

IAGT Committee Chairman:

Lawrence Kaempffer

IAGT Committee Vice-Chairman

Steve Robinson
*Customer Business Manager,
North and Central America -
Oil and Gas Rolls-Royce
Energy Systems Inc*

IAGT Committee Members

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Chairman's Corner



Welcome to our first summer issue of the IAGT Canadian Gas Turbine Newsletter. We hope this newsletter provides you with interesting and valuable information including new developments in the Canadian gas turbine industry along with contacts should you have any questions. The current IAGT Committee names are provided with this newsletter. Feel free to contact the committee members directly via our website: www.iagtcommittee.com. Tracy Soyka, our event manager & committee coordinator, can help with any questions regarding our website. help@canavents.com.

As I work in comfort during a hot Southern Ontario day, it gives me pleasure to know that natural gas fired gas turbines are playing a continuously larger role in providing a clean source of electricity, when compared to the fossil fueled thermal power stations of yesteryear.

Our 2012 IAGT Fall Course is available for registration on our website. Please take the opportunity to review and share this information with any of your colleagues and/or customers. The course topics and field tours will be of benefit to newcomers, or experienced people, interested in any aspects of gas turbine applications.

Thank you to the attendees, presenters, session chairs, and sponsors for making the 2011 IAGT Banff Symposium, another success. Now is the time to start thinking about the topics you would like to present, or have presented by others, at the 2013 Symposium!

Canadian Industrial Gas Turbine Manufacturing & Design-Development had both negative and positive outcomes in 2011. Fifty years of Industrial Gas Turbine manufacturing and related design came to an end in Hamilton Ontario as a result of Siemens' Charlotte, NC Energy Hub Expansion Project, which added Gas Turbine manufacturing capabilities to that existing site. Rolls-Royce announced plans to support an investment of C\$225 million in Canada to develop new technologies for the Group's Energy business. Work will be undertaken in the Rolls-Royce facility in Montreal.

Possibly the biggest story related to Gas Turbines through 2011 and into 2012 is the availability and low price of Natural Gas in Canada & the USA, with spot gas gate prices in the \$2/GJ range. One can only hope that low prices will not result in the squandering of this most valuable clean fuel in inefficient applications. Given the impressive 60% Gas Turbine combined cycle efficiencies now quoted for power generation, it needs to be remembered that 40% of the heat is still wasted unless the lower grade heat is used for another purpose (e.g. heating or absorption chilling). A suggested new target norm for base load and intermediate duty units should be 80% fuel efficiency, which is comparable to what many Combined Heat & Power (CHP) units achieve. Let us save the gas for future generations! Hope to see you all in 2012 & 2013.

Lawrence Kaempffer,
Chairman, IAGT Committee

2011 IAGT Symposium

The 19th Biannual IAGT symposium was held on October 17th thru 19th at the Banff Springs Hotel. Attendees & presenters from Canada, USA, Asia and Europe enjoyed and participated in 15 paper presentations, 9 training sessions, 2 keynotes, and several poster presentations. A complete listing of past papers is available on our website. All the 2011 IAGT presentations will be unlocked for general public access after our upcoming short course in October 2012. We thank those presenters who posted their IAGT papers on their company internet sites.

As in the past, the evaluation for the best paper award was a close run affair. The 2011 Best paper was awarded to Brett Butler & Les Esau from Tarco International Inc., for LM2500 Controls Upgrade (paper 11-IAGT-202). The award will be presented at the 2013 IAGT symposium, October 21st thru 23rd.

Given that the 2011 ASME Turbo Expo was held in Vancouver, IAGT had a booth to promote our organization and upcoming symposium. Many thanks to our committee member, & past chairman, Manfred Klein for organizing this and producing an excellent IAGT committee summary document, including Gas Turbine systems in Canada, IAGT Member company profiles, past IAGT symposium topics and recent newsletters.

The IAGT committee thanks our 2011 sponsors:



*Thanks to photographers Keith Drysdale & Jim Noordermeer



Alberta Room, Fairmont Banff Springs



Randy Bohl of Chinook Engineering receiving 2009 IAGT Symposium Best Paper Award presented by Jim Noordermeer



Brian Igoe,
Product Manager,
Siemens Energy UK



Dr. Kamal Botros,
Research Fellow,
Nova Research
& Technology
Corporation



Scott Hastie,
Engineering Manager,
Liburdi Turbine Services



Doug Bloom,
President,
Spectra Energy
Transmission West



Dr. Ian J. Potter,
Vice-President
Engineering,
National Research
Council Canada

Upcoming Events

	<p>Conference Registration</p> <p>Preliminary Program</p>	<h1>20 12</h1>
	<p>October 18 & 19, 2012</p> <p>Delta Toronto Airport West</p>	

Please mark your calendar, and inform your colleagues, customers, suppliers, & consultants, regarding this excellent opportunity to learn from experts in the gas turbine field combined with the

opportunity to visit some of the latest gas turbine installations, and a state of the art gas turbine repair & engineering facility. Please visit iagtcommittee.com or click the links above for more information.

Recent 2011 & 2012 Announcements

The following is a sampling of Canadian Gas Turbine projects, showing various applications and unit sizes.

ENMAX Corporation
www.enmax.com

The Shepard Energy Centre ground breaking ceremony took place Oct 4, 2011. This 800 MW Combined Cycle power plant located in southeast Calgary will incorporate two 240 MW Gas Turbines and one 320 MW Steam Turbine, sourced from Japan. Currently ENMAX has existing gas turbines at the 140 MW Crossfield Energy Centre peaking plant, and at the 300 MW Calgary Energy Centre Combined Cycle plant. An application has been filed to build and operate the Bonnybrook Energy Centre 165 MW cogeneration plant located on the Canada Malting site in southeast Calgary.

TRANSALTA
www.transalta.com

In the first quarter of 2012 TransAlta signed an agreement with MPS Canada Inc., a wholly owned subsidiary of Mitsubishi Heavy Industries, Ltd. for two Gas Turbines. The Gas Turbines are to be used in the construction of Sundance 7, TransAlta's 800 MW Combined Cycle natural gas-fired generation plant. This plant will be located in central Alberta, with a targeted completion in 2016/2017.

UNIVERSITY of CALGARY
www.ucalgary.ca

The University of Calgary converted its central heating and cooling plant into a 12 MW cogeneration facility. This retrofit, which replaced obsolete boilers with a Solar Titan 130 gas turbine and waste heat recovery unit, is expected to reduce CO2 emissions by approximately 80,000 tonnes per year, dropping emissions 23% below 1991 levels. This project was supported by the Industry Canada Knowledge Infrastructure Program. www.ic.gc.ca

IMPERIAL OIL Nabiye Cogeneration Plant
www.imperialoil.ca

Construction has begun on a 170 MW cogeneration facility as part of the Imperial Oil Cold Lake Expansion project. It will include two General Electric 7EA natural gas-fired gas turbines with nominal output of 85 MW each. Turbine exhaust gas with supplementary firing is ducted to the heat recovery steam generators to produce steam to be used in the bitumen production process. Imperial's Cold Lake Alberta facility is the largest and longest-running in situ oil sands operation in Canada, and includes four steam generation and bitumen production plants.

ALTAGAS Harmattan II Cogeneration facility
www.altagas.ca

The recently commissioned 15 MW cogeneration facility at the Harmattan Gas plant produces electricity for on-site consumption with excess clean base-load power sold in the Alberta market. The facility will produce steam required to process natural gas at the complex. The overall emissions of the Harmattan Gas plant will decrease since several engines are being retired and several heaters are no longer needed due to the new cogeneration unit.

VERESEN York Energy Centre
www.vereseninc.com

This 393 MW natural gas fired peaking generation facility is located in the Township of King, Ontario. Two simple cycle Siemens SGT6-PAC-5000F Gas Turbines can reach full capacity within 10 to 30 minutes. It is estimated that the units will operate between 260 to 1,300 hours annually to meet peak electricity demand. The unit nameplate capacity is 456 MW while the Ontario Power Authority contracted capacity is 393 MW. The units are equipped with Ultra Low NOx combustors. www.powerauthority.on.ca

SPECTRA ENERGY Northeastern B.C. Increased Pipeline Capacity
www.spectraenergy.com/Operations/New-Projects/T-North-2011

As part of a pipeline capacity increase in the Fort St. John area of northeastern British Columbia, Spectra Energy is installing a Solar Titan 250 turbo-compressor package to increase power at Compressor Station N4. This is the first installation in Canada of this Gas Turbine model. The new Sunset Creek compressor station at the southern end of the Stewart Lake pipeline incorporates a Solar Titan 130 Gas Turbine.

Waste Heat Recovery

Industrial facilities that have high temperature exhaust streams from gas turbines and other processes are increasingly taking advantage of new opportunities to use that valuable energy to increase efficiency and reduce net emissions of GHGs and air pollution. Combined cycles and cogeneration plants have been doing this with steam and water for decades, but newer systems are being developed that avoid the need for large amounts of clean water.

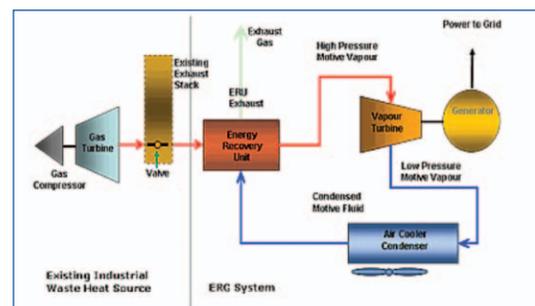
For some background on the gas pipeline industry in Canada, the steam-based WHR systems were first used by TransCanada in northern Ontario in 1992-2000. These were innovative 'enhanced combined cycles' based on the capture of about 6 MWe in a once-through HRSG from IST in Cambridge ON, each installed behind Rolls Royce RB211 compressor units at Nipigon, North Bay, Kapuskasing, Tunis and Calstock. They were then sold to EPCOR/Capital Power in 2006 and now recently transferred to Atlantic Power Corporation.

When there is a shortage of clean water, Organic Rankine Cycles (ORC) have also become popular in the 5-10 MW size range. In 1999 TCPL built the first Canadian ORC plant at the Gold Creek station in N. Alberta, using an ORMAT system from Reno, Nevada. This cycle now owned by Maxim Power, enables a gas turbine to produce extra power through a pentane-derived organic working fluid turbine. The GT waste heat is transferred by two types of heat exchangers, with thermal fluid heat exchange to the pentane working fluid for the turbine.

Several have been built for western Canadian pipeline facilities, employing pentane turbines in ORMAT cycles for two locations on the Spectra BC pipeline with EnPower systems, and four stations with Alliance Pipeline and NRGreen in Saskatchewan. Some new developments based on organic rankine cycles for pipelines and industrial processes include;



ORMAT Pentane Turbogenerator in Nevada



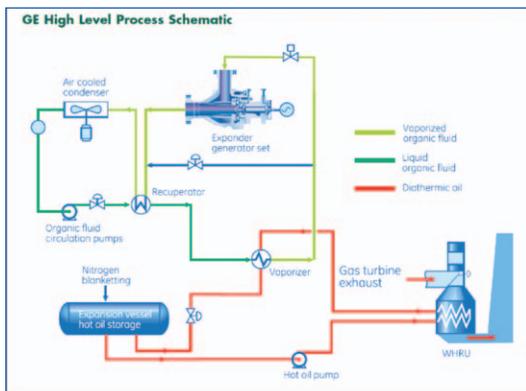
'EnPower' layout on Spectra Pipeline Stns in BC

1. ORC waste heat recovery system, ORegen developed by GE Oil & Gas, will be installed at Alliance Pipeline's Windfall compressor station northwest of Edmonton. The ORegen system will produce 14 MW of electricity, using waste heat from the three GE PGT25+ gas turbine compressor units to maximize energy efficiency, and thereby avoiding CO₂ and air pollution emissions.

The Windfall station has three 28 MW GE LM-2500+ turbines driving Nuovo Pignone PCL 802 centrifugal compressors to raise the Alliance system pressure from 8 MPa to 12 MPa. Configured in series for this high station pressure ratio, each compressor package has a four-bay aerial aftercooler.



Alliance Windfall compressor station



GE High Level Process Schematic

2. A new 6 MWe project has been developed by TransCanada, AltaGas and Mistral Power at the large Crowsnest BC compressor station supplying the Foothills western leg gas export line. This WHR system expected to be completed by end of 2012, and uses exhaust gas from either a GE LM2500+ gas turbine or from two nearby LM1600 units, using an ORC system combined with turboexpander technology.



Completion of Crowsnest waste heat unit
(TCPL, Mistral Power)

3. Innovative Steam Technologies has a new subsidiary, Found Energy, which develops small waste heat projects and designs thermal oil heat exchangers, as described in our recent Symposium (Lucente, 2011-IAGT-204). They have partnered with TransGas and SaskEnergy, using Pratt & Whitney's Turboden ORC system, to install a 1 MWe project at the Rosetown compressor unit (with a Solar Centaur) west of Saskatoon. In the same region Found Energy is also working on a 1 MW reciprocating engine WHR system, with a smaller heat exchanger and expander for a 0.1 MWe waste energy project at the TransGas Coleville station.



Found Energy WHR at TransGas, Rosetown SK (IST)

4. Genalta Power is developing a project to generate 1 MW of power from turbine waste heat at the Stolberg Dehydration and Compression Facility operated by Husky Oil Operations Limited, located approximately 90 km west of Rocky Mountain House. The Stolberg Waste Heat to Power Project has been designed to provide emissions-free electricity all of which will help meet the site's power requirements. The project is forecast to be commissioned by mid-2013. Genalta is also developing a 3 MW plant in Peace River using waste fuel gas from flaring operations, and a 2 MW project with Pengrowth Energy at their Olds sour gas facility.

5. Manitoba Hydro is installing a Waste Heat demo plant at the Spruce Products lumber sawmill in Swan River Alberta, using a GE Clean Cycle 125 organic Rankine cycle energized by low pressure excess process steam from wood waste boilers. This is one of five small bioenergy projects receiving some funding from the utility Bioenergy Optimization Program, and the NRCan Clean Energy Fund.



GE Clean Cycle 125 ORC waste heat generator at Spruce Products, Manitoba (NRCan)

6. Pratt & Whitney Power Systems is installing a 2 MWe biomass waste heat recovery plant at the Nechako Green Energy pellet mill in Vanderhoof, BC. This would be the first ORC in a forest products facility in North America to make the most of the waste products from its 140,000 tpy wood pellet plant. It will use waste heat from an existing biomass system burning the mill's residual hog fuel and waste bark, which would otherwise be landfilled. This exhaust gas stream will heat the thermal oil loop for the ORC cycle.



Pratt & Whitney Turboden WHR system

7. A similar but larger P&W Turboden system is proposed for the West Fraser Timber company at their Chetwynd Forest Industries plant in northern BC, using wood chips converted to biomass fuel. Pratt & Whitney Power Systems will deliver a biomass heat recovery power plant, comprising two Turboden 65 ORC turbogenerators to generate a portion of the 13 MW of power for sale to BC Hydro in 2013.