CASE STUDY

SAWDUST TO SEEDLINGS

Three new wood pellet boilers are keeping New Brunswick winters away from millions of seedlings at a renovated tree nursery

Nature's 'mini-battery', versatile wood pellets, undergo a reincarnation of sorts at Biomass Solutions Biomasse's (BSB's) latest custom wood pellet boiler system installation. Pellet heat created from the wood waste of New Brunswick's forest industry is helping conifer seedlings thrive in a harsh Canadian winter at the Kingsclear Tree Nursery.

Jonathan Levesque, BSB's General Manager in New Brunswick, said the biomass retrofit at the nursery helps reduce the province's reliance on costly imported fossil fuels.

"At the nursery, it's the full cycle, growing trees and using waste wood to help them grow while all New Brunswickers benefit from being less dependent on non-renewable energy," Levesque said.

Thousands of conifer tree seedlings grow at the Kingsclear Provincial Tree Nursery in Island View, New Brunswick. The seedlings are protected from harsh winters by wood pellet boiler systems which replaced oil-fired systems. Photo: Mark Rickard

An extensive buffer tank system installed at the Nursery helps ensure tree seedlings can thrive despite a harsh New Brunswick winter. Three Herz Firematic 350 wood pellet boiler systems were installed at the facility as part of a retrofit. Photo: Mark Rickard

BIOMASS RETROFIT

The New Brunswick Climate Change Action Plan aims to reduce the use of fossil fuels in public buildings. The province decided to tender for a low-carbon biomass heating system retrofit at the nursery.

> The Kingsclear Tree Nursery, located on the outskirts of Fredericton, grows and ships approximately 19-20 million tree seedlings annually for reforestation on Crown land and private woodlots. Martin Noël, Nursery Manager, said the BSB installations replaced numerous oil-fired boilers, including some equipment that was more than 45 years old.

"We had redundancies, so we have more than one boiler in case one went down. Today, we still have redundancies and oil boilers to help with the peak heating," Noël said. "In the winter, we are trying to maintain overnight temperatures of 23 degrees Celsius (C) when the outside temperature is minus 25 C."

Noël said the project was tendered in the summer of 2024 and completed in time to be fired up in February. The installation included reinforced concrete pads, new buffer tanks, new external silos and new exhaust flues.

"The system is new to us, and over time, we will get a good sense of fuel consumption and pellets. This year will be a good testament to that," he said.

Three Herz Firematic 350 wood pellet boilers were installed at the nursery. The Herz boilers are designed to be compact and sized to fit into a normal boiler room. In the Kingsclear retrofit, the units were installed with a forklift. The two-piece boiler was assembled on-site.

BONE-CHILLING COLD OUTSIDE, WARM INSIDE

Noël explained the provincial greenhouses aren't usually heated in February, but scheduling required an early start up. February 2025 was also the coldest in New Brunswick for years, with temperatures dipping below minus 20 C over numerous nights.

"Production costs for greenhouse seedlings in February are prohibitive with oil heating. This year, we had to start a crop in February to make up some losses we had with a crop from last year."

"Greenhouse boilers have a busy night shift keeping the cold air from the seedlings," Levesque said. "We were quite surprised to see the system can handle close to 100 per cent of the nursery load. It has managed to handle the load quite well."

Almost three million seedlings were planted in the greenhouse complex this February, depending on biomass heat to keep the cold temperatures at bay. The seedlings are destined for reforestation on Crown Lands and helping private woodlot owners with their silviculture programs.

Noël said using wood pellets to give the delicate seedlings a head start makes sense at the nursery.

"We are using harvest residues to heat the greenhouse now. We strive for continuous improvement of the genetics of the tree. We have seed orchards right here on site. We have a section responsible for collecting the cones off trees, extracting the seeds from those cones, storing them and providing high-quality, genetically-improved seeds for the seedling operation."

PELLET HEAT A GREAT FIT FOR GREENHOUSES

The nursery, which has operated for over 45 years, includes seven growing complexes with 85 greenhouses and 19 outdoor crop-holding areas. The 90-hectare facility employs up to 65 workers.

Noël said the greenhouse modernization will include a new 110,000-square-foot expansion to be heated with wood pellets. The new complex, now under construction, will be more than triple the size of the existing heated greenhouses in Kingsclear.

Noël said the nursery officials are eager to chart the cost savings over the next year, but initial impressions show a sizable savings over oil heat at the facility.

Three wood pellet silos were installed at the Kingsclear Provincial Tree Nursery last year, providing fuel for a trio of wood pellet boilers installed at the New Brunswick greenhouse as part of a retrofit. The boilers replace aging oil-fired boiler systems.
Photo: Mark Rickard

BSB has installed other wood pellet units in greenhouses, including the New Brunswick Botanical Garden in St. Jacques and the Nadeau Greenhouse in Laurierville, Quebec. Levesque predicts more greenhouses will utilize efficient, low-carbon pellet heat in the future.

> "Nurseries and greenhouse installations are a promising market for biomass. There are usually no space limitations in a greenhouse application compared to an existing commercial building. There's no cooling needed, which eliminates other considerations."
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> — Jonathan Levesque

Jonathan Levesque, Biomass Solutions Biomasse (BSB) General Manager, explains some features of the Herz 350 Firematic wood pellet boiler system to Martin Noël, right, the Kingsclear Provincial Tree Nursery Manager. The provincial facility replaced three aging oil-fired systems with pellet boilers. Photo: Mark Rickard

ENERGY INDEPENDENCE FROM IMPORTED FOSSIL FUELS

BSB uses third-party contractors to deliver most of its pellets but does have a truck with a scale for smaller bulk delivery. Pellets to fuel the Kingsclear boilers come from the Groupe Savoie pellet mill, which has a 90,000-tonne annual capacity.

Levesque said the more cost-efficient Herz boiler system has made biomass heating more competitive than customized alternatives BSB used in institutional facilities.

The Herz units are new to North America, but the systems are heating mainstays throughout European countries and around the world.

Levesque said the momentum of adopting biomass heating solutions for New Brunswick public spaces is increasing. Governments and communities are recognizing the advantages of wood pellets—a sustainable local fuel source, efficient heat and low carbon output at schools, hospitals and other facilities.

> "We don't need to export fuel that can be used domestically. Biomass can offer New Brunswickers energy independence from imported fossil fuels. It is also way cheaper."
>
> — Jonathan Levesque