Biomass
“Struggling to make it work”- the Canadian Experience

IEA Task 38 Meeting
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Edinburgh, Nov 12, 2001
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- Canadian Forest Industry Biomass Usage
- Biomass success stories
- Issues holding back development
Canadian Forest Industry - Energy from External Sources

Source: Forest Products Association of Canada
Canadian Forest Industry GHG Emissions

Source: Forest Products Association of Canada

19% ↓
Canadian Forest Industry Energy Use - 1999

- Biomass: 54%
- Electricity: 21%
- Natural Gas: 16%
- Oil: 7%
- Other: 2%

Biomass: includes wood, bark, sawdust, and pulping liquor

Source: Forest Products Association of Canada
Biomass Utilization - P&P Ind.

- 1990: 9.4 Million BDt pa
- 1998: 12.3 Million BDt pa

Surplus: 5.4 Million BDt pa
Use: 12.3 Million BDt pa
GHG Emissions – (without sinks)
Canada vs Pulp & Paper Industry
Index of emissions vs 1990
Grand Prairie, Alberta
Waste Wood Cogen

- 20 MW cogen
- Wood waste from Canfor sawmills
- Process and Bldg Heat to Canfor
- Power to Canfor
- Possible district heat to town
- Driven by high fuel & power costs, waste incineration, deregulated power
St. Felicien – Quebec Biomass Cogen

- $63 million project
- 290k GMT/yr bark from area sawmills
- 24k lbs/hr steam to Alliance sawmill
- 21.4 MW sold to Quebec Hydro

Why?
- Steam host
- Many bark sources
- 6¢/kwh from Quebec Hydro
Windsor, Quebec
Domtar cogen

- $23 MM bark cogen inaugurated Oct 26, 2001
- At 560,000 tpa Windsor pulp/paper mill
- 50% on site bark, 50% area purchases
- 25MW power and steam to mill
- Displaces 3.8¢ power from Hydro Quebec
Dynamotive- Vancouver
Fast Pyrolysis to BioOil

- 10 tpd liquid BioOil demo plant- completed 2000
- Ran design capacity 8mos
- Scale up to 100 tpd- 4Q 2002- Isle of Arran
- 2.5 MW generation for island using forest waste
- Drivers- 10¢/kwh for renewable power
- Next scale up 400 tpd 20MW
Temiskaming - Biomass boiler

- Uses spent sulfate liquor from pulp mill, bark from area sawmills
- 10MW power for pulp mill
- Steam, hot water for cellulose mill
- 14MM liters ethanol Canada’s vinegar
- Drivers
  - Many area sawmills
  - Have sulfite mill
  - Limited by Quebec Hydro
Cornwall- Ethanol Plant

- $48 million plant
- To use 6.25 MM bushels corn pa
- To produce 66 MM litres pa ethanol
- Project drivers
  - Ontario elimination of “road and usage tax” on ethanol fuel
  - Canada exempting ethanol portion of fuels from 10% excise tax
- Project awaiting insurance
Why do projects remain on the drawing board?

- Biomass supply
- Alternative fuel prices
- Low Power prices
- Technology
- Infrastructure
- Money!
Problems- Biomass Supply

- **Amount** - Sawmill waste reduced from 9.1 to 5.4 million BDT pa
- **Haul distance** - Remaining pockets of biomass smaller, further away
- **Location** - Excess biomass at sawmills not at pulp mills which need power, steam
- **Alternative Uses** - Higher fibre value in OSB or MDF than energy
Problems- Biomass Supply

- **Free trade** - 19.3% export duty shutting sawmills
- **Harvesting rules** - Increase in deliming at stump for nutrients
- **Concentration** - Most excess in British Columbia where power is only 3.5¢/kwh
Problems- Alternative Fuel Costs

- Fossil fuel costs lower in Canada than Europe
- Canada has large supply of oil, natural gas
- Europe has carbon taxes
- Low fossil fuel costs hurt “biomass economics”
Problems- Low power prices

- Canada has lower power prices than Europe- less opportunity for revenue
- Regulated industry (provinces)
  - Prevented wheeling of power
  - Limited size of biomass plants
  - Controlled price of power
  - (Alberta now deregulated, Ontario next)
Problems - Technology

- Difficulty with green biomass
- Instability of BioOil
- Gasification - not efficient for wood
- Fuel cells - not there yet
Problems- Infrastructure

- Europe has infrastructure for combined heat and power systems
- Canada has natural gas lines, oil infrastructure
Problems - Money!!

- Rate of return usually 10% at best
- Hurdle in forest industry 15-30%
- Capital limited to “core business” - necessitates third party capital
- Huge capital investment requires long term contracts - fuels, power, heat
- Carbon credits - indirect “power savings” don’t count
Summary

- Success stories - but hanging fruit gone
- Need improved economic environment to promote further development
  - Lower taxes on biomass fuels, products
  - More incentives for investment (capital)
  - Deregulated power industry - green pricing
  - Green power policies
  - Non-residual biomass sources
- Emerging technologies