

BIOMASS



Ontario Power Generation Solid Biomass Fuel Program

Sandy Drysdale

Manager, Fuel and Transportation Contracts

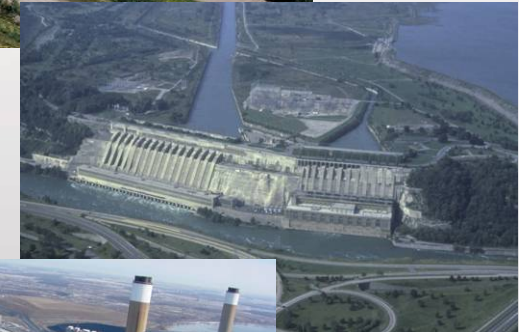
***Emerging Opportunities with Wood Pellets Forum
North Bay, Ontario
March 5, 2009***

BIOMASS



Ontario Power Generation Profile

- ⦿ Owned by the Province of Ontario
- ⦿ Generated 107.8 TWh in 2008
- ⦿ Produces 70% of Ontario's electricity
- ⦿ 11,000 employees
- ⦿ Capacity: 21,000 MW
- ⦿ Gross Revenue: \$6 billion



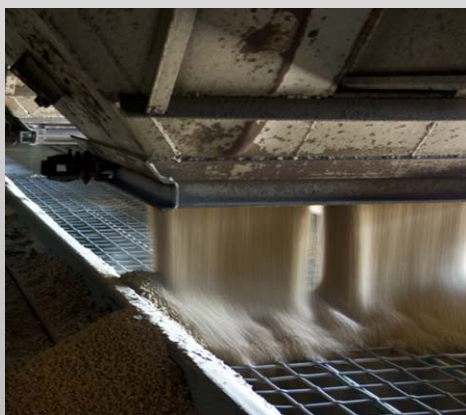
BIOMASS



Why Biomass at Coal Plants ?



Thunder Bay GS



Atikokan GS

- ⦿ Coal generation ends 2014
- ⦿ Makes use of existing coal plants
- ⦿ Renewable energy
- ⦿ On demand when you need it
- ⦿ Net greenhouse gas reduction
- ⦿ Contributes to the transition to lower carbon future
- ⦿ Synergy with Ontario's agriculture and forestry industry

BIOMASS



OPG's Expectations

- ⦿ Not all 15 coal units will be converted
- ⦿ Fuel availability may limit electricity production from solid biomass fuel
 - ⦿ 600,000 tonne of wood pellets generate 1,000,000 MWh of electricity
- ⦿ We will need a renewable energy premium
- ⦿ Supply infrastructure will take time



BIOMASS



OPG Biomass Test Program

- ⦿ Tests encouraging but we are still learning about
 - Fuel types
 - Fuel handling
 - Combustion
- ⦿ Environmental approvals for testing in place



BIOMASS



Atikokan GS Biomass Experience

- Lignite boiler design is favourable to 100% biomass fuel
- Focused on fuelling with wood pellets
- Test burns achieved 100% biomass fuel input
- Host to the Atikokan Bio-Energy Research Centre



BIOMASS



Nanticoke Biomass Experience

- ⦿ First no-coal wood pellets test complete
- ⦿ Continued with seasonal wheat-shorts tests
- ⦿ 2008 test production of 4,000 MWh
 - More than 300 homes for a year
 - Displaced 4,700 tonnes of carbon dioxide



BIOMASS



Challenges

- ⦿ Fuel cost
- ⦿ Fuel supply infrastructure to be developed
- ⦿ Covered shipping and storage is required.
- ⦿ Safe fuel handling
- ⦿ Potential boiler issues – slagging, fouling, capacity
- ⦿ Ash re-use considerations
- ⦿ Avoid competition for resources

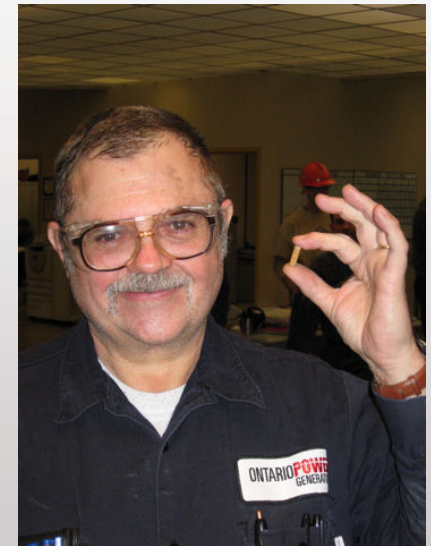


BIOMASS



OPG & Responsible Fuel Sourcing

- ⦿ Will not use food crops
- ⦿ Wood fuel must be from sustainable harvest practices
- ⦿ Keep watch on new developments like algae
- ⦿ Biomass obtained with minimal impact on consumers and existing resource users



BIOMASS



Request for Expressions of Interest - Fuel

- ⦿ OPG needs to build understanding of:
 - ⦿ Biomass industry
 - ⦿ Production capability
 - ⦿ Physical characteristics
 - ⦿ Commercial conditions
- ⦿ Open to wood or agricultural based material
- ⦿ Aggregation of smaller producers expected
- ⦿ Current RFEI closed, but participation does not limit future opportunities
- ⦿ RFEI can be found at:
www.opg.com/power/fossil/biomass.asp



BIOMASS



Basic Requirements

- ⦿ Solid biomass fuel being sought
- ⦿ Ontario sourced and processed
- ⦿ Wood or agricultural products with the following qualifications:
 - ⦿ Meets the UN Framework Convention on Climate Change definition of renewable
 - ⦿ Biomass fuel delivered to OPG must not be any material defined as a waste



BIOMASS



Going Forward

- ⦿ Technical studies complete and contracts for plant modifications (fuel storage and handling, combustion modifications) let within two years
- ⦿ Generation supply contracts in place within two years
- ⦿ RFEI's received and being reviewed
- ⦿ First fuel contracts let within two years – fuel and transportation industries geared up within three years
- ⦿ First unit ready to go – likely Atikokan – in 2012!!

