WHY BIOMASS?

Alaska Wood Energy Conference
Fairbanks, Alaska
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Natural Resources Canada
HELLO
I AM...
NOT
AN EXPERT

An expert
Not an expert
Can you spot the difference?
The Pan-Canadian Framework on Clean Growth and Climate Change is Canada’s plan – developed with the provinces and territories and in consultation with Indigenous peoples – to meet our emissions reduction targets, grow the economy, and build resilience to a changing climate.

The Framework commits to reducing GHG emissions by supporting rural and remote communities in their transition toward more secure, affordable, clean energy.
BC AND YUKON BIOENERGY STRATEGIES

Clean Energy BC

BIO MASS

Biomass energy can be generated using heat generation such as the lumber dry kiln associated with sawmills. Conversely, it can be used to produce power generation such as in the Provincial Biomass Power Plant. The energy losses in the form of biomass, either dry or wet, are typically converted into energy. Biomass energy is commonly referred to as renewable and sustainable. This is due to the short decomposition cycle involved, coupled with the regeneration of carbon through repositioning, referred to as "organic carbon." Biomass energy production in British Columbia is limited to wood and forest residues, as well as on-farm gas collection. Over 90% of the amount is currently in operation in the province at large pulp and paper facilities (nearly 60% of capacity). A further 20% is produced by pyrolysis lifetime. 60% of the product is generated by integrated systems and standing pine piles. Generation potential for existing mills is in excess of 300 MW. The total generation potential for on-farm sources is in the order of 1.250 MW. Ultimately, this will likely be utilized for renewable energy. Total on the potential is 1.0 making of heat generation is the capacity of generating 1 MW of power.

Yukon Biomass Energy Strategy

February 2016

Yukon Biomass Energy Strategy

- 2007 BC Energy Plan calls for provincial energy self-sufficiency by 2010, and for a clean and renewable energy portfolio of greater than 70%.
- Biomass is considered the power by utilities. Typical biomass power facilities operate with a capacity factor in excess of 82%, while averages 88% of those 40.
- Biomass generation will replace thermal burners and greatly reduce the amount of particulate emissions discharged into the atmosphere.
- Over 660 million cubic meters of pine have been harvested by the Mountain Pine Beetle to date. Much of that wood is available for high-value forest products. A successful Biomass program will assist in removing inedible and non-renewable forest facturing by utilizing the resources of BC's forests.
- The 2007 BC Energy Strategy has identified the following action items for the province:
  - 1,000 MW by 2016
  - 316 million BF below existing protocol biomass production.
  - Relocating all on-site lasers in a new biomass feedstock to feed the plant.
  - 10 community energy projects that convert local biomass into energy by 2009.
  - Establish one of Canada’s most comprehensive biomass inventories to create value from energy opportunities.

Natural Resources Canada

Resources naturelles Canada
Indigenous Forestry Initiative:
focuses on economic development and forestry, with a bioenergy component

Strategic Partnership Initiative:
focuses on promoting participation in the forest bioeconomy
Clean Energy For Rural and Remote Communities: Bioheat Stream

focus on capital projects to develop biomass heating systems and reduce fossil fuels in remote communities
Indigenous Off-Diesel initiative:

Aimed at reducing diesel reliance in remote Indigenous communities through supporting leaders that can develop renewable energy solutions in their communities.
Kwadacha First Nation: CHP Project

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Kwadacha Nation installs wood gasification system

Feb 1, 2018 - Chief Danny Van Rumer of the Kwadacha Nation in Bella Coola, recalls the incident almost seven years ago when his first Nations CHP trial project for the Kwadacha Nation and Bella Coola community was a success. The project is now well established and the wood gasifier serves as a critical and integral part of the utility’s energy strategy. Dr. Greg Brunk, the project manager, says it is the first of its kind in Canada and is expected to become a model project for other Indigenous communities.

The wood gasification system, composed of three fuel gasifiers, is designed to provide hot water and electricity for the majority of the community. Each of the three units independently produces 300 kWe of electricity and 750 kW of heat in the form of hot water.

"It’s hard to believe looking back, but this is a project that we have been talking about for years now," explains Van Rumer. "I remember negotiating with a mining company on a deal that was underway in our region back around 2011, and it occurred to me then that our lands and our country deserved a fairer return for the resources that we own and control."

Van Rumer went on to say that the project has been a success and has helped to reduce the community’s reliance on diesel generators for electricity and propane for heat.

Located in Bella Coola, B.C., the Kwadacha Nation is an off-grid remote community more than 100 km north of Bella Coola, near the town of Bella Coola. The community has an estimated population of 2,500 people, and has traditionally relied on costly diesel generators to provide electricity, and propane for heat.

Looking to the future, Van Rumer expressed optimism that the Kwadacha project could be replicated in other communities. The project manager, Dr. Greg Brunk, said it is the first of its kind in Canada and is expected to become a model project for other Indigenous communities.

Van Rumer and the Kwadacha council were looking for the kind of technology and innovation that would provide their community with reliable and sustainable energy at an affordable price. They decided to proceed with the project, and the Kwadacha Wood Gasification Project was launched.

The project was supported by the Canadian government, which provided funding to help cover the costs of the installation and operation of the wood gasification system. The Kwadacha Nation also received support from the Province of British Columbia, which provided funding to help cover the costs of the installation and operation of the wood gasification system.

Since the project began, the Kwadacha Nation has been able to reduce its reliance on diesel generators for electricity and propane for heat. This has resulted in significant savings for the community, as well as a reduction in greenhouse gas emissions.

The project was completed in 2017, and the Kwadacha wood gasification system is now operational. The system has been praised for its reliability and efficiency, and has become a model for other Indigenous communities across Canada.
Canada Invests in Biomass and Indigenous Participation in the Forest Sector in Prince George

News release

January 23, 2019  Prince George, British Columbia  Natural Resources Canada

Our government is investing in our resources — Canada’s natural advantage — to boost economic competitiveness while protecting our environment. This includes investments in new technologies that tap into the vast potential of forest-based biomass and bioenergy.

Canada’s Minister of Natural Resources, the Honourable Amarjeet Sohi, today announced a $589,629 investment in three Indigenous forestry projects in British Columbia that will create jobs and boost the local economy.

They are:
- $475,000 for Chu Cho Environmental to support an Indigenous bioheat project in Tsay Keh Dene Nation as part of our commitment to creating good jobs and building a clean growth economy. The funding will enable Chu Cho Environmental — a Tsay Keh Dene Nation–owned company — to assess the feasibility of using biomass to generate heat and power. Once completed, this project would be among the first of its kind to heat and power an Indigenous community in the province, demonstrating the power of innovation to create opportunities in a remote community.

This is the second project announced under Natural Resources Canada’s (NRCan) Clean Energy for Rural and Remote Communities program. The goal of the program is to reduce the reliance of rural and remote communities on fossil fuel for heat and power with particular emphasis on Indigenous communities.

Tsay Keh Dene: CHP Project
Visitors flock to Yukon village to see bioenergy system in action

Hundreds of people have travelled to learn about Teslin’s biomass heating system

Alessandra Byers - CBC News - Posted: Mar 30, 2019 12:00 PM CT | Last Updated: March 30

Sier Rogers explains Teslin’s biomass heating system to visitors from B.C. and the N.W.T. (Kelly Abbotts/Radio-Canada)

Teslin Tlingit Council – Hargassner biomass boiler district heating system.

The Yukon village of Teslin has become a world-leading model in biomass heating, with more than 900 people from around the globe having visited to learn about the facilities.

Once a month, and even up to once a week in the summer, the Teslin Tlingit Council leads tours of its system, where biomass boilers heat ten of the community’s major buildings. It went into operation almost a year ago, and has been attracting visitors like Fred Dehners ever since.
• Energy cost savings from systems that burn wood more efficiently.
• Local economic development and jobs.
• Training, employment and business opportunities.
• Decreased costs and risk of impacts from transportation/use of fossil fuels.
• Energy independence and keeping $$ in the community.
• Use of forest residues from other forestry activities and construction projects.
• Use of dead wood and fire smart residuals.
• Community pride.
• Members returning to the community because of employment opportunities.
• Makes sawmilling profitable if there is a market for the waste.
• Investment in future of community
Biomass Energy
MOR E HARM THAN GOOD

Dis-Advantages of Biomass
Why Burning Trees for Energy Will Harm People, the Climate and Forests
“Burning forest biomass to make electricity releases substantially more carbon dioxide per unit of electricity than coal”.

“We see this biomass industry as one of the biggest threat to these forests”.

“I’m far from convinced that the biomass industry is policing itself, or being policed, forcefully enough.”

“The most dangerous component of combustion is the particulate matter which is produced by biomass power generation”.

Burning trees for energy ‘like pouring gasoline to put out a fire’
Biomass Energy

MORE HARM THAN GOOD
IT DEPENDS: WHAT FOSSIL FUEL ARE YOU DISPLACING

Natural gas

Coal

Diesel in off-grid communities
IT DEPENDS: WHAT IS THE SOURCE OF FEEDSTOCK
• Biomass comes from a dynamic natural system that continuously sequesters from, and releases carbon to, the atmosphere.

• The use of biomass for bioenergy can be carbon positive, negative or neutral. It depends on the assumptions made when calculating the carbon impact of bioenergy use.

• To compare energy sources, a full life-cycle accounting of all carbon emissions and sequestration is required.
• Sustainable forest management planning must guide biomass practices.
• When evaluating the impact, must consider the baseline or alternative use.
• The over removal of dead trees or woody residue could reduce the stock of coarse woody debris with possible negative impacts on biodiversity and soil fertility.
Potential economic benefits/revenue from bioenergy:

• Selling power
• Construction of facilities
• Feedstock collection
• Tourism
• Products
• Use of local fuel source versus trucking in diesel
• Stability of a local fuel source
How do we have a balanced dialogue about bioenergy?
Comments from CBC Website regarding the Teslin Article:
“Biomass is not a great long-term solution to diesel power generation. For one, it is a myth that it is 'carbon neutral'. According to the IPCC, compared to natural gas, the burning of wood puts out 2 times more CO2, 60 times more methane and 400 times more Nitrous Oxide (N2O) for each unit of energy burned. It also puts out more CO2 and N2O than the burning of oil or even coal.

It also releases a huge amount of fine particulate matter (PM2.5) which is very harmful to people’s health. So if it is located near communities it could be creating a lot of harm, increasing health impacts and, therefore, costs. Is there any air quality testing set up as part of this? Are there any health studies mandated to assess the impacts?

And what happens when all the Fire Smart wood in the area is harvested? Biomass plants demand an ongoing source of wood for decades to come, that can outstrip the supply of wood chips (which are being shipped from where?) and lead to harvesting of live trees”.

Visitors flock to Yukon village to see bioenergy system in action

Hundreds of people have travelled to learn about Teslin’s biomass heating system

Alexandra Dykes - CBC News - Posted: Mar 30, 2019 12:00 PM CT | Last Updated: March 30

Ilait Hogan explains Teslin’s biomass heating system to visitors from B.C. and the N.W.T. (Helly Attere/Re reporter Canada)

The Yukon village of Teslin has become a world-leading model in biomass heating, with more than 900 people from around the globe having visited to learn about the facilities.

Once a month, and even up to once a week in the summer, the Teslin Tlingit Council leads tours of its system, where biomass boilers heat ten of the community’s major buildings. It went into operation almost a year ago, and has been attracting visitors like Fred Behrens ever since.
CONCERNS REGARDING THE MYTH THAT BIOMASS IS CARBON NEUTRAL

Comments from CBC Website regarding article on the Teslin Biomass Project:
# 1: "Biomass is not a great long-term solution to diesel power generation. For one, it is a myth that it is 'carbon neutral'”.

Biomass Energy: A clean and renewable Fuel:
“Contrary to what many people think, biomass is very environmentally friendly fuel. Growing trees capture and feed on CO2, which is present in the air. When wood is burned, CO2 is released into the atmosphere restarting the cycle. This is why biomass is considered neutral for the production of GHG unlike all the fossil fuels that pollute the atmosphere”.

- The knowledge of carbon accounting has evolved.
- Canadian scientists are moving away from using the term carbon neutral when discussing forest biomass.
- We should have consistent messaging on bioenergy and GHG.
Conclusions regarding deployment: Key messages about bioenergy
Bioenergy has significant potential to mitigate GHGs if resources are sustainably developed and efficient technologies are applied.
Forest products and biomass residues and wastes can deliver significant GHG mitigation performance—an 80 to 90% reduction compared to the fossil energy baseline.

Comments from CBC Website regarding article on the Teslin Biomass Project:
# 2: “According to the Intergovernmental Panel of Climate Change (IPCC), compared to natural gas, the burning of wood puts out 2 times more CO2, 60 times more methane and 400 times more Nitrous Oxide (N2O) for each unit of energy burned. It also puts out more CO2 and N2O than the burning of oil or even coal”.

Special Report on Renewable Energy Sources and Climate Change Mitigation
Summary for Policymakers: A Report of Working Group III of the IPCC
Comments from CBC Website regarding article on the Teslin Biomass Project:

#3: “It (burning of wood) also releases a huge amount of fine particulate matter (PM2.5) which is very harmful to people's health. So if it is located near communities it could be creating a lot of harm, increasing health impacts and, therefore, costs. Is there any air quality testing set up as part of this? Are there any health studies mandated to assess the impacts”?

- Modern boilers / stoves have much lower emissions than conventional stoves because they use advanced emissions control technologies. Most modern equipment is imported from Europe and meet stringent European standards. Canadian Council of Ministers of the Environment are currently developing a guide for managing air emissions from small scale combustion systems (between 50kW and 5MW). Larger systems would require permitting / authorization from provincial bodies.

The International Organisation for Standardisation (ISO) has developed standards for solid biofuels which have been adapted by the Canadian Standard Association (CSA).
Comments from CBC Website regarding article on the Teslin Biomass Project:
# 4: “And what happens when all the Fire Smart wood in the area is harvested”?
# 5: “Biomass plants demand an ongoing source of wood for decades to come, that can outstrip the supply of wood chips (which are being shipped from where?) and lead to harvesting of live trees”.

- Firesmart activities are usually not a one entry treatment
- Harvesting of live trees specifically for biomass energy use is a valid point of concern.
- In the case of Teslin Tlingit Council, they are sourcing feedstock from several sources including:
  - Trees that were removed for construction and road building;
  - Fire killed trees;
  - They also plan to use sawmill residuals when the sawmill becomes operational.
LESSONS I LEARNED: HOW TO HAVE A BALANCED DISCUSSION

• Be respectful of other’s opinions.
• When having discussions, you got to know when to hold ‘em, know when to fold ‘em, know when to walk away, and know when to run.
• Using terms like good/bad/carbon neutral does not help.
• It might help to change the terminology e.g. advanced wood heat.
• The science around bioenergy is complicated, multi-faceted and evolving.
• Put the conversation into context and be specific and clear on assumptions.
• KEEP LEARNING AND EDUCATING YOURSELVES AND OTHERS ON BIOENERGY

• BRING YOUR PASSION TO THE DISCUSSION

• ALSO BRING CREDIBILITY TO THE DISCUSSION