SUCCESS STORY:

Modern pellet-fired biomass heating plant

INVESTMENT CASE
Title:
Pellet-fired Biomass Plant – Viessmann Canada
Year commissioned:
2017
Location:
Viessmann Manufacturing Company Inc., Waterloo, Ontario, Canada

Stakeholders:
1. Harald Prell / Viessmann Canada, President
2. Armin Fleck / Viessmann Group, Director of Sales, Western Hemisphere
3. Andreas Wintzer/Viessmann Canada, Biomass and Commercial Projects Manager

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For over three generations, Viessmann has been providing its customers with comfortable, efficient and environmentally-responsible heating solutions. Sustainability is firmly embedded in the company's guiding principles and it is in this spirit that the decision was made to invest in a new wood-fired biomass heating system t for the company's 60 000 ft.2. In addition to helping our facility become virtually 100% fossil fuel independent, the new biomass boiler plant also acts as an important educational facility for engineers, specifiers, mechanical contractors, as well as government, healthcare and educational facility decision makers.

The decision to transition from a gas-fired to a wood-fired heating plant required a significant financial investment during a time of relatively inexpensive and readily available natural gas supplies. However, the decision was regarded as an important and necessary step to help accelerate the education, development and growth of the Canadian wood biomass heating market.

The new biomass heating plant consists of a 390 kW thermal output pellet boiler, and 35-ton external steel pellet silo for locally sourced, sustainably grown wood pellets. The system replaces two gas-fired boilers, each rated at 143 kW thermal output, which will act as back-up boilers during periods of peak heat demand.

The investment and its technology

The principle decision-making driver was the recognition that in order to successfully market wood biomass energy products in Canada, the market needed to be educated about the benefits of modern biomass heating in general and about Viessmann biomass energy products in particular. As a result, the decision was made to establish a modern wood biomass training facility at our Waterloo location that would function as a state-of-the-art biomass training centre, as well as replace the existing gas-fired heating plan as our facility's primary heating system.

Another objective was the overall reduction of our facility's GHG emissions. This objective was directly in line with overall Viessmann corporate values to be one of the world's premier providers of ecologically sustainable heating solutions.

The new 390 kW wood pellet fired heating system is

Fuel type:
- Wood pellets

Feedstock origin:
- Domestic wood manufacture by-products / residuals: dry chips, shavings, dust

Conversion system:
- Boiler combustion, e.g. stand-alone boiler plant

Co-fire:
- Heat generator (i e boiler) is 100 percent biomass-fired.

Heating system heat sources:
- Heat generator is part of a system with fossil fuel fired boilers

Comments:
- NG-fired boiler for backup

The new heating system is fuelled with sustainably grown wood pellets via a 35-ton external steel silo.

a high efficiency boiler based on underfeed combustion technology and equipped with advanced combustion control mechanisms.

Factors behind the decision

As stated above, the decision to install a wood biomass heating system at the Viessmann facility in Waterloo was in alignment with Viessmann corporate strategy to "create living spaces for generations to come." According to Prof. Dr. Martin Viessmann, "Viessmann commits itself to sustainability. We want to make our contribution towards preserving the basis of life for future generations."

From a business / market perspective, the investment was deemed necessary to provide potential customers and decision makers with some basic insights about the benefits, possibilities and limits of modern biomass heating technology, as well as to dispel some commonly held assumptions and misconceptions. Having an operating, state-of-the-art training facility acting as a tangible showpiece of modern wood biomass heating technology was regarded as the best way to underscore and support our educational and training efforts.

A description of the underlying policy framework:
Beginning in 2015, new air quality guidelines were developed in Ontario that differentiate between large wood-fired combustors (LWFC) and small wood-fired combustors

Relation to Sustainable Development Goals:

Ensure access to affordable, reliable, sustainable and modern energy for all

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Take urgent action to combat climate change and its impacts

Make cities and human settlements inclusive, safe, resilient and sustainable

Ensure sustainable consumption and production patterns

Take urgent action to combat climate change and its impacts

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

(SWFC). The dividing line between LWFC and SWFC is 3 MW nominal rating capacity on a fuel input basis. The air quality guideline for SWFC was published in January 2017 that included, for the first time in Canada, direct references to both the EN 303-5 standard and the ISO 17225 standards for solid wood biofuels.

In January 2017 the Ontario government concurrently launched the new Environmental Activity and Sector Registry (EASR) program (Regulation 1/17) which was developed for facilities with air emissions that are not considered high risk or complex. The EASR program also included direct references to the EN 303-5 and ISO 17225 standards to streamline and simplify the permitting process for specific types of EN certified SWFC using ISO graded woody based solid biofuels.

Several factors need to be assessed to determine if a facility is applicable to the EASR program, such as the NAICS code of the facility, the heat input and output capacity of the SWFC, the EN certification status of the SWFC and the characteristics of the wood fuel. According to these rules, the Viessmann HQ qualified under the EASR program with its selection of an EN certified boiler and use of high quality fuels.

Lessons learned

- Importance of having stakeholders (business & government) work actively and collaboratively together throughout the regulatory development and approval processes
- Importance of adequate up-front research as to the quality of available wood supply and delivery infrastructure

Success factors

- Need to ensure proper fuel (pellet) supply and delivery infrastructure is in place
- Viessmann ensured that all necessary approvals to sell wood biomass energy products on the Canadian market had been obtained in advance
- Viessmann had the required technical expertise to properly install and integrate a new biomass boiler into an existing heating system
- Viessmann actively supported the development of the new small wood-fired combustor guideline in the Province of Ontario and provided technical data as needed

Constraints

- General lack of overall/basic market education with respect to most aspects of modern biomass heating technology
- General lack of technical expertise regarding biomass energy products on the part of most mechanical contractors
- Emission limits differ from province to province
- No readily available supply of wood chips

Replicability potential:

- Low local replicability
- Low regional replicability
- Medium national replicability
- High international replicability
- GHG reduction targets are expected to have positive influence on the biomass heating demand.

Comment:

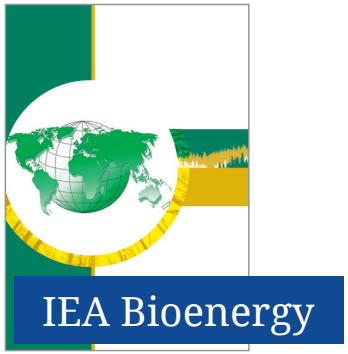
- NG is readily available and cost effective for heating purposes across ON; in general fossil fuel prices are cost competitive in Canada.

Scale-up potential:

- Low local potential
- Low regional potential
- Medium national potential
- High international potential

Comment:

- Viessmann product profile contains a broad range of biomass combustion systems to meet the needs of residential heating market, as well as industrial applications.



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