxes are all part of this cycle evaluation. Communities also have to consider costs associated with meeting their regulatory responsibilities such as the emission targets under Bill 27 as well as the Climate Action Charter.

A community energy emissions plan (CEEP) is built around the four principles of sustainable energy planning which are 1) reduce energy demand, 2) re-use waste heat, 3) use renewable heat sources such as solar and geothermal, and 4) use renewable energy sources such as biomass. The CEEP will typically include an inventory of energy/GHG use, forecast of future usage, target setting options, public involvement, identification of potential opportunities, recommended policies, as well as a plan/schedule for future action.

At the community level, benefits of a sustainable energy plan are undeniable. Economic development will be bolstered by the development of local energy sustainability strategies, such as attracting investment to secure local energy projects and potentially supplying Pacific Carbon Trust with carbon offsets. Communities will also become healthier and more efficient and reap numerous environmental benefits through greenhouse gas reductions, better air quality, and healthier ecosystems.

Over the past 15 years, CEEPs have been created for the cities of Kamloops, Revelstoke, Bowen Island, Quesnel, Atlin, Whistler, Vancouver, North Vancouver, Smithers, Prince George, Vanderhoof, and Dawson Creek. Although the focus of the planning is slightly different, CEEPs can also be created for a local government's corporate emissions (as opposed to their community emissions), or for both.

Questions

When communities approach you, what is the prioritization decision, because you obviously can't work with all of them?
We work with communities that get in touch with us and help them out the best we can. We also work within the communities that we live in. There are seven staff members that are spread out across the province; Victoria, 3 staff in the lower mainland, Kelowna, as well as two staff members in the Kootenays.

Do you work with the BC Sustainable Energy Association?
We are easily confused with this association, but we are two separate organizations. Dale Littlejohn, Community Energy Association's Strategy and Outreach Manager, is also on the Board of Directors of the BCSEA. There is a formal relationship, to an extent. We have a couple of contracts with them to provide support.

Are areas of high density an opportunity to implement district-heating programs?
Areas with high density are an opportunity for district heating programs, but it needs to be looked at on a case-by-case basis. Heat demand and availability of energy should be considered.

Community Information Guide: A Review

Janice Larson – BC Ministry of Energy, Mines, and Petroleum

This presentation reviews the information guide that was produced for communities, First Nations, and small entities, to explore bioenergy opportunities. The guide is entitled: *An Information Guide on Pursuing Biomass Energy Opportunities and Technologies in British Columbia for First Nations, Small Communities, Municipalities and Industry.*

The information guide was produced in response to some of the overarching policy directions that came into effect in the past few years. The 2007 Energy Plan set a new green vision for the province and targets were set out in the 2008 Climate Action Plan. This direction was further supported by the 2010 Throne Speech, which highlighted the emphasis on clean energy development as well as the corresponding budget that included more funding for clean technology and clean energy; $100 million over the next 3 years to add to the success of the Innovative Clean Energy Fund; $35 million over 3 years for the LiveSmart Energy Efficiency Program, and International investments in clean energy and carbon trading, which could include bio-energy development, and will now qualify for tax reductions under the International Financial Activity Act.

From that policy direction the BC Bioenergy Strategy was developed, hinged on the fact that we have a lot of biomass opportunity in the province, and we should be focusing on developing those opportunities. At that time the government recognized that there would be a strong community component to developing this opportunity and wanted to have bioenergy advisors in each community, but there were no resources. The bioenergy information guide was developed to extend that support to communities. The guide will help communities identify suitable biomass opportunities and technologies that are available as well as challenges and funding opportunities. It is important to note however, that prior to delving into the biomass energy guide, it is important to consider all the energy opportunities that are present in your communities (i.e., wind, solar…). Once you have determined that you would like to consider biomass conversion opportunities specifically, then move to the guide.

The first step is to confirm your interest and assess project feasibility by documenting your community needs, such as energy demands and employment needs, and potential challenges, such as fibre supply and project financing.

Once that is established the Guide will orient you in-depth to eight different technologies in plain language with simple diagrams. For each technology, the guide extends information around the technology itself, air emissions, feedstock types, scale-appropriateness, market readiness, and capital costs. Each technology also includes a decision matrix that walks you through the decision process associated with that technology to ensure that a technology is chosen that interfaces with your community needs and assets most effectively.

The guide also orients readers to funding opportunities and includes private funding opportunities and grants, as well as additional incentives. Subsequent chapters extend information around the mechanics of selling energy, developing a business idea, and identifying consultants and technology vendors.

Overall, the guide supports the exploration of the bioenergy opportunity from a community perspective.

Community Needs and Values: Adapting your Projects to Meet Expectations

Case Study: Pristine Power

Harvie Campbell – Pristine Power Inc.

About Pristine Power

Canadian owned Pristine Power owns, operates, and develops independent power projects in Canada and worldwide and has played a senior role in developing 5,000MW of power around the world. It currently has 2 waste heat plants in operation in BC, Savona (5MW), and 150 Mile House (5MW), as well as a 35% interest in a (65MW) power facility in Mackenzie. This project is "shovel-ready," but, like many other projects around the province, is being held up until the rules of bioenergy development can be clarified. Additionally, the company has a 57% interest in the Kleana run of the river project (600MW) on Vancouver Island. The company also has many other projects under development in British Columbia.

BC's resource opportunities

In British Columbia, we continue to incinerate the biomass resource in beehive burners. 1.2 BDt (bone-dry tonnes) of mill residues are still incinerated in beehive burners annually, as well as 7-million BDt burned in roadside piles during harvesting. We still have an additional 500 million m^3 of beetle-killed wood available. If all of this biomass were to be used for power, we could generate about 18,000 GWh annually, the equivalent of seventy-two, 30MW plants.

Access to fibre also plays a role in the opportunity in British Columbia. The issue, however, is not so much access to fibre but getting an equation for "who" bears the risk

for the cost of that fibre. If we can solve that issue, the bioenergy sector will be able to move forward in British Columbia.

What size, where?

Huge megawatt projects, like the one being developed in Mackenzie, have huge logistical challenges that make them very difficult to implement anywhere else. Very small projects, such as 5-10MW projects most often use steam technology that bears high operating costs due to the requirement for steam engineers. These smaller steam installations do not make a lot of economic sense unless they are located in remote communities that are currently operating on costly diesel power.

To that end, Pristine Power has chosen to develop a series of 30MW projects across the province. Currently the company is focused on developing plants at four locations: Burns Lake, Ft. St. James, Mackenzie, and Merritt. This will result in an investment of up to $500 million. Each project has significant First Nations involvement (19 FN communities involved).

30MW case study

The capital cost for a 30 MW installation is about $120 million and will generate 240GWh of power. It will create approximately 100 jobs during construction and 72 during operation (including both operation (12) and fibre management (60)). Incidentally biomass power is the only renewable energy that will create the additional fibre management jobs, adding to community sustainability. The system will require about 210,000 BDt or 450,000 m^3 of feedstock at a cost of about $10 million annually, based on 50% sawmill residue and 50% standing bug kill. This $10 million goes directly into the community. Additionally biomass power is the only "firm power," unlike solar or run-of-the-river sources. In terms of logistics, the plant itself only occupies about 2 acres, however the fibre management activities require about 15 acres. This means that when you are thinking about this kind of project as a community, understand that the plants themselves aren't all that intrusive, they do not give off excess light at night, quiet, low emissions; however, the fibre management can be intrusive in terms of noise levels, so don't locate them too near the community.

New technologies at the smaller MW level

Nexterra, a Canadian company, developed a gasifier technology that creates syngas rather than steam and can be installed in 2MW blocks. The technology doesn't require steam engineers and can be operated remotely so the operating costs are much lower, making the technology a viable economic alternative for remote as well as non-remote communities. Nexterra will be installing these technologies at both the University of British Columbia and the University of Northern British Columbia this year.

The role of First Nations

First Nations are playing a critical role in the development of bioenergy in almost every project in British Columbia. Pristine Power practices an equity model when working with First Nations rather than an innovative business agreement (IBA) model. We would like to have First Nations as a partner, because then there is full disclosure and they are fully involved in the stewardship of the land. These types of projects offer First Nations partnerships and economic development opportunities. It is a real opportunity for First

Nations to contribute and get value back. They can work in an industry they are comfortable with, realize economic gains, and develop a commercial acumen that can be used to develop other business opportunities.

Take away messages

There are a number of key take-away messages regarding the place of bioenergy in British Columbia communities. Bioenergy development has significant potential in communities across the north and interior of BC—when focusing on medium sized and smaller-sized (5-10kW) power plants. These small-scale projects can do a lot for communities in terms of contributing to the environmental, economic and social sustainability of a community. For example, bioenergy installations using biomass can act as a catalyst for jobs and investment in forest-dependent communities and provide revenue for mill residue, thus contributing to the economic stability of local mills. Additionally, using bioenergy can contribute to improvements in local air quality through the elimination of roadside burning of debris piles and beehive burners.

Case Study: Tsilhqot'in Bioenergy Project

Chief Joe Alphonse – Tsilhqot'in National Government

The Tsilhqot'in community is located in the Chilcotin area of B.C., which has been significantly impacted by the mountain pine beetle infestation. It is projected that they have a 20 year supply of pine beetle damaged timber and with it a unique opportunity. The Band has values that they want to protect, including salmon, steelhead, and woodland caribou. The question became "what type of power generation opportunity should they pursue that would fit with their community values"? The Band entered into a 50/50 joint venture with Western Biomass to create the Tsilhqot'in Power project.

Working with community values

Meaningful community engagement was the rule from the onset of the project, and 30 community meetings were held in their own language, as well as English. Early on in the process, the development team recognized the importance of bringing issues forward to the community and discussing the issues with them. They also integrated data from traditional use studies. Helping the First Nations community understand and assess the risks and benefits of the project, allowed the community to protect their way of life and their culture. Because of their community's dependence on the water and salmon, they were able to redesign the project so that it used a much-reduced volume of ground water rather than river water. The community was also able to design a human resources plan that laid out a sustainable employment vision for their Band, which initiated training opportunities for its members. Culturally sensitive areas were identified and set aside from fibre supply management areas.

The project

The Tsilhqot'in Power project will generate 60MW of power with capital costs of $260 million and annual operating costs of $60 million. The Hanceville sawmill, purchased by six Chilcotin Nations, will be the site of the project and economic benefits will include construction, nursery, harvesting and reforestation jobs. The project has been submitted

to BC Hydro's Phase 1 Bioenergy Call and will be submitted to the Phase II call, once the terms are released.

Meaningful engagement–lessons learned

- "Meaningful" engagement is not a one-time event;
- It is not unilateral. It takes communication, sacrifice, commitment, and understanding; and
- It takes time and patience. For proponents this means a sincere willingness and a desire to know and understand the First Nation partner, their values, goals, culture, and long- term community interests.

Chief Alphonse noted there is a new way of doing business, their doors are open and they are willing to work with anyone, if a project meets with their values. They continue to build relationships with Western Biomass through regular social interactions.

Community Needs Panel Questions

What are some of the skills that are going to be needed in the future for the bioenergy industry and do we have the capacity currently through our universities/colleges or other types of training institutes to deliver that development?
Job sets divide into forestry activities, which forest-dependent communities already have in great depth, including in First Nations communities. Things such as logging, trucking, fibre management are already in place. Steam engineers are incredibly difficult to find, but around because of the pulp mills. Communities may need 1st and 2nd class steam engineers in the future, but that will take awhile, because it takes 12 years to achieve a 1st class steam engineer certificate. There are a few steam engineers around, but they are employeed at the pulp mills. Some smaller bioenergy companies are facing a lot of public scrutiny, because they do not have the necessary skill sets to carry out a project. However, if new skills are needed, it seems the universities are willing to create new programs to deliver those skills. There are also programs through the BC Ministry of Skills and Labour that can be accessed by communities to help pay for some of the training programs for bioenergy programs, as well as federal and industry led funding programs.

Why is the requirement for First Nations consultation not included in the Bioenergy Guide or decision matrix?
The BC Ministry of Energy, Mines and Petroleum Resources will ensure that these needs will be included in the next guide update, which is currently underway.

Where do you see the future of biomass energy going in BC?
A lot has happened in the last few years. In 2001, bioenergy was not really talked about, other than when mills were generating excess energy. Certainly, it was not talked about as a broader opportunity. Today interest has permeated every part of society, and we have a bioenergy strategy. There is going to be more refinement and improvement of the policy/regulatory environment to facilitate the good opportunities. This will be reflected in forest policy, agricultural policy, energy policy and probably in local government

policy as well. There is a considerable gap in the public's knowledge around these technologies and people are suspicious. There is a huge public information job that needs to be done before the industry can move forward.

2 CONFERENCE PRESENTATIONS – MARCH 4, 2010

Future Forest Strategies to Support Bioenergy Solutions

Albert Nussbaum – BC Ministry of Forests and Range.

This presentation was presented on behalf of Jim Snetsinger, Chief Forester of British Columbia.

The role of the Chief Forester

The Chief Forester's role is to ensure that the forests of BC are sustainably managed and provide for a wider variety of values, including timber and non-timber resources, for now and future generations. This includes ensuring that management practices and policies in BC result in forests that are resilient and provide for the diversity of values that society desires. The Chief Forester is also responsible for setting harvest levels for Tree Farm Licenses (TFLs) and Timber Supply Areas (TSAs) that cover the majority of BC's crown forest. Forest management practices are always evolving and are continually being updated to reflect the changing forest and desires that society has for products and services from those forests. One current example that we are struggling with is: how we are going to balance current harvest levels with carbon stocks in our forests?

How does bioenergy fit with the governments current objectives?

The BC government would like to reduce its reliance on fossil fuels. There is a desire to reduce GHG emissions, manage carbon stocks, and foster innovation in forest products. Most importantly there is a strong desire to improve the utilization of BC's forest fibre and see the industry through its current transition to a more diverse product line. Bioenergy fits within these objectives very well. Community bioenergy projects add an exciting dynamic to the mix of products that society can derive from the forest. There would be better utilization, improved synergy with existing producers, provision of local jobs, and more opportunities for local communities to become more involved in their surrounding forests. In short, community bioenergy projects would contribute to making the forest sector more diverse.

Where is the fibre for bioenergy going to come from?

The existing pulp industry and pellet producers have shown that the bioenergy fibre will be mainly a by-product of sawlog harvesting and milling. However, complete dependency is inadvisable, so we have to create a secondary source of fibre that is managed more collaboratively, to support a variety of wood-based industries. The lumber sector is not producing as many residuals as it once was.

Will there be fibre availability for bioenergy and how will we access it?

We are approaching the 700 million m^3 mark of killed lodgepole pine in the BC timber harvesting landbase. Another 45 million m^3 kill is expected this year on that landbase. Although the Chief Forester has increased cuts to try and salvage something from this opportunity, the majority of the AAC has already been allocated by the Minister of Forests in the form of tenures and many of the sawmills holding tenure are not operating. This is problematic, because there is a window of opportunity to get that fibre off the landbase, and it is not happening. This is also delaying regeneration.

Community-based biomass projects need to rely on a variety of sources both now and long-term and have a fibre plan that is robust. If you want to participate in the bioenergy sector, you cannot be held hostage by other players.

The forecasted timber supply for BC, taking into account how long we have to harvest beetle-kill for sawlogs, is really dependent on things like diversifying product mix, market health. However, the longer we can stay in pine harvesting, the more of other species will be available afterwards. Currently harvest levels are well below the AAC at around 40 million m^3, if we could use more than just the sawlog (i.e., tops and branches) then we could add 10– 20% to the harvest. Developing a market for alternative products would allow us to take more fibre.

What are the future sources of fibre?

- Residuals: harvesting residuals; tops, limbs, and sub-merchantable residuals; mill residuals and urban residual wood waste.
- Standing timber: fire and insect killed wood, timber from road clearing, urban interface fire-proofing, and young stand rehabilitation (i.e., remedial treatments).
- Fibre plantations: planting existing stands at higher densities to allow for intermediate treatments, planting fast growing hardwoods such as poplar, alder, and willow, and/or unmerchantable stand conversions.

Even after the MPB wood becomes unmerchantable, we are estimating that the harvest levels in the Prince George TSA will be as high as 6 million m^3. Bioenergy will have to devise plans to acquire fibre from a variety of sources.

Management strategies

There are management strategies that can influence the timing and amount of fibre in our forests in the mid and long term. These strategies will support the development of a variety of products. Possible management strategies are as follows: short rotation plantations, high-density fibre plantations, high-density natural stands, fertilization, commercial thinning, juvenile spacing, and site rehabilitation. These treatments have to be executed in a strategic way and make sense at a stand level. This requires a degree of planning that provides fibre for a variety of players, with a diversity of management that we have not seen in BC. The cost and benefitting of these strategies need to be assessed on a case-by-case basis.

It is important to note that no single solution will work everywhere. Every community-based project will require a customized fibre solution that reflects the local forests and the industries surrounding these communities. For example if you have a local pulp operation that is consuming every stick, that may not be the best place for a community bioenergy project unless you can work with them.

Take home messages

- Community-based bioenergy projects are well aligned with the government objectives for BC forests.
- A majority of the economic fibre will come from residues of sawlog harvesting and milling.
- Additional fibre will come from a wide variety of sources.
- Forest management activities can influence the amount and timing of fibre availability.

Questions

Can you describe the costs that might be associated with each stand management activity? Is all that fibre available at the same cost to the consumer?
Absolutely not, the costs are stand- and location-dependent. These need to be part of a local area strategy and then cost estimates developed locally, stand-by-stand.

In the context of the three-legged stool illustration (timber, pulp, and bioenergy), three major timber companies control half of the timber in BC, and none are interested in bioenergy. The pulp industry is dying, while the bioenergy sector is ready to become a bigger player. When will we see major fibre removal and regeneration to support this new industry?
Although lumber prices are currently low, lumber will become a significant revenue generator in BC in the near future. However, a lot of mills have closed and the fibre is not being harvested to current AAC levels. Until the industry recovers, there is a provision for the government to seize fibre that is not harvested to help other players. I, personally, would suggest that we might need to exercise that right and liberate some fibre. Tenure is a difficult thing to work with. The best course of action for the bioenergy producers is to develop relationships with the existing players. They need to be part of the solution, but we are not sure how to get them on board.

Why are we leaving so much behind after harvest? They are leaving 40% behind on the ground. They do not do that in Europe; this is a management problem.
We have to find a balance between what needs to remain on site and what needs to go. This is not about vacuuming our forests, which has a serious downside on nutrient cycling. Retention of coarse woody debris has to be addressed and some will have to be retained. There is no intention to see our forests “manicured.”

Tools for Accessing Fibre

Rick Sommer – BC Timber Sales

Who is BC Timber Sales and what do they do?

BCTS was formed in 2003 as a result of the outcome of the softwood lumber agreement with the United States. It was agreed that BC would move to a market-pricing system and BCTS evolved to create a stumpage mechanism that industry paid under different tenure types. They currently hold about 20% of the AAC, or about 17m m^3 throughout the province.
The mandate of BCTS is to offer marketplace timber sales. BCTS develops the timber, advertises the wood and administers the license. Lately BCTS has moved to become a more customer-focused organization, and along with its regular offerings of sawlog volume to existing industry, they will now custom design non-sawlog fibre needs for various components of the industry. Interestingly, their margin on non-sawlog sales is higher than what would have traditionally been seen on saw-log sales. Since BCTS is certified by numerous different certification bodies, proponents can market their wood as such.

There is potential for BCTS to extend its auction base to woodlot licenses, community forests, and First Nations licensees. There is also potential for BCTS to auction the volume from these licensees of which there are about 500 TSLs across the province to try to create a diverse array of volumes that meet the needs of various customers. This can be a "just-in-time" opportunity for business as well.

What is a Timber Supply License and how can I get one?

Under a TSL, the successful bidder is given the rights to harvest public timber in a specified area, over a specific amount of time, normally a two-year period. Volume in this case means the entire volume, including sawlogs and non-sawlogs. To bid on a license, you must be registered with the program, which is free, be a SAFE company under the BC Forests Safety Council, as well as fully participating in the BCTS Environmental Management System (EMS).

What is an "innovative timber supply license?"

Traditionally, BCTS sold sales as standard timber sales under the market pricing system and the auction starting point for that system is 70% of the indicated rate. (Basically discounts to the market stumpage rate, which then, in theory, are bid up by competing bidders.) In response to the need for more non-sawlog fibre, BCTS is beginning to move to an innovative timber supply license (ITSL), which is a lump sum purchase model allowing the holder to access all of the volume at a known stumpage rate before they begin to harvest. Traditionally, you purchase the volume based on your best estimate of what the volume is based on cruise data, you then harvest, the wood is scaled, grade-factored, and billed. In the case of an ITSL you know that your stumpage is "x" upfront, and you can decide how to extract value from that and how much you wish to use.

Alternate opportunities that BCTS is supplying, such as chipping and roadside grinding of debris piles, are growing. Markets such as feedstock for hogfuel and greenhouse heating are beginning to be established.

BCTS is open for Business as a Customer Centric Organization capable of delivering fibre on time at a competitive market price. Just ask us; BCTS will deliver!

Questions

In the Ft. Nelson area, what is the situation if someone wanted to put a pellet mill in. What is the availability of fibre? What kind of local welcome would you get there?
I sense that communities are very interested in talking. There is lots of fibre, but the economics drive availability. Normally, consider that 100km radius is acceptable and try to mix and match to achieve the necessary volumes. Get a hold of a local timber sales manager in Dawson Creek and have a discussion.

I run a local Community Forest and was really interested in your comment about the potential to expand the mandate of BCTS to become a marketing agent; can you expand on that idea?
Out of the roundtable discussions, the BC Minister of Forests and Range announced that he would like to see if BCTS could become a marketing agent and help others market their fibre. We are working on this, we want to help community forests get better value out of their fibre. Since the collapse of the sawlog market, we are trying to create opportunities for them to diversify their markets. BCTS may become part of that opportunity.

Can you expand on how you feel BCTS can help First Nations market their fibre?
This ties in with increasing the auction presence of BCTS throughout the province. The 20% AAC of BCTS could increase with the expanded auction presence to become competitive with major industry, helping others get true market value.

Burns Lake Energy Working Group

Natasha Letchford – Village of Burns Lake

Burns Lake is a community of 2,800, with 8 municipal staff, none of whom have any technical forestry background. The Community Energy Working Group was created in 2009 and is a loose collaboration of community partners who came together with the aspiration to make Burns Lake "a leader in community energy self-sufficiency using local renewable energy sources." Local conditions make Burns Lake a good fit for some type of bioenergy project. It is cold, surrounded by dead pine, and has local lakes suitable for geothermal heating.

From a municipal perspective, the opportunity is driven by energy costs. Natural gas prices are very high in Burns Lake. Last year the Village of Burns Lake spent $62,000 on

natural gas. A building audit revealed that the village was spending $160,000 annually on natural gas and hydro alone, a significant amount of the overall $3 million operating budget. The audit also showed that the arena was the largest energy consumer and should be one of the first buildings targeted for some sort of energy alternative.

In addition to the cost of traditional fossil fuels, last year Bill 27 was passed mandating that by 2012 municipalities will be required to be carbon neutral. In light of this, it was important to audit our GHG emissions considering that the village may have to buy carbon offsets to achieve carbon neutrality if things didn't change. The audit identified that our biggest source of GHG emissions was the natural gas use. The goal therefore is to replace our use of natural gas with a carbon neutral heating source. Staying with the status quo would result in a carbon-offset bill of $8,000 in 2012, diminishing the available budget for important social entities in town.

The village council considered this an opportunity to invite industry to town. They created a revitalization tax exemption whereby businesses that employ 5+, use local wood energy, diversify the forest industry, and build or improve municipal infrastructure are eligible for a scaled tax exemption over 5 years.

The immediate goal of the Energy Working Group is to heat one large municipal building with a locally derived sustainable fuel source. The Ministry of Forests is participating in the working group and is overseeing the fibre supply part of the project. Burns Lake also has access to feedstock through its community forest. In 2009, a request for information was put out and 15 different responses to what Burns Lake could do for a community energy project were received. We are hoping to secure funding and put out a request for proposals in the near future.

Question

Did the village of Burns Lake explore the potential of offsetting carbon using a district-heating project for the entire community?
I have spoken with Pacific Carbon Trust but they are looking for 4,000–5,000 additional carbon tonnes, which we will not achieve with the one building, and I am not sure if we could even achieve it if we had the whole community on it. We do not feel that we are at that level; we are not big enough to create that volume of offsets.

Feedstock Supply Logistics: Challenges and Opportunities

Ken Day – Alex Fraser Research Forest

The UBC Alex Fraser Research Forest is located near Williams Lake, BC. This presentation contains some of the observations and lessons learned regarding the biomass forest residues and energy opportunities from the perspective of a log seller and forest manager.

Observations

1. Regarding projects in the design phase, it is pretty clear that the engineers are in charge. They assume that the feedstock is going to arrive at the time, quality, and price you need it. It is not that simple!

2. Biomass in the forest has a cost, and not just the cost of transporting it. We need to recognize that there are a whole host of management and infrastructure costs that should be considered when pricing that resource.
    - If a log seller needs to average a minimum of $\$40/m^3$ to be in business, then heat or CHP projects should have a budget of 0.7 cents per kW for fibre from the woods; if you only make electricity, the number needs to be 1.7 cents per kW. What is the cost estimate of the project you are working on?

3. You are making a product with a narrow margin. It works for communities because there are other non-economic benefits to the community. Is the payback sufficiently fast to interest a corporation?

4. Future fibre supply is a concern. Will there be enough fibre supply for the demand we are currently creating? We need to keep in mind the future supply, and the necessity of leaving some fibre behind to ensure ecosystem processes.

How do Scandinavians manage their feedstock?

Lessons learned from a trip to Finland and Sweden in 2009 to study the feedstock supply for bioenergy:

- Energy security is a powerful motivator when you do not have domestic oil sources.
- Heat is more valuable than power.
- Biomass is a valuable product, not a waste product.
- Having biomass inventory on-site at a plant is expensive and dangerous, therefore, industry is built around "just-in-time" delivery, and the feedstock supply is managed in the woods.
- Consistency of feedstock is critical and fibre is sourced from multiple locations and then blended to get the desired consistency and moisture content.
- They have concerns about the environmental impacts of fuel harvesting on biodiversity, nutrient export, and impacts on soft soils.
- Companies there are willing to work together. A pulp and paper company was developing its capacity to supply bioenergy feedstock, in order to protect their pulp log prices. They were putting more feedstock into the market so that demand for feedstock did not push the price of pulp logs up. Thus everyone has a better business opportunity.

Nordic producers are very careful about controlling the moisture content of their feedstock. Roadside piles are designed to control moisture content. Logs are piled linearly on a brow log and covered with a waterproof paper product. The pile dries over

the course of a summer and the inventory is collected within a couple of years. Inventory is all tracked by computer so they know how much is there, when it was put there, who owns it and where it is destined. They are also very careful to minimize contamination of the feedstock and have developed many flexible transportation solutions.

Environmental implications are carefully considered to mitigate negative impacts. To improve nutrient cycling, fibre is cured on-site before piling and ash is recycled back into the forest. There are, however, concerns about the lack of dead wood and there is tension between biodiversity and bioenergy values.

Results of local research to determine best practices in feedstock quality and moisture content.

There were many lessons that were learned from the results of six case studies that were investigated with support from FP Innovations. The issues relating to feedstock quality were identified as the species composition of the feedstock in the field; and contamination with garbage, metals, sticks, stones, and soil. High moisture content leads to less efficient handling, grinding and trucking. Wet feedstock also requires drying, which consumes energy and reduces efficiency in the production process.

To overcome these issues it is important to grind biomass into trucks (not onto the ground) and to plan the project around some of the trucking limitations that may occur. It is also important to make sure that you have a diversity of equipment to choose from, so that the best equipment can be matched to the job and efficiencies can be gained.

In conclusion, it is critical to your project to manage your moisture content and develop a toolbox of approaches to meet the needs of large and small projects. It is also important to recognize that fibre for bioenergy has value, and there are a lot of costs that go into producing and extracting that fibre. Biomass for bioenergy should never be considered a "waste" product.

Partnership Models – What are the Possibilities?

Sandy Ferguson – BC Bioenergy Network

This presentation introduced the concept of partnership to provide context for the afternoon sessions.

Definitions of partnership can vary but all hinge on a common interest between parties, which is built on creativity, commitment and patience. Partnerships are an important part of any project's development. Each stage of the project lifecycle will require different types of partnerships with a different stakeholder mix. For example, during the idea stage, government, research organizations, and utilities may need to be approached for their expertise. Partners will be required for the financing phase to fund feasibility studies and implementation. Alliances with industrial suppliers will be pivotal during the equipment and technology selection process and relationships will be forged with First

Nations during consultation or as a potential partner during the idea stage. In short, a variety of partnerships should be considered throughout the phases of the business development from idea to implementation.

Case Study: Lhtako Energy Corporation- Partnering for Success

Chief Geronimo Squinas - Lhtako Dene Nation
Denis Pelletier – National Choice Biofuels

Lhtako Energy Corporation's project is a small pellet facility outside of Quesnel that will produce about 10 tonnes per hour of wood pellets. The facility will begin operations in July/August of 2010.

Lhtako Dene Nation partnered with National Choice Biofuels to create the Lhtako Energy Corporation. Both had experience that they brought to the table to make this partnership work and both invested capital. Lhtako had learned a lot from a previous failed business venture. They learned that politics and business had to be separated; decision-making had to be shared; open communication had to be open; and that ownership, as well as the opportunity to develop capacity and mutual respect, were pivotal for First Nations involvement. Community meetings were traditional and involved elders and other community members. To their credit, National Choice Biofuels did not come with an agenda. They came with an idea and a blank piece of paper. Lhtako worked together with National Choice to develop an Economic Development Agreement (EDA) and formed a limited liability joint venture corporation, after a high-level of support from a community referendum. An independent board of directors was struck to oversee the corporation, with the understanding that no director that is a member of the Red Bluff Band can sit on the council of the Band. This reinforces the separation between politics and business. There was also a conscious decision to remove the interest of Indian and Northern Affairs Canada (INAC) from the project. The business plan was developed off the reserve so that INAC control and rules were not an issue.

Co-development of the project

The Band, together with National Choice Biofuels, negotiated a custom Economic Development Agreement (EDA) with the province, on behalf of the new Lhtako Energy Corp. This EDA helped to secure a long-term fibre supply that was critical to the project and facilitated relationships with existing major licensees. Existing Lhtako Dene forest licences (non-renewable forest licenses) were also cancelled and reassigned to the new Lhtako Energy Corp. This allowed the Lhtako Energy Corp. to sell fibre, on behalf of the Nation, to raise capital to contribute to this project. The two partners also mutually explored potential technologies, funding opportunities, and employment opportunities tied to training programs. This was an important step and established mutual respect and a true joint venture.

What made this project work?

Clear and open communication! Communications relating to business and politics were completely separate. There was clear communication with stakeholders about what we wanted to do and consulted with local and provincial governments, as well as neighbouring First Nations, and industries to get their support at both the political and the business level.

Question

Where are you selling the pellets?
We are open to overseas and domestic markets; we want to diversify. We had an agreement with a vendor in New Brunswick for our first pellets, but do not want to rely on this market, solely. We are exploring market opportunities in Asia and Europe.

A Community in Action: Integrating Biomass Conversion into Green City Planning in Quesnel

Jim Savage – Savage and Associates

This work has been led by the Quesnel Community and Economic Development Corp., which is a subsidiary of the City of Quesnel.

Quesnel is a forest-dependent community in the interior of British Columbia that is facing significant challenges for many reasons. The biggest issue, like in many communities, is that there is a net outflow of capital to the rest of BC and Canada, approximately $2b net since the 1960s has exited from Quesnel alone. This means that it is incredibly difficult to get capital for re-investment. New approaches are necessary.

Quesnel's surrounding forests are healthy and vibrant and there is a belief that the community has a bright future as a net-wealth generator. From a global perspective Quesnel has amazing assets. Facing the Mountain Pine Beetle challenge, a community input process was initiated to put together a new vision and plan for the next 10 years. Over $200m in new investment will be needed to implement the new Green City Vision, which is guided by the philosophy borrowed from Herman Daly, former Chief Economist, World Bank: "The economy is a wholly owned subsidiary of the environment, not the reverse."

Numerous green goals are part of the Green City Vision, with a focus on using resources to invest in green infrastructure, such as green energy production, an approach that will increase community resiliency. Integrating a "bio-economy" framework into the vision will also provide a diverse list of options.

What have we done thus far?

As a first step, a resource inventory was done, where eight projects were identified as having some potential. These projects were then subjected to a quick test for viability

and the short-list was then subject to more technical scrutiny and business planning. Combined Heat and Power (CHP) and a biogas digester, using feedstock from the pulp mill, were the two most viable alternatives for the community. Paybacks are expected in the 5–8 year range, which is attractive for a utility.

In the end, it was proposed to generate power and deliver hot water to buildings using heat recovered from a sawmill energy system. 40% of useful energy from recovered heat and the remainder from sawmill residuals. The project will generate 1.7MW of electrical and 5.5MW thermal energy. The capital costs of the project will be $17.5 M, with $14M of that coming from new investment. Revenue is projected to be 64% from power, 32% heat, and 4% in offsets. The electricity component of the project is critical, the project will have to be CHP to be viable. The development corporation is now looking to secure funding and hopes to implement the project in 2012. The full build-out will include 22 buildings. The partnerships that have been developed were complicated but essential. Overall this project should be a useful template for other communities.

What are the benefits of the project?

The benefits of the project are:

- offset generation (6,000 tonnes);
- non-tax revenues for community: a huge driver because the community is facing loss of tax base because of the MPB impact;
- meeting Climate Partnership and Bill 44 commitments;
- many economic benefits; and
- demonstration, education, and community pride value.

Quesnel's bio-economy vision includes closing the loop and eliminating waste. Where can we use "waste" to create energy, installing technologies like micro-turbines and bio-gas digesters to convert "waste", burning it is no longer an option.

Comment & Question

This project's viability is not dependent on offsets. It is viable on its own with an input cost of $50-75 BDt for feedstock (cost estimate from sawmill).

Have you considered the First Nations archaeological sites that will be under those proposed pipelines?

Yes, we have begun initial consultations with First Nations, and we would like to set up processes. We have not gotten into this too much because we haven't signed the agreement with the sawmill yet.

Review of Technologies

Dr. Preto – National Research Council

Dr. Preto is a research scientist with CANMET Energy working on bioenergy, specifically biomass energy systems.

It is important to consider energy creation from biomass because it helps reduce dependence on fossil fuels, environmental benefits, employment creation, and stable pricing. That being said, there are many different technologies to choose from when considering biomass conversion systems. The main two technologies that are relevant here are combustion for heat or combined heat and power (CHP) or gasification (heat and CHP).

Combustion

Combustion technologies generate either straight heat or combined heat and power (CHP). Combustion should not be used for power generation only because efficiency is extremely low (approx. 25%). Comparatively, a CHP installation can achieve about 80% efficiency. Various combustion technologies are available for different energy ranges, ranging from small-scale residential wood stoves with a 2–10 kW capacity, boilers with a 5–35kW capacity, all the way to fluid-bed technologies that can achieve 500MW energy creation. There are a number of commercial suppliers in Canada, of which Deltech is a local supplier.

Although combustion equipment can be bought for larger energy needs, there are considerable issues with feedstock quality that have to be addressed such as moisture content, species, and volume handling, as well as emissions. An increase in moisture can result in a significant drop in efficiency and an increase in emissions. For example, using fresh wood will result in only 50% efficiency. Therefore the fuel type must fit the furnace.

In a CHP system, steam goes through a turbine to create electricity (Rankine system). These systems operate using high-pressure steam, which means that they have to have steam engineers operating them. This required manpower renders any system under 10MW uneconomical. There are combustion technologies that do not use high pressure steam to create power, such as the organic Rankine system, Brayton cycle, and Stirling engine but all are uneconomical due to their capital cost.

Gasification

Gasification is a technology that generates energy by converting biomass into low-molecular gas, known as “syngas” (carbon monoxide and hydrogen mainly), using only about a third of the amount of air required for traditional combustion. The syngas is cleaned of impurities in the scrubber and then burned in an engine to create heat and power. In this process the biomass does not burn completely but instead turns into gases. Gasifiers have been around for a very long time and were even used to power some cars, but the issue has always been the impure nature of the syngas. The engines

would have to be cleaned and maintained regularly because they would get "gummed up" from the impurities in the gas. There was a huge maintenance costs to continually clean the engine to keep it running.

However, the new gasification technologies include a gas "scrubbing" step that cleans the gas and allows the engines to run more efficiently. Gasification technology holds a lot of potential for application in communities in Canada. The benefit is that not only can you create heat and power, but you can also make things like hydrogen, methanol and other products as well.

Nexterra is a local company with a lot of experience in BC gasifiers. They have gasifiers installed at the new Dockside Green residential project in Victoria, a couple in the United States, and will be installing a CHP gasifier at the University of British Columbia in the fall.

Question

Is there an economic technology out there to produce CHP? Gasifiers are expensive?
This is a problem right now, but you have to consider what the Nexterra's product is. They now have perfected their syngas cleaning system, and it can now be used for CHP generation. You are willing to pay more when you have the potential for small-scale power generation.
There are not any perfectly economic solutions at the moment.

The Economics of Biomass Energy

Reg Renner – Atticus Financial

We were approached by a fellow from Finland who explained that 10 years ago they had no community heating projects in their province. Today they have 600 community heating plants. This shows what we can do, but we live in the age of scepticism.

What stops us from moving forward?

Technology concerns

Who is doing this? Austria has 20,000 residential pellet furnaces installed and 1200 community heating plants. Westbank First Nations have a KOB boiler system that they put in 5 years ago (150 MW), which heats their manufacturing plant and office building. A 540kW wood boiler system heats 3 apartment buildings in Norway and is very clean.

Sustainability of the system

How can we consider this when we do not even convert our cubic meter estimates into Gigajoules? How many Gigajoules in a cubic meter of solid wood? Does anyone know?

This is why we are having difficulty, because in forestry we never talk about our resource in terms of energy potential. The answer depends on the moisture content, solid wood or chips, and wood species. For BC wood, the number is approximately 12 Gigajoules per BDt. If we used 40M m^3 of the underutilized ACC we could generate 20M tonnes of pellets. Our export of pellets this year was 1.2M tonnes. This is not an issue at the moment. Burns Lake is concerned about sustainability, when the numbers are crunched they only need one logging truck a month to supply their proposed heating project.

Environmental concerns

If you have been to Austria there are no smoke concerns in their air sheds, and they have 1200 community heating systems. Austria has high environmental standards. They have 30 boiler manufacturers generating $2.2B in gross sales yearly.

Economic concern

Forty percent of our energy needs are thermal. We have an annual, provincial heating bill of 4B per year. Coincidentally, there is also $62B worth of energy in our forests, and we do not know what to do with it.

BC is the best place for a green energy economy. The carbon tax will put pressure on the biggest users. Green policies, drying forests, carbon credits, and dying forests all add to the opportunity. This approach will also benefit our communities by keeping our investments local.

The take home message is to replace scepticism with education. Begin with an energy audit and educate yourself on the numbers.

Funding Opportunities through BC Hydro

Paul Bouman – BC Hydro

Power Smart has a new Sustainable Communities Program. We have a supply gap in BC– traditionally, we use more power than we produce. BC Hydro is trying to manage the majority of supply gap through demand-side management, saving power instead of producing power. To this end, BC Hydro has a new Power Smart program called the Sustainable Communities Program, the focus of which is energy and emissions. There are two components to the program: community energy planning and the district energy program.

Funding is available for the 3 Ps:

1. **P**lanning: creating a community energy and emissions plan (CEEP) is an eligible activity,
2. **P**eople: co-funding human resources that support energy savings, such as a community energy manager; and
3. **P**rojects: eligible project costs include pre-feasibility and feasibility studies that are eligible for 50% of cost up to a maximum of $20,000. BC Hydro will also be

providing a capital incentives program in the near future that relates to district heating projects. The capital incentives pay out is the same as power smart payout, and the amount of payout is based on the amount of electricity saved by that project over the life of the installation. Incentives are paid once the project is fully built.

Ideal district energy system would exhibit the following characteristics:

- Show a reduction in energy and electricity as compared to "business as usual" case.
- Maintain fuel-switching neutrality – we don't want to encourage businesses to increase natural gas consumption.
- Include a renewable fuel source at full build out – biomass conversion is a very good solution for curtailing energy use. We do plan to allow for a natural gas interim period (1-5 year). In this circumstance some of the capital incentive may be held back.
- Would like systems to include CHP opportunities, they are more efficient.
- Hoping that the decision criteria includes some sort of triple-bottom line approach – don't want just an economic case, would rather see that they are attributing value to some other things.

Eligibility:

- Project needs to be in BC Hydro's service area;
- Need to see the potential for energy savings – need to see a reasonable electricity;
- Open to local government development, developer, or institution. Not so much about who the proponent is as what the potential project looks like; and
- There may be some size or energy density criteria, but that hasn't been decided yet.

Funding Opportunities through Community Futures

Dale Tomma – Community Futures of Central Interior First Nations

Central Interior First Nations Community Futures (CIFNCF) is located in Kamloops and is one of three First Nations Community Futures in BC, including Stó:lō Nation and Haida Gwaii. The mandate of CIFNCF is to provide community economic development to FN businesses and entrepreneurs. Our services include

- Promote business assistance; business plans.
- Provide training programs for people going into business; we have youth and 55+ entrepreneurial programs. CF is registered as an institution and can provide accredited training programs.
- Provide business and start-up loans, as well as lending circles.

Try to prevent economic leakage in our communities and play a role in human resources and capacity building, assist aboriginal business, and employ aboriginal people.

Loans based on the 5-C's of credit but Community Futures will consider lower credit scores than other aboriginal lending organizations.

Loan portfolio

- General loans of up to $75,000
- Youth up to $15,000 & $25,000
- Forestry and value-added of up to $75,000
- Lending circles up to $4,000 maximum

Funding Opportunities through All Nations Trust

Paul Donald – All Nations Trust

All Nations Trust is an aboriginal-owned trust company located in Kamloops, BC, which provides business loans and business consulting services and is also involved in delivering funding programs that are relevant to the bioenergy sector. The following are two equity gap contribution programs that are available to aboriginal individuals and communities exploring business opportunities.

Aboriginal Business Canada Program (ABC) has a mandate to increase the number of aboriginal businesses in Canada, both individual-owned and community-owned. They provide assistance with feasibility studies, business plans, environmental assessments, business valuations (for acquisitions), and some legal council. ABC will provide 20–25% of the actual business start-up costs, (i.e., purchase of equipment and site prep costs) and will support almost any sort of business that will be run for profit. Contributions of up to $250,000 for business planning costs, and up to $1 million to start-up of a commercial operation are available. They will also provide up to %75 of business planning costs. To be eligible there have to be 3 components of project funding:

- proponent needs to provide some of their own funding;
- some commercial financing; and
- ABC contribution (ABC funding is a non-repayable contribution).

Indian Affairs—Major Resource and Energy Development Fund specifically focuses on oil and gas and bioenergy sectors. They will typically fund soft costs of project development similar to ABC. However, they will also help you set up partnerships and negotiate joint ventures. They have funded $750,000 in BC so far this year, and, nationally, they have contributed to $600,000 in bioenergy projects, which have been mainly soft costs.

- Would like to encourage aboriginal people to apply for this program. Indian and Northern Affairs Canada will not become involved with the project other than to support the success of the business. No involvement with day-to-day operations.

Funding Opportunites and Financial Considerations

Reg Renner – Atticus Financial

Atticus financial is located in Vancouver and finances a wide variety of equipment, mainly leasing. Leasing is a good option for many projects, because the collateral is usually secured, against the equipment, not against your property. Leasing also accelerates paybacks. Paybacks that we have heard about over the past few days have been conservative and based on today's energy prices. What we know, however, is that the energy markets spike often in reaction to global events, and those spikes will accelerate paybacks dramatically. For many cities, school districts, regional districts, and First Nations bioenergy projects are discounted, because they do not have the available capital for the equipment. However, it is important to realize that you have credit strength in your institution. By leasing the equipment, you can use the monthly energy savings to pay your monthly lease charges. The greenhouse industry has leased all their installations. In 5 years you can own the system and then realize the cost savings. There are opportunities to go longer than 5 years as well (i.e., 7 years). As a broker we can negotiate that on your behalf with funders by educating them about what bioenergy is and what the return on investment of thermal energy is. It is important to have someone educated to speak on your behalf. Going into your own bank can be challenging, because more than likely, they will not know what you are talking about. There are funders out there interested in funding these types of projects; banks will probably not be interested in bioenergy.

Funding Panel Questions

To Reg Renner: *What would the breakdown be for leasing equipment versus bond financing for district energy systems?*
Bond financing is not my strength, but bonds are for more long-term financing. Leasing has fixed term (3, 5, 7 years) with fixed rates that is dependent on your credit strength.

To Paul Donald: *Do the equity gap funding opportunities that you talked stipulate whether a project is on-reserve or off-reserve?*
The project can be on-reserve or off-reserve. The only stipulation is that we are funding the aboriginal partner or an entity that is at least 51% aboriginal owned.

To Paul Bouman: *Could you comment on where some of the thresholds are for community size for your new sustainable communities program?*
The energy planning and community energy manager part of the fund has a 20,000-person population threshold to be eligible. However, we are working on a program for smaller communities under 20,000. The district energy program has no size threshold; it is more about the potential for energy savings. Thresholds in this program may be more about square footage and energy intensity thresholds.

Resources and Follow-up Support

Sandy Ferguson – BC Bioenergy Network
BC Bioenergy Network (BCBN) is a not-for-profit network mandated to maximize the value of BC's biomass resources through partnerships. For more information, please visit http://bcbioenergy.ca/home .

Peter Robinson - Community Energy Association
The Community Energy Association is a not-for-profit organization that was established to work on energy sustainability and climate action for local governments and First Nations in BC. For more information, please visit http://www.communityenergy.bc.ca/resources/cea-publications.

Cam McAlpine – Northern Bioenergy Partnership
The Northern Bioenergy Partnership was established to advance the interests of the bioenergy sector and northern communities. The partnership would like to act as a resource for industry and communities. If you are involved in the industry, or are a community that wants to be involved in bioenergy, please visit them at www.bioenergypartnership.ca.

David Dubois – Green Heat Initiative
The Green Heat Initiative was established in 2009 and is scheduled to run until March of 2011. It was founded to facilitate the development of the green heat solutions in northern BC and has a goal to facilitate the creation of 18 green heat systems. There will also be a large component of education and overcoming some of the barriers.

What can GHI help with?
- identifying current and future energy needs;
- conducting energy audits;
- identifying what the biomass needs are going to be for your project;
- identifying potential energy synergies;
- payback calculators;
- identifying where your carbon offsets are going to be;
- other technical tools as they become relevant; and
- accessing funding.

Green Heat Initiative is an independent information source that can benefit your community and help develop solutions. For more information, visit www.greenheatinitiatives.com .

Paul Bouman – BC Hydro
For more information, visit www.bchydro.com/sustainablecommunities .

Paul Donald – All Nations Trust
All Nations Trust is an aboriginal-owned trust company located in Kamloops, BC, which provides business loans and business consulting services and is also involved in

delivering funding programs that are relevant to the bioenergy sector. For more information, visit http://www.antco.bc.ca .

Cameron Stonestreet – Pacific Carbon Trust
For more information, visit http://www.pacificcarbontrust.com .

Dale Tomma – Community Futures of Central Interior First Nations
Community Futures of Central Interior First Nations is a registered not-for-profit organization whose mandate is to provide community economic development to FN businesses and entrepreneurs. For more information visit http://www.cfdcofcifn.com .

Rick Sommer – BC Timber Sales
For more information, visit http://www.for.gov.bc.ca/bcts .