TorchLight Bioresources

Municipality of the District of Argyle Wood Pellet Demonstration

Concept & Proposed Forestry Innovation Transition Trust Application

Bioheat as an Essential Forest Product

In the absence of pulp production, wood heat (bioheat) is the only proven high-efficiency, economic alternative market for low-grade wood fibre, thinnings, and pulpwood. Local bioheat demand supports forest sector financial stability and permits management of timberlands to maximize forest health, productivity, resilience, diversity, and economic value. An example is Austria, which is by far the world's largest producer of high-value mass timber products, such as cross-laminated timber, but is home to only a modest pulp sector. While 30-33% of Austrian wood fibre becomes solid wood products, 60% becomes heat. Austria has approximately the same forested area as Nova Scotia – 4 M ha – but the forest sector generates over 8 times the economic (GDP) impact. This shows that while bioheat is not the highest value wood product, it can play a central role in an economically successful forest industry by providing an essential market. Bioheat is also a key product within the successful forest sectors in Sweden and Finland, where wood is used to heat numerous cities and towns. In the EU, bioenergy represents 60% of renewable energy, has a 90% renewable heating market share, and is responsible for more greenhouse gas reductions than any other renewable energy resource/technology by far. The reason that bioenergy, and specifically wood, dominates the renewable heating market is that it is usually the lowest cost option. Bioheat also generates more than eight times the number of operating jobs per unit energy as other renewables.

The Wood Pellet Boiler Opportunity

The countries with the highest proportion of solid wood heating, including Sweden, Finland, Denmark, are also the countries with the highest percentage of renewable energy consumption. District energy systems, which consist of underground hot water pipes that connect tens, hundreds, or thousands of buildings to central bioheat or combined heat and power plants, have been essential to achieving high rates of biomass heating. However, district energy systems are generally only viable for concentrated population centres. In rural and low population density areas, wood pellet boilers are the key primary heat appliances for wood fuels. While multiple buildings can be connected to a single boiler, the most common approach is for each building to have its own wood pellet boiler and for pellets to be delivered in bulk by truck. The pellets are blown into a storage space, which is often located in the basement or garage. A typical single-family detached home may require 2-3 bulk pellet deliveries per heating season. The pellet boilers are completely automated, thermostat controlled, and can be controlled with a smartphone. The only building owner requirements are emptying the ash bin once every 3-4 weeks and a 15-minute clean twice per year. There are approximately 1 million wood pellet boilers in operation in the EU at present, with the largest manufacturer, Fröling of Austria, producing over 35,000 units per year. Distributors for Fröling and other manufacturers, such as ÖkoFen, are already providing boilers to the Canadian market.

Changing Energy Prices

The Government of Canada is implementing two major policies that will have a significant impact on the cost of heating homes and businesses in Nova Scotia. The first is the climate levy or 'carbon tax', which is scheduled to increase to \$170/t CO_2 by 2030. This is the equivalent of increasing heating oil prices by \$0.45/L. In addition, the forthcoming Clean Fuel Standard requires a reduction in the carbon intensity (CI) of liquid fuels, including heating oil. The projected impact of this policy is \$0.15/L by 2030. The two policies are stacked, meaning both apply to the same litre of heating oil and result in an additional \$0.60/L beyond inflation and crude oil market price changes. Although Nova Scotia Power has encouraged Nova Scotians to install electricity-driven air-source heat pumps, the CI of Nova Scotia's coal-dominated electricity grid means replacing heating oil with heat pumps does not reduce GHG emissions in the province. Nova Scotia Power must undertake a significant capital spending program over the coming two decades and, according to the Integrated Resource Plan, this will increase electricity rates by 2-3% above inflation annually. With Nova Scotia's high carbon electricity, it is clear fuel switching to wood fuels, as per the EU, is the leading approach to ensure low cost and low carbon building heat.

More Information: Jamie Stephen, PhD, TorchLight Bioresources Inc. | Tel: +1-613-532-7079 | Email: jstephen@TLBio.com

Municipal Ownership and the Development & Operations Model

Wood pellet boilers have a higher capital cost than heating oil and propane furnaces/boilers or air source heat pumps. However, wood pellets are a lower cost fuel than heating oil, propane, and electricity and all-in heat costs are usually lower than fossil fuels or heat pumps over 20 years. This is particularly true if GHG emissions are valued, as is the case in Canada. However, homeowners can have difficulty justifying the upfront capital cost of wood pellet boilers, given payback takes several years and the boiler may outlast their ownership of the home. While some jurisdictions have offered large capital grants to subsidize the cost for wood pellet boiler purchase or have instituted renewable heat incentive policies that reduce payback time, these have not been implemented in Canada to date. TorchLight is proposing an alternative financing, development, and operations model that relies upon federal and provincial grants from the Investing in Canada Infrastructure Program (ICIP), matched with private sector investment, to eliminate the upfront capital cost for homeowners. Under this model, a municipality would source ICIP grants for 73.3% of the installed boiler cost. A private sector partner would provide the remaining financing as well as manage the installation, operation, maintenance, and fuelling of the boilers. The municipality would own 100% of the boilers. However, all customer management would be handled by the private sector partner and the customer would need to sign an installation, maintenance, and fuelling agreement with the utility management partner. As the heat utility management partner, enforcement of customer payment would be the responsibility of the private sector partner.

Argyle Demonstration Project and Beyond

TorchLight Bioresources is proposing to develop and manage a wood pellet boiler demonstration project on behalf of the Municipality of the District of Argyle. A similar project was developed in Ontario utilizing funds from the Government of Ontario. The demonstration project would consist of 20 wood pellet boilers installed in homes and small institutional/commercial buildings in Argyle. Funding for the 20 pellet boilers would be sourced from the Forestry Innovation Transition Trust (FITT), a $50 M provincial program established to help Nova Scotia's forestry sector transition to a new business model following the closure of Northern Pulp. As this is a demonstration project, 100% of the capital cost of boilers and installation would be sought from the FITT. The proposed private sector heat utility management partner, which would manage pellet boiler installation, fuelling, boiler maintenance, billing, and customer management, is Shaw Resources. Shaw owns and operates the only wood pellet plant in Nova Scotia that produces residential-grade wood pellets (as opposed to industrial pellets). The plant is located in Shubenacadie and Shaw would plan to truck pellets to a silo owned by the Municipality of the District of Argyle. A local company with fuel delivery (e.g., heating oil) experience would be contracted to deliver pellets and perform any required maintenance on the boilers. Training on these operations is provided by the boiler manufacturers.

TorchLight, in collaboration with Shaw and municipal staff, would prepare a draft application to the FITT for submission by the Municipality of the District of Argyle. No cash support from the municipality is requested, although staff time will be required to undertake this demonstration project. If the funding is approved, TorchLight would help the municipality establish a municipality-owned utility corporation, which would sign a utility management contract with Shaw.

Should the demonstration project be deemed successful, it could be used to justify a much larger grant request from the 'Green Stream' or the 'Rural and Northern Communities Stream' of the Investing in Canada Infrastructure Program. This request could be on the order of 200-300 boilers, with an annual wood pellet demand of 3,000 to 5,000 tonnes. The capacity of the Shaw Shubenacadie plant is 50,000 tonnes. Longer term, sufficient local pellet demand could justify development of a wood pellet plant in Yarmouth County, which would eliminate the long haul.

This demonstration project is intended to showcase the opportunity for wood pellets as the leading local, cost effective, low-carbon heating fuel in Nova Scotia. With 30 million tonnes of wood pellet production worldwide, Nova Scotia would simply be replicating what has already proven successful in many jurisdictions around the globe.