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ADVANCING CANADIAN MANUFACTURING

Volume 10, No. 01 >> Supplement, PLANT >> March/April 2015

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Tracking EXCELLENCE

NovAtel wins with lean

HIGHLIGHTS

- Investing in GHG reduction pays!
- New R&D centre for Imperial Oil
- Tax incentives for BC's LNG industry
- Manufacturing drives Manitoba's growth
- The greenest thing in burners

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Investing in BC's LNG

Securing industrial investment has become a highly competitive global sport. When a major industrial player considers investing major dollars in a jurisdiction, there's a shopping list of requirements that must be ticked off, some of which require governments to throw in some cash, offer special considerations and/or provide some kind of preferential tax incentive. Such collaboration is a global reality, especially when multi-millions or billions of dollars are involved.

Such is the case in BC, where there are 19 liquefied natural gas (LNG) projects on the table that are stalled by "economics."

Canada's only export market for natural gas is the US and North American supply is more than adequate to meet demand. The Canadian industry needs to break into other, growing markets such as Asia where the resource would be sold at non-discounted, global prices.

BC will require some terminals to service those markets. The province wants to get the ball rolling so it has lowered its expectations for projected tax revenues from \$1.5 billion to about \$800 million over the next 10 years. And the federal government is offering capital cost incentives similar to those provided to manufacturers who are offsetting equipment and machinery costs with a break on depreciation rates. The cost of these LNG measures in foregone tax revenues will be about \$50 million over five years.

Not everyone agrees governments should use taxes to play favourites. Jack Mintz, scholar, tax expert of some world renown, and holder of the Palmer Chair in Public Policy at the University of Calgary, advocates a different approach as part of a reformed corporate tax regime.

In his 2014 *Global Tax Competitiveness Report*, co-authored with Research Fellow Duanjie Chen, he applauds the lowering of general corporate income tax rates from a federal-provincial average of 43% to 26.5%, plus other measures such as combining HST and GST. But peer countries are catching up because Canada's efforts have stalled.

The report advocates a uniform corporate tax rate of 20% (11% federal and 9% provincial) by removing tax preferences for resource and manufacturing businesses, and small businesses. It reasons the focus on manufacturing, for example, has done little to prevent the decline in the sector's share of employment. The corporate tax system should be neutral and the playing field level for all types and sizes of businesses. Best to use means other than tax measures to address the specific needs of a particular industry sector.

But not all business sectors are equal. Although manufacturing may be experiencing falling employment levels there are other considerations. Most Canadian manufacturers are small and find capital hard to come by. Capital cost and depreciation measures have encouraged many of them to invest in machinery and equipment that improve productivity and help grow their businesses. Expanding export markets, which is not dependent on employment levels, comes to mind, and that brings us back to BC's LNG industry.

Deloitte Canada energy and resource leader Ron Loborec noted in a *Financial Post* article that capital is getting more expensive. He said favourable tax measures improve investment prospects because they improve upfront cash flow.

And let's not forget there are other jurisdictions with LNG to sell such as Russia, China, several Middle East and African countries, the US and Australia.

Timing is everything. BC's LNG prospects will depend on how quickly projects get underway to serve rapidly expanding demand in Asian markets.

The Mintz/Chen report may not approve, but tax preferences are among the few tools governments have to tweak the economics and encourage industry heavyweights to pull out their wallets and commit.

Joe Terrett, Editor

Comments? E-mail jterrett@plant.ca.

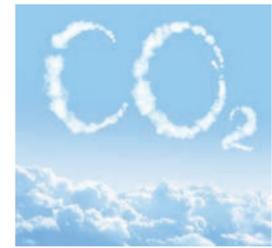


COVER IMAGE: CANDICE WARD

6



7



8



9



11

10



Features

» OPERATIONS

6 **LEAN** NovAtel leans on continuous improvement to navigate global markets.

» INNOVATION

7 **RESEARCH** Imperial Oil to develop next-generation energy technologies at new R&D centre.

» SUSTAINABILITY

8 **EMISSIONS** CCEMC-funded technologies are doing more for Canada than reducing carbon emissions.

BIOFUEL Diacarbon uses EDC financing to bring "green" coal alternative to market.

» INDUSTRY

9 **ENERGY** Federal capital cost allowance aims to kickstart BC's LNG industry.

» TRENDS

10 **MANITOBA** Exports and a lower-value loonie are driving manufacturing gains.

CIEN

» TECHNOLOGY

11 **BURNERS** Absolute Combustion goes to "Extreme" measures for the oil sector.

PLANTWARE Hardware and software for managing plant operations.

12 **PRODUCTS AND EQUIPMENT** What's new in industrial products, equipment and machinery.

Departments

4 Industry View

Pulse

5 Careers

13 Events

14 Postscript

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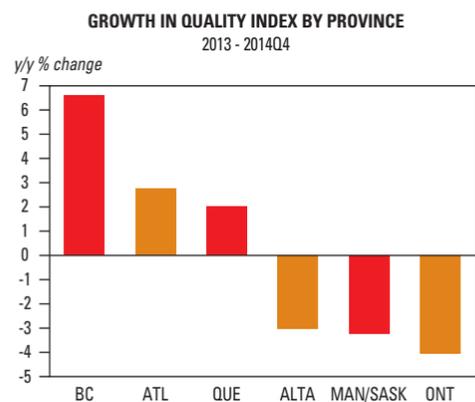
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» Pulse



SOURCE: CIBC CALCULATIONS BASED ON STATISTICS CANADA'S TABULATIONS

Job quality hits bottom

Low-paying positions are becoming the norm

Job quality in Canada is now at a record low and showing few signs of a turnaround in the near future, according to CIBC's *Canadian Employment Quality Index*.

The index, which measures the quality of employment based on compensation, shows declines in all measures and indicates the decline in job quality is more structural than cyclical, and likely won't be reversed by the Bank of Canada's prescribed remedy of low and lower interest rates.

The index measures three key areas, including the distribution of part-time versus full-time jobs; self-employment versus paid employment; and the compensation ranking of full-time paid employment jobs in more than 100 industry groups.

Since the late 1980s, the number of part-time jobs has risen much faster than full-time positions, an important measure of employment quality.

"The damage caused to full-time employment during each recession was permanent. Full-time job creation was unable to accelerate fast enough to recover lost ground," says Benjamin Tal, deputy chief economist and author the index.

The good news is that the number of full-time jobs rose twice as fast as the number of part-time jobs for the past year, which offsets some of the recent softening. And the index shows a similar trend in the ratio of paid- to self-employed Canadians.

The compensation ranking of full-time paid employment jobs in more than 100 industry groups is the third metric and the numbers are not encouraging.

"The number of low-paying full-time jobs has risen faster than the number of mid-paying jobs, which in turn, has risen faster than the number of high-paying jobs," says Tal.

Over the year ending in January, the job creation gap between low and high-paying jobs has widened. Low-paying full-time paid positions are rising twice as fast as the number of high-paying jobs.

The report notes job quality in Alberta fell 3% during the year ending in December. Saskatchewan and Manitoba have seen similar declines with Ontario falling by 4%. BC, Atlantic Canada and Quebec have bucked the trend, increasing over the same period.

— PLANT Staff

Mexican Air Force C-130K upgraded

Cascade Aerospace program modernizes two aircraft

ABBOTSFORD, BC — Cascade Aerospace Inc. conducted the first test flight of a foreign military aircraft from its base in Abbotsford, BC, beginning the completion phase of the Mexican Air Force C-130K maintenance and modernization program that began last year.

Over the past year, engineering teams at Cascade Aerospace, a specialty aerospace contractor, have designed and installed a complete upgrade to the cockpit avionic system, including the integration of the advanced digital Rockwell Collins Flight 2 avionics suite, plus digital fuel quantity indication and engine instrument display systems.

The aircraft, one of two currently in Cascade's hangar, also had a new Auxiliary Power Unit (APU)



Mexican Air Force's C130K taxis out to runway at Abbotsford International Airport.

PHOTO: CASCADE AEROSPACE

installed and a Wing Availability and Sustainment Program conducted.

Operational and technical training for Mexican Air Force personnel took place at the company's facility in Abbotsford using the onsite Rockwell Collins Flight2 procedural training simulator.

Ben Boehm, Cascade's executive vice-president and COO, said the test flight will lead to the delivery of

a modernized and updated aircraft to the Mexican Government "at a fraction of the cost of a new aircraft."

Cascade Aerospace is an operating unit of IMP Aerospace & Defence.

It provides long-term integrated aircraft fleet support and program management, aircraft maintenance, modification, engineering and integrated logistics support to domestic and international customers.

\$450,000 for CCS showcase

Shell partners with TELUS on interactive exhibit

EDMONTON — Shell Canada is contributing \$450,000 to TELUS World of Science – Edmonton (TWOSE) to fund its on-site school program and open an interactive carbon capture and storage (CCS) exhibit – a first for an oil sands operation.

It will showcase the technology, and specifically Quest, Shell's first commercial-scale CCS project.

Funding will be directed to the Science Centre's on-site school program and distributed over three years.

The interactive experience will take visitors more than two kilometres underground to the rock formation where carbon dioxide (CO₂) will be injected and permanently stored. Shell says the science centre attracts more than 160,000 students annually.

"As we get closer to starting up Quest later this year we want to show Albertans how CCS works and demonstrate Canada's leadership in helping to pave the way for future GHG-reducing CCS projects," says Stephanie Sterling, Shell's general manager of community and indigenous relations.

The Quest CCS project is being built by Shell Canada for its joint venture Atha-



Shell employees standing next to the wellhead of the first Quest CO₂ injection well.

PHOTO: SHELL

basca Oil Sands Project with \$865 million in investments from the federal and Alberta governments. Once operational, it will reduce CO₂ emissions from the Scotford Upgrader, 50 kilometres northeast of Edmonton, by more than one million

tonnes per year.

The Athabasca Oil Sands Project, with 255,000 barrels per day of mining and upgrading capacity, is a joint venture involving Shell Canada Energy, Chevron Canada Ltd. and Marathon Oil Canada Corp.

Shell withdraws Pierre River mine application

CALGARY — Shell Canada is withdrawing its regulatory application for the proposed Pierre River Mine north of Fort McMurray, Alta. to focus attention on its existing oil sands operations.

The mine remains a "very long-term opportunity" but it's not currently a priority, said Lorraine Mitchelmore, Shell Canada's president and executive vice-president of heavy oil.

Shell has existing regulatory approval and scope for more than double its oil sands production from its current level of 255,000 bpd.

Manufacturing centre opens in Saskatoon

SASKATOON — The federal government is investing more than \$1.4 million to help establish and operate the Saskatchewan Manufacturing Centre of Excellence in Saskatoon.

The centre, a Canadian Manufacturers & Exporters (CME) initiative, will focus on gaps in industry and address impediments to the growth of the province's manufacturing sector.

Support will be provided to small- and medium-sized manufacturers in three core areas: productivity improvement, workforce and skills development, and innovation. The centre will also develop and implement programming to connect Aboriginal participants to career opportunities.

Manufacturing employs more than 28,000 people. Some of the products being manufactured include parts being used in the aerospace and defence sector.

ACT wins two PV measurement orders

VANCOUVER — ACT Aurora Control Technologies Corp. has received two orders from SEMCO Engineering for its Decima inline measurement system with Veritas software, which will go to two unidentified photovoltaic (PV) solar cell manufacturers.

The Decima technology measures three lanes across every wafer as they emerge from the annealing or diffusion furnace at full production rates. Veritas software displays the emitter profiles in three dimensions to monitor the quality of each wafer from the furnaces, comparing them with specifications and allowing operators to adjust and optimize the furnace parameters for a higher yield of top quality cells.

No financial details were released.

ACT Aurora Control Technologies, based in North Vancouver, BC, manufactures inline measurement systems for the photovoltaic industry.

SEMCO Engineering, based in Montpellier, France, is a global supplier to the solar, semiconductor and MEMS industries.

Alberta opens Shepard Energy Centre

Natural gas power plant will produce 800 megawatts/year

CALGARY — Enmax Corp. and Capital Power Corp. have opened the Shepard Energy Centre in east Calgary, a natural gas fuelled power generation facility that has capacity for annual production of more than 800 megawatts.

The companies said the facility is the largest of its kind in Alberta and an important step in the province's transition away from aging coal-fired power generation.

Announced by Enmax in 2007, the project became a joint venture when Capital Power agreed to become a 50% owner in late 2012.

The facility's combined-cycle technology has two combustion turbines to generate electricity and uses waste heat streamed through a steam turbine to create additional electricity. This



Alberta's largest natural gas-fuelled electricity generation facility is now operational. PHOTO: ENMAX CORP.

configuration makes the plant 30% more efficient than conventional coal plants.

It emits less than half the CO2 emissions per megawatt hour of a conventional coal plant, and fewer carbon monoxide, sulphur dioxide, and nitrogen dioxide gases.

The cooling towers also use 14 million litres of re-

claimed water daily from the City of Calgary's Bonnybrook Wastewater Treatment Plant.

This is the first use of reclaimed water for power production in Alberta.

Enmax is a generator and distributor of electricity based in Calgary.

Capital Power is an Edmonton-based power producer.

Nevada buys 305 CNG buses

Firm order for New Flyer 35 XN40 and 20 XN60 Xcelsiors

WINNIPEG — New Flyer Industries Inc. has been awarded a contract for 305 (heavy-duty 40-foot and 60-foot) Xcelsior compressed natural gas (CNG) buses from the Transportation Commission of Southern Nevada.

The contract includes a firm order for 35 XN40 and 20 XN60 Xcelsior buses, with an option for another 150 XN40s and 100 XN60s over the next 5 years. All buses are to be powered by CNG.

RTC is both the transit authority and the transportation-planning agency for Southern Nevada and specifically Las Vegas. Since 1991, New Flyer has delivered 332 buses to RTC. Its current transit fleet consists of approximately 650 buses.

Financial details of the deal have not been released.

New Flyer is a Winnipeg, Man.-based



New Flyer's 60-foot XN60 Xcelsior. PHOTO: NEW FLYER

manufacturer of transit buses powered by clean diesel, natural gas, diesel-electric hybrid, electric trolley and battery-electric. The company employs 3,000 people with manufacturing, fabrication, parts distribution and service centres in Canada and the US.

» Careers



Michael Blundell

Michael Blundell, president of KSB's Canadian subsidiary in Mississauga, Ont., has been appointed president of KSB Group's USA operation, headquartered in Richmond, Va. Blundell will work to align management and strategy in the two countries. The KSB Group, an international manufacturer of pumps, valves and related systems, is headquartered in Frankenthal, Germany.

CARLO GAVAZZI, a manufacturer of automation products with Canadian offices in Mississauga, Ont., has appointed **Vinesh Kumar** account manager for the Alberta region. Kumar has more than 10 years of sales experience with electrical and automation products.

Farnaz Riahi is the new CFO of the Vancouver-based Industry Training Authority (ITA), which leads and coordinates BC's skilled trades system. Previously she was vice-president of finance at Canada Wide Media Ltd.

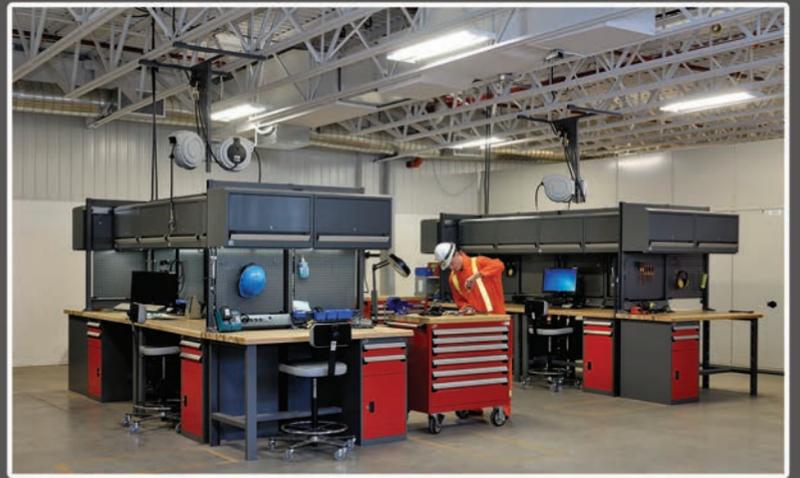
Athabasca Oil Corp., a Calgary-based energy company focused on thermal and light

oil assets in Alberta's Western Canadian Sedimentary Basin, has separated the chair and CEO roles on its board. **Thomas Buchanan** will return to the role of chair after completing a short-term assignment as CEO. **Rob Broen**, president and COO, will assume the role of president and CEO.

Newalta Corp., a Calgary-based provider of engineered environmental solutions, has appointed **Gordon Pridham** chair, replacing the retiring **Barry Stewart**. Pridham, a member of Newalta's board since 2004, is an experienced director and board chair with 35 years in banking.

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» Lean

NovAtel: Navigating GLOBAL MARKETS

STAYING ON TRACK WITH CONTINUOUS IMPROVEMENT

The high-tech manufacturer of global navigational systems focuses on being customer-centric.

BY KIM LAUDRUM

It's all about precision at NovAtel Inc., a manufacturer of sophisticated global navigational satellite systems (GNSS) technology. This high-tech Calgary company produces OEM receivers, antennas and subsystems that customers in a range of industries put to work to make possible seismic mapping for geologists, precision agriculture allowing farmers to pinpoint where to apply chemicals, rapid storm intensification data for weather predictions, deep sea mapping and defense applications (to name a few).

Precision is also how the company has approached continuous improvement, which earned it the prestigious Manufacturing Excellence Award from the Association of Manufacturing Excellence (AME).

This not-for-profit international organization (400 members in Canada) focuses on business improvement, with an emphasis on the application of lean principles. NovAtel was recognized by AME in October for its commitment to a continuous improvement culture.

"We are very proud to receive an award that recognizes NovAtel as a leader in Enterprise Excellence in North America," said Michael Ritter, NovAtel's president and CEO since 2009. "Making data-driven decisions in combination

with fostering employee teamwork, mutual respect and accountability throughout all levels of our organization, is essential to our long term success in a global marketplace."

But such acknowledgment comes after a long, lean journey, says Ritter, an engineer with almost 26 years of experience in GPS.

NovAtel strives to make precise positioning ubiquitously available, easy to use and ready to integrate for all of its OEM customers, regardless of their size, industry or application, he says. The company exports 95% of its production, with 40% going to the US. It also has offices in Europe, China, Australia and India. Other export markets include South America, Asia and the Middle East.

In October, NovAtel won a contract with the United States Army to demonstrate the effectiveness of its GPS Anti-Jam Technology, a null-forming system that protects military and civil GPS receivers from jamming and other interference. Called GAJT, it enhances military capability by ensuring protected use of GPS for position, navigation and timing.

While the accolades and new business are now rolling in, things could have gone differently if the company, bringing in more than \$50 million a year (according to its Industry Canada profile), hadn't adopted lean manufacturing principles and a customer-centric philosophy.

In 2003 NovAtel "started to become very successful in the GPS industry," says Mike McAloney, NovAtel's vice-president of operations since 1995. "We had real products. Our order book was

increasing but we were challenged to deliver quality products on time. We had the burning platform. We could see we were in trouble and could soon be in more trouble. So we were highly motivated to find a solution [that would] improve our quality and on-time delivery."

Finding religion

McAloney and Frank Oh, NovAtel's manager of manufacturing, attended an AME conference in Toronto in the fall of 2003. "It was all about lean manufactur-

ing. After being there a couple of days we [found] a new religion when it came to thinking about manufacturing."

They learned the key elements of a successful continuous improvement culture: respect for people, using a scientific method to do continuous improvement under the guidance of people who understand problem solving, and management's support for the need for change.

But McAloney also notes one of the key tenets of lean: the customer determines value.



(Photos L-R)

Assembly of Smart 6 (Dual frequency SMART antenna) at the production cell, which integrates NovAtel's OEM6 GPS/Glonass receiver and Pinwheel antenna technologies in a single housing.

GNSS Receiver Cards assembly. The cards are software configurable and can be custom-loaded before shipment.

Final assembly of pinwheel GNSS antenna modules, which integrate with OEM manufacturers' own custom designed or branded products.





Mike McAloney, vice-president of operations, with NovAtel's AME award for continuous improvement.

PHOTOS: CANDICE WARD

onstrate early success, which brought along the 80% and all of a sudden you have 90% buy-in."

The product mix was a challenge for the shop floor. NovAtel makes circuit-card assemblies, enclosure products, antennae and GPS receivers combined into (for example) waterproof housings that are put into vehicles. Its products sell for between \$100 and \$70,000. A product might be made of quantities of one or two pieces or up to 3,000 pieces.

"We have a large number of SKUs, a big product mix, we have widely varying volumes, that go from very simple to very complex products," McAloney explains. The company manufactures to get the customer's order out the door the same or next day rather than in batches that would sit in inventory.

"The more we do with lean the less we do with ERP. Our business is built on an extended supply chain. It's built on pull-systems, kanbans and daily signals..."

NovAtel changed how it measures on-time delivery from the date the company promised delivery to the date the customer wanted it delivered. Now it scores how well they do meeting customer requests. Today 30% to 50% of orders are for next-day delivery.

"The more we do with lean the less we do with ERP. Our business is built on an extended supply chain. It's built on pull-systems, kanbans and daily signals. It's not built on ERP programs and forecasting and slow cycle- and update-times and transaction-intensive processes," McAloney says.

Lean principles such as point-of-use inventory, one-piece flow and reduced transactions were applied to one of the simpler products. "We were trying to adjust our field closer to customer pull." McAloney describes it as counterintuitive. "You would think bigger batches and fewer set up times would be more

efficient. But then product just sits in inventory."

Every year a series of additional "significant things" have been completed. They looked at changing the plan for organizational layout, how to transact materials, how they fit into the extended supply chain, policy deployment and strategic planning. And the process continues.

Identifying disrupters

McAloney says the focus on continuous improvement and lean is good for recruitment and retention of employees. NovAtel creates structures to make suggestions for improvement happen. When a problem is identified, the disrupters in the business flow are picked up and sifted. Then the best improvement opportunities are identified. Employees feel they are part of the process, listened to and valued.

Keeping up with innovations in the fast-paced high-tech sector is a challenge: one NovAtel is determined to meet head on.

"One thing we do – and we're lucky because our owners support this – is spend 30% of our revenues on research and development. The usual rate in manufacturing is closer to 6% to 8%," says Ritter. "We have to be at the forefront. We have to develop chips before we develop boards. We have to talk to our customer's customer to anticipate what's coming."

McAloney describes the company, which employs 300 people at the Calgary plant, as a powerhouse in product development with 40 US patents.

It's because of this commitment to product development that the company has grown from its founding in 1978 to a wireless communications-focused company developing advanced GPS technology and growing globally.

In 1997 NovAtel became a public company and in 2007 was acquired by Hexagon, a Swedish provider of information technologies for industrial and geospatial applications.

In 2006 NovAtel CTO Pat Fenton won the Institute of Navigation Johannes Kepler Award "for sustained and significant contributions to the development of satellite navigation."

Adding the AME award to its trophy case is an indication the company is tracking the right path.

Kim Laudrum is a Toronto-based business writer specializing in manufacturing and is a regular contributor to PLANT. E-mail klaudrum@rogers.com.

Comments? E-mail jterrett@plant.ca.

New R&D centre for Imperial Oil

It will develop next-gen oil sands technologies

BY PLANT STAFF

Imperial Oil Ltd. is building a new research facility in southeast Calgary to develop next-generation resource recovery technologies for its oil sands resources.

Canada's second biggest integrated energy company isn't disclosing the cost of the planned state-of-the-art facility, but it will be located near its new headquarters at the eight-hectare Quarry Park campus in Calgary. Full occupancy of the new centre, built to LEED Gold standards for energy efficiency and environmental stewardship, is planned for 2017.

The facility will house lab-scale experiments and specialized facilities to support 50 full-time employees.

Imperial Oil has invested more than \$380 million on R&D since 2005, focusing on piloting new recovery technologies; supporting oil sands research; developing cleaner products; advancing environmental technologies; and funding projects at universities.

The Calgary Research Centre, which currently occupies space within the University of Calgary's Research Park, developed two in situ oil-sands recovery technologies now in use – cyclic steam-stimulation and steam-assisted gravity drainage (SAGD).



Built to LEED standards for energy efficiency.

PHOTO: IMPERIAL OIL

Its projects include Imperial's and Exxon-Mobil's Kearl mining operation, the first that doesn't require an upgrader to process bitumen into a salable crude oil. With the addition of electrical co-generation, Imperial Oil says a barrel of Kearl bitumen will have about the same greenhouse-gas footprint as other oils refined in North America.

Other projects involve technologies that would virtually eliminate the use of water in oil sands mining and cut greenhouse gas emissions associated with bitumen production processes.

The R&D team is also developing a new solvent technology called LASER (liquid addition to steam to enhance recovery) that adds a small amount of light hydrocarbon solvent to steam injected into the ground to recover heavy oil. The diluent aids the recovery of the harder to extract bitumen from mature wells using the same amount of steam.

And a pilot project has been commissioned at Cold Lake (near the communities of Cold Lake and Bonnyville) that adds solvent to SAGD wells to produce more bitumen with the same amount of steam, resulting in lower energy intensity and lower GHG emission intensity. The technology has the potential to enhance recovery for specific reservoirs in the Cold Lake and Athabasca areas.



» Emissions

A Conference Board of Canada report finds projects that receive funding from CCEMC pay more than emissions reduction dividends.

BY JOE TERRETT

Investments in technologies that aim to reduce greenhouse gas emissions and ease the effects of climate change have a positive impact on the Alberta economy and they're delivering spin-off benefits across the country.

The Conference Board of Canada analyzed 100 projects that have so far received \$250 million from the not-for-profit Climate Change and Emissions Management Corp. (CCEMC) for a total investment of \$1.3 billion from 2011-16. The analysis shows the projects will generate more than \$2.4 billion (in 2007 dollars) over the five-year study period and add 15,017 person-years of full-time employment to the Canadian economy.

This is certainly validation of the work CCEMC has been doing since 2009 when it was established by the Alberta government as an independent organization with a mandate to reduce greenhouse gas emissions through the development and deployment of technology.

Why the analysis?

Kirk Andries, managing director of CCEMC, says the organization's first five and half years looked at transformative technologies, with the core metric being the reduction of greenhouse gas emissions. "One of the things we hadn't looked at was the economic impact. We went to the Conference Board of Canada because we wanted an in-depth assessment."

Predictably, he is pleased with the results detailed in the final report, *Investing in GHG Emissions-Reduction Technology*.

"It takes some of the sting out of the argument that managing CO2 is just a cost. There are benefits that come out the other end as well, including GDP growth, employment, tax revenues and disposable income," he says from his office in Sherwood Park, a hamlet located east of Edmonton.

Indeed, the Conference Board estimates for every dollar invested, economic activity is boosted by \$1.90.

Much of the benefit (98.3%) flows to Alberta where real GDP is forecast to be \$1.95 billion (a multiplier of five for every dollar invested by CCEMC) with an added 12,244 person-years of employment over the study period. At its peak last year, employment was up by close to 5,200 jobs. Household incomes get a boost as will retail sales (by \$790 million). Housing starts are expected to increase by 398 and corporate profits are to rise by a cumulative \$278 million. Construction, manufacturing and personal services account for the greatest industrial impacts. And the report says a lift to personal income of \$1.2 billion (disposable income of \$963 million) will add \$226 million to general government coffers.

Reducing GHG emissions

NEW TECH INVESTMENTS ARE GOOD FOR THE ECONOMY

Other provinces receive some benefit through supply-chain dynamics. Ontario is the biggest winner with an increase to GDP of \$240 million and an additional 1,231 person-years of employment. Gains to the other provinces range from \$22 million in Manitoba to \$106 million in BC, while increases in person-years of employment are from 134 to 696.

Feeding the fund

CCEMC has 100 projects on the go that receive money from the Climate Change and Emissions Management Fund.

Companies that emit more than 100,000 tonnes of CO2 annually are required to reduce their emissions intensity by 12% below their 2004-05 baselines. If they are unable to do so, there are three compliance options: improve

internal energy efficiency, buy carbon credits from other Alberta organizations or pay \$15 per tonne to the fund, which is collected by the Alberta government.

"We think every project has the potential to be a hot one," says Andries, who is also executive director of the Alberta Biodiversity Monitoring Institute. "We're really trying to push the envelope. We see our money as risk capital, so we're not like a VC [venture capital fund] looking at a financial return in a year and a half. Ours is patient capital. We understand that technology takes time and the return we are looking for is the greenhouse gas reduction."

Projects cover carbon capture and storage, renewable energy, clean-energy, energy efficiency, climate change adaptation, carbon uses and biological.

Andries offers examples, such as the Lethbridge Biogas Cogeneration project, which converts waste material such as agricultural manure and food processing waste into electrical and thermal energy through anaerobic digestion.

Another is the Enhanced Solvent Extraction Incorporating Electromagnetic Heating (ESEIEH) Consortium that involves the Harris Corp. of Melbourne, Fla., a telecommunications equipment manufacturer, and energy producers

CCEMC FUNDING PRIORITIES

- Conserving and using energy efficiently (emissions target of 24 megatonnes by 2050).
- Implementing carbon capture and storage (emissions target of 139 megatonnes by 2050).
- Greening energy production (emissions target of 37 megatonnes by 2050).

» Biofuel

Biocoal gets \$2M from EDC

Diacarbon focuses on carbon-neutral alternative to coal

Diacarbon Energy Inc. has received \$2 million in financing from Export Development Canada (EDC), bringing its biocoal product a step closer to commercialization.

The Vancouver-based cleantech company is completing a thermal biomass refinery in BC's interior that will convert wood waste into the low-carbon biocoal product that's ready for distribution.

"EDC's investment provided the working capital that allowed us to grow our business

and expand our technological base," said Jerry Ericsson, president, CEO and co-founder of Diacarbon. "The export markets are very interested in both our pellets and biocoal over the near and long term."

Biocoal is a form of charcoal produced by pyrolysis, a chemical process that heats wood waste through torrefaction. The company describes the bio-product as a direct replacement for fossil coal. Biocoal has similar energy density and water resistance, making it a

CNOOC Ltd./Nexen Inc., Devon Canada and Suncor Energy Inc.

They're testing a new process that would replace steam used for in situ bitumen extraction with electromagnetic heating, combined with solvent dilution. On a full cycle basis, it has the potential to reduce emissions generated from steam-assisted gravity drainage by up to 80%.

CO2 Solutions Inc., an innovator in enzyme-enabled carbon capture, has been working with a major Alberta oil sands producer to capture carbon from natural gas combustion emissions. The one-year project, almost complete, applies a technology that uses an enzyme (carbonic anhydrase). When introduced in a packed tower scrubbing system, it substantially improves the efficiency of capturing CO2 with low-energy solvents. Andries says the Montreal company is submitting another project.

Grappling with climate change

Alberta is committed to reducing its greenhouse gas emissions, but the projects funded by CCEMC have the potential for much broader geographic reach as nations grapple with the effects of climate change.

Environment Canada notes average annual temperatures in Canada have increased by 1.7 degrees C over the past 65 years, and the US Environmental Protection Agency estimates the average global temperature is expected to rise between 1.1 to 6.4 degrees C. The effects of climate change run from more severe weather patterns to health risks and damage to ecosystems.

So the work continues at CCEMC. Andries says it's hard to say how funding might be affected by plunging oil prices because it will depend on whether or not energy companies change their production levels. But looking ahead, he sees CCEMC collaborating more with other organizations. A potential partner is Canada's Oil Sands Innovation Alliance (COSIA), a resource-rich group of oil sands energy producers that are working together to improve their environmental performance. Both organizations have a common goal. Much rests on the success of their collective efforts.

Visit www.e-library.ca for a copy of the report.

Comments? Email jterrett@plant.ca.

more appealing, lower carbon alternative for power generation utilities looking to replace coal. And there's plenty of bio-waste available from agriculture, forestry and urban sources.

Last year, Diacarbon received \$1 million from the provincially funded BC Bioenergy Network to demonstrate its torrefaction bioreactor technology and produce biocoal to displace coal used by Lafarge Canada's cement plant in BC. Sustainable Development Technology Canada added \$1.1 million with \$7 million coming from other funders.

The potential reduction in greenhouse gas emissions and other pollutants from the plant was estimated at 52,500 CO2 equivalent tons per year.



» Energy

Stephen Harper hopes tax incentives will drive a burgeoning (but stalled) industry forward and get Canadian natural gas into export markets.

BY MATT POWELL, ASSOCIATE EDITOR

As oil prices plunge, the federal government is looking to boost the prospects of another major natural resource by granting tax relief to BC's proposed liquefied natural gas (LNG) terminals, hopeful the move will persuade the major players to make final investment decisions.

There are 19 LNG proposals on the table, but they aren't going anywhere.

So the Harper government has introduced a number of tax incentives to increase investment and get the LNG flowing. The provisions will cost the government \$50 million in tax revenues over the next five years, but the anticipated pay-off will be significant economic activity and billions of dollars of tax revenue for the federal and provincial governments.

"This will create investment that would obviously not occur," said Prime Minister Stephen Harper at a Feb. 19 announcement in Surrey, BC, where he introduced a capital cost allowance rate of 30% for equipment used in natural gas liquefaction and 10% for buildings at a facility that liquefies natural gas.

The incentives are similar to those extended to manufacturers who are off-setting equipment and machinery costs and taking advantage of breaks pegged to asset depreciation rates.

The incentives apply to equipment, structures and buildings used in Canada for liquefying natural gas. The tax relief is available for assets acquired as of Feb. 19 and before 2025.

Deductions can be claimed against income from eligible activities at a facility, calculated as though it were a separate business. This includes income from providing liquefaction services for natural gas owned by third parties, the sale of by-products, and the sale of the LNG owned and processed by the taxpayer.

Global opportunity

"The changes will make Canadian projects more competitive on the global stage, but undoubtedly there continue to be challenges," said Barry Munro, a Canadian oil and gas leader at Ernst & Young, the professional services firm headquartered in Toronto.

Ernst & Young predicts that a \$100 billion investment into the Canadian LNG industry would produce a 3.7% jump in GDP by 2025, add more than 200,000 new jobs to the national economy and provide the federal and provincial governments with an additional \$455 billion in revenues between 2015 and 2035.

Market opportunities are in Asia, where economies are expanding and countries

Kickstarting BC's LNG play

CAPITAL COST ALLOWANCE AIMS TO SPUR INVESTMENT

are looking to replace more carbon-intensive forms of energy with cleaner burning fuels. Canada's only export market for natural gas is the US, which Ernst & Young notes is moving rapidly towards energy self-sufficiency and placing greater downward pressure on the current price discounts plaguing natural gas sales.

"Canadian and global energy companies want to invest in Canadian LNG," added Munro. "Without a viable export LNG business in Canada, we will strand assets and sell natural gas at a discount."

The incentives respond to concerns of the BC LNG Alliance and the BC government, both of which have been steadfast in their advocacy for federal support to build the proposed export terminals.

The BC LNG Alliance, formed in 2014 to advocate the development of the BC's LNG export industry, includes Kitimat LNG, LNG Canada, Pacific NorthWest LNG, Prince Rupert LNG (BG Canada), Triton LNG, and Woodfibre LNG. They cover seven of the 19 currently proposed projects for the West Coast.

The BC government is counting on three projects operating by 2020, hopeful at least one will be a major exporter. But industry analysts have cautioned there is only room for four terminals in BC due to increasing global competition from countries such as Australia.

The BC LNG Developers Alliance called on the House of Commons finance committee in September, proposing LNG exporting be reclassified from "distribution" to "manufacturing" for capital cost allowance purposes.

As high construction costs and sinking crude prices weigh on the budding sector, some companies, including Malaysia's Petronas, say they will put off investment decisions until the economics make the multi-billion dollar projects viable. But there's ongoing concern that idle projects will lose competitive ground to developed projects in the US and elsewhere.

Global demand is expected to outpace supply by between 100 and 120 million tonnes a year over the next decade or so, and sinking prices in the oil sands may also help LNG projects round-up much-needed skilled labour as energy producers in Alberta slow production and layoff workers.

The International Energy Agency forecasts LNG trade to rise by 40% between 2013 and 2019. Demand in Asia is expected to represent half of the world's incremental needs.

Manufacturing connection

LNG is increasingly being used for remote power generation and the high-horsepower engines used in trucking, shipping, rail, drilling rigs and pressure pumping services.

The tax measures have been lauded by the Canadian Manufacturers' & Export-

Ernst & Young estimates investments totalling \$100 billion to export BC LNG would boost national GDP by 3.7%. PHOTO: BC LNG ALLIANCE

ers (CME).

"Accelerated depreciation has had a very positive impact on manufacturers," said Jayson Myers, CME president and CEO.

CME has advocated for the extension of accelerated capital cost allowance as an incentive for manufacturers to adopt new processes and undertake product commercialization.

"It has kept Canada competitive as an investment location and boosted activity in advanced technologies, helped businesses grow and created jobs," said Myers.

The BC government revised its LNG tax rate in October, starting it at 1.5% and holding at that level while plants are operating at a loss and capital investments are being recouped.

The rate will rise to 3.5% after four years, where it will stay until 2037 when it rises to 5%. The province expects to bring in tax revenues of \$800 million, down from an original projection of \$1.5 billion over 10 years.

A new corporate tax credit reducing the provincial rate from 11% to 8% will encourage investment and reflect competitive rates in the US and Australia.

Time will tell if the incentives are enough to move LNG projects off the table and into production.

Comments? E-mail mpowell@plant.ca.

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Manufacturing drives GROWTH

EXPORTS ARE UP, EMPLOYMENT IS STRENGTHENING



New Flyer Industries Inc., a Winnipeg-based bus manufacturer, is contributing to growing transportation industry sales in Manitoba with products such as this XDE60, a diesel hybrid.

PHOTO: NEW FLYER

Manufacturing in Manitoba hasn't been getting a lot of attention in recent years, likely because sales were stagnant in 2012 (1.1%) and 2013 (0.1%); however, it appears the tide has turned.

RBC's *March Provincial Outlook* expects GDP to advance 2.8% this year, up from 1.8% projected for 2014, and will continue at 2.8% in 2016. The Conference Board of Canada, an Ottawa-based research firm and think tank, is

also expecting a good year for Manitoba in 2016. It's forecasting growth of 3%.

RBC says this is a reflection of a stronger performance from manufacturers. Sales rebounded in the third quarter of last year to almost 6% following increases of 1.5% (Q2) and 2% (Q1).

Gains were led by transportation equipment but otherwise broadly based, which shows exporters were benefiting from a resurging US economy and a lower value loonie.

Trade data that shows the value of exports declining 8% in the fourth quarter following double-digit declines in the previous two quarters is not encouraging, says the RBC report. However, it attributes some of this decline to lower energy and non-energy commodity prices as agricultural-related exports wind down following an abundant harvest in 2013.

"Excluding the energy and agricultural exports components, export growth in the fourth quarter of 2014 was a much stronger 5.6% on a year-over-year basis," said Craig Wright, RBC's senior vice-president and chief economist. "What's even more promising is that this measure of exports rose 6.5% in 2014, following relatively flat activity in the previous two years."

Advances for manufacturing

Employment is also strengthening. After declining over the first half of 2014 on a year-over-year basis, it crept higher in Q3 and rose 2% in Q4. RBC said there is tentative evidence this strength will continue.

There will be more advances for manufacturing in 2016. Transportation equipment will continue to lead. RBC notes demand is expected to continue rising in aerospace and bus equipment, while strengthening investment in the US will support machinery production.

And stronger economic growth will have a positive effect on the province's books in 2016-17 if it meets its spending targets presented in the 2014 budget, notes the Conference Board. It anticipates solid revenue growth over the medium term, with less reliance on federal equalization payments.

RBC lowered its December outlook for Saskatchewan's real GDP growth to 2.1% from 2.8% this year and to 2.1% in 2016. The change reflects greater caution about investment in the energy sector.

Alberta's growth has also been revised to 0.6% from 2.8% because of weakness in the energy sector and flagging consumer confidence. Growth will pick up to 1.1% in 2016.

Meanwhile, growth in BC will advance at its fastest rate since 2010 at 3.1% this year and 2.8% next year. Wright said home-building activity in the US is anticipated to increase this year, which will likely have a positive effect on BC's forestry exports.

Comments? E-mail jterrett@plant.ca.



Achael, Business Development Analyst

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C I E N

CANADIAN INDUSTRIAL EQUIPMENT NEWS

» Burners

Extreme's combustion technology uses less fuel and produces fewer emissions, yet provides greater heat transfer.

BY DAVID NESSETH

A small green startup from Alberta plans to inject some new life into the oil and gas industry's traditional combustion burner technology market.

Absolute Combustion International Inc. describes its Extreme Burner as a game-changer that will provide a more consistent, cost effective and stable way to produce heat while saving money and the environment.

"Heat is essentially the most ubiquitous product on the planet," says Hank Mottl, the company's director of engineering. "It's a real problem to resist the urge to be all things to all people. There are so many areas that could use our technology."

Extreme competes against more traditional burner equipment. The company's initial market applications are targeting fire tube applications such as separators, treaters, glycol heating loops and temporary heating needs. Down the line, Absolute Combustion may build more powerful units of around 20 million to 50 million Btus that are capable of handling frac- water heating requirements as well as steam-assisted gravity drainage (SAGD) bitumen extraction.

The company has performed hundreds of demos featuring its burner technology at its state-of-the-art combustion testing facility in Leduc, Alta., which serves ongoing research and development efforts. It's also there to convince skeptics of the system's unheard of performance. The team runs a burner up to 5 million Btu's for an 8,000-gallon (36,400-litre) water heater, testing for efficiency, emissions and durability over the long term.

Testing and performance

The result? Less fuel consumed for a given Btu output, lower GHG emissions, nearly zero flame (reducing flame impingement), significantly reduced fuel pressure (increasing workplace safety), and enhanced heat transfer (reducing production costs).

Canadian Natural Resources Ltd. (CNRL), one of Alberta's largest oil and gas producers, is testing Absolute Combustion's technology over several months to see how well it keeps the process hot and the heavy oil flowing.

"We already know we're going to perform well at CNRL," says Mottl. "The only



Darsell Karringten, Absolute Combustion's president and CEO (who passed away in January) with the Extreme burner.

PHOTO: ABSOLUTE COMBUSTION

Absolute goes EXTREME

THE GREENEST, HOTTEST THING IN BURNERS FOR OIL PRODUCERS

thing left for them to experience is, are we as reliable as their existing systems."

The flame within the burn chamber measures about 20 centimetres long, whereas more traditional burners have flames that range from 1.8 to 6.1 metres long. Apart from safety concerns, Mottl says more flame means more wear and tear on downstream materials.

Absolute Combustion says its burner reduces fuel needs by 15% to 20%, and drops pressure requirements from 19 pounds per square inch to 4 pounds per

square inch or less, which increases workplace safety and reduces the potential for blowback.

The burner delivers a consistent spiral heat pattern throughout the length of the fire-tube, rotating in a way similar to a bullet travelling through a gun barrel.

A computer controls the air fuel ratio and flame stability of the burner, says Mottl. Unlike most traditional burners, it utilizes compressed air instead of draft air induced from the burning of fuel

Continued on page 12

» Plantware

NETWORK IN REAL TIME

Skkynet Cloud Systems Inc. is accepting registrations for its Secure Cloud Service, giving system integrators, engineers, and managers



Optimizes cell design.

of industrial, embedded, and Internet of Things (IoT) systems access to a secure, end-to-end solution for networking data in real time.

The service provides bidirectional supervisory control, integration and data sharing with multiple users, and real-time access to selected data sets in a web browser. It handles more than 50,000 data changes per second per client at speeds of just a few milliseconds over internet latency.

It requires a VPN and there are no open firewall ports, no special programming and no additional hardware.

Skkynet Cloud Systems is a developer of real-time cloud information systems based in Mississauga, Ont.

www.skkynet.com

SOFTWARE IMPROVES ROBOT SET-UPS

ABB Robotics' RobotWare 6 robot controller software improves the programming and control of robotic systems and equipment



End-to-end networking

with an extensive toolbox and broad communications capabilities.

Installation Manager has a flexible application licensing mechanism and an intuitive user interface that improves set-up time and system reconfiguration.

Externally guided motion aids external sensors and provides more precise control over motion, which optimizes cell design and production flows.

The sensors gauge absolute positions modification of the robot's path, which is updated every four milliseconds with a controller lag of between eight to 20 ms depending on the type of robot.

Installation time is shorter, jogging is more responsive and restarts are quicker, all combining to provide improved productivity.

ABB is a manufacturer of power and automation technologies based in Zurich.

www.abb.com

Greener burn

Continued from page 11

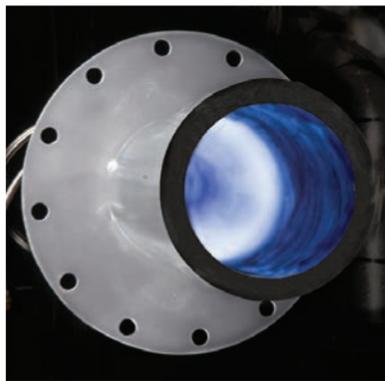
augmented by heated air rising in the exhaust stack.

The burner operates as a single pass with no recirculation, which means it doesn't "reburn" emissions as many other low emission burners do. As a result, NOx emissions end up at around 12 to 18 parts per million.

"We control all aspects of our system, and burn it more efficiently so emissions don't vary," says Mottl. "Our burners are cleaner, so we don't need to recirculate. Think of it like a supercharged automobile engine."

The burner system also utilizes a cooling jacket, helping to stop deterioration in the burn chamber at high temperatures.

Traditional burners have exhaust temperatures up to 800 degrees F (427 degrees C) to atmosphere, whereas Extreme's exhaust is less than 400 degrees F (205 degrees C). Competitive units can fluctuate between 30% to 80% measured efficiency whereas Absolute Combustion's burner efficiency does not vary.



Close-up of the Extreme burner, which reduces fuel use by up to 20%. PHOTO: ABSOLUTE COMBUSTION

As the company gets ready for the first year of sales, it's focusing on smaller burners in the 3 million to 5 million Btu range soon to be followed by 10 million to 20 million Btu units.

The burner and the complex flow regime within it are proprietary. Still, the company is looking for the best components.

"With every component you're relying on someone else's vision, and hoping they've done the same things we have," says Mottl. "For example, if the product that lights the flame fails, we fail."

Absolute Combustion is small at about seven direct employees as it explores new funding options. But the company is also part of a consultancy of about 20 individuals and companies that helps it tackle particularly difficult business challenges.

The next step is to convince oil and gas companies under pressure to reduce their greenhouse gas emissions that adopting an "Extreme" measure is the greenest and most cost effective way to go.

David Nesseth, an environmental writer for *Cleantech Canada* and *Eris* when this article was written, is the editor of *Solid Waste & Recycling* and *Haz Mat Management* magazines.

Comments? E-mail jterrett@plant.ca.

MATERIAL HANDLING

FILL 'EM UP!

Flexicon Corp.'s stainless steel Bulk Bag Filler detects and separates metal as it fills bulk bags by weight, dust-free.

The filler frame is a patented Twin-Centerpost design that maximizes strength, reduces cost and improves accessibility to bag hooks. An integral metal detector/separates metal in the free-fall stream of material entering the filler, then ejects it through a chute that discharges into a removable drum at the rear of the unit.

A fill head height adjustment accepts most bag sizes and an inflatable cuff forms a high-integrity seal to the bag inlet spout. A blower removes creases prior to filling and loads cells for filling by weight; a vent port provides dust-free air displacement; retractable bag hooks are powered pneumatically; and an automated vibratory deaeration/densification system maximizes capacity and stabilizes the bag for storage and shipment.

The filling system integrates with Flexicon conveyor feed systems, as well as existing plant conveyors or overhead storage vessels.

Flexicon is a manufacturer of bulk handling equipment based in Bethlehem, Pa.

www.flexicon.com



Detects and separates metal.

HOSES

HOSES TRANSFER LIQUIDS AND GASES SAFELY

CRP Industrial's ReinFlex thermoplastic hoses handle dynamic working pressures up to 10,000 psi for transmitting liquids and gases, including petroleum or synthetic-based fluids, fuel and mineral oils, most



Handles pressure to 10,000 psi.

phosphate esters and many industrial gases.

The hoses are available in 14 different versions with diameters ranging from 3/32 up to 1 in., each with specific materials and construction. Multi-layer construction features up to three layers of reinforcing material, which include a combination of polyester fibre, polyaramid yarn, steel, and aramid, allowing most models to provide 4:1 safety factor on burst pressure.

A number of models withstand exposure to paints, solvents and other chemicals, as well as other environmental agents such as ozone and UV light.

Fittings include NPT, NPSM, BSP and JIC, in plated or stainless steel, male or female.

Twin lines are welded together, providing a secure attachment. Accessories include hose jackets, pressure gauges, quick connect/disconnect couplers.

CRP is a supplier of power transmission and fluid transfer products based in Cranbury, NJ.

www.crpindustrial.com

DUST COLLECTION

DUST COLLECTOR CLEARS THE AIR

Camfil's Farr Gold Series Package (GSP) dust collector captures dust and fumes generated by CNC laser and plasma cutters, and handles air flows from 1,000 to 3,000 cfm at 8-in. wg.

The collector comes with two, four or six HemiPleat eXtreme Gold Cone filters with nano-fibre media to meet OSHA permissible exposure limits (PELs). Additional HEPA filter modules increase efficiency when handling dusts with low PELs, such as hexavalent chromium produced in stainless steel cutting. HEPA after filters also allow indoor recirculation to save energy.

Camfil, a global developer of air filters and clean air products headquartered in Stockholm, Sweden, says the collectors are equipped with "plug and play" capability and are shipped completely assembled and wired. The assembled unit includes all internal electrical connections, an integrated inlet



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ENCODERS

IXARC MAKES MOTOR SPEED MEASUREMENT EASY

Posital-Fraba's IXARC rotary encoders make use of the company's precision magnetic measurement technology to generate output signals each time the shaft rotates.



IP69K-rated.

Advanced signal processing software running on powerful 32-bit microprocessors match the performance of larger, more complex optical encoders.

The encoders come in a number of configurations with HTL (Push-Pull) or TTL (RS422) interfaces, different types of electrical connectors and a range of shaft and flange diameters.

Heavy-duty models with IP69K-rated housings and seals stand up to wet and dirty environments, including repeated exposure to water jets from pressure washers.

POSITAL-FRABA is an encoder manufacturer based in Hamilton, NJ.

www.posital.com

damper, filters, fan and cleaning system.

The collector uses fire retardant filter media, a fire sprinkler in the clean air plenum and a built-in spark baffle.

Diaphragm valves are mounted low for maintenance accessibility. The discharge system uses a 20-gal. drawer on casters that slide easily in and out using a cam-operated lift system.

www.camfilapc.com

TEST AND MEASUREMENT

TRANSMITTERS KEEP BUILDINGS BALANCED

Dwyer Instruments Inc.'s RHP-E/N Wall Mount humidity, temperature and dew point transmitter comes in a housing that's well vented to provide air flow across the sensor for improved measurement accuracy.



LCD display.

An LCD display indicates the ambient temperature along with the humidity or dew point, while the transmitter has internal dip switches to select the temperature engineering units and outputs humidity or dew point.

The humidity and the dew point are measured using a capacitive polymer sensor that recovers from 100% saturation.

Dwyer, a manufacturer of industrial controls and instrumentation based in Michigan City, Ind., says humidity and dew point have either a current or voltage output, while the optional temperature output is a current, voltage, RTD or thermistor.

www.dwyer-inst.com

POWER



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MicroPower Direct's MA300RW compact 6 W DC/DC converters are equipped with a wide 2:1 input range; single and dual outputs; tight regulation and low noise operation for a variety of board level power applications.

Available in 24 models from 9 to 72 VDC, they provide outputs of 3.3, 5, 12, 15, 24, ± 5 , ± 12 , or ± 15 VDC. Features include high efficiency; $\pm 1\%$ line/load regulation; an input/output isolation of 1,500 VDC; and input filtering.

All models are protected for output overloads and have continuous short circuit protection with autorecovery.

Each model operates over a temperature range of -40 to 70 degrees C and cooled by free-air convection.

MicroPower Direct is a supplier of power conversion products based in Stoughton, Mass.

www.micropowerelectronics.com

» Events

ISA Calgary 2015

ISA

April 22-23, Calgary

The Calgary event, produced by DMG Events for the International Society of Automation (ISA), covers advancements, technologies, and methods to increase efficiencies and reduce costs. Visit <http://isacalgary.com>.

BSA 2015

BSA

May 2-5, Amelia Island, Fla

Bearing Specialists Association's (BSA's) annual convention is

themed "Relationships Matter." The business program will examine how relationships are the core to successful long-term partnerships and some new technologies. Visit www.bsaconventions.org.

PTDA Canadian Conference
PTDA

June 4-6, Vancouver

The Power Transmission Distributors Association (PTDA) hosts this event for Canadian distributors and suppliers. Networking and industry-focused presentations will be featured. Visit www.ptda.org.

Global Petroleum Show

DMG Events

June 9-11, Calgary

Now an annual event for global energy producers, EPCs, service companies and suppliers hosting 95 countries, 63,000 attendees and 2,000 exhibitors. Visit <http://globalpetroleumshow.com>.

WMTS

SME

June 15-17, Edmonton

The Western Manufacturing Technology Show (WMTS) features state-of-the-art machinery and equipment for manufacturers in Western Canada, plus

educational sessions, industry keynotes, an interactive town hall panel and networking opportunities. Visit www.wmts.ca or call (888) 322-7333, ext. 4435.

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PEMAC

Sept. 21-24, Vancouver

"I cubed" (Inspire, Innovate and Improve Maintenance) is the theme of this year's conference, presented by the Plant Engineering and Maintenance Association of Canada (PEMAC). Join leading experts, practitioners and professionals. Visit <http://www.maintrain.ca>.

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Oil price collapse was foreseeable

BY GWYN MORGAN

The *Los Angeles Times* headline reads, “Oil Glut, Price Collapse Spreads Across World Economies: As producers squirm, other nations rejoice.” That headline describes the current situation perfectly – but it appeared on March 2, 1986.

In a story published days later, *Los Angeles Times* reporter Don Cook stated “The critical issue . . . is the outright state of economic warfare declared by the Saudis.”

“The last time the Saudis became fed-up with diminishing market share, it took 20 years for oil prices to recover...”

Events leading up to these stories were remarkably similar to those of today.

The oil glut started building in the early 1980s when soaring oil prices drove expanded non-OPEC production and weakened demand. Slowing economic activity in industrialized countries exacerbated the glut. Efforts by the Saudis to tighten markets were stymied as other OPEC members habitually failed to adhere to their allocated quotas,

leaving the Kingdom as the sole swing producer.

After five years of seeing their market share drop, the Saudis had enough. Within hours of Oil Minister Sheik Ahmed Zaki Yamani’s vow to end the erosion of his country’s market share, prices plummeted from US\$30/barrel to below \$10 and it wasn’t until 2005 (20 years later) before real inflation-adjusted oil prices finally climbed back to pre-

collapse levels.

That was also the year, 30 years after dedicated to building EnCana Corp. into Canada’s largest oil and gas producer, I stepped down as founding CEO.

The 1980s price collapse had taught me the importance of building our company’s asset base upon resources having the lowest possible development and operating costs. Even as oil prices hit US\$60/barrel, we were still using a price of half that amount to test the financial resiliency of our development projects.

Since retiring, I’ve watched in amazement as oil prices continued their climb to more than \$100/barrel. Even more amazing has been the mandating of so many projects requiring sustained high oil prices to be economically viable. Were the lessons of the 1980s forgotten in a euphoric cash-rich drive for growth? Or could it be the current generation of industry leaders aren’t old enough to have experienced those lessons?

Cost discipline

No one knows if such high prices will ever be seen again, but projects based on the higher quality resources can achieve good investment returns at much lower price levels.

Rather than risking shareholder capital on projects needing unsustainably inflated prices to be financially viable, prudent forecasting and cost discipline will need to rule. This reality will drive a fundamental sorting out of industry players based on the quality of their assets and technological expertise. Projects that yield acceptable risk-adjusted returns from prices at the lower end of the scale will gain investor support, while the owners of higher cost assets pray for (unlikely) salvation from the Saudis.

Longer term, there’s one factor that ensures a strong future for oil producers. Every barrel produced must be replaced if global production is to be sustained. Tomorrow morning, there will be 94 million fewer barrels of oil than existed this morning. And despite moderating demand among industrialized countries, the International Energy Agency forecasts developing world growth will drive global demand to 120 million barrels per day by 2040, while the current global capacity surplus is only 4 million barrels per day.

No one knows how long it will take, but the coming corporate player re-trenchment combined with the growth of global demand will, once again, see the Canadian oil sector humming. Perhaps by then history lessons will have become compulsory.

Gwyn Morgan is the retired founding CEO of EnCana Corp. This column is distributed by Calgary-based Troy Media.

Comments? E-mail jterrett@plant.ca.

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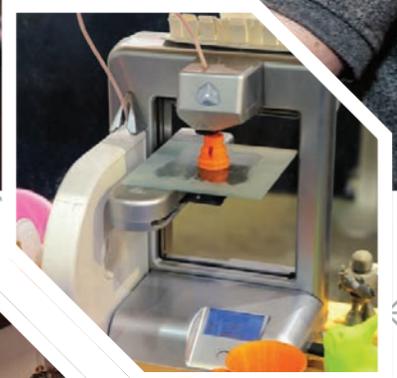


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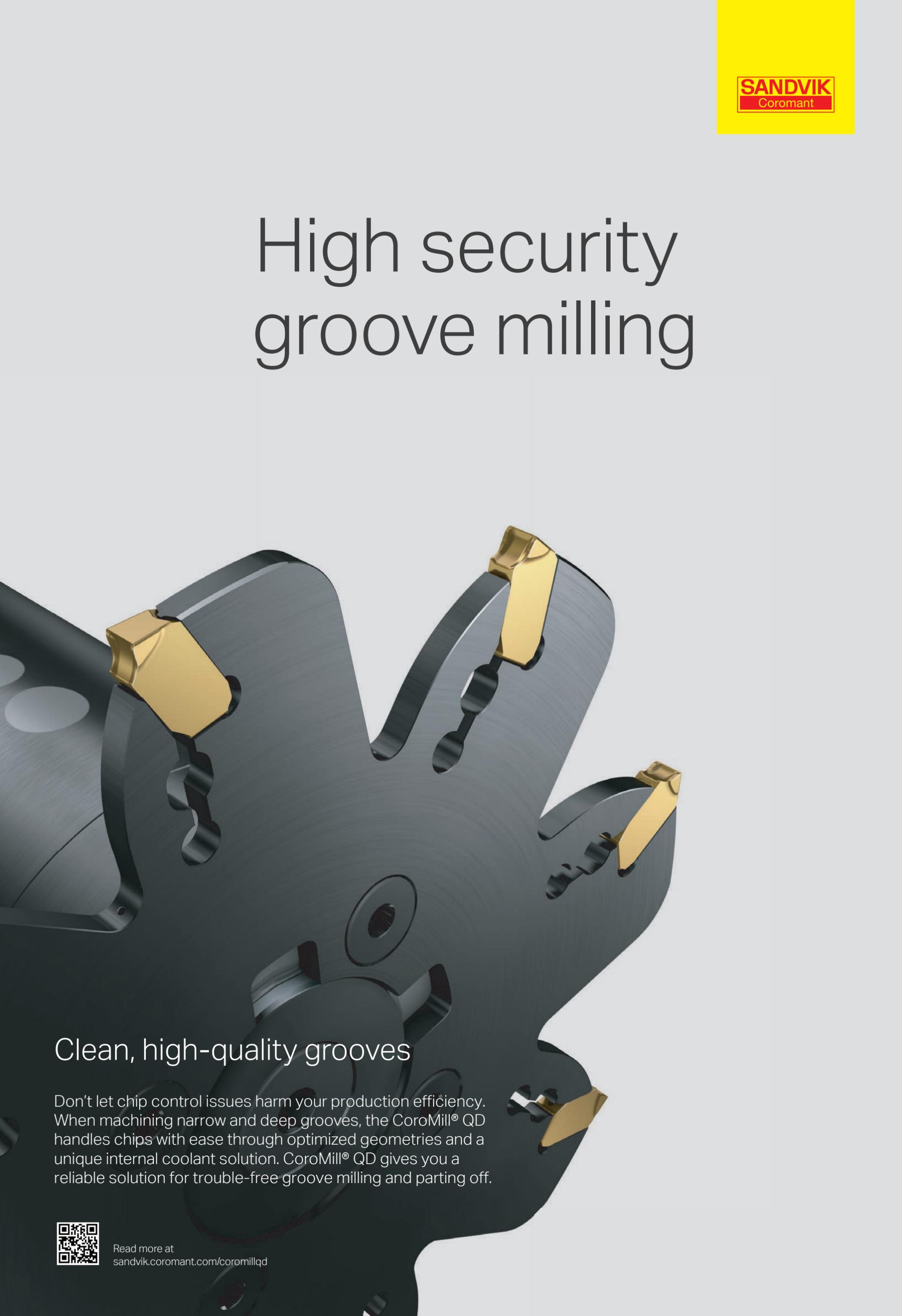


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A detailed 3D CAD rendering of a groove mill. The tool is dark grey with four gold-colored inserts. It is shown in a perspective view, highlighting its complex geometry and the precision-machined grooves on its cutting edges. The background is a light grey gradient.

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