Council Of Athabascan Tribal Governments (Ft. Yukon) : Fort Yukon Wood Energy Program - Wood Boiler Deployment (AK)

Presented by:
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Yukon Flats

- 10 Athabascan villages in the Yukon Flats
- 8 Gwich'in villages and 2 Koyukon villages
- 55,000 sq. mi. Size of Wisconsin
- 1,500 people
- Fort Yukon largest Hub Village 650 people
- Smallest Village Birch Creek 25 people
- Fort Yukon and Circle are the only villages with a City Government
- There is no organized Borough in the Yukon Flats
- Two villages on road system
Tribe

- Gwichyaa Zhee Gwichin Tribal Government formally known as the Native Village of Fort Yukon
- Council of Athabascan Tribal Government is an consortium of 10 Gwichin/Koyukon villages
- Gwitchyaa Zhee Corporation ANCSA Village Corporation
Overview of Project:

- Off Road system biomass CHIP
- New Power House (CHP) Facility construction
- Wood Chip Boiler
- District Heating loop providing heat to commercial buildings
- (6-10 buildings)
  - I.e. School, Radio Station, Water Plant, etc.
- Sustainable Forest Management program
- Create a for profit in-village wood energy utility to displace diesel energy
- Support training needs for field forestry technicians and supports workshops for education on key biomass issues for Fort Yukon and the Yukon Flats Villages
Fort Yukon Combined Power & Heat
David Lee Thomas Building
Fort Yukon, AK
Fort Yukon District Heating System
Installing District Heat Loop with Arctic Pipes, this was installed over the ANTHC’s water-sewer infrastructure.
Kob Pyrotec Boiler

Our Biomass Chip Boiler !!!

1. Feed auger (with light barrier)
2. Burner trough with internal grate
3. External grate
4. Moving annealing grate
5. Secondary air flow
6. Ignition fan
7. Deashing system
8. High-temperature burnout zone
9. Combustion chamber door
10. Triple-pass heat exchanger
11. Safety heat exchanger
12. Pneumatic pipe cleaning system
Boiler Delivered to the CHP site from the Barge Sept 29, 2017
The manufacture did not get the boiler loaded onto the barge in Austria, was delayed a month, which created a domino effect with all the other logistic planning.
BOILER IN
CONNEX

NEW PLANT
Boiler inside the bay
Our boiler at the site in boiler bay
Biomass Boiler Stack
Our above-the-Arctic-Circle-Style Chipper Bin beginning construction
Continued construction work for the chipper bay
The standard chip bin with hopper to feed the boiler...but, above the Arctic Circle, we must modify to be in compliance
MOVING FLOOR & HYDRAULIC SYSTEM Chipper Trailer
Design Considerations

- 4-Bay Generator Power Plant
- w/ 2 Detroit Diesels and 2-3508B CAT
- – Biomass Bay, Biomass Chipper Bay & Garage
- – 20,000 gallon fuel tank
- – 14 days + 5-day fuel reserve at peak loads
- District Heating System to Serve 7-10 Commercial Buildings
- – Displaces 60,000 plus gallons of heating fuel
Design Considerations (Cont’d)

- Connect other potential sites
- Transport of biomass Chips to CHP site –
- Used Oil for heating existing Power Plant / and Shop areas
Grants / Bookkeeping

- RUS USDA
- DOE Tribal Energy
- AEA REF
- REAP USDA
- 3rd Party Accounting
Integrated Biomass Program

- Rural Economic Development
- Energy Cost Reduction
- Wildfire Mitigation
- Habitat Enhancement
- Environmental Improvement

Community Biomass Utilization Program
Organizational Overview:

- Council of Athabascan Tribal Governments (CATG)
- Consortia of 10 Tribal Governments of Interior Alaska
- Gwitchyaa Zhee Corporation (GZ Corp)
- Alaska Native Claims Settlement Act Village Corporation
Harvest Equipment Operator and Safety Training

Held Classroom instruction & Field time instruction

Selections based on:
Previous experience
Attentiveness
Safety Awareness
Work Ethic
Comradely
Common Sense

Overall Objectives:
Operational Safety
Operational efficiency
Regulatory compliance
Our chip site, we will cross water ways to our harvest site upon freeze up so the equipment can cross safely.

Must cross this Yulotta Slough
WOOD BOILER PREPARATIONS:
SITE PREPARATIONS
• ADDED GRAVEL TO CHIP SITE
HAUL OUR HARVEST FROM HARVEST SITE TO CHIP STAGING SITE

THE HEAT LOOP HAS A READING OF 180 GOING OUT OF THE CHP AND A RETURN OF 165.

WHEN TEMPS DROP TO MINUS 20, WE WILL NEED THE BIOMASS BOILER KEEP THE HEAT LOOP TEMP UP.
• THE Pyrotec 390, requires at least 35% Moisture Content
• Our Poplar Wood Harvest has been drying for 3 years
• We will have to Harvest Birch as Galena, AK is doing
Equipment Training New Holland Tractor and Kubota

**Kubota Training:**
- Cutting and Loading Capabilities
- Maintenance
- Falling Debris
- Proper timber cutting layout

**New Holland Training:**
- Safety
- Maintenance
- Proper functions, in the woods and around other machinery and hazards
- Proper log skidding techniques
# Fort Yukon Wood Energy Program

## Lessons Learned

- Be Vigilant
- Monitor the overall project
- Budget
- Be willing to stop project to get the updates & answers
- You will need to make good decisions
- Always & Always check the Weather!

## Activities Yet to be Completed

- Electrical work on Biomass Boiler
- Run through of all Harvest Equipment, Trial Chipping
- Hauling the Harvest wood to Chipper Staging Site
- Commission Biomass Boiler Heat Sales Agreement W City
Only accessible by boat during the summer, snow machine during winter, plane, and Yukon Barge.
For-Profit Wood Energy Business Model Fort Yukon

- Forest Management Service-CATG
- For-Profit Wood Utility Company-Vertically Integrated
- Gwitchyaa Zhee Native Corporation
  - Wood Harvest Company
  - Village Wood Yard/Distribution Company
  - Wood Energy Utility- Diesel Biomass
  - Wood diesel hybrid power plant CHP – still dreaming for 200 – 700 Kwh technology
Future Plans

Once a program has been established in Fort Yukon, it is the intent of CATG Natural Resource Department in collaboration with the Village Tribes, Native Corporations and Private Lands to support the installation of programs in each of the villages in the Yukon Flats Region. The model program being developed in Fort Yukon will serve as the basis for all projects in interior Alaska.
Fort Yukon’s new Combined Heat and Powerhouse (CHP)
FORT YUKON CHP STARTED DIESEL ELECTRICAL GENERATION DEC 2016

BIOMASS BOILER INSTALLATION END OF NOVEMBER 2017

COMMISSION BIOMASS BOILER DECEMBER 2017
Fort Yukon’s Old Power Plant
Mashii Choo for the new CHP and Biomass System for Fort Yukon & the Yukon Flats
Questions & Answers