



FROM COAL TO BIOMASS

Generating a Sustainable Future

Atikokan Generating Station is now North America's largest 100 per cent biomass-fueled plant.

Two hundred kilometres west of Thunder Bay, Ontario, tucked beside the jagged granite outcroppings and gnarled deciduous forests of Quetico Provincial Park, rests the small town of Atikokan.

It's a quiet place, with about 3,000 people and three major employers – a hospital, a pair of lumber mills, and a power plant. Small and out of the way, few would expect Atikokan to be the lightning rod for provincial debate, but in 2007 it was. The tiny northern town became the front line as decades-old coal communities were caught in the shift toward clean power.

It all started in 2003, when the government of the province of Ontario embarked on the largest climate change initiative in North America. The province promised to cease all coal-burning power generation, an ambitious goal that was achieved in 2014. Environmentally, the decision was groundbreaking. Nearly a quarter of Ontario's power came from coal generation. Closing the plants would equal the removal of seven million cars from the road. But while environmental advocates welcomed the announcement, to Atikokan, the news was grim.

Like other small communities that housed the coal facilities, Atikokan relied on its generator. Built in 1985

after a collapse in the area's mining industry, the plant employed about 90 workers and accounted for about a third of the town's annual tax revenue. It also provided financial support for community initiatives and services, such as the hospital and library. Had the generating station shut its doors forever, the economic and social impacts would have been devastating.

This is the crux of the clean energy debate. There is a cost to eliminating smog and greenhouse gases, both fiscal and social. But communities need not become casualties in the fight against global climate change.

Managing the transition as a responsible employer

Ontario Power Generation (OPG), the government-owned electricity generator responsible for phasing out the use of coal, took community needs into account when crafting a transition strategy. Employment, social and economic considerations were made, and consequently the company has experienced considerable success maintaining

positive relations with the affected communities.

As Ontario's largest electricity generator, 24 per cent of OPG's power in 2003 was coal-fuelled. Managing the shift away from coal required a comprehensive framework for transition built from the ground up, starting with the company's employees. The transition process affected more than 1,400 staff across five locations in north and southwestern Ontario: Lambton, Nanticoke, Mississauga, Thunder Bay, and Atikokan. Working with the affected employees and their unions, OPG was able to provide alternative employment for staff willing to relocate to positions in hydro and thermal operations. When required, retraining was provided for employees who made the switch. Those who chose not to relocate received severance or retirement packages, and at the Lambton and Nanticoke plants, a few employees were retained to carry out routine upkeep and maintenance tasks.

Throughout this process, no employee was terminated against their will. This initially resulted in a managed surplus of employees in some locations, but plants are on schedule to return to regular staffing levels by 2017 through attrition.

Biomass Facts

- Biomass is energy produced by burning renewable organic material – in OPG’s case, sustainably harvested wood pellets from well-managed Canadian and Norwegian forests
- Emissions from wood-based biomass generation contain 75 per cent less nitrogen oxide than coal emissions and virtually no sulphur dioxide
- Wood-based biomass generation in Ontario produces 80 per cent less greenhouse gas emissions than combined cycle natural gas
- Advanced biomass has been treated to withstand exposure to rain, and has handling and storage properties similar to those of coal. It is still in the early stages of development, which is why OPG purchases advanced biomass fuel from Norway
- Thunder Bay generating station is the first conversion to 100 per cent advanced biomass in the world
- 100 per cent of OPG’s regular biomass fuel comes from local producers within the province
- Atikokan generating station is the largest 100 per cent biomass-fuelled station in North America
- All of the fuel OPG uses for biomass generation meets the United Nations Framework Convention on Climate Change definition of renewable biomass

Despite the well-defined employment transition process, the lengthy coal closure presented a significant stressor for employees. Managing their mental health became a key priority.

“There was a lot of effort put into change management,” says Chris Fralick, plant manager for the Atikokan and Thunder Bay generating stations. “We were communicating regularly with employees throughout the process, because there was initially a lot of uncertainty. What these changes mean to an individual is hugely important – in some cases, they may mean moving across the province.”

Managing community transition

The organized relocation of employees provided economic stability for the OPG community. However, were nothing else done, the closures would still considerably impact host communities.

“Without the OPG station operating ... it would be much more difficult to live here,” says Dennis Brown, Mayor of Atikokan. Brown says the plant makes up one-third of the town’s tax revenue, about \$2 million annually.

In recognition of the coal stations’ economic importance, the second tier of OPG’s conversion plan involved an assessment of the broader fiscal impact a plant closure could have on a community, and how that impact could be mitigated for both company and community benefit. Of the five coal-burning plants, four were subjected to rigorous assessment to determine long-term potential. Only the old Lakeview generating station in Mississauga shut its doors for good, a decision that was met with widespread approval from the city’s residents and the entire Greater Toronto Area.

Located in rural southwestern Ontario, the Lambton and Nanticoke generating stations posed the most significant challenge. Like the Atikokan facility, both Lambton and Nanticoke played major economic and social roles in their communities, together employing over 900 staff. While the plants will

never again burn coal, they haven’t shut their doors permanently. Instead, they’re being preserved to meet Ontario’s future energy needs as candidates for natural gas or biomass generation and possible solar farm sites.

“Conversion to natural gas is technically a viable option,” says Mike Martelli, OPG’s Senior Vice President of Hydro Thermal Operations. “However, the equipment needs to be effectively placed in a safe and protected state to maintain its integrity. This means keeping critical equipment dry and maintaining adequate building heat. We’re maintaining their condition so if energy needs arise we can quickly complete a fuel conversion.”

Preserving the plants guarantees Ontarians a cost-effective and easily accessible source of electricity to meet future demand. Additionally, it ensures communities still benefit from the revenue earned through property taxes, and allows OPG to maintain a physical presence despite ceasing operations. The company’s social commitments also still stand – through its corporate citizenship program, OPG contributes \$2.5 million to support local initiatives, sports and charities across the province.

Renewing communities with renewable energy

The largest changes resulting from the coal closure legislation occurred at the Atikokan and Thunder Bay generating stations, where the company’s presence is still very much felt.

“We couldn’t just walk away,” says Martelli. “Atikokan generating station has been an important part of the community, and it would have been devastating for them to lose it.”

Atikokan and Thunder Bay were identified as strong candidates for conversion to biomass energy, a renewable process recognized as beneficial to climate change mitigation.

A 2010 study commissioned by OPG and conducted by the Pembina Institute further reinforced the



Two new silos were constructed at Atikokan during the conversion to biomass. Each is 44 meters tall, and holds approximately 5,000 tonnes of wood pellets.

concept, identifying the conversions as both economically and socially viable. The study found the conversions would create 130 jobs in the forestry and pellet production sectors, and that burning wood-based biomass fuel would produce 80 per cent fewer greenhouse gas emissions than natural gas generation. It was a tantalizing prospect for the people of Atikokan.

“This was an exciting opportunity for the company and the community,” says Martelli. “The people of Atikokan were certainly in favour of a biomass solution.”

The conversion was completed in Atikokan in the summer of 2014. Soon after the Atikokan announcement, Thunder Bay was given the green light, completing its conversion to advanced biomass in early 2015. Now, rather than lignite coal, the plants’ large boilers burn wood pellets and together produce more than 350 megawatts of renewable peak electricity on demand.

“Atikokan can really wave their flag on that one,” says Gerry McKenna, a senior environmental

scientist at OPG. “They’ve left coal for clean renewable energy and it’s paying off both long and short term. With regards to greenhouse gas emissions, the impact of this conversion is enormous.”

OPG was able to repurpose the two plants for a total investment of \$175 million, making use of existing facilities and diversifying its energy portfolio in the process. However, the benefits weren’t exclusively economic: the biomass conversions also served to mitigate staff relocation. While there was significant movement at the Thunder Bay plant, the measures were successful in ensuring no one from Atikokan had to leave their home town.

“Conversion to biomass created what we call a new dawn for Atikokan,” says Brown. “There’s a lot of support in the community for what OPG does.”

It’s easy to see why. In addition to preserving dozens of well-paying jobs, Atikokan’s conversion to biomass spurred a mini-revival of the area’s flagging forestry industry.

Atikokan’s particle board mill, which had closed its doors in 2008, reopened as a pellet manufacturer for the newly converted plant. Now, in conjunction with a new facility at a once-shuttered sawmill in Thunder Bay, it supplies the Atikokan plant with all of its fuel – some 90,000 tonnes, all of which meets the United Nations Framework Convention on Climate Change definition of renewable biomass.

Already, Atikokan has benefited from the conversion to renewable energy. After witnessing demand for wood pellets drive significant growth in the forestry industry, Brown says the town now has more jobs than when the coal generator was running.

Not to be left out, the Thunder Bay generating station has also become a leader in the electricity sector. It’s pioneering advanced biomass, a fuel composed of treated wood pellets with storage and handling characteristics similar to those of coal. Together, the plants greatly improve Ontario’s energy profile. Emissions from biomass generation contain 75 per cent less nitrogen oxide than coal emissions and virtually no sulphur dioxide.

Though the two plants currently provide peak power to supplement the base generation that comes from OPG's nuclear and hydroelectric facilities, they also act as economic engines in Ontario's northwest. While demand for electricity had dropped over the past decade, new mining ventures in the region have spurred speculation that energy needs will again rise.

"As more mines develop in northwestern Ontario, we're going to need more power," says Brown. "When the demand increases, hopefully we'll see more jobs as the plant runs more."

Ontario burned its last piece of coal in April 2014. Since its elimination, 99.7 per cent of the electricity Ontario Power Generation produces is free of smog and climate change-causing emissions.

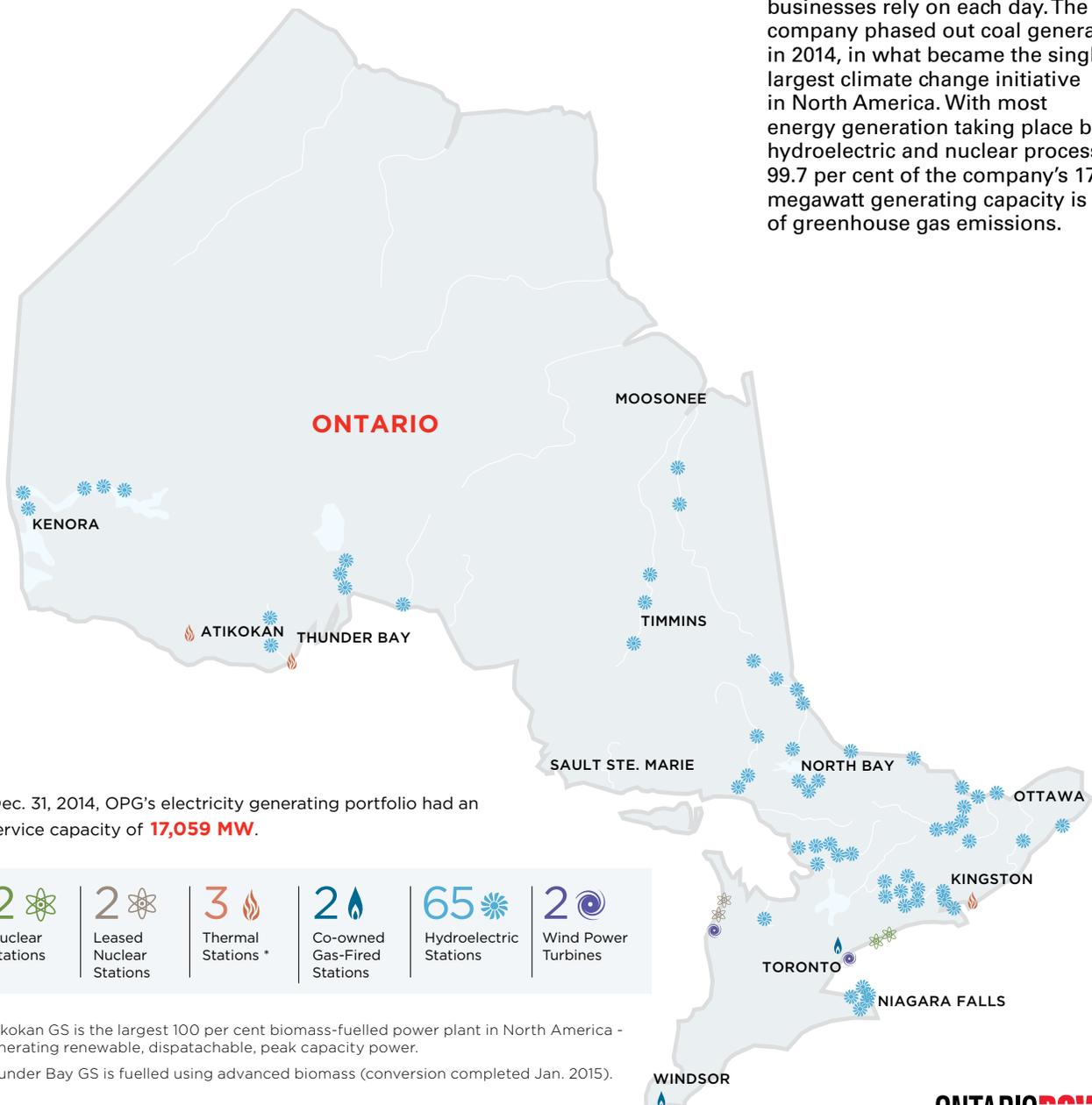
"We've kind of rebranded ourselves since the coal closures, and that's something to be proud of," says Ted Gruetzner, OPG's Vice President of Corporate Relations and Communications. "Since we've shut the coal plants and expanded our energy portfolio to include processes like biomass, we can speak much more proudly about our environmental contributions as the province's largest clean energy provider."

There's good news for the people of Atikokan as well. With North America's largest 100 per cent biomass-fuelled facility up and running, the town's economic future is bright.

"We're extremely happy to be pioneering this renewable energy for Ontario," says Fralick. "And we're proud to continue our operations."

OPG Biography

Ontario Power Generation (OPG) is a Canadian power generation company operating in the province of Ontario. OPG produces more than half of the electricity Ontario homes, schools, hospitals and businesses rely on each day. The company phased out coal generation in 2014, in what became the single largest climate change initiative in North America. With most energy generation taking place by hydroelectric and nuclear processes, 99.7 per cent of the company's 17,059 megawatt generating capacity is free of greenhouse gas emissions.



At Dec. 31, 2014, OPG's electricity generating portfolio had an in-service capacity of **17,059 MW**.



* Atikokan GS is the largest 100 per cent biomass-fuelled power plant in North America - generating renewable, dispatchable, peak capacity power.

Thunder Bay GS is fuelled using advanced biomass (conversion completed Jan. 2015).