Forest Biomass Supply Chain for Community Projects

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Challenges of small(er) scale supply chains

- Forest energy supply is different than other energy sources
- Young developing technology
- Many stakeholders with different backgrounds
- Resources strongly affect usage
- Low density of the fuel creates problems
Challenges of small(er) scale supply chains

- Raw material availability
- Technology selection & availability
- Quality of chips
  - Moisture content
  - Particle size distribution
- Supply flow and storage management
- Entrepreneurship
- Payment method(s)
- New products adaptation
- Public support
Metla efforts in small-scale biomass project implementations

Heating plants based on wood chips in Finland
Metla efforts in small-scale biomass project implementations
Technology considerations

- Selection and adaptation of existing technology
- Machines must have full loads & be efficient
- Proper sizing of the supply chain & boiler
- Avoid too complex supply chains
- Avoid sophisticated, new technology; proven technology is needed
- Avoid long distance forwarding & transportation of forest biomass
- Moisture content
- Proper loading of the forwarder
- Supply chains are usually more complex than anticipated
Business process map - Finnish supply chain
Matapedia
Matapedia

- Active successful cooperation on all levels
- Promotion of Finnish Technology
- Continued cooperation on research level
- Bi-Lateral agreement between Matapedia and North Karelia
FPInnovations involvement with Matapedia

Amqui biomass heating system
- Heated building: Amqui Hospital
- Owner: Amqui hospital (CSSS)
- Management, maintenance and supply: Matapédia Forestry Cooperative (CFM)
- Two boiler: 500 kW and 800 kW
- Annual consumption: 3,675 MWh
- Annual wood consumption: 1,600 gmt (35 % MC)
FPInnovations involvement with Matapedia

- Supply analysis:
  - Forest biomass availability for the area
  - Biomass harvesting scenarios: cost analysis and recommendations
- Chipping operations tour
- Support and coaching on residus harvest operation
- Time studies (report)
Matapedia forest biomass supply flow
Monthly Consumption of the Amqui Hospital

Annual consumption: 1,600 gmt

Monthly Consumption (gmt)
Biomass supply from a storage

Monthly consumption (gmt @ 35% MC)  gmt in stocking

January  February  March  April  May  June  July  August  September  October  November  December
FPInnovations involvement with Matapedia

- Help in setting strategies for long period storage of wood chips
- Technical support in monitoring heat in chip piles
- Report and recommendations to prevent self ignition fire in chips piles
- Support in developing new biomass storing strategies
Developing new supply strategies

Harvesting and storing of delimbed tops

- Transport with regular self-loading trucks
- Outside storage with minimal infrastructure
- Better conservation of wood characteristics
- Chipping when required
- Better use of the sheltered area
- Better control of wood chip quality
- Cost comparable to chipping in the forest (still in development)
Community project development with Quebec Forestry Cooperatives

Québec Federation of Forestry Cooperatives
http://www.fqcf.coop/
Community project development with Quebec Foresty Cooperatives – Biomass heating projects

- La Sarre Hospital
- Rouyn-Noranda DH project
- Mont-Joly Hospital
- Cégep of Matane
- Chicoutimi DH project
- Baie St-Paul DH project
- Amqui community centre
- Montmagny Hospital
- Maria Hospital

Community project development with Quebec Foresty Cooperatives – Biomass heating projects
Marian Marinescu

- Estimate the heat and electrical power **consumption**;
- Evaluate the **feasibility** of small-scale combustion technologies (cordwood/chip boilers, modular CHP units);
- Evaluate the forest biomass **requirements** for each technology;
- Assess the local availability, supply chains, and **cost** of forest biomass.

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**Annual heating costs for current and potential chip boiler generation in communities with available biomass**

- **Bamfield**: $200,000
- **Coal Harbour**: $400,000
- **Ditidaht**: $600,000
- **Ehattesaht**: $800,000
- **Holberg**: $1,000,000
- **Huu-ay-aht**: $1,200,000
- **Jordan River**: $200,000
- **Kyuquot**: $400,000
- **Mowachaht/Muchalaht**: $600,000
- **Nuchatlaht**: $800,000
- **Pacheedaht**: $1,000,000
- **Port Renfrew**: $1,200,000
- **Quatsino**: $200,000
- **Quatsino IR**: $400,000
- **Rumble Beach/Port Alice**: $600,000
- **Sayward**: $800,000
- **Shirley**: $1,000,000
- **Tahsis**: $1,200,000
- **Uchucklesaht**: $200,000
- **Ucluelet**: $400,000
- **Woss**: $600,000
- **Zeballos**: $800,000
FPInnovations involvement in community projects in B.C.

Kwadacha first nation bio-energy project

Charles Friesen

• Identify a sustainable fibre supply for a bioenergy plant to be installed in the First Nations community of Kwadacha (Fort Ware);

• Develop a biomass harvesting plan;

• Determine cost of supplying biomass from surrounding forests;

• Develop a sustainable forest management plan.
FPInnovations involvement in community projects in B.C.

**First nation bio-energy project**

Forest biomass supply

- Surrounded by forest and biomass
  - limited access (Hesquiaht)
  - no forest operations
  - limited equipment available

- Complex supply chain due to small scale operation

- High quality requirement for feedstock
  - low moisture content
  - specific particle size
  - white wood, contamination free

- Supply in competition with firewood
Recipe to success

- Holistic planning
- Proper training of involved individuals
- Use expertise/build partnerships
- Integrate
- Everyone in the production chain must make a profit
- Constant improvement
- First pilots must succeed (failure = bad reputation)
- Nature impact/Public support
- Many small projects built up to larger scale operations
Questions & Answers
Contact

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Thank you