

Affordable power for the Canadian North



Exhaust gas heat exchanger.



Charge air cooler from EJ Bowman.

Bowman heat exchangers are a key part of a co-generation system which has halved electricity costs in a remote Canadian community and could transform power generation across the whole region. Bowman Charge Air and Exhaust Gas heat exchangers have been installed in an upgraded co-generation system which brings vital power and heat to Fort Providence in the Northwest Territories of Canada. This small hamlet of about 800 people is situated on the MacKenzie River, 2,000km north of the Canada-USA border, reports UKPN.

In 24 of 32 communities in Canada's Northwest Territories, electricity is produced using diesel generators. The commercial rate per kilowatt hour ranges between \$0.51 and \$0.61 CDN, which is four or five times the utility rates in southern Canada. Diesel has to be trucked or sea-lifted long distances from the south, hence the high cost of power.

At the heart of Fort Providence is the Snowshoe Inn (SSI) which provides much of the local community's commercial and retail facilities.

SSI had previously used a co-generation diesel power plant to provide all required off-grid electricity and heat for its operations, comprising two diesel generators (120kW/208v) for power, with waste heat captured from the cooling water and the exhaust gases for heating.

However, during the coldest months of the year, additional heat from a 900,000 BTU waste oil burner was required to ensure indoor temperatures were maintained.

In 2013, working closely with one of Canada's best custom fabricators – Pratt Diesel in Ottawa – Jeff Philipp oversaw a major upgrade to the co-generation system, replacing the old 120kW/208v diesel gensets with new 150kW/600v state-of-the-art gensets.

The first generator has already been installed and upgraded to co-generation using a Bowman Exhaust Gas Heat Exchanger and Charge Air cooler, whilst a second came on stream in Autumn 2014. A third, back up generator is also planned.

The combination of high efficiency gensets fitted with Bowman heat exchangers has delivered huge savings in heat capture – results that have implications for scores of other remote communities in Northern Canada.

"The Bowman units are performing extremely well, with at least a 60% gain in heat capture due to the massive improvement in efficiency," says Jeff Philipp.

"This is reflected in a reduced need for back up heat from the waste oil burner. In fact, due to improved heat capture, the 900,000 BTU waste oil burner will soon be replaced by a modern 500,000 BTU unit. Today, Snowshoe's amortised cost per kWh is \$0.24 compared to \$0.51 for commercial grid power (and climbing annually), a 52% saving."

The Fort Providence co-generation system is just the start of an initiative to modernise power production in the Canadian North,

according to Jeff Philipp - and one in which Bowman heat exchanger technology could play a key role.

"Most of the electricity in Canada's North is generated by diesel and the cost per kWh is excessively high, consuming a large percentage of community revenues that could otherwise be used for much needed economic and social development projects. There are 100+ remote diesel plants - none of which capture and utilise the waste heat," he explains.

Philipp says he is determined to modernise power production in the North, using his home community of Fort Providence as a showcase to be replicated elsewhere.

"Converting existing diesel plants into highly efficient co-generation systems is a key first step," he explains.

Jeff Philipp is currently working closely with political leaders and key government agencies responsible for power production in the North. Canada's three territorial governments and the federal government are anxious to resolve the North's energy challenge, to find long-term solutions to reduce the cost of living while improving opportunities in the communities.

When it happens, Bowman technology will be at the heart of the systems.

"I am confident we will be purchasing Bowman units again," says Jeff Philipp.

The installation in Fort Providence is just one example of Bowman heat exchangers proving their worth in some of the toughest environments on the planet. Bowman units are reducing energy costs and carbon emissions from the Outback to Antarctica.

By adding a Bowman unit to a genset, waste heat energy from the water jacket, exhaust gases, charge air and lubricating oil can be recovered and utilised to provide a 'green' CHP solution which delivers heating and hot water - or even more power, with no additional fuel requirement.

In addition, genset efficiency is significantly increased - with up to 90% of waste heat being recovered and turned in to valuable 'free' energy.

Bowman heat exchangers are designed to remove thermal energy from exhaust gases of natural gas, diesel and bio-fuel engines.

With a wide range of models available, they give genset manufacturers the opportunity to offer their customers CHP solutions which combine exceptional efficiency with a competitive price.

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