

Alaska–Yukon Wood Energy Conference

Biomass Heating for the North

Feasibility and Early Project Development

And Other Interesting Things

David Dubois BSc ChE, Manager of Business Development – Fink Machine

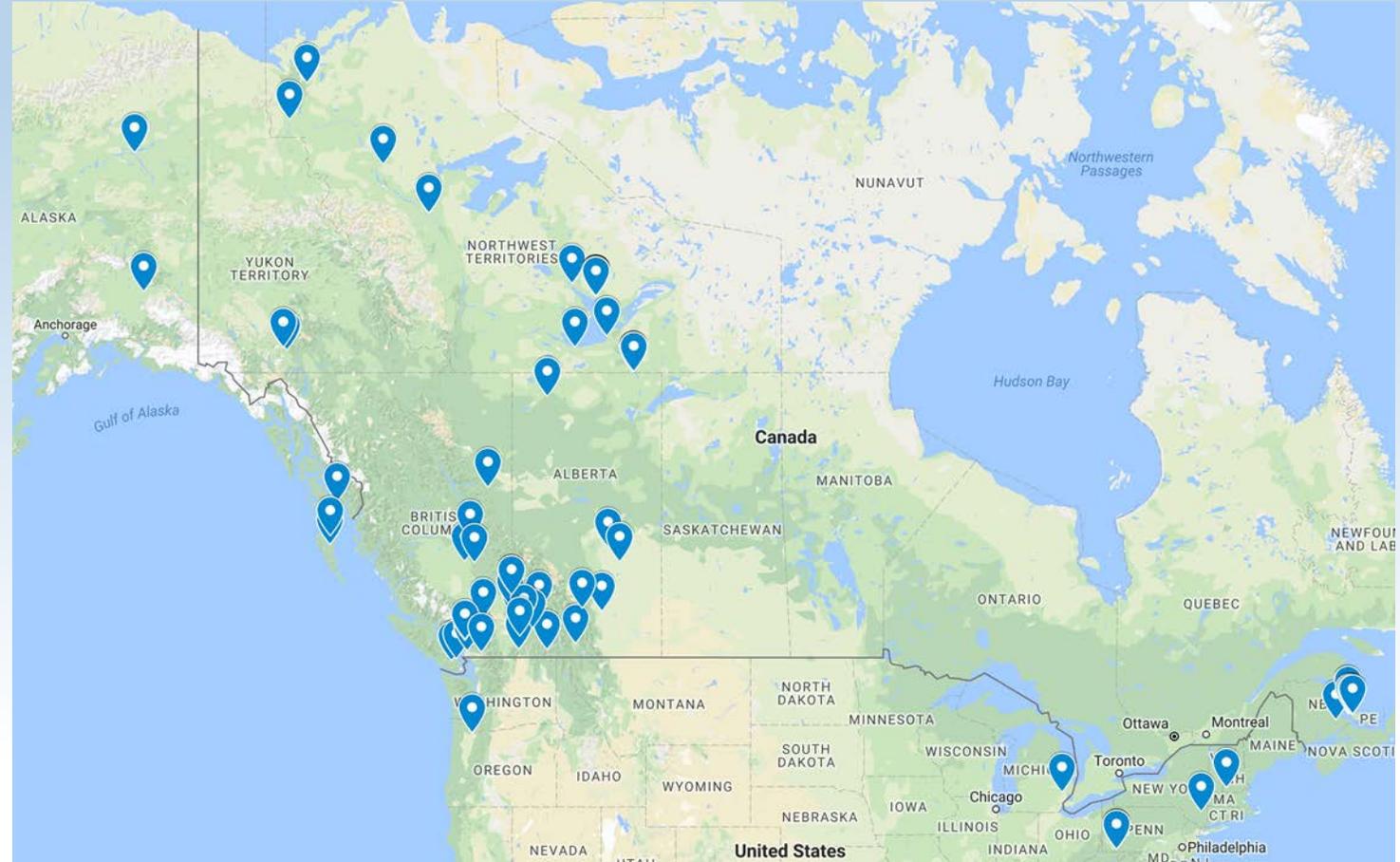
Fairbanks, Alaska April 16, 2019



State of the Art Bio Energy Heating Systems
Revolutionary Wood Heating Technology
Highly Economical for Commercial, Industrial Buildings

Who is Fink Machine Inc.?

- Canada's Largest Supplier of ICI Biomass Boiler Systems
- First install 2003
- Over 100 installations



I want to do a bioenergy project!!

Alaska Energy Authority Renewable Energy Fund Application - Biomass Best Practices Checklist

The following checklist contains detail items that are critical to the success of a Renewable Energy Fund application. The intent of the checklist is to aid applicants in the submission of a comprehensive project proposal.

Economic Analysis

- Assumptions and their sources are clearly identified:
 - o Fuel conversion values for biomass
 - o Cost of biomass
 - o Cost of diesel
 - o Fuel conversion values for diesel
 - o Efficiencies of the existing heating system and of the proposed biomass system
 - o Estimated maintenance and operating costs are identified and the rationale of the estimates is discussed.

Business Plan

- The business plan should identify who will have overall responsibility for all components from wood purchase to heat delivery.
- O&M
- PCE reporting, IRS, and Bulk Fuel Loans must be current - RFA
- The project is consistent with the Regional Energy Plan.

Fuel Supply Considerations

- Resource Assessment - Small Project**
 - o Long term harvest sustainability assessment
 - o The plan should incorporate all land ownership involved in the project
 - o 5 year harvest schedule
 - o Required harvest equipment
 - o Finalized delivered costs estimates, including stumpage
 - o Access/transportation plan
 - o Preliminary Fuel supply contract – Final contact is required for construction
 - o GIS – SDMI or other high resolution classified systems – 10 m or less resolution
 - o Requirements of the Forest Practices Act are considered in the wood harvest plan. A plan of operations should be submitted to The State of Alaska Department of Natural Resources – Division of Forestry.
- Resource Assessment - Large Project**
 - o Long term harvest sustainability assessment
 - o The plan should incorporate all land ownership involved in the project
 - o Detailed 5 year harvest schedule with identified plots
 - o Assessment of anadromous streams if required
 - o Verify timber volumes with field sampling
 - o Required harvest equipment
 - o Finalized costs estimates – economic model
 - o Access/transportation plan
 - o Preliminary Fuel supply contract – Final contact is required for construction



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Keys to Success

- Economically/Environmentally* Viable
- Proponent AND Operator Buy-in
- Social License and Naysayers
- Technical Details
 - Fuel Supply
 - Sizing
 - Etc.



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Common Threads on ~~Feasibility~~ Studies



- De-risk new approach/technology
- Gather information
- Understand your market and drivers
 - Economic
 - Environment
 - Business Development
- Technical considerations



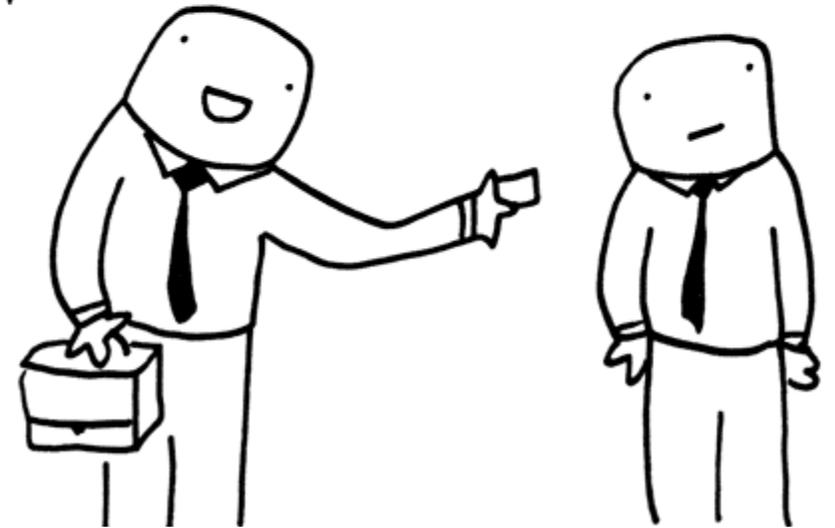
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Capacity vs Consultant

- Detail Level
 - 10,000 ft or granular
- Knowledge
 - Internal vs external
 - Plugging the gaps
 - Fuel supply/availability
 - System design
 - Economic analysis/business case
 - Environmental
 - Etc.



i'm a consulting consultant...
i can help you with consulting.
here's my card... all the consulting
consultant consultants agree
i'm the best



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Managing the Approach



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- Most Foresters and Engineers do not speak the same language and are challenged speaking politician and bureaucrat
- Get the information you need not what someone thinks you need
- Use the resources around you for support
- Careful of assumptions based on lack of knowledge
- **BE HONEST**



Alaska Energy Authority
Renewable Energy Fund Application - Biomass Best Practices Checklist

The following checklist contains detail items that are critical to the success of a Renewable Energy Fund application. The intent of the checklist is to aid applicants in the submission of a comprehensive project proposal.

Choosing a Project Support Team

- Experience
 - References and Timeframe
- Knowledge
 - Technical, Local, Fuel, etc.
- Limitations
- Passion/commitment
- Be critical of needs



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Common Pitfalls of Developing Bioenergy Projects

- Scope Creep
- Inertia
 - Too fast/too slow
- Paralysis by Analysis



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Common Pitfalls of Developing Bioenergy Projects

- Focus on technology rather than infrastructure
- Information Quality
- Not enough focus on connection and operation



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Buffer Storage/Multiple Boilers

Buffer Storage		Multiple Boilers	
Pros	Con	Pros	Cons
<ul style="list-style-type: none">• Simple• Low Capital Cost• Responds Quickly	<ul style="list-style-type: none">• Temporary response	<ul style="list-style-type: none">• Better coverage of peak load• Reduction/elimination of peaking capacity	<ul style="list-style-type: none">• Complexity• Increase Maintenance



Efficiency vs Efficiency

- Energy
- Operational



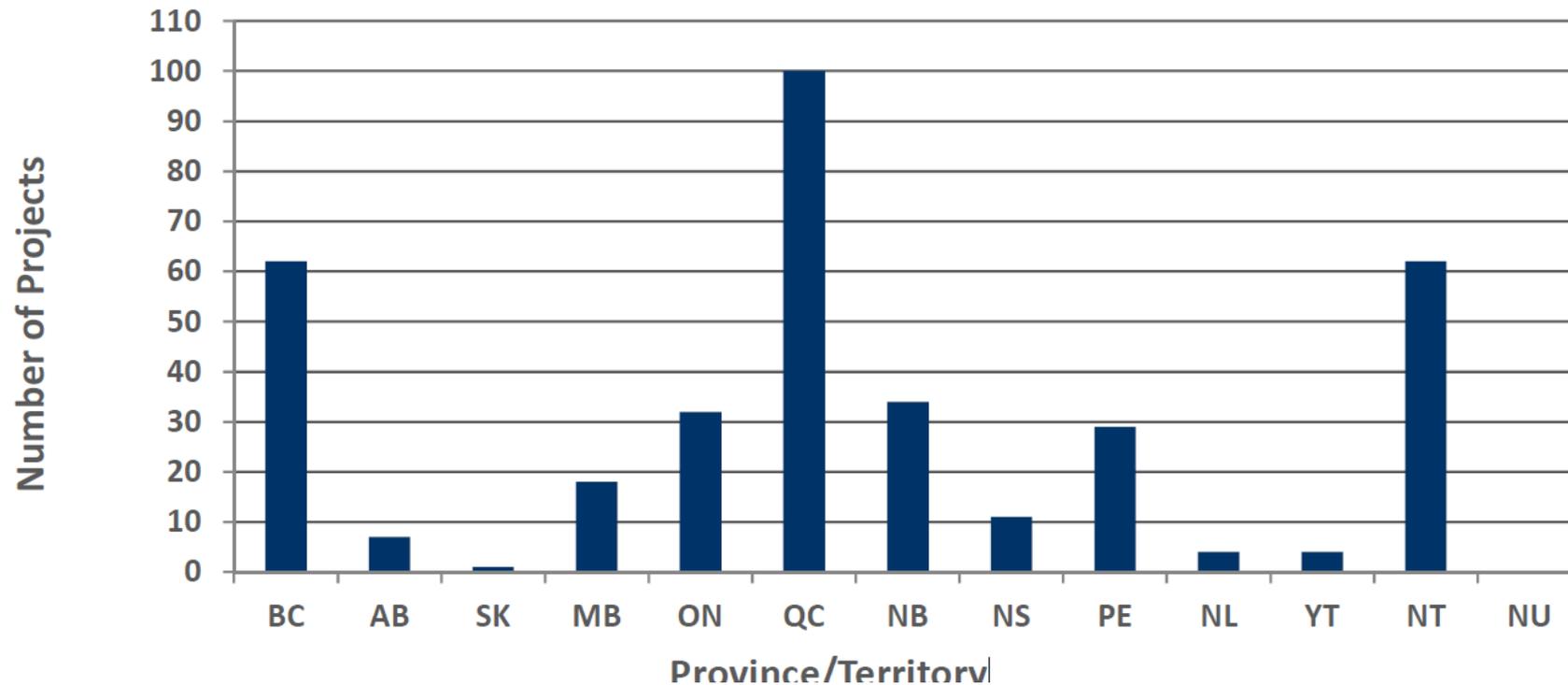
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Bioheat Projects in Canada

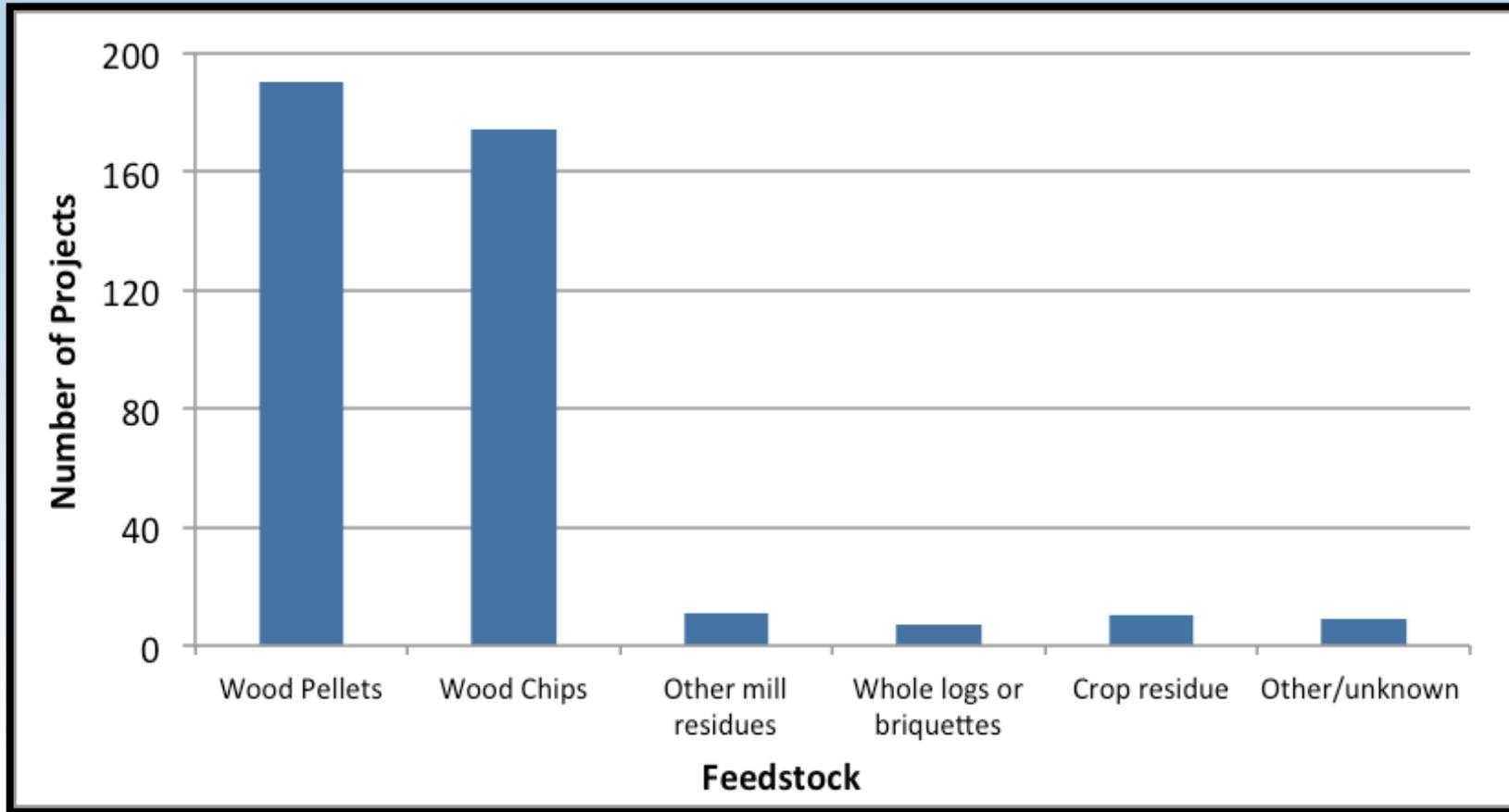
Figure 1. Canadian Bioheat Projects by Province/Territory



Updating and Expansion of the Canadian Bioheat Database – Torchlight Bioresources



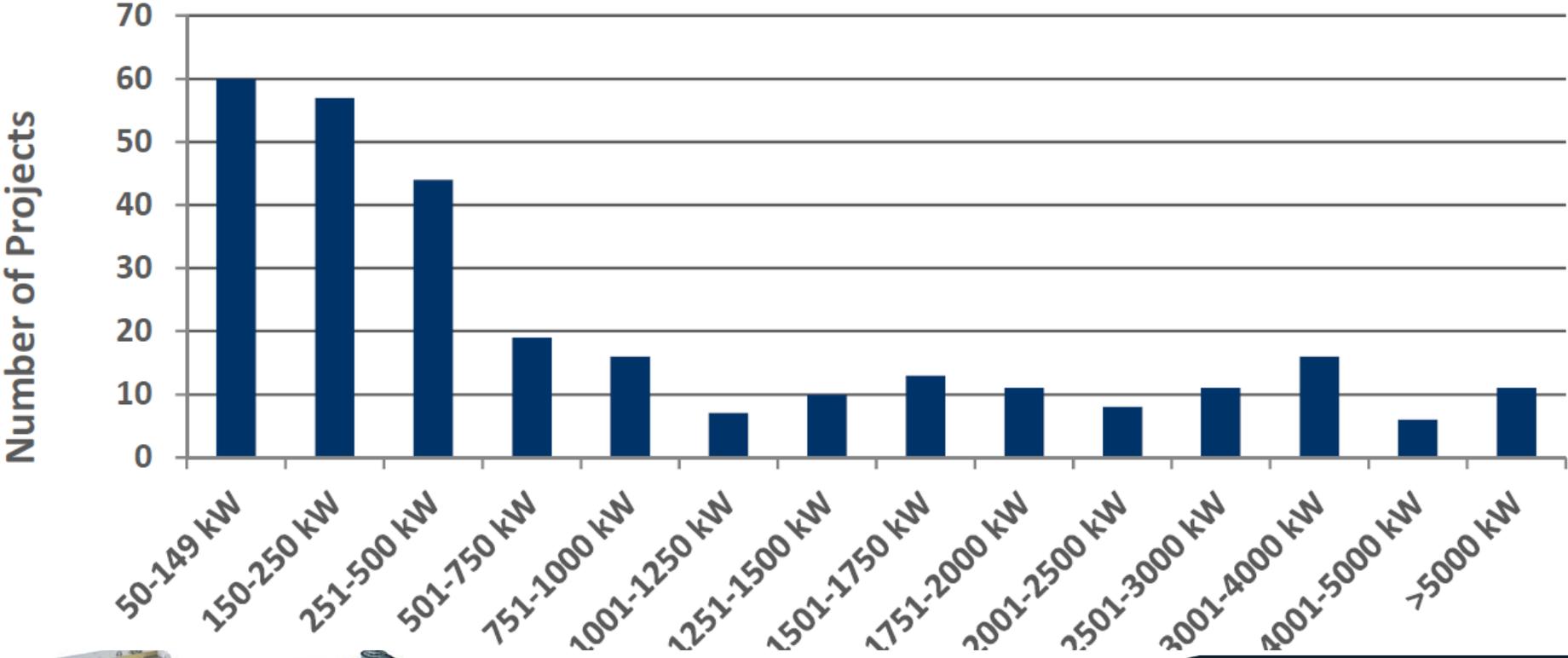
Bioheat Projects by Fuel Type



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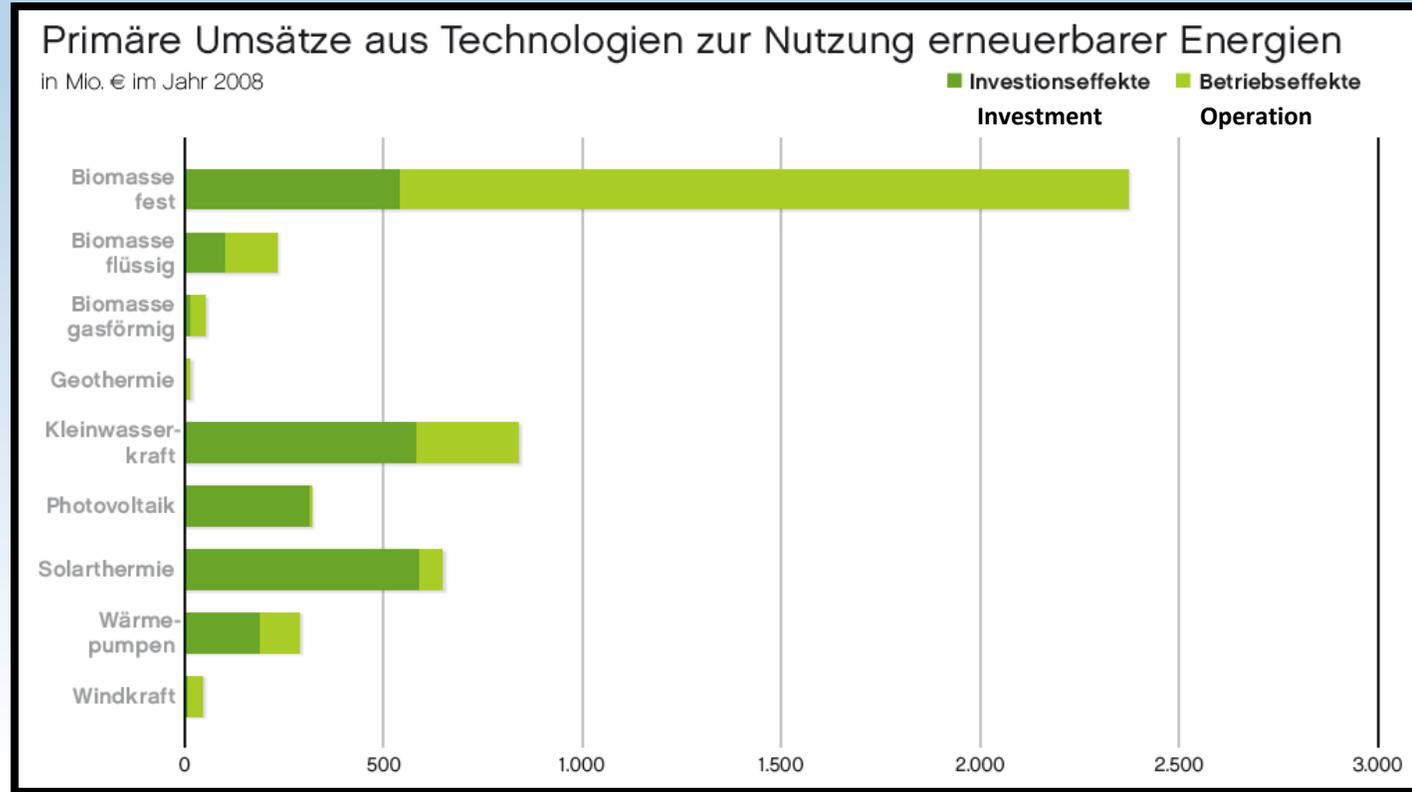
Bioheat Projects by Size

Figure 2. Canadian Bioheat Projects by Capacity



Austria Renewable Energy

Turnover of RES technologies: investment - operation



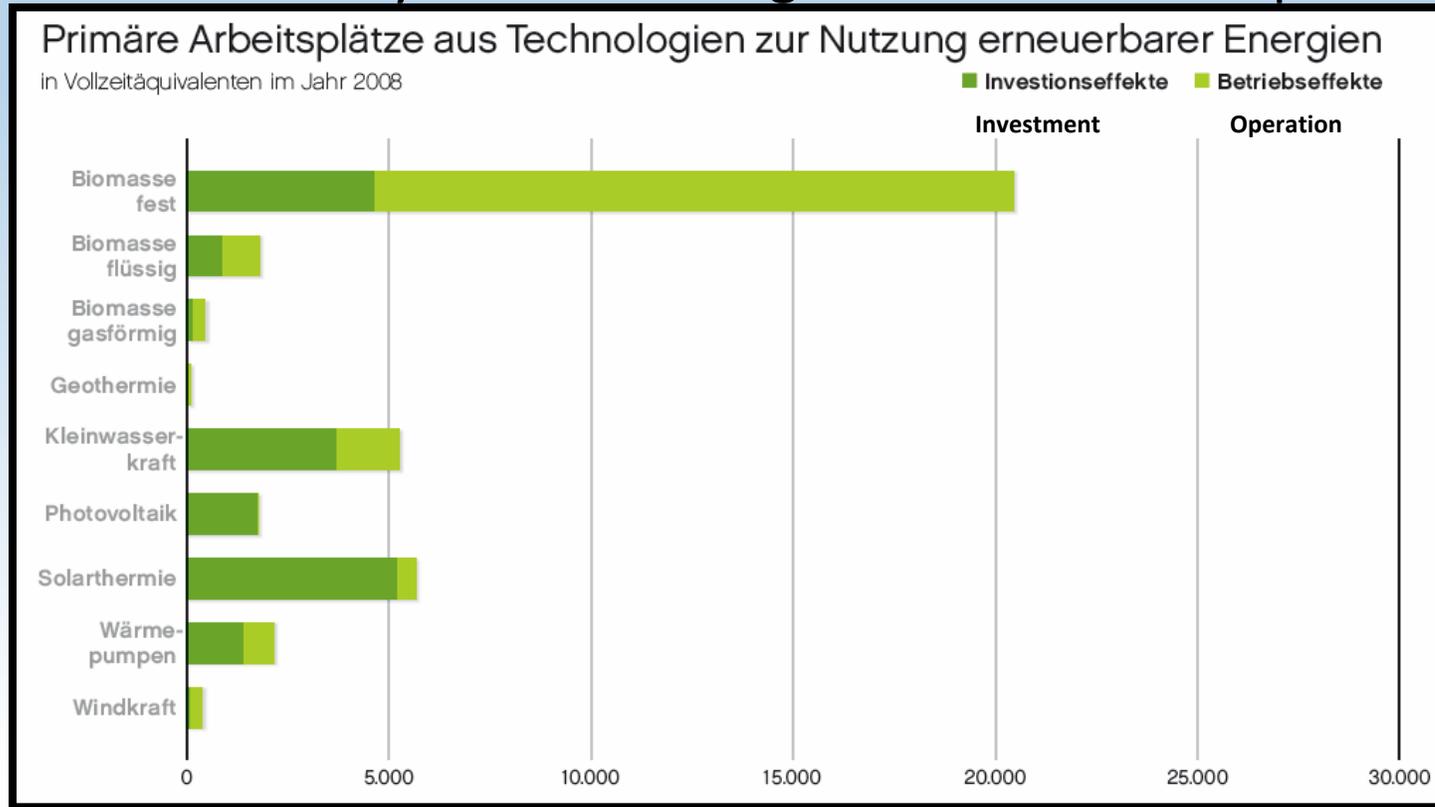
Source : Gottfried Lamers, Austrian Ministry of Agriculture, Forestry, Environment and Water Management, Presentation Feb 2011



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Austria Renewable Energy

Jobs created by RES technologies: investment - operation



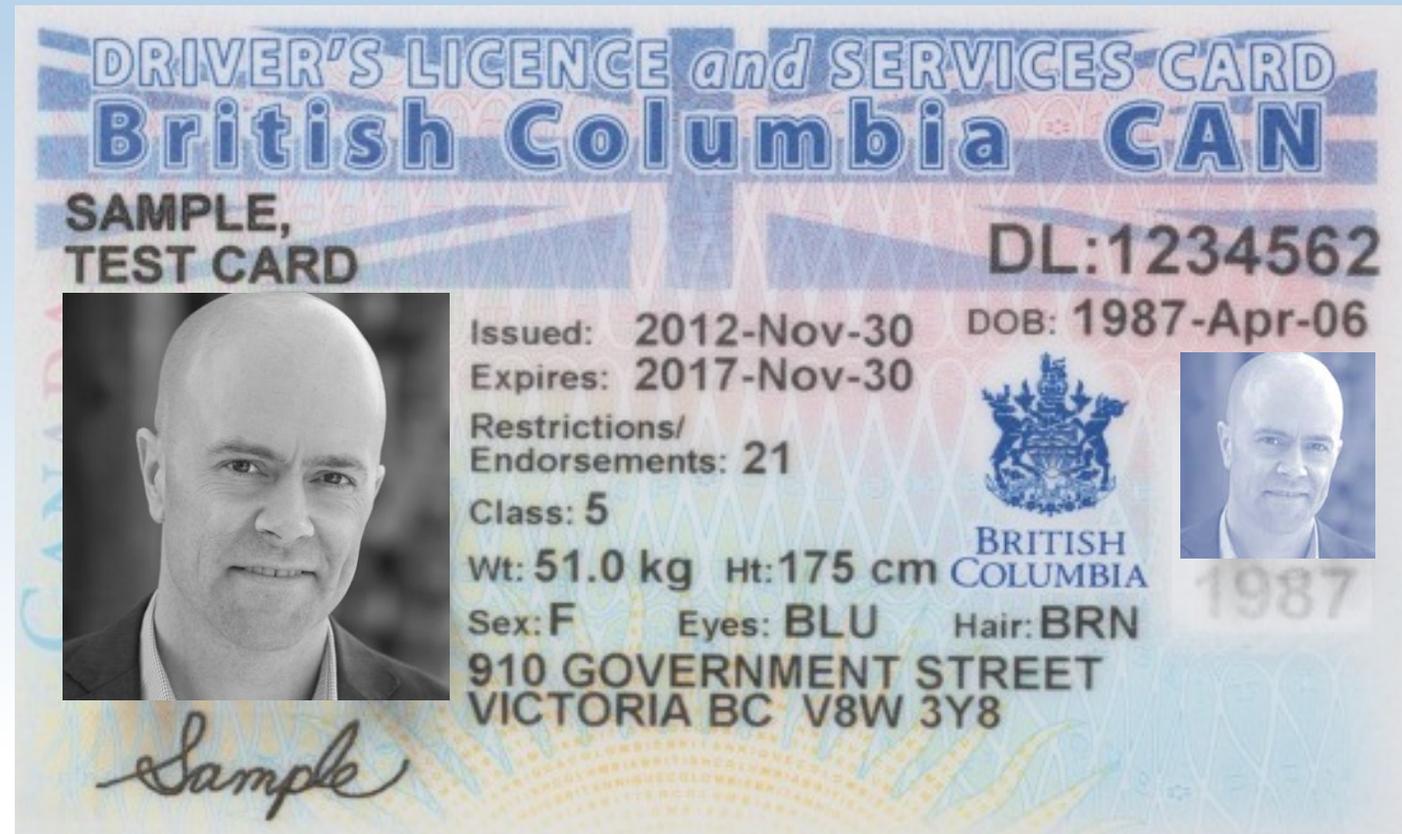
Source : Gottfried Lamers, Austrian Ministry of Agriculture, Forestry, Environment and Water Management, Presentation Feb 2011



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Key Community Drivers for Bioenergy

- Cost Savings
- Economic Development
- Lower GHG Emissions
- Waste Reduction/Resource Utilization
- Wildfire Mitigation



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Case Studies – Cost Savings

- Clearwater
 - Dutch Lake School
 - North Thompson Sportsplex



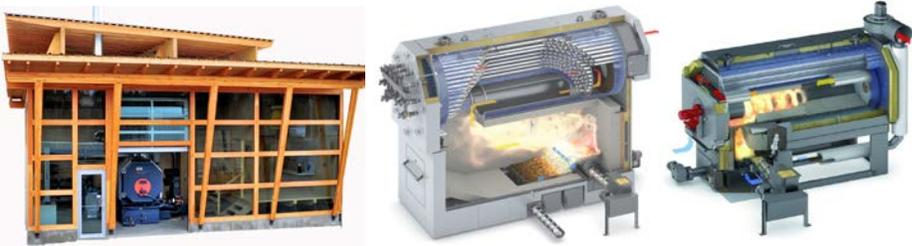
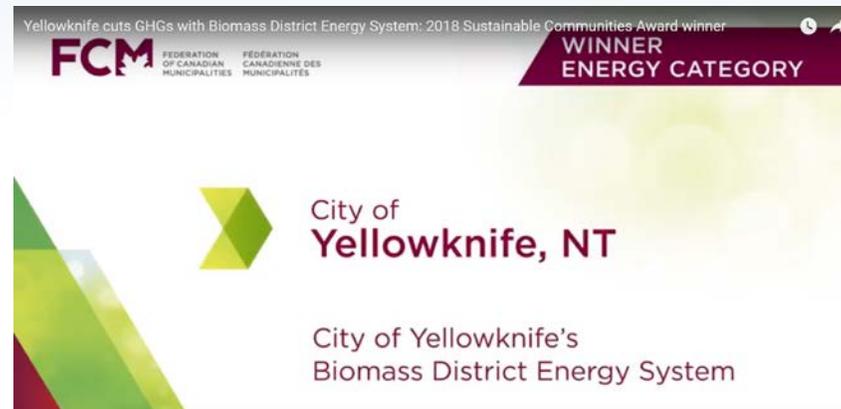
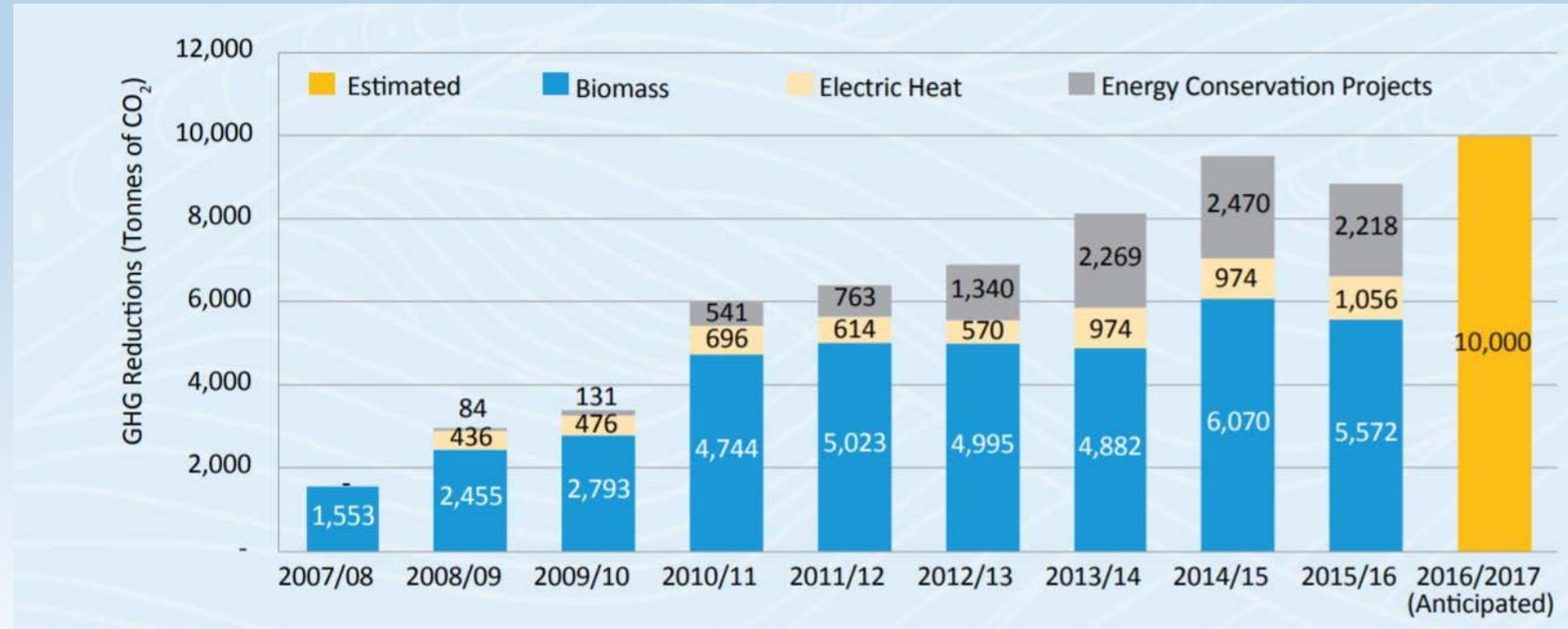
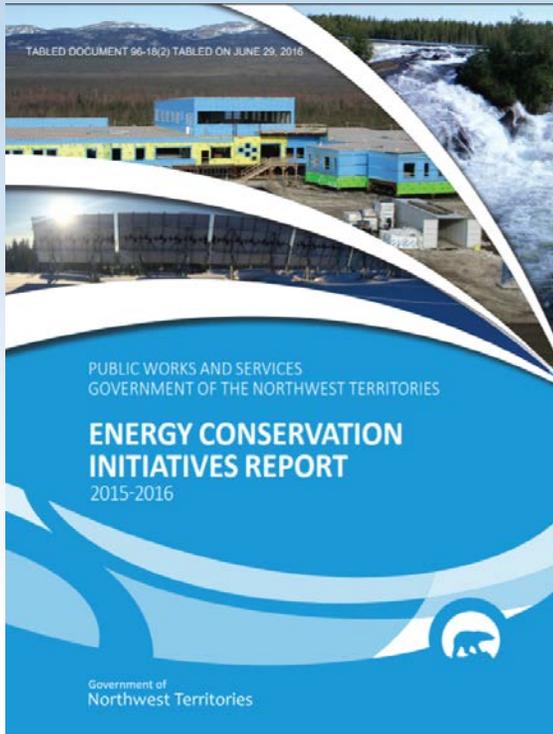
Case Studies – Economic Development

- Gussing, Austria



Case Studies – Lower GHG's

- NWT



Case Studies – Waste Reduction

- ECCO Recycling – Calgary
- 2 x 540 kW boilers
- Ground Waste Wood



Case Studies – Wildfire Mitigation

- Telkwa District Energy System



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Case Studies – Other

- Camrose County
 - Willow Plantations for Fuel
- Barriere
 - Preheating for Hydroponic Waste Water Treatment
- Yukon Gardens
 - Northern Food Security



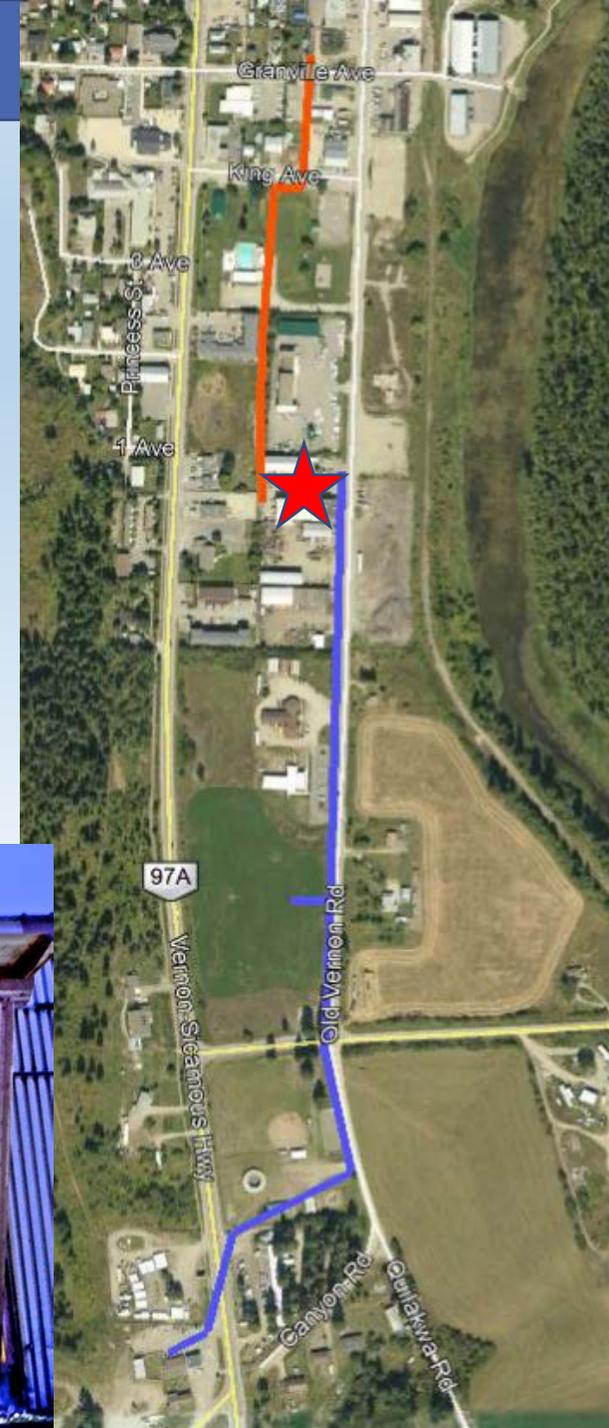
Growth: 5, 10 and 15 weeks old



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Enderby DH System

- Privately Owned and Funded
- Utilised Knowledge Base
- 540 kW chip Boiler
- 11 clients
- 1.6 km of trench



Lillooet Rec Centre

- 400 kW **Viessmann** Wood Pellet Boiler
- Simple Payback 5.4 years
- \$26,000 a year savings
- Air Emissions below 50 mg/m³

CASE STUDY

Green Energy
as a Rural Economic Development Tool Project

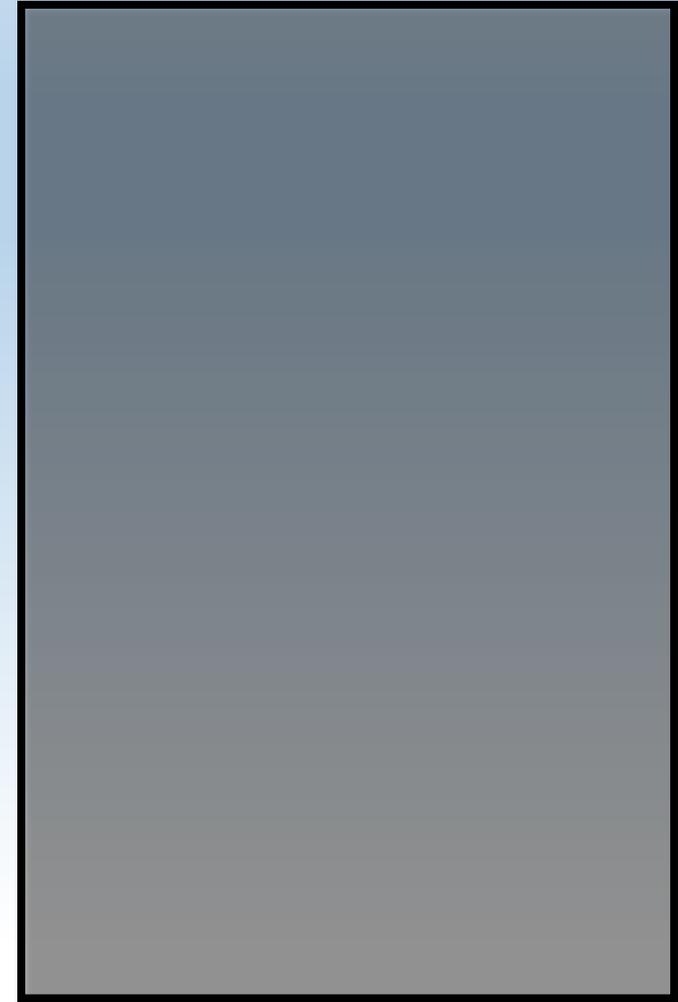
COMMUNITY: District of Lillooet
PROJECT: Biomass Heating System

NOTES:

LILLOOET
GUARANTEED RUGGED

FUNDED BY:

BRITISH COLUMBIA
SOUTHERN INTERIOR BEETLE ACTION COALITION
Canada's Rural Partnership
COLUMBIA BASIN TRUST
CARRBOR CARLETON BEETLE ACTION COALITION
SINAC
SINAIKIC



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Additional Thoughts

- Talk to the community early and get them involved
- Not all bioenergy projects are the same
 - 500 tonnes of chips for DE system as compared to 60,000 tonnes for a single line pellet plant
- There is no free lunch - you might get it for nothing now but there is cost and value to this fuel so think beyond the short term
- Look for Windows of Opportunity and Synergies



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Looking Forward

- Bioheat Voice
- Renewable Fuel Standards
- Low Carbon Building Standards
- Challenges
 - Standards – Emission, Carbon, Safety
 - Public Perception



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Thank You



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