

Yukon Bioenergy Strategy

Yukon Energy Biomass Workshop

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Presentation Overview



- Yukon Energy Strategy
- Yukon Bioenergy Strategy (Wood to Heat)
- Examples of Northern Bioenergy Projects

Energy Strategy for Yukon (2009)

- Guides energy production, conservation & use in Yukon.
- 4 pillars:
 - Improve energy conservation & efficiency
 - Increase supply and use of renewable energy
 - Meet current and future electricity needs
 - Manage responsible oil & gas development

Energy Strategy: Renewable Energy Priorities

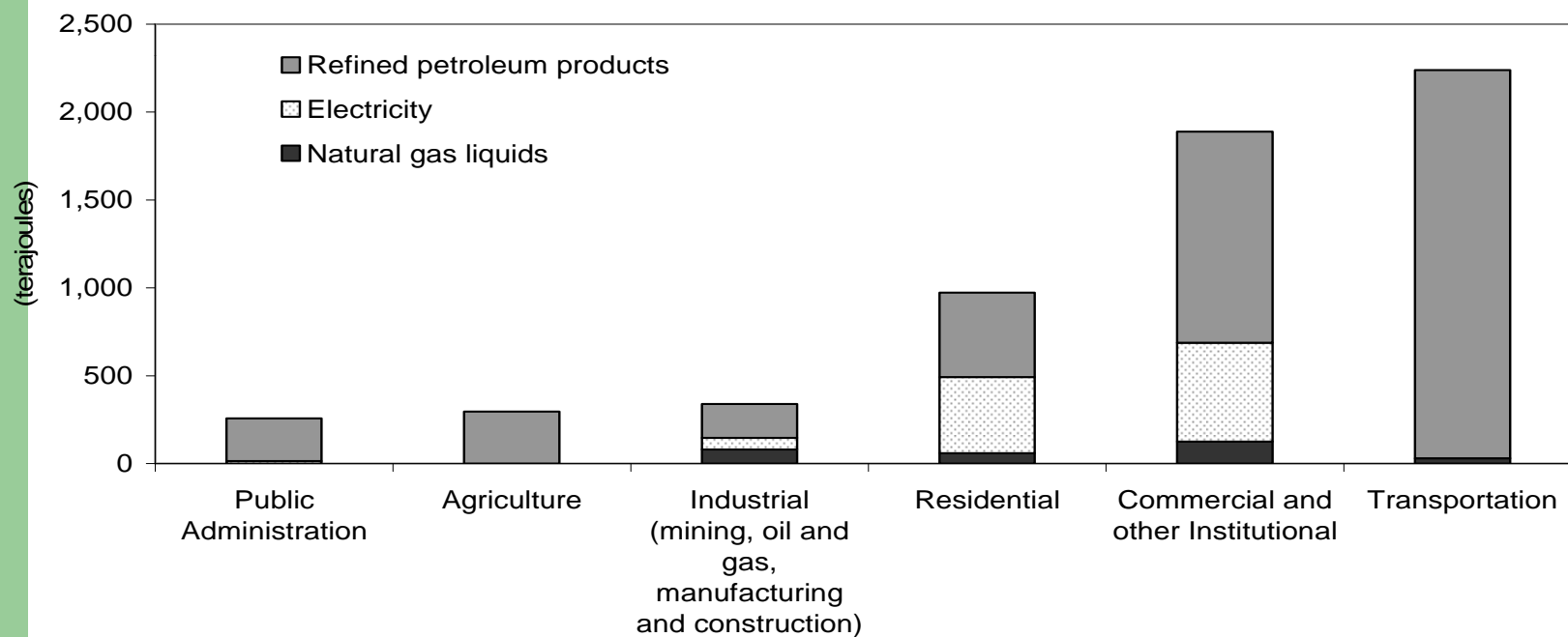
- Increase renewable energy by 20% by 2020.
- Promote renewable energy for heat & power
- Develop wood based bioenergy industry
- Provide leadership in research, development & demonstration projects
- Build partnerships

Yukon Bioenergy Strategy

Progress to Date:

- Establish Bioenergy Development Committee
- Compile energy use baseline data
- Research on modern combustion technologies
- Economic studies
- Air emissions research
- Timber supply analysis
- Review of successful northern bioenergy projects
- Project implementation (Dawson & Whitehorse)

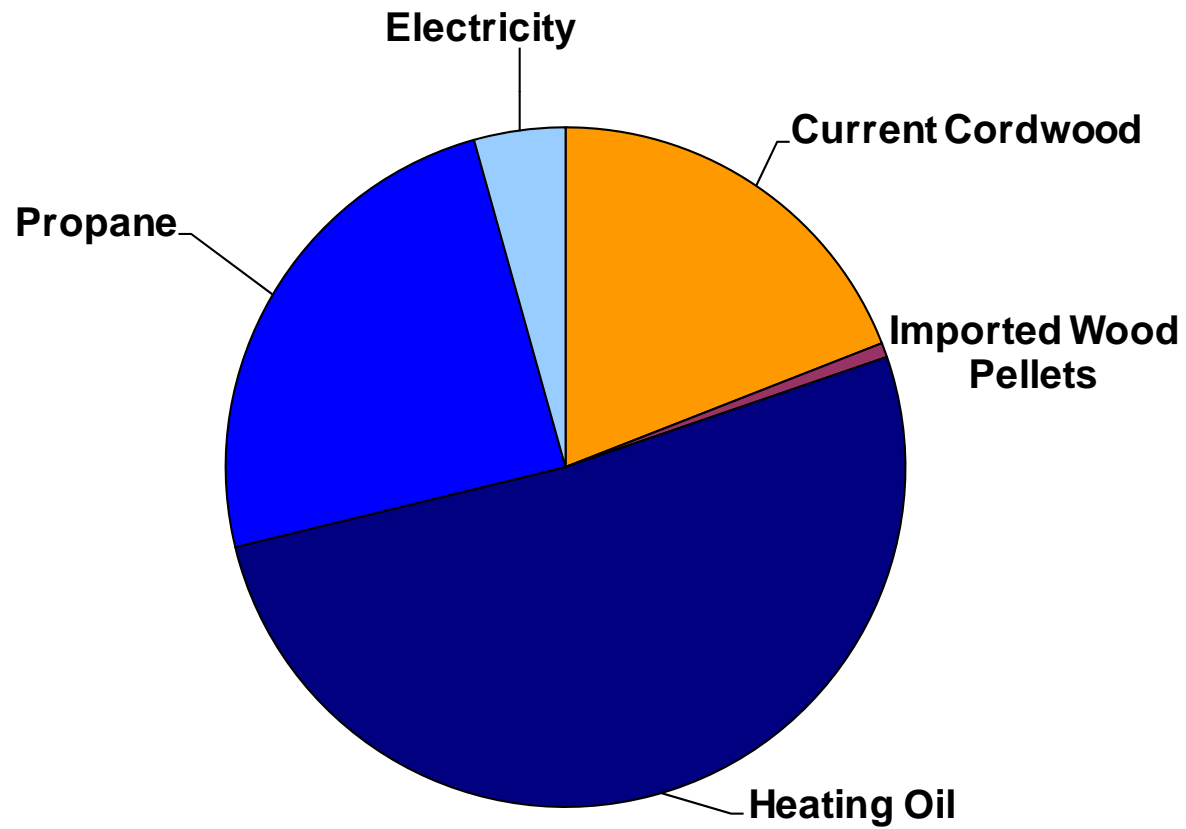
Yukon Energy Consumption (2005)



Heat Energy Cost in Yukon (2009)

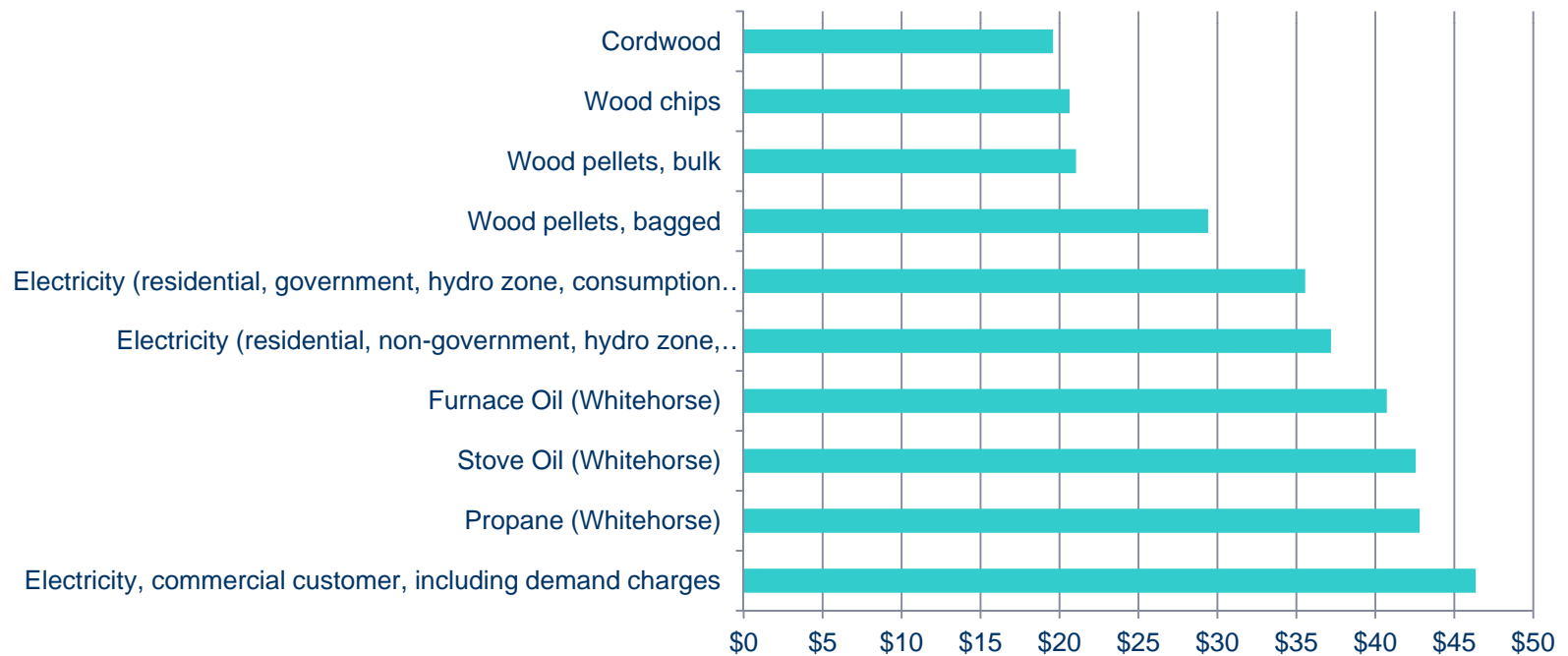
● Heating Oil:	40 M litres	\$38.3 M	68%
● Propane:	8 M litres	\$ 7.4 M	13%
● Electricity:	190 GWh	\$ 5.4 M	10%
● Cordwood:	22,000 tons	\$ 5.0 M	9%
● Pellets:	825 tons	\$ 0.3 M	0.5%
● Chips:	60 tons	\$ 0.008 M	0.01%
TOTAL:		\$ 56.5 M	100%

Heat Energy Used in Yukon



Relative Cost of Heating Options

Net cost, including maintenance (\$/GJ)



Yukon Bioenergy Strategy

- **Key Goal:**

- **Reduce our use of fossil fuels for heat.**
- **Increase our use of wood for heat, using modern, efficient, safe and clean technologies.**

Benefits:

Switching from Fossil Fuels to Wood for Heat:

- **Energy costs:**
 - Wood is 30 – 50% cheaper than using heating oil
- **Renewable & local energy source:**
 - Increases energy self sufficiency
- **Local employment:**
 - Increases forest industry opportunities
- **Reduced greenhouse gas emissions**
 - Wood is considered carbon neutral
- **Safety:**
 - Wood fuel is safer to handle than heating oil.

Challenges:

Switching from Fossil Fuels to Wood for Heat

- **Higher capital costs:**
 - Wood furnaces cost more than oil furnaces
- **Air emissions:**
 - Public health concerns must be addressed.
- **Fuel supply:**
 - Secure high quality fuel supply is needed.
 - Local timber supply is important
- **Lack of local expertise & infrastructure:**
 - Yukon has only limited successful experience in modern wood heat systems.

Yukon Bioenergy Strategy

Goal

- Optimize use of bioenergy for heat and power
 - initial focus is on using **wood** for **heat**.

Principles:

- Government Leadership
- Partnerships
- Proven & Reliable Technology
- Clean Air Emissions
- Secure and High Quality Fuel Supply
- Sustainable Forest Resource Use
- Support for Yukon Jobs

Yukon Bioenergy Strategy

Strategic Approach:

1. Build a strong technical foundation.
 - Use proven technology and expertise
2. Establish supportive policies and regulations.
3. Build strategic partnerships
4. Implement bioenergy projects
 - In the public sector, and with partners and the private sector
5. Require clean air emissions
 - Develop policies and regulations as needed

Yukon Bioenergy Strategy

Strategic Approach (con't):

6. Ensure a secure & high quality fuel supply chain.
 - Establish standards for fuel quality and fuel security
7. Sustainable forest management and timber supply
 - Complete forest management plans & timber tenures
8. Encourage Yukon forest industry development
 - Build demand for wood fuels. Provide support as needed.
9. Ongoing research and development
 - To stay informed on evolving opportunities.

Examples of Successful Modern Northern Bioenergy Projects

- Northwest Territories
- Alaska
- Yukon

Arctic Green Energy Ltd.

Correctional Center: 1st Project in NWT (2005)



Arctic Green Energy Ltd.

Pellet Storage Silos & Delivery Truck



City of Yellowknife: Rec. Complex

Pool, Arena & Curling Rink



City of Yellowknife: Rec. Complex

Binder 746 kw pellet boiler



St Joseph's School: Storage silo and pellet augers



St Joseph's School

KOB 300 kw pellet boiler & original oil boilers



City of Yellowknife: Energy Cabin

25 Kw pellet boiler (Arctic Green Energy)



Energy Cabin

Bosch 25 kw pellet boiler



Northern Properties: Private Sector

57 tonne silo, 756 Kw boiler, 100 suites, 4 buildings



Northern Properties

Binder 746 kw Pellet Boiler



Northern Properties

Computer monitor & Cyclone emission control



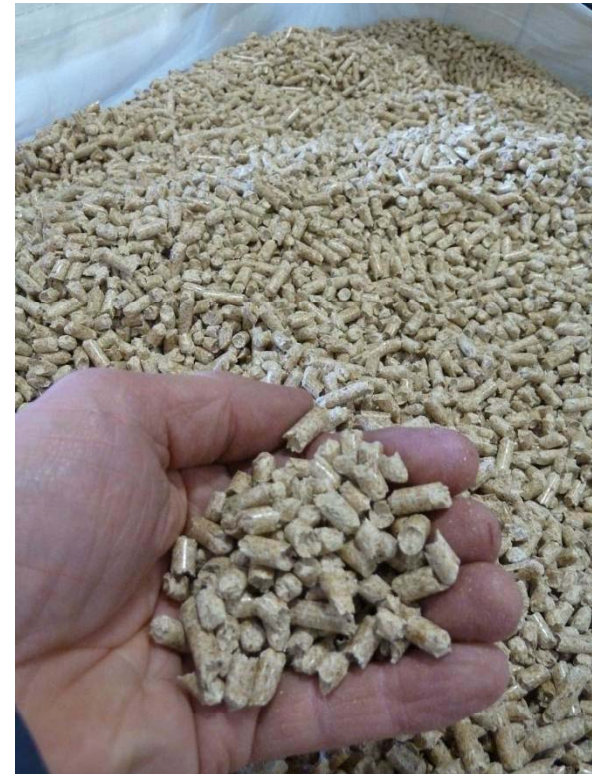
Superior Pellet Mill (Fairbanks)

Capacity: 30 - 40,000 tons / year



Superior Pellet Mill

Finished Product



Delta Junction Sawmill: Alaska

Building logs, lumber, cordwood, chips, pellets



Delta Junction Sawmill: Alaska

Pellet Plant Capacity: 800 - 1,000 tons /year



Delta Junction Sawmill: Alaska Pellet Plant: Finished Retail Product



Delta Junction Sawmill: Alaska

Wood Chips: Chipper & Transport Van



Tok Wood Chip Boiler Community School

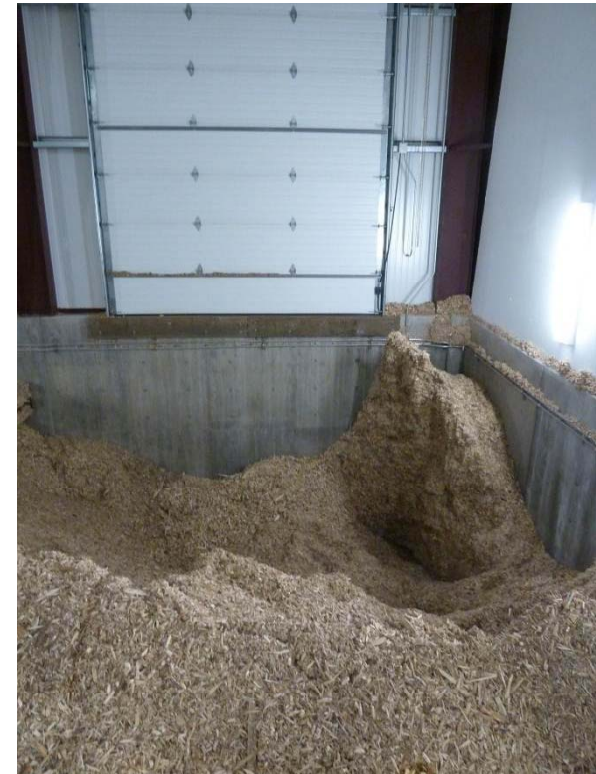


Tok Wood Chip Boiler Feedstock



Tok Wood Chip Boiler

Boiler Building: Chip Storage



Tok Wood Chip Boiler

Chip Type & Feeding System



Tok Wood Chip Boiler

Chip Boiler & ESP Air Emission Control

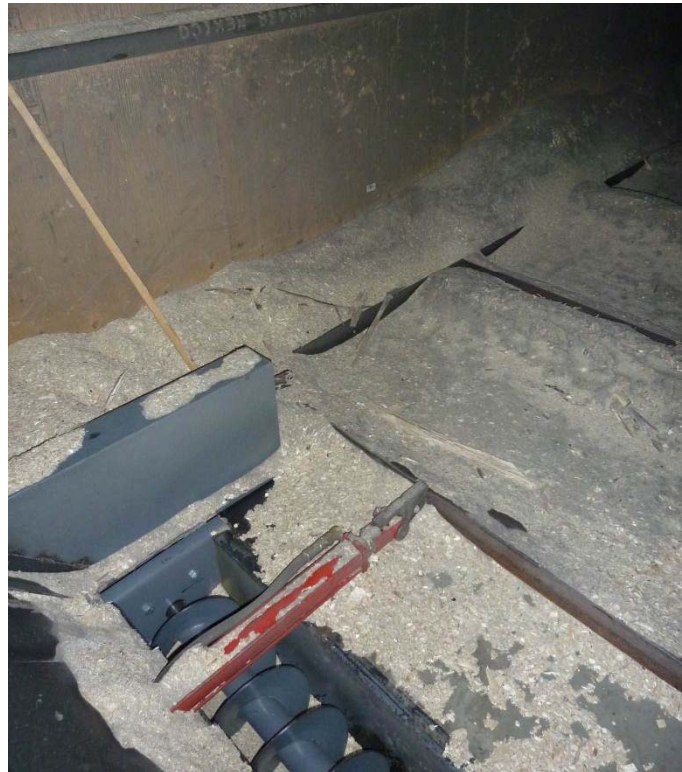


Burwash Landing: District Heat System Boiler Building & Feedstock Supply



Burwash Landing: District Heat System

Wood Chip Type & Feed System



Burwash Landing: District Heat System

Wood Chip Boiler: 30 cords / year



Burwash Landing: District Heat System

Four buildings now connected. Plans for more



Key Lessons Learned

- **There are many different technologies and systems available.**
 - Pellets
 - Chips
 - Cordwood
 - Recycled waste
- Important to pick the technology and system that fits best for your community.

Key Lessons Learned

- **Heating with wood saves money!**
- NWT: 50% savings on fuel costs @ 2010 prices.
 - 5 -7 yr payback on capital cost of infrastructure.
- Tok: School saves \$500 k per year.
 - redirects energy savings to school programs.
- Burwash Landing
 - Fuel cost for 4 community buildings (including laundromat): 30 cords @ \$125/ cord

Key Lessons Learned

- **Modern wood combustion systems are clean.**
- Many have strict European emission standards.
- Additional air emission controls can be used.
- No air emission issues were experienced for any of the projects visited.
- Good fuel quality and proper system maintenance are essential.

Key Lessons Learned

- **Modern wood combustion systems are reliable.**
- **3 Essential Ingredients:**
 - Consistent fuel supply
 - Consistent fuel quality
 - Consistent system maintenance

Summary

- **YG supports bioenergy development**
 - Focus on modern wood heat systems first
 - Learn from other successful bioenergy projects.
 - Support new systems as they become feasible
- **Key Principles:**
 - Use high quality, proven & reliable technology
 - Controlled air emissions
 - Sustainable forest resource use
 - Yukon benefits

Yukon Bioenergy Strategy

Next Steps:

- Continue research on:
 - suitable technologies
 - air emission controls
 - business case analysis
- Continue building partnerships & local expertise
- Support pilot and demonstration projects
- Prepare draft bioenergy policy documents for review
- Finalize bioenergy policy and strategic approach
- Implementation