Canadian Gas Turbine Newsletter
Spring 2009

Welcome to our new edition of our annual newsletter, your information source to the Canadian gas turbine industry. The *IAGT Gas Turbine Newsletter* summarizes some previous Committee activities, and addresses today's developments to inform you about upcoming events and new developments of interest to all of us connected to the industry. The newsletter is available on the IAGT website at *iagtcommittee.com*. Contributions, feedback and suggestions to the Symposium and to the Newsletter are welcome and can be sent via e-mail to the addresses on the back page.

The Industrial Application of Gas Turbines (IAGT) Committee, formed in 1973 under the sponsorship of the National Research Council of Canada, is a Technical Advisory Group to Canadian industry and government. The group provides a forum for the exchange and dissemination of ideas and the communication of new developments related to the industrial application of gas turbines in Canada.

Presently under the sponsorship of the Canadian Gas Association and the National Research Council, the IAGT Committee's specific functions relate to the organization of a biennial technical symposium and a fall Forum held on alternate years from the Symposium. The Symposium provides the venue for the presentation of technical papers and discussion panels covering all aspects of industrial gas turbine operation as well as providing a forum for reviewing directives, guidelines, codes and practices, as issued by Regulatory Agencies, which impact directly on the application of gas turbines.

The IAGT Committee members are listed on the website and we thank those members who volunteer their time and effort to the Canadian Gas Turbine Industry.

Mark your calendars, **the 18th IAGT Symposium will be held in Banff, Alberta on October 19-21, 2009.** The theme for the Symposium will be ***"Innovative and Reliable Energy Solutions"***. The "Call for Papers" has been done and the agenda has now been set. If you have not received your notification, please call any of the Committee members to get your name and Company affiliation put on our mailing list. Through our Sponsor, The Canadian Gas Association, a block of rooms at the Banff Springs Hotel has been reserved and details will follow with the preliminary program in the Spring of 2009.

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Recent IAGT Activities

17th IAGT Symposium, October 2007, Banff, Alberta

The 17th Symposium which was held in Banff in October 2007 was a great success with over 110 attendees. Papers on a wide range of relevant topics including gas turbine technology and applications; operations and maintenance; performance; cogeneration and combined cycle; and emissions and environmental were presented over the three day session. The variety, quality, and technical scope of the papers and the presentations were excellent. A special guest presenter was Dr. Dah Yu Cheng, famous for his steam-injected Cheng Cycle. Papers and other documents are available in the 'Papers' link at the IAGT homepage, *iagtcommittee.com*.

The "Best Paper" award went to Keith Drysdale of Imperial Oil, for his excellent paper on "***Challenges for Pipeline Compression in Canada's North***".

IAGT Symposium, with 110 attendees in Sessions and the networking breaks

2008 Gas Turbine R&D Forum, Ottawa

About 60 people attended a successful two day Forum in October 2008 at the Delta Hotel in Ottawa, '*Challenges and Opportunities in Future Gas Turbine Development and Operation'*, dealing with many new topics offered by the research community and IAGT members. The event was aimed at bringing together gas turbine experts and stakeholders from government, industry, academia and users sectors to identify and address the theme of the event. Invited experts presented their view on topics that address solutions to technical issues on reducing environmental emissions, and increasing system efficiency, engine reliability and energy security.

This "**Fuel Flexibility and Alternative Fuels for Gas Turbines**" Panel was followed by two others dealing with **Gas Turbine Performance & Health Monitoring,** and **Materials & Components**, as well as a ½ day tour of the National Research Council gas turbine R&D facilities. Panel participants were asked to contribute from their international experience to the discussion by addressing the following issues:

- Challenges and opportunities in developing, operating and maintaining gas turbines burning alternative fuels.
- Needs for research and development in this area.
- Funding sources available for research and technology development in this area.

We recognize the excellent efforts of our IAGT members, especially Tracy Soyka in organizing all of the event logistics, and NRC research staff Wajid Chishty, Jeff Bird and Linruo Zhao for chairing sessions, and Mike Player, Dave Chow and Rastko Hadzic for helping with the NRC tour.

Industry News

Examples of Some New Canadian Gas Turbine Projects

Natural gas, electricity and industrial energy topics are high on the priority list in environmental topics of air pollution, greenhouse gases and energy conservation, as well as energy security objectives. Gas turbines fuelled by natural gas (or by liquids and waste gases) can provide a clean and efficient source of power and heat for many industrial and utility energy applications. Oil sands gasification, Arctic & offshore pipelines, Distributed Energy and Liquid Natural Gas supplies are upcoming investment topics all involving gas turbine engine systems. About $12 billion has been invested in 80 such plants over recent years in Canada, and more is planned. Below are recent example projects and proposals across Canada, with detailed descriptions of some on pages 7-11.

Eastern Canada

The period 2005-2008 saw a large growth in Ontario Power Authority and Ontario Power Generation's program to develop private power plants using gas turbine technologies, in two 'Clean Energy Supply' programs. The first large new gas turbine combined cycle (GTCC) was the 580 MW ATCO Brighton Beach repowering project with 3 GE Frame 7FA units near Windsor. In June 2004, the Ontario government initiated an RFP for 2,500 megawatts of electricity generation and demand-side measures. Of the new 10000 MW of energy that are being added in total, over half is from various types of natural gas fired generation. These will also support the high voltage transmission systems in southern Ontario. Additional developments of additional combined cycle plants in Ontario are planned for the 2010-12 period.

Among the large GTCC projects approved and built through these procurement processes are;

- The Greenfield plant near Courtright, Ontario is a 1005 MW combined cycle built through a partnership between Calpine and Mitsui. As Canada's largest GTCC plant, it is based on three 170 MW Siemens 501FD2 gas turbines with DLN combustors and air inlet fogging for additional hot day power. Also included are three Deltak triple-pressure HRSGs with COEN duct burners and SCR modules, and a 500 MW Toshiba steam turbine with an air-cooled condenser system. It was completed in October 2008.
- TransCanada Power has installed the first portion of the 550 MW Portlands Energy Center at the Toronto waterfront near the decommissioned RL Hearn power site. The two GE Frame 7FA gas turbines exhaust into Heat Recovery Steam Generators to supply one Alstom steam turbine. In 2008 the gas turbines were ready for operation, and TCPL is now completing the steam system and a water cooled condenser for combined cycle operation in early 2009. There is a provision for future cogeneration service when economic conditions allow.
- TCPL has also started the Halton Hills Generating Station with a contract capacity of 632 MW, located west of Toronto. The facility is based two 175 MW Siemens SGT6-5000F gas turbines assembled in nearby Hamilton, with DLN combustion each supplying an HRSG with the combined steam into one steam turbine generator with an air cooled condenser. Natural gas fuelled duct burners can increase steam production for more power output from the steam turbine. Completion planned for mid-2010.

- The St. Clair project in southwest Ontario is a 635 MW capacity plant built by Invenergy Investment Co., to be ready in Spring of 2009. Each of the two General Electric 7FA gas turbine unit trains, with dry-low NOx combustion systems, will have a triple pressure reheat HRSG with duct burners, a GE condensing steam turbine generator, and inlet chillers for the gas turbine.
- Sithe Global Power's Goreway combined cycle plant in Brampton Ontario is an 874 MW facility with three GE Frame 7B gas turbines with DLN combustion, also to be ready in early 2009. Exhaust energy serves three triple pressure reheat HRSGs with duct burners and backend SCR emissions reduction systems, combined with one condensing steam turbine generator, and an air cooled condenser.

Sithe Goreway GTCC Plant, 2008 (OPA)

TCPL Portlands, GE Gas Turbines (OPA)

- In 2008 construction began on the smaller 280 MW Greenfield South combined cycle being developed by Eastern Power Developers in Mississauga, ON with one industrial gas turbine and steam turbine combination. Eastern Power operates two landfill gas power plants in the Toronto area, Keele Valley and Brock West.

In the natural gas transmission sector, the Union Gas Storage and Transmission system (Spectra) has had several recent upgrades in equipment. These include a retrofit/expansion project at its Bright Compressor Station in Ontario, a facility with two Rolls Royce Avon units installed in the early 1970's, and a third Rolls Royce RB211 driven compressor added in 1991. With increasing demand for the natural gas, Union is replacing the two existing Avon packages with larger RB211-24G-DLE packages within the existing buildings. Included in the project for 2009 completion are RT-62 Power Turbines, new impellers on all 3 gas compressors to provide increased pressure head and accommodate for parallel operation, and installation of an aerial aftercooler.

For cogeneration systems, a provincial program launched in 2006 set a goal to contract 1,000 megawatts (MW) of power from providers using Combined Heat and Power (CHP), which can provide a highly efficient and low-GHG method of generating electricity and process heat/cooling. These projects are appealing to industrial and institutional hosts as byproducts like steam and hot water can be utilized. By the fall of 2006, the program had arranged seven contracts for a total of 414 MW. Existing cogen projects completed in the 2003-06 period included;

- TransAlta Sarnia Regional Cogeneration, an additional 440 MW combined cycle cogen plant.
- Greater Toronto Airports Authority (GTAA) 90MW Cogen Plant,
- The 7 MW Sonoco Trent Valley Cogeneration Plant, Trenton

The three new gas turbine CHP projects being built for 2008/09 are part of a number of contracts which also include several recip engine and steam turbine based systems.

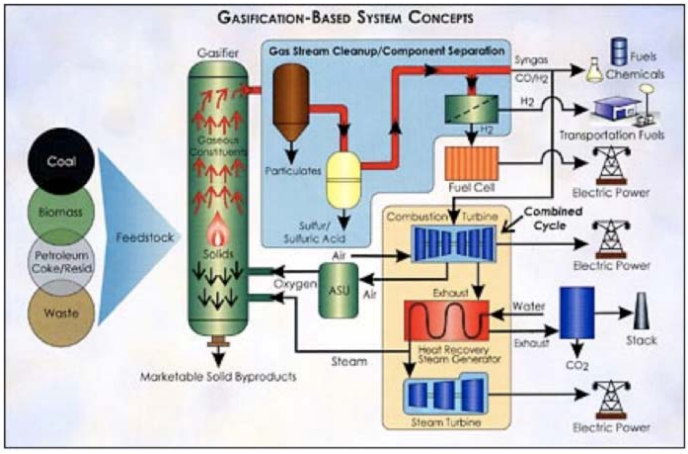
- The Countryside London Cogeneration Facility is located in London with the Fort Chicago District Heating and Cooling system. Using a Solar Titan 130 gas turbine with three small 1 MW steam turbines, the facility will have a contract capacity of 12 MW, expandable to 17 MW.
- East Windsor Co-Generation Centre is located at the Engine Plant of Ford Motor in Windsor. Using two GE LM6000 gas turbines, the facility will have a contract capacity of 84 MW.
- The Thorold Cogeneration Project is located at the Abitibi-Consolidated paper mill. Using a GE Frame 7FA gas turbine, auxiliary firing in the HRSG, and two steam turbines, the facility will have a physical capacity of about 300 MW, and a contract capacity of 236 MW.

Western Canada

- ATCO Power has installed a second 45 MW peak power plant at Valleyview in northwestern Alberta near Grande Prairie. The new GE LM6000 gas turbine will provide fast start capability and grid support.
- SaskPower is planning a natural-gas fired power plant near Kerrobert to bolster the provincial electrical grid, and avoid new power lines in this oilfield region. It would install two gas turbines to produce about 100 megawatts by late 2009. SaskPower is also planning to install another 100 MW of generation at Queen Elizabeth Power Station in Saskatoon, with Hitachi Canada supplying three H-25 gas turbines to replace an old boiler.
- ENMAX Green Power proposes to build a new 800 MW natural gas-fired gas turbine combined-cycle power generation system near Calgary, Alberta. Mitsubishi Heavy Industries will provide two M501G1 gas turbines, two heat recovery steam generators and one steam turbine, and generators from Mitsubishi Electric Corporation.

Importance of Alternative Gasified Fuels in Canada

A variety of solid-fuel gasification concepts may allow some of Canada's high-carbon energy systems to operate with lower emissions of CO_2, NOx, SO_2 , particulate and mercury air emissions. Integrated Gas Combined Cycle (IGCC*)* with a high-efficiency gas turbine system is a primary 'clean coal technology' for the power and oilsands sectors. This can reform solid fuel such as coal, bitumen or petroleum coke into a low heating value synthetic fuel gas based on hydrogen and carbon monoxide.



(courtesy US Dept of Energy)

Gasifier design and combustion research is needed to verify the technical potential and reliability of these systems for various input feedstocks and combustion pressures. Proportions of hydrogen, CO, nitrogen and/or dilution steam can vary according to system separation choices for oxygen and nitrogen, CO_2 capture and delivery, and emissions control methods.

A major benefit of the Gasification process is that it can create a pure CO_2 stream that can be more easily captured and geologically stored or used in other industrial processes. Various carbon-based feedstocks can be used such as petroleum coke, the carbon waste product from upgrading oilsands bitumen to synthetic crude, the high-sulphur residues from oil refinery operations, and sometimes woodwaste biomass or municipal waste diverted from landfills. Polygeneration of hydrogen, chemicals and liquid fuels from the syngas (with Fischer-Tropsch conversion process) provide additional economic opportunities. Research into such low CO_2 systems is being conducted by Alberta Energy and the Alberta and Saskatchewan Research Councils and their partners, as well as CanmetEnergy and the National Research Council.

Some notable Canadian gasification project proposals include;

- The first phase of the OPTI Canada and Nexen oilsands bitumen project has now being completed with a Shell gasifier in Long Lake northern Alberta, for steam assisted heavy oil production. Asphaltene feedstock from OPTI's patented OrCrude upgrading process will be gasified to produce hydrogen for the upgrading process as well as fuel gases for steam generation and the upgrader. A 200 MWe syngas fueled gas turbine cogen plant is included.
- North West Upgrading plans to construct a bitumen upgrader north of Edmonton near Redwater. The first phase, with a capacity of 50,000 barrels per day, would use residual bottoms from its hydrocracker to be gasified into syngas and hydrogen.
- Suncor Energy plans to draw hydrogen and fuel gas from petroleum coke at its third upgrader near Fort McMurray. Suncor's Voyageur Two expansion with a gasification unit would reduce the need for natural gas. Synenco Canada plans a $4 billion Northern Lights upgrader with a daily capacity of 100,000 barrels/day near Edmonton, possibly with petcoke gasification. Other oilsands companies may well opt to install gasification capability in future.
- Saskatchewan is planning the Belle Plaine polygeneration project involving gasification of heavy oil residues, with TransCanada providing energy and chemicals for the fertilizer and potash sector.
- For electric utilities, Sherritt Int'l proposes to build Canada's first coal-fed gasification plant near Edmonton, the Dodds-Roundhill project. The synthetic gas could be used as a petrochemical feedstock, or provide pure hydrogen or fuel, and possibly carbon dioxide capture for use in enhanced oil recovery.
- EPCOR Utilities Inc. has selected coal gasification technology from Siemens for Canada's first using integrated gasification, combined-cycle IGCC thermal power plant, with the planned fourth unit at Genesee plant located near Edmonton. A front-end engineering and design (FEED) study worth $33 million, is being undertaken with partnership from the Alberta Energy Research Institute, Natural Resources Canada and Canadian Clean Power Coalition. The potential capture of carbon emissions for permanent underground storage is an important part of the project, for which Siemens will license its coal-gasifier technology.

TCPL Halton Hills Generating Station

Ontario Minister of International Trade and Investment, Sandra Pupatello joined CAW union representatives in Mississauga in October 2008 to witness TransCanada accept the first of two gas turbines from the Siemens Fossil Power Generation Division. It is the first time since 2001 that the Siemens Hamilton facility has supplied to a Canadian company, and the final destination, TransCanada's Halton Hills Generating Station, is just 72 km from the Siemens plant.

"Our products are in demand all over the world because of Siemens' state-of-the-art technology, high quality, high efficiency, and on-time delivery," says Hamilton Plant Manager Brian Maragno. "Being able to supply our turbines to a site in our own backyard gives us great pride." Beyond the TransCanada deal, Siemens is providing the Canadian market with efficient, reliable, Canadian-made power equipment.

Under a contract with the Ontario Power Authority (OPA), TransCanada will develop, finance, construct, own, operate and maintain the Halton Hills Generating Station. The two Siemens SGT6-5000F natural gas fired combustion turbines form the backbone of the power plant. The station will also feature two heat recovery steam generators, one 275 MW steam turbine, and a high voltage switchyard. In combined cycle mode, the station will have a generating capacity of more than 680 MW; enough power for approximately 600,000 homes. The combined-cycle of the gas and steam turbines will use low emissions technology that generates more electricity, more efficiently than conventional fossil fuel and boiler generation. Natural gas is the cleanest burning fossil fuel, producing less than half the greenhouse gas of other fossil fuels such as coal or oil.

The station will be connected to the 230 kV Hydro One system to supply the Ontario electricity market administrated by the Independent Electricity System Operator and is expected to be ready for commercial operation in summer 2010.

L to R: Craig Laviolette (Siemens Hamilton), Finn Greflund (TransCanada), Guenther Scholz (Siemens Canada), the Hon. Sandra Pupatello (Ontario Minister of International Trade and Investment), Bob Chernicki (CAW Canada), Brian Maragno (Siemens Hamilton).

Siemens Hamilton's First Shipment of Advanced F-class Engine

The newest design of F-class gas turbine for the 60 Hz market has been successfully produced and shipped by Siemens Energy's Hamilton Manufacturing Facility. In April 2008, Siemens officially presented a completed SGT6-5000F turbine with advanced fast-start capability to the customer, Great River Energy in Minnesota. Joining some 500 Hamilton employees in the presentation were representatives from the Siemens Energy Sector's North American headquarters in Orlando, Hamilton's sister plant in Berlin (which produced the rotor for the Great River Energy turbine), and Siemens Canada. Speakers included Martin Urban, head of Product Line Engineering, Jerry Klopf, head of Casing in Berlin, Steve Welhoelter, head of Gas Turbines for the Product division, Hamilton Plant Manager Brian Maragno, and Rick Lancaster, VP of Generation, Great River Energy.

"Cross-Atlantic and cross-functional teamwork provided the knowledge and support necessary to achieve our goal," said Brian Maragno about the collaboration between Berlin, Orlando, and Hamilton. The engine will make its home at Great River Energy's Elk River Peaking Station. The site includes Great River Energy offices and Elk River Station, a 40-MW waste-to-energy facility. The new 175-MW power generation facility will begin providing peaking power in spring 2009. Great River Energy is a wholesale electric cooperative serving 28 distribution cooperatives in Minnesota.

Siemens SGT6-5000F4 Gas Turbine Rotor, and Shipment from Hamilton

The new Siemens F-class engine was designed with power and flexibility in mind. The fast start capability will deliver approximately 150 MW of power within 10 minutes, helping to significantly reduce start-up emissions. The new F engine also has an Ultra Low NOx combustion system which reduces the engine's emission profile across the operating range. Another key element is the new 13-stage compressor and hot gas path components, which are designed for extended maintenance intervals. This means fewer combustor outages, once every 900 equivalent starts, versus the previous design of 450 starts. The redesigned F engine is built on a platform design concept, meaning other engine models incorporate the same design features and manufacturing requirements. Some of these include a single tie bolt rotor, Siemens-style stators (as opposed to old Westinghouse style welded diaphragms), and a platform combustion system. Hamilton has made strategic capital investments to be able to produce the new F model as well as other next generation models.

Once-Through Steam Generator (OTSG) Installations

In 2008 the Industrial Group of the Aecon Group Inc. was awarded two contracts by East Windsor Cogeneration LP totaling $116 million. Under the main Aecon Engineering, Procurement, and Construction contract, Aecon Industrial was constructing the new 84-megawatt East Windsor Cogeneration Centre (EWCC), a high efficiency gas-fired electric power and steam cogeneration facility located in Windsor, Ontario. The plant will provide electrical output to Ontario's electricity market, and will also provide high-pressure and medium-pressure steam to the adjacent facilities of Ford Motor Company of Canada. East Windsor Cogeneration LP is a partnership between Pristine Power Inc. and Fort Chicago Energy Partners L.P. The EWCC's steam generation units will be provided by Aecon's wholly-owned subsidiary, Innovative Steam Technologies (IST) under a separate $11 million contract. IST has supplied two compact Once-Through Steam Generator (OTSG) units for steam production.

In January 2009 Aecon announced that Innovative Steam Technologies will design and supply two OTSG units to the Tufts Cove Thermal Generating Station in Dartmouth, Nova Scotia, scheduled for an April 2010 delivery. The contract is based on the design and supply of two OTSGs which will recover waste heat from two existing 46 megawatt gas turbines at the Tufts Cove Generating Station. The OTSG units will help Nova Scotia Power improve the fuel efficiency and increase the power output of the facility, which generates electricity for the Dartmouth and Halifax region in Nova Scotia.

IST has also been awarded a contract to design and supply its sixth OTSG unit into Spain, to be used at Peninsular Cogeneration's paper mill owned by Holmen in Madrid, scheduled for a November 2009 delivery. The OTSG's unique ability to function without a continuous supply of water will allow the paper mill to achieve its objective of generating electricity at a constant rate even when steam from the OTSG is not required for paper production. The paper produced at this facility with the steam from IST's boiler is made entirely from recycled materials.

"By allowing for the production of electricity even when steam is not required, the OTSG for Holmen Paper will help ensure the reliability of the power supply," said Bob Dautovich, President of IST. "IST has always been committed to producing a product which not only delivers energy, but proactively and assertively respects our environment using multiple "green"strategies, and IST is very pleased that this new contract allows us to combine both."

TransCanada PipeLines Compressor Unit

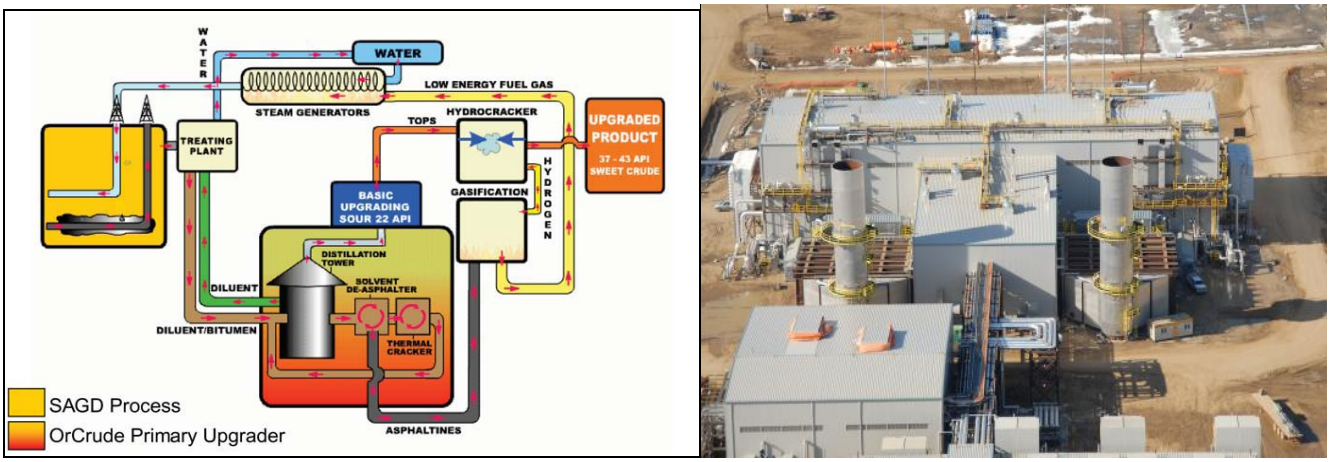
In 2006, TransCanada installed a Solar Taurus 60 Compressor package, complete with a C452 compressor with twenty-four inch yard piping, at the existing Gadsby Compressor Station near the town of Stettler, Alberta. The project utilized the existing boilers, air system, and control room that support the General Electric LM1600 and Rolls-Royce Avon units currently in-service on the site.

The project was completed, on budget, with a great safety record. The package was installed in record time for TransCanada; thirteen months from conception to start up. The unit has run 11,000 hours since Dec 2006 without any major issues. The installation design is currently being used by TransCanada as a "standard" for building and piping layout for all new Solar unit additions; up to and including the T-70.

Alberta Oilsands and Gasification

One of the most innovative energy systems in Canada is the bitumen gasification project being built and commissioned by project partners Nexen and OPTI Canada at Long Lake, Alberta (40 km SE of Fort McMurray). This Steam Assisted Gravity Drainage (SAGD) oilsands extraction and upgrading system requires large amounts of heat. Instead of using valuable natural gas, the project has been designed to produce most of the steam from gasifying the asphaltene bitumen residues in the upgrader. The first Phase of the 70 000 barrel per day production will employ a large cogeneration plant with two 80 MW GE Frame 7EA gas turbines, fuelled by the synthetic gases. The Shell gasification process is matched to the OrCrude hydrocracking process which separates the bitumen into lighter components, with the heavier asphaltenes from the gasifier being made into hydrogen for upgrading, and syngas for fuel with a planned 57% CO and 32% H_2 content (HHV = 11 MJ/m3)

Water injection into the combustors would be used for NOx emission reductions. Water usage will not require extensive surface water, with most needs being met from recycled underground water. The use of carbon capture and storage from gasification is being studied for possible future adoption. The project includes two HRSG steam generators with duct-firing to produce 80% quality steam for the SAGD requirements. A separate plant with five once-through boilers will provide a backup steam supply, and all facilities would be designed for dual-fuel operation. After satisfying onsite power needs, much of the electricity is planned to be exported to the Alberta Power Pool. The project first phase was opened in the Fall of 2008.



OrCrude Process, and Cogeneration Facility (courtesy, Nexen Canada)

Spectra Pipeline Waste Heat Recovery

In the Fall of 2008, Pristine Power Inc. and ENMAX Green Power Inc. announced that commercial operations have started at their two jointly owned Enpower 5 MW Energy Recovery Generation (ERG) projects in British Columbia under the terms of a 20-year electricity purchase agreement with BC Hydro. The first plant, located in Savona, about 45 km west of Kamloops, generates electricity from the waste heat created by existing gas compressors on Spectra Energy's main natural gas pipeline (formerly Westcoast Energy). These facilities utilize the exhausted heat of 18.5 MW LM2000 gas turbine compressor drives, resulting in zero emission generation of electricity. The ERG process captures waste heat and converts it to pressured vapour to drive a vapour turbine generator. ERG uses proven technologies and similar systems are used on other pipeline compressors and in geothermal applications around the world.

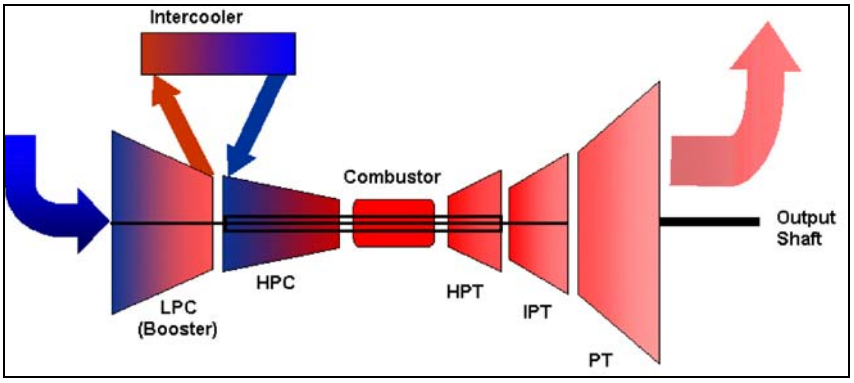
The Savona project is one of two Enpower ERG 5 MW projects in BC, the other is located on the same pipeline at 150 Mile House, 270 km north of Kamloops. Together the projects produce 10 MW of clean electricity, enough to power approximately 10,000 homes. They will also offset greenhouse gas emissions by approximately 25,000 tonnes per year, equivalent to removing 9,000 cars from our roads. Savona is the first project to achieve commercial operation under BC Hydro's 2006 Open Call for Power.

"The Savona Enpower ERG project represents the first megawatt generated by Pristine and Enpower for commercial sale, and demonstrates our ability to deliver projects on time and on budget," said Pristine Power's President and Chief Executive Officer, Jeffry Myers, on behalf of the Enpower Partnership." The Savona and 150 Mile House projects are owned by Enpower Green Energy Generation L.P., a partnership jointly owned by Pristine and ENMAX Green Power Inc., a wholly owned subsidiary of ENMAX Corporation. Project development and execution is the responsibility of Pristine Power. The total cost of the two projects is expected to be approximately $31.5 million.

New Additions to EPCOR in Edmonton

The 660 MW Clover Bar gas-fired boiler steam plant has recently been decommissioned, and its replacement will be a plant with three modern gas turbine units. Initial capacity has been added in 2008 with a new 43 MW General Electric LM6000 gas turbine peaking plant designed for fast startup to address Alberta's rising power grid demands.

In 2009-2010 EPCOR Utilities Inc. will install the first of two intercooled GE LMS100 units in Canada. These 100 MW units employ a new cycle design to achieve a 44% simple cycle thermal efficiency, without use of an HRSG system. The 2-spool air compressor uses an LP unit derived from the GE Frame 6FA industrial design, and a HP compressor from the LM6000 aero design. Between these two, the compressor air is sent offboard to the intercooler (with a separate water-cooled or ambient air-cooled heat exchanger) to reduce air temperatures. Compressing colder air more efficiently allows for a high 42:1 compression ratio and additional mass flow.



Twin-spool intercooled compressor-turbine, with separate 3rd power output shaft (GE paper GER-4222A)

The IAGT Committee includes the following members who volunteer their time and effort to the Canadian Gas Turbine Industry:

Manfred Klein	National Research Council (Chair)
Jim McArthur	Innovative Steam Technologies (Vice-Chair)
John Barrie	Fluor Canada Ltd.
Wajid Chishty	National Research Council
Paul Colwell	Spectra (Union)
Keith Drysdale	Imperial Oil Ltd.
Chris Gilmour	Shell Canada Ltd.
Martine Gagne	Rolls Royce Canada Ltd
Bryan Halliday	Natural Resources Canada
Lawrence Kaempffer	Siemens Westinghouse
Ken Leier	TransCanada PipeLines
Louis Marmen	Canadian Gas Association
Jim Noordermeer	Gryphon International Engineering
Todd Parker	Spectra (Westcoast)
Martin Perrin	Liburdi Engineering Ltd.
Jeff Sansome,	Standard Aero
Tracy Soyka	Canavents
Ken Walls	Solar Turbines Canada Ltd.
Ida Wierzba	University of Calgary

IAGT Committee members at 2007 Symposium (with guest, Dr. Dah Yu Cheng, 5th from right)