

# Thunder Bay Generating Station

## Advanced Biomass Conversion

Ontario Power Generation (OPG) is converting one unit at Thunder Bay Generating Station (GS) to use advanced biomass as fuel. This is a new beginning for the Thunder Bay station that puts OPG at the forefront of an exciting new area of the electricity industry. Our biomass conversions will also allow us to develop expertise that can be exported world-wide.

Since the conversion was announced, last November, OPG has been working to obtain environmental approvals, develop detailed technical specifications, obtain bids from fuel suppliers, select contractors for modifications and negotiate a revenue agreement with the Ontario Power Authority. The unit is targeted to be in-service by 2015.



**Thunder Bay Generating Station**

### **Advanced Biomass is a New Fuel**

Advanced biomass is a new, solid biomass fuel that is thermally treated to create a weatherable and durable pellet that can be used at coal-fueled plants with minimal plant modifications. It can be handled and stored much like coal. It is sustainable fuel recognized as beneficial to climate change mitigation. Conversion to advanced biomass requires less capital investment than gas conversion and will help bridge the gap to enable the station to meet reliability requirements in the northwest.

OPG's Atikokan Generating Station (GS) was converted from coal to biomass fuel and was placed in-service July 24, 2014. The station is the largest capacity 100 per cent biomass fuelled power plant in North America.

Advanced biomass is different from "white" biomass wood pellets being used in the Atikokan GS conversion project.



(l to r), The Hon. Michael Gravelle, OPG's Chris Fralick, Power Workers Union representative Tim Borg, MPP Bill Mauro and Society of Energy Professionals representative Aaron Butikofer were on hand for Ontario's announcement of the project in November, 2013..

# Thunder Bay Generation Station Advanced Biomass Conversion Quick Facts

- Advanced biomass is a new and renewable fuel derived from forest or agricultural sources that has similar characteristics to coal. It is solid biomass that is processed with advanced techniques.
- Advanced biomass can be handled much like coal using the existing fuel handling systems with limited plant modifications.
- It has higher energy density and better combustion characteristics than traditional biomass and is somewhat water resistant which allows it to be stored outside.
- Plant modifications required to use advanced biomass are minimal. The project cost is estimated to be approximately \$5 million.
- The use of advanced biomass requires less capital investment than gas conversion and will enable the station to meet reliability requirements in the northwest.
- The conversion project is consistent with historic land use and complies with the City of Thunder Bay Official Plan.
- Fewer staff will be required. OPG will honour the collective agreements.
- Advanced biomass is available from demonstration facility in large quantities at this time. OPG has secured a fuel supply contract with deliveries to start this fall. A second RFP for future fuel supply is to be issued later in 2014.
- Pellets will be procured from suppliers in accordance with OPG procurement procedures and will meet both environmental sustainability standards and technical/combustion specifications.
- Advanced biomass wood pellets will arrive at the site by truck.
- Biomass is a sustainable fuel recognized as beneficial to climate change mitigation.
- The Thunder Bay Energy Supply Agreement was signed by the OPA and OPG in June, 2014. The contract provides for the recovery costs.
- Thunder Bay GS will continue to operate in compliance with all existing permits and approvals. The process to attain permanent ECA certifications has been initiated.
- Biomass will provide greater than 95 per cent of the station's electricity generation. Non-renewable ignition oil will be less than 5 per cent and used as a start-up ignition fuel.
- Close to 100 per cent of the electricity OPG produces is from sources that are free of climate change and smog causing emissions.
- OPG is leading the way in generating electricity from biomass wood pellets.

# BIOMASS

## Community Update

September 2013



## Atikokan Generating Station Biomass Conversion Project

Ontario Power Generation's (OPG) Atikokan Generating Station (GS) is on its way to becoming North America's largest 100 per cent biomass-fuelled power plant. Converting from coal to biomass means the station will still have the capability to generate to full capacity. And thanks to new leading edge technology, it will be sustainable, better for the climate and good for northwestern Ontario's economy.

### Converting the Station's Fuel to Biomass

Fuel handling and storage construction is well underway. The walls for the two 5,000 tonne storage silos are complete and stand 43 m (140 ft.) tall / 21 m (68 ft. 10 in.) in diameter. In total, 2,750 cubic metres of concrete (over 300 truckloads) were cast in the silos project. That was supported by over 200,000 kg of rebar. Linking the silos into the transfer system is the next step.

The structural steel for the truck receiving and transfer tower is also complete. The shell of the transfer tower is about six stories high. Still to be completed are modifications to the furnace and combustion system and replacement of the controls system.

### Fuel Supply and Transportation

OPG has entered two ten-year fuel supply contracts. Each has an annual volume of 45,000 tonnes and includes Aboriginal involvement. The pellet facilities will be located in Atikokan (Rentech Inc. acquired the facility from Atikokan Renewable Fuels in May 2013) and Thunder Bay (Resolute Forest Products). The transportation contract to deliver pellets from the facilities to the generating station is also in place.



### Environment

- In 2011, OPG conducted a sustainability analysis study through the Pembina Institute.
- Its findings showed that using wood pellets at a rate of 2 million tonnes per year can be done with no systemic decline in forest carbon stocks over time. (This fact, combined with Ontario's sustainable forest management planning process and practices, means OPG's biomass program can satisfy the United Nations Framework Convention on Climate Change definition of renewable biomass.) The wood pellet electricity pathway offers significant greenhouse gas benefits over combined cycle natural gas generation (on average 80 per cent lower).
- The study also analyzed a scenario that included harvesting and processing 100,000 tonnes of forest-based biomass, sourced from forest management units in northwestern Ontario, each year for OPG's Atikokan Generating Station. The results of that analysis are the same, but the wood pellet electricity pathway offers significant greenhouse gas benefits over combined cycle natural gas generation (on average approaching 90 per cent lower).

## History

Atikokan GS was originally constructed with one coal-fuelled generating unit. It was officially opened on November 14, 1985. Built at a total cost of \$754 million, the station burned low-sulphur lignite coal from western Canada for 27 years.

Under the Environmental Protection Act Ontario Regulation 496/07, Cessation of Coal Use - Atikokan, Lambton, Nanticoke and Thunder Bay GS, requires that coal not be used to generate electricity at these stations after December 31, 2014.

August 26, 2010 - The Minister of Energy directed the Ontario Power Authority to negotiate a Power Purchase Agreement with OPG for biomass-generated electricity from Atikokan GS. A number of studies were conducted, including safe handling and storage analysis, engineering concept studies, and combustion and ash studies. Fuel specifications were developed. As well, environmental permitting was completed and approved.



## Reliability and Safe Handling of Biomass Fuel

- Biomass power generation is reliable and flexible. It is there when needed to back up hydroelectric and other forms of green energy (wind/solar) when they are not available.
- Safety is a top priority for OPG and for all involved in the conversion project. All workers on site undergo safety training.
- The silos will be equipped with industry best practice safety capabilities that will ensure the safe handling of the pellets.
- Pellets will be processed "first in, first out" to minimize self heating.

## Economy

- The ongoing operation of the plant means that OPG will continue to contribute to the local and regional economy.
- Converting the Atikokan GS to biomass makes use of an asset already owned by the province. The cost is less than building a new natural gas plant.
- The project is on budget and on track for commissioning and placing the plant in-service in mid 2014.
- Estimated to cost \$170 million, the project is currently on schedule and on target.
- The number of contractors working on site is expected to peak at 250. Jobs include those in construction, technical work and administration.
- The project will create new business opportunities for suppliers.
- Conversion is "one way" -- the plant will no longer burn coal in the future.
- Atikokan GS will maintain full production capacity of approximately 200 megawatts on biomass.

## The Coal Legacy

On June 10, 2013, the grand opening of "The Coal Legacy" exhibit was held at the Atikokan Centennial Museum. This permanent display includes models, historic photos and artifacts. It is a tribute to the Atikokan Generating Station's very proud past -- serving the community from 1985 to 2012. It also introduces the station's conversion to biomass fuel to the community.

Photo: Atikokan Township Mayor Dennis Brown (centre) with OPG's Wray Clement (left) and Brent Boyko (right).



For more information and to watch our biomass video visit [www.opg.com](http://www.opg.com).

Pembina Institute Biomass report can be found at: <http://opg.com/power/thermal/fuelconversion/>.



# ELECTRICITY FROM... BIOMASS

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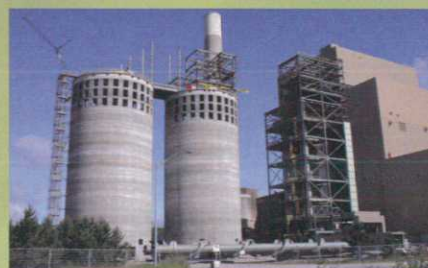
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**ONTARIO** **POWER**  
GENERATION



**Atikokan Generating Station - Grand Opening, September 10, 2014**  
Largest Capacity 100 per cent biomass fuelled power plant in North America.

*from a painting by artist Wendy Wood*