Agroforestry & Woodlot Extension Society – AWES

www.awes-ab.ca

Toso Bozic – Agroforester
Alberta Agriculture and Rural Development
Opportunities, Process and Challenges for Bioenergy projects
Look familiar?
Source of wood biomass!!!
Is this opportunity??
Madsen Cabinet Maker - Edmonton...
Camrose County
Camrose County bioenergy project

• 155 KW
• Total cost of project $220,000
• Office space 32,000 sq feet
• Return on investment -7 years
Strathcona County DHS

LAMBION SYSTEM
Output: 900 kW
(3.1 million Btu/h)
Fuel: Waste Wood & various Straw Pellets
Strathcona County DHS
Strathcona County DHS

Mobile Fuel Storage

General view back

View of the heavy-duty feed auger mounted to container bottom (optional)
The technology turns local waste resources into environmentally and economically feasible and responsible energy.
Key Things to consider for wood bioenergy project

• Technology
• Wood Supply
• Financial aspect
• Environmental Issues
• Human Resources
Appropriate Technology

• Search for most appropriate technology considering project location and fuel supply
  » Ability to convert local fuel supply into heat/power
  » Must meet local permitting specifications
• Technology must be proven:
  » Commercially available
  » Operates efficiently on available fuel supply
  » Operates cleanly on available fuel supply
  » Appropriate for site and local resources
Technology

• Mostly European technology is not known here
• European systems are more expensive but more reliable and proven to work
• Services - Very few dealers in Alberta for wood biomass technology
• In case something goes wrong – who will come and fix it.. Your gas furnace is broken you know to whom call ... to whom you will you call in case of wood boilers
• North American technology is way behind, very little research done, not proven and many cases not modernized
• Few pilots projects – still learning curve
• No infrastructure in support – parts and HR
• Needs for training
• There are a lots of sellers BE VERY AWARE WHAT YOU ARE GETTING INTO – ASK LOTS OF QUESTION AND VISIT FACILITY THAT IS WORKING FOR LONG PERIOD OF TIME
Wood supply consideration

• You must have long term contract with steady and consistent supply – few local suppliers
• Each system requires various specification on wood supply
• Storage system for wood- eg, shed, bins, walking floor, etc
• Cost – cheaper wood means cheaper GJ
Wood Biomass characteristics

• Feedstock source – directly from forest, home waste, waste from sawmill, burnt wood, and others

• Location and concentration

• Form and size (eg, size of woodchips, pallets, bark, sawdust, etc etc)

• Moisture content

• Energy and ash content

• Processed characteristics
Storage

- Need to know how much wood and space you need it
- Moisture content important – freezing issues
- Contamination – by dirt, rock, chains, nails etc
Transportation

- Highest cost for bioenergy project
- Haul energy not water
- Load and unload system
- Load size and moisture content

Why comminute or compact?
High transportation costs

Transporting a low-value, low bulk-density material with a high moisture content over a long distance
- Importance of maximizing payload through comminution and compaction

Photo Credit: Holman - John Deere
Blowing of chips

- blowing capacity is about 2 m³ per minute
- dust free
- maximum distance is 50 meters
- maximum height 20 meters
- Net load volume 28 – 36 m³
Camrose - Fuel handling
Wood supply

- **Myth – free wood supply** – such a thing does not exist
- In conventional gas supply – we have very developed and efficient supply chain while in wood bioenergy some bits and pieces but not efficient and proven supply chain...
- Lack of infrastructure in certain area of province
- Quality is an issue: size of particles, moisture, not uniform supply
- Steady supply of quality and quantity – do we have it?? Try to find somebody to deliver wood in short period of time
- Price – variable, unpredictable and all over the place
- **WHO CONTROLS WOOD SUPPLY** – very important thing and sometimes very tricky thing to have a control
Wood supply continue

- Storage – space, issues with freezing, fire and transport to facilities – how many steps from storage to system – could be very tricky
- Space for wood bunker, bin or other system
- System to fill up bunker – air blower, auger, etc
- Frequency of filling up storage and maintenance of storage
- You may need to have a year supply as back up – needs additional space
- Additional cost of building storage and equipment need to move wood supply
- Do you need extra equipment – eg wood chipper
- And all cost of wood supply must be comparative with natural gas which is less headache
Environmental needs

• Current regulations – lack of it
• Smoke and other emission issues
• Carbon credits potential
• It is renewable and green energy
• All environmental benefits are given
“Smoke”
Environmental issues

- Carbon credit market exist but process and long and costly
- Public perception about smoke and emissions
- Ash disposal can be an issue
- What is really Carbon footprint in renewable energy ??
- Emissions can be the result of:
  - complete combustion
  - incomplete combustion
- Emissions are influenced by:
  - combustion technology
  - process conditions
  - fuel properties – mismatch of fuel with system requirements
Financial consideration

• There is NO competition with World market price
• Locally controlled – supply, and end user
• Less hassle with Regulations – eg. electricity
• Most of projects that I work is less then half million dollars – easier to get money then for multi million dollars projects
• Most of work and $$ stays in community – eg wood supply, system operating, labour, etc
• There are many government grants available that support projects like this
• ROI in most of the project 5-8 years
• Put bioenergy into prospective with other projects in your area – eg one mile of building rural road is around $ 200 K and most of communities put many miles –
Financial issues

- Most of local financial institutions knows very little about financing bioenergy project
- Many projects are driven by emotions not really by real business scenario
- Financial plan must include following details:
  - Equipment and installation cost
  - Feedstock supply cost and analysis
  - Marketing plan or in many case many years contract from buyer
  - Financing Plan
  - Grants and Permits SECURED
  - 2 year detailed budget
  - Cash flow projections
  - Executive summary
- As one finance officer said to me “nothing worse then people come with great idea and no clue about financial aspect of project”
Human Resources

• Lots of people are interested in renewable energy projects – **it is kind of sexy**
• In some cases requires very little training
• People are eager and keen to learn about it
• Some institutions are starting to provide educational courses
• Project manager with skill and knowledge is required
• Find a best person that will run wood bioenergy project successfully
HR issues

• Unfortunately many bioenergy projects are given to people that has very little or no knowledge about all aspect of project
• TIME – seems to me everybody doesn’t have a time beside their regular work
• Training is still inadequate for operators, suppliers, builders, codes, permits, etc
• Political leaders gets very exited while administration doesn't’ care or in some cases will do everything to stop project – more work
• Somebody has to fill up application for grant
• Financial Dept said – “ what are talking about –what bioenergy ??? We are fine with current system –we don’t have money for experiment “
• Financial Dept said “ show me a bottom line – cut a chase about environment “
Summary

• Technology is available but pay attention on details and buy what fits your needs and requirements
• Look what best renewable resource are available at lowest cost
• Look in long term energy supply for your facility
• Initial cost might be high but in long term ROI is very promising.
• Visit already business that are using wood boilers or systems in their operations
• Human resource – educate and have a knowledgeable people about bioenergy project
• Get finance in place and treat as business and nothing else then business
• If doesn’t make sense to you –don’t do it