

# PLANT WEST

ADVANCING CANADIAN MANUFACTURING

Volume 9, No. 04 >> Supplement, PLANT >> November/December 2014

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## Betting on NEWSPRINT

ANC finds growth  
in a declining market  
with wood chips

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### CIEN

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3D printing saves the universe

Charging up the energy supply chain

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# More than energy

Canada gets a healthy economic boost from Alberta's energy sector, but we need more than one basket for the eggs.

How much of an impact does Alberta's energy resources have on Canada's prosperity? CBC News asked the School of Public Policy at the University of Calgary to create a "what if" scenario, the premise being Alberta's job market, with the highest growth of all provinces, matching Ontario's rate. Since 1995, employment has grown by an average 2.5% each year, well ahead of Ontario's 1.44%. In August, Canada's unemployment rate was just under 7.2%.

In the parallel universe created by the School of Public Policy, the unemployment rate would be more like 9.39%, or 411,000 fewer jobs this year, which by any accounting, is quite an impact.

Here's a potentially real scenario. World oil prices have been falling, and if they remain low, the energy boom will slow, which will have a corresponding effect on the Canadian economy.

Manufacturing, particularly the non-energy related kind, needs to kick into a higher gear to lessen the impact of energy's ups and downs.

Conditions are promising. The loonie is floating below the US dollar and is expected to do so, possibly for some time. American manufacturing is surging; and the Bank of Canada is forecasting growth of 2.5% in 2015, then 2% in 2016. Meanwhile, the federal government has been securing trade deals that will provide expanded and new markets for Canadian products.

But manufacturers, most of them small and fatigued by the effects of the 2008-09 recession and unsteady world conditions of the past few years, appear to be risk averse.

PLANT's 2015 Manufacturers' Outlook survey of a mostly "cautiously optimistic" group of senior executives, found they continue to focus on domestic and US markets.

More than 90% of the 416 respondents derive most of their business from trade in North America (63.1% in Canada). Over the next three years, about 83% will seek new markets within the home continent, and from there the numbers take a mighty tumble. China is a huge opportunity, not without some risk, and so far just 2% of the respondents are doing business there.

The federal government is wrapping up trade deals with the European Union and South Korea, and negotiating the Trans-Pacific Partnership with a number of countries, all representing expansion into global markets that should translate into growth and jobs. However, only 11% of the Outlook respondents appear to be excited by the opportunities.

Of course, Canadian companies must be prepared to compete. But the Bank of Canada warned earlier this year that Canada is missing out on \$40 billion in export sales and will continue to do so because of lagging productivity that's costing companies market share.

Manufacturers have access to technology that will boost the productivity of their operations, yet the survey reveals most are not making use of it to monitor and measure shop floor manufacturing equipment and operations. Fifty-one per cent are still using manual methods to collect, analyze and review data compared to 31% who use automated means. Seventeen per cent aren't doing any monitoring or measuring.

Companies ignore competitive issues such as productivity at their peril. There is prosperity beyond North America's markets. The Made in Canada brand is respected around the world and economic conditions are generally positive. Embrace the risks and build up that other basket so Canada's prosperity will depend a little less on what happens to the world energy market and the impact it has on Alberta's fortunes.

Joe Terrett, Editor

Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).



COVER IMAGE: THINKSTOCK



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» Pulse



Canadian exports to grow 6% in 2015.

PHOTO: THINKSTOCK

## US to power next global cycle

The momentum of the US recovery will be the key driver of the next global growth cycle, says a new global economic forecast by Export Development Canada (EDC).

The Crown export credit agency notes US consumers and businesses "are back" and this is already translating into solid Canadian export growth.

"Others aren't far behind," says Peter Hall, EDC's chief economist. "US growth will translate into higher activity in other OECD economies and in emerging markets."

He says the US is well-positioned to power up economies that are in gear.

"It's all happening quickly, so for Canadian companies active in trade, or even considering it, it's crucial for them to ensure they're in gear too."

EDC predicts US growth of 3.6% in 2015, which is higher than most forecasts. The outlook notes consumer and corporate confidence as a key signal that pent-up demand will continue driving growth forward.

The US economy and a lower Canadian dollar are paying dividends to Canadian companies. Real merchandise exports, currently up 12% year-on-year, are on an eight-month surge.

EDC cites a respectable rate of Canadian exports to Europe, despite recent "macro-economic" weakness, as bolstering this strong performance.

The Ottawa-based agency forecasts Canadian exports to grow 11% this year and 6% in 2015.

The EDC notes export growth, spanning a variety of industries, extends across almost every province, and will boost trade-related business investment, despite the expectation of persistent weakness in commodity prices. As a result, it says tightening industrial capacity will lead to significant expansion decisions.

Despite weaker domestic performance, Canada's GDP growth is forecast to accelerate to 2.8% next year, largely thanks to trade.

"Add it all up, and it comes to 4% global growth in 2015, up from 3.2% this year. It's good news for Canadian companies, but it doesn't guarantee growth; that depends on a lot of additional factors," added Hall.

There's more good news: he says recent weakness of the Canadian dollar is likely to persist.

EDC's forecast calls for the loonie to hover in the low 90-cent US range for the next two years.

## Alberta tops world energy investment

Texas first globally according to global petroleum survey

**CALGARY** — Based on the strength of its petroleum reserves, Alberta remains the most attractive province for oil and gas investment in Canada, but Texas tops the list globally, finds the Fraser Institute's annual Global Petroleum Survey.

The survey, based on responses from petroleum executives and managers, ranks 156 jurisdictions worldwide on their relative attractiveness for investment. Barriers to investment include high taxes, costly regulatory obligations and uncertainty over environmental regulations.

Of the 27 jurisdictions with large petroleum reserves, Texas tops the list, followed by Alberta, Norway-North Sea, the United Arab Emirates and Qatar.

Of the 44 jurisdictions with medium-sized reserves, Oklahoma is number one while Newfoundland & Labrador ranks 15th and BC ranks 19th.

The remaining 69 jurisdic-



A SAGD well head, MacKay River.

PHOTO: SUNCOR

tions, which have relatively small proven oil and gas reserves, include the other seven ranked Canadian jurisdictions. Mississippi tops the list followed by Saskatchewan and Manitoba.

An alternate ranking that focuses solely on survey responses ranks Saskatchewan first in Canada (and third out of 156 jurisdictions worldwide). Manitoba ranks second in Canada (and fifth globally), followed by Alberta (16th globally).

On the other end of the spectrum, Quebec presents the greatest barriers to oil and gas investment. Survey respondents point to Quebec's foot-dragging during authorization and permit processes.

BC dropped from 47th (of 157) in 2013 to 62nd (of 156) this year. Survey respondents expressed concern over BC's tax policies, environmental regulations and uncertainty around regulatory enforcement.

## CO2 Solutions develops new carbon capture enzyme

**QUEBEC CITY** — CO2 Solutions Inc. has developed a new high-performance carbonic anhydrase enzyme that will be used in the company's carbon capture process.

The Quebec City-based developer of carbon capture technology said extensive bench testing showed the new enzyme, named 1T1, demonstrated longevity and catalytic performance that significantly surpassed the same characteristics of the best third-party enzymes currently used by the company.

CO2 has filed patent applications for

1T1, which it said will be used in its process for the efficient post-combustion capture of carbon dioxide with low-energy aqueous solvents.

The company says initial manufacturing results suggest the production cost per unit weight of enzyme protein are likely to be substantially less than other third-party enzymes.

The production of 1T1 has been outsourced, and industrial-scale batches have been manufactured.

The new enzyme will be used in upcom-

ing tests at the University of North Dakota Energy & Environmental Research Center (EERC).

1T1 was developed with financial assistance from the Industrial Research Assistance Program (IRAP).

CO2's technology is being positioned as a lower cost way to capture and use the carbon dioxide in other applications such as helping plants grow faster in greenhouses, aiding PH regulation in the pulp and paper industry, and providing carbonation for bottling plants.

## \$170M expansion for Resthaven

Will bring total gas processing capacity of Pembina facility to 300 mmcf/d

**CALGARY** — Pembina Pipeline Corp. has entered into commercial agreements to proceed with a \$170 million expansion of its recently completed Resthaven gas processing facility.

The expansion in west-central Alberta involves a new pipeline that will deliver gas into the 200-million-cubic-foot per day (mmcf/d) facility.

Pembina, a Calgary-based pipeline company, says the project is underpinned by a long-term, fee-for-service contract with Mosaic Energy Ltd., a Calgary-based developer of oil and gas reservoirs.

The gas processing part of the project is estimated

to cost \$105 million and will increase capacity by an additional gross 100 mmcf/d, bringing total capacity to a gross 300 mmcf/d. This will require a \$65 million, 28-kilometre, 12-inch gas gathering pipeline to connect the customer's condensate recovery plant to Resthaven.

Pembina said if all the partners in the existing facility participate in the project, its capital for the plant will decrease to \$75 million and its incremental net expansion capacity will be 69 mmcf/d.

Additional natural gas liquids extracted from the processed gas will be transported on the recently constructed



Pembina Pipeline's Resthaven gas processing facility.

PHOTO: PEMBINA PIPELINE

Resthaven lateral.

Service is to begin in the second quarter of 2015, followed by the gas processing expansion in mid 2016.

With the added volumes

at Resthaven, Pembina has a long-term contract with Mosaic for Phase III pipeline and fractionation capacity at the company's Redwater facility.

## AI-EES calls for next-gen energy

**EDMONTON** — Alberta Innovates – Energy and Environment Solutions (AI-EES) is making \$2 million in funding available to help develop the most promising next-generation energy storage technologies for Alberta.

AI-EES, the research, innovation and technology implementation arm for the Government of Alberta, is looking for technology providers – from Alberta and beyond – that have ideas for energy storage that will accelerate the deployment of wind and solar power.

AI-EES's target is 20% of electrical generation to come from renewable sources with an energy storage capacity equivalent to 2.5% by 2030.

Applications are due Jan. 29.

The corporation will fund up to \$250,000 per approved project. Proposals must demonstrate that the technology is applicable and well-suited for Alberta.

Visit [ai-ees.ca/opportunities](http://ai-ees.ca/opportunities).



» Forest Products

As competitors fold, Alberta Newsprint Co. adopts an innovative business strategy that quickly adapts to market conditions.

BY NORDAHL FLAKSTAD

A lot fewer daily newspapers are landing on front porches these days but that doesn't mean that the Alberta Newsprint Co. (ANC) in Whitecourt, Alta., is planning to ride off into the sunset like some of its competitors. In fact, through several projects – some of which may not seem complementary at first glance – ANC is seeking to secure its future as a pulp and paper producer. Notable among these new initiatives are a recently completed gas-fuelled electrical plant and a rail/truck fully functional trans-loading facility, both built beside the paper plant.

While showing a visitor around Alberta's first and only newsprint plant, located 160 kilometres northwest of Edmonton, ANC technical director Gary Smith quickly lists more than a half a dozen newsprint competitors that have closed down part or all of their operations in recent years. Although this obituary listing might appear to signal sales opportunities for ANC, it also points to changes publishers and their suppliers are facing as they abandon the old and seek alternative ways to reach readers and do business. (Interestingly the *Edmonton Journal* no longer offers home delivery in Whitecourt, a community of 10,000, two-hours by car from Alberta's capital.)

Natural Resources Canada recently reported demand for Canadian newsprint dropped by 9.4% in 2013, surpassing the average annual decline of 7.4% since 1999. Smith admits such statistics prompt references to buggy-whip manufacturing, yet he remains remarkably sanguine about ANC's prospects, noting: "We are still the lowest-cost producer of newsprint in North America. There is still a good market and value in what we do in supplying newspapers and there is still a need for newsprint in inserts and other products."

That optimism is rooted partly in the fact that with its current daily capacity of 800 tonnes, ANC is a relatively new plant (opened in 1990) and operates with a "slim" workforce of 200-plus employees. Although it marks its silver anniversary next year, it's still a youngster of sorts in an industry generally characterized by aging infrastructure. With its fairly modern plant, ANC was able to continue selling newsprint to dailies as they added more colour and ran higher-speed presses.

In setting up the ANC joint venture, the owners (Vancouver-based Stern Group and West Fraser Timber Co. Ltd. of Quesnel, BC) sought to use by-products – notably spruce and pine chips, from various sawmills near Whitecourt. According to Smith, ANC "vacuums up chips" that local sawmills would have incinerated. Burning them is a low-value proposition both in terms of financial return and environmental stewardship. ANC



# Betting on NEWSPRINT

## ANC DIVERSIFIES TO REINFORCE MODERN

also harvests from land accessed through its forest management agreement with the province.

Significantly, ANC's ownership chose the thermo-mechanical pulp (TMP) process rather than traditional kraft technology. TMP relies on steaming wood chips and then sending them through primary, secondary and tertiary refiners where they are aggressively ground between fast-spinning metal plates. The resulting pulp goes into a surge tank where it's mixed with hot water and stirred before the slurry heads to the four-story-high and block-long Voith papermaking machine.

Besides avoiding the bad smell associated with kraft

production, TMP lends itself to quick shutdowns – an important factor relative to installing an associated power generator. As a relatively new operation, end-of-line packaging, labelling and handling are highly automated. Although environmental standards have certainly tightened over its lifetime, the modern ANC plant was better positioned to respond to emerging environment demands, yielding a further competitive advantage. TMP also has a higher process yield producing 92% fibre versus 50% for kraft based on initial wood feed. The TMP waste stream, in the form of wood fibre and effluent-treatment solids, is spread as fertilizer on



Aerial view of ANC facility.

PHOTO: ANC



ANC's new power plant.

PHOTO: ANC



Gary Smith points to real-time power information. PHOTO: NORDAHL FLAKSTAD



Wood chip byproducts are harvested from sawmills to make the newsprint pulp. PHOTO:THINKSTOCK

barrels were shipped in the first year of operation. It's also expected to become an offloading point for sand, hydrochloric acid and other products used in nearby fracking operations.

Besides providing ANC with an added revenue stream, trans-loading allows use of an underutilized rail marshalling area once dedicated to boxcars carrying paper and newsprint to market (70% in the US, the rest in Canada). Now, most (70%) ANC newsprint leaves by truck and intermodal – reversing the earlier pattern whereby the bulk left by rail. Road transport means ANC has the added benefit of filling trucks that otherwise would deadhead down Highway 43 after making deliveries to northwest Alberta.

### Shift from coal

“For a paper mill to develop a trans-loading facility and to diversify in this way represents no easy feat,” Smith concedes. It aligns with a business plan over five years, starting in 2011, to spin off at least five thriving businesses from its existing operations as a means of countering the risks and volatility of the newsprint business.

More ambitious than the trans-loading facility is a 65-megawatt, natural-gas-fired power plant. This was commissioned at the ANC site this summer. The province has embarked on efforts, likely lasting several decades, to wean itself off coal, an abundant and major, but problematic fuel source. Alternatives, including gas-fuelled generation, have been encouraged for both base and peak loads. ANC's refiners that grind chips consume considerable electricity, which until now has been generated off-site. The electricity needed to turn seven 22,000 horsepower refiners represents a significant part of ANC's overall 125-megawatt power consumption. Fortunately, waste heat from those refining processes generates steam that's used in chip steaming and for drying the paper as it winds through multiple rollers of the papermaking machine.

Built as a turnkey operation by Caterpillar Power Plants, the new \$75-million plant will help to stave off higher transmission fees and to ensure the mill's long-term viability. It will also allow a smooth transition for the papermaking process during periods of rapidly rising power costs throughout the year. Smith explains that besides the generator offering a measure of electrical self-sufficiency, it's also geared to contribute peak-demand power to Alberta's electrical grid.

Delivery to the grid occurs once ANC receives a request from the Alberta Electric System Operator (AESO), which oversees the power grid. Using mathematical formulas that take into account multiple factors – including the cost of natural gas, the price of electricity and weather – ANC will have the flexibility to produce pulp or power, or a combination of the two.

The power plant will be controlled from the same room that now monitors paper production. A recent control-room addition is an overhead electronic ticker tape and computer screens, which flash relevant real-time information such as wind speeds at wind farms – factors that impact the availability and cost of power.

If the algorithm suggests much greater returns from producing and selling electricity compared to those of producing pulp, ANC quickly transforms to a generating station that also manufactures paper. Such a turnaround is possible partly because TMP technology lends itself to quick shutdowns and because ANC maintains sufficient inventory of finished product to bridge periods when power production takes precedence. However, the paper production is less energy intensive than pulp production, hence shutting down pulp production and depleting inventory storage while continuing to run the paper machine is a viable option.

Meanwhile, Alberta Newsprint Co. continues working on still-to-be-announced business propositions to add to its two recent economic stabilizers.

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**Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).**

## PAPERMAKING

nearby farmlands, one of several examples of how ANC benefits from its location.

Whitecourt straddles the prairies parkland region to the south and boreal forests to the north. That means there are farms nearby, but the municipality also happens to be within an oil and gas-producing area, which prompted ANC's \$1.6 million investment in a trans-loading facility opened in the spring of 2013 just east of its plant. Oil is trucked from local production batteries to the trans-loading site where it's transferred onto railway tank cars. About 10 tank cars loaded daily is fairly modest compared to similar facilities but still one million



Rolls of newsprint ready to roll.

PHOTO: NORDAHL FLAKSTAD

## Battling beetle damage ANC adds more pine to its pulp

Working the bugs out of the system assumes additional meaning for Alberta Newsprint Co. (ANC). Besides already having to adapt to a reduced demand for newsprint, Alberta-based ANC also has shown flexibility in dealing with the repercussions of mountain pine beetle (MPB) infestations.

These small black insects have destroyed extensive pine tracts in BC by clogging and destroying the conductive tissue of trees and introducing a blue-stain fungus, which blemishes pulp products, notably newsprint.

The beetles have also done damage in Alberta. As in BC, Alberta's response involves burning infected trees. A second strategy consists of logging infected but still useable stands as soon as possible. As a residual chip user, ANC was called upon to use more pine in its pulp.

“The government needed partners to help communities and safeguard employment. We're living up to our part of the bargain,” says ANC technical director Gary Smith.

ANC has used spruce and pine in a 75% to 25% pulp-making ratio. With more pine being cut in reaction to the beetle, ANC faced the prospect of using more pine feedstock. Pine with its coarser fibres – even when free of MPB – tends to produce a weaker, more-breakable pulp. It all impacts the quality of the newsprint and requires more energy for production. Furthermore, use of blue-fungus-tinted pine chips can affect product brightness.

With the beetles advancing east to Alberta, ANC launched pre-emptive strikes by turning to Voith Paper, which supplied its paper machine, and the Alberta Research Council, now a part of Alberta Innovates-Technology Futures.

Solutions came in several forms. Germany-based Voith suggested customized modifications to the newsprint machine to compensate for the disadvantages of using greater amounts of the drier pine. Drawing on investigations done by Alberta Innovates, with help of provincial funding, ANC has installed advanced instrumentation systems to analyze chip quality – including chip brightness, colour and wood species of the chip feed prior to it being turned into pulp. Gas chromatography, from chip steaming, measures the volatile portion of terpenes to provide a wood species signature.

ANC draws up a suitable on line recipe from the data to “refine” an optimal product with pulp consisting of up to 35% MPB-infected pine chips. With the beetle infestation easing somewhat, it hasn't been necessary to go that high. The average is up to about 19% blue stain in summer months.

Efforts to date, Smith suggests, “have been a success story.” And although workable solutions have been found to deal with MPB-affected chips, he cautions, “the mountain pine beetle is still a problem and expanding.”

ANC will continue to depend on its nimble footwork to stay a step ahead of this six-legged pest.



Mountain pine beetle.

PHOTO: BEATTHEBEETLE.COM

## » Better Energy Use

Innovator Bob Mitchell says carbon is not the boogeyman; Alberta could lead the world in better energy utilization.

BY LYNDA HARRISON

Alberta has the opportunity and the responsibility to lead the world in hydrocarbon utilization, and not just in reducing the CO<sub>2</sub> intensity of energy production, developing carbon capture and long-term geologic storage projects, or fuel switching from hydrocarbons to renewables. Instead, Bob Mitchell sees a world where hydrocarbons help elevate the livelihood and well-being of the globe as its population continues to increase.

“Quit running away from the climate change challenge as if it’s a threat. Look at it as an opportunity and we can do a lot,” Mitchell, senior director of innovating for performance and sustainability in ConocoPhillips Canada’s oil sands business unit, told an Oilsands Review Speaker Series breakfast.

He said that Alberta needs a flue-gas capture and carbon dioxide (CO<sub>2</sub>) commercialization centre – even a campus – where innovators can toss out their hunches, kickstart innovation in important new areas and get more value out of the province’s hydrocarbons.

“We need to give people a place to prove, to de-risk technologies so we can apply them back in a commercial space. If we do I really think the world will embrace this,” he said, noting some “really cool things” can be made from carbon-based materials.

He suggested Alberta could contribute the practice of diverting carbon from CO<sub>2</sub> into the food chain and, eventually, use excess carbon in 3D food printers, carbon-based materials for nano-filters and aerogels for electro dialysis to desalinate water.

The province could also provide advanced carbon-based insulation and building materials to create new business opportunities and capitalize on the chemical values of carbon and hydrogen, he said.

“Instead of emitting CO<sub>2</sub> and other things into the atmosphere, whether you believe in climate change or not, that is a wasted product. We need to find ways to use those products instead of just releasing them,” said Mitchell, co-founder of the Oil Sands Leadership Initiative, which has been rolled into the Canadian Oil Sands Innovation Alliance and the Sustainable Communities Initiative.

“To do that we need to embrace open innovation, captivate innovators, facilitate collaboration and help ideas become reality by bridging the technology valley of death.”

It’s up to the private sector to develop a carbon innovation campus; government is not going to take the lead on this, he said.

## » Markets

### Energy needs infrastructure Oil export growth depends on it

BY PLANT STAFF

Canada’s long-term ability to access fast-growing emerging markets will depend on an increase in energy infrastructure capacity, according to HSBC’s Global Connections Trade Forecast.

Global economic activity is expected to strengthen over the coming year, and increased momentum in the US and China should lift Canada’s exports in the short run. With global energy demand and prices expected to rise in 2015, and as Canada’s production continues to outpace domestic demand, energy producers will have ample potential to ramp up exports beyond the US market.

“Oil will contribute nearly 50% to the increase in exports



ConocoPhillips’ Ghost Pine gas battery in Morrin, Alta.

PHOTO: CONOCOPHILLIPS

# Embrace HYDROCARBONS! USE CARBON FOR LIFE-CHANGING PRODUCTS

While current uses of hydrocarbons include transportation fuels, home heating and electricity generation, higher-value uses in the future may be 3D printing, graphene, ammonia and biofuel bicycles.

### Energy efficiency focus

Graphene is a one-atom-thick miracle substance that’s stronger than steel and appears to be a super-conductor.

He said “really smart people” are focused on energy efficiency and conservation, fuel-switching hydrocarbons to renewables, reducing the energy and CO<sub>2</sub> intensity of energy production, fuel switching from hydrocarbons to nuclear and fission, capture and long-term geologic storage, and capture and enhanced resource recovery – all of which have become mainstream.

But until recently what hasn’t been pursued are air capture and conversion, flue-gas capture and CO<sub>2</sub> conversion, and higher-value uses such as materials and clean fuels – realizing there’s more chemical value in hydrocarbons than there is thermal value, he noted.

over the next two years, but between 2017-20 its share is forecast to drop below 20%,” said Linda Seymour, executive vice-president and head of commercial banking and HSBC Bank Canada.

“Canadian firms need to expand and diversify their energy export strategies if Canada is to remain a key player in the global energy market.”

She added that rail will be the key driver until 2020 after which research shows planned pipeline projects have the potential to address this challenge. With the necessary infrastructure in place, Canada will be well placed to become a global exporter of oil, rather than one primarily focused on the US.

The US currently receives 97% of Canada’s energy exports. From 2014 to 2016, exports are expected to grow 7.4%, moderating to just above 5% further out. Meanwhile, petroleum exports to China will grow by 53.7% in the same timeframe and 10% to 14% further out.

As a result, China’s 0.2% share of Canada’s fuel exports as of 2013 is predicted to rise to 0.9% in 2020 and to 2.5% in 2040. Europe will also see stronger growth of energy imports from Canada.

“We can divert carbon dioxide, from CO<sub>2</sub> into the food chain, by putting it into fertilizers [and] composting, but if you get futuristic, we could be printing using carbon molecules to actually make food like a 3D print.”

Aerogels are the world’s lightest solid materials, composed of up to 99.98% air by volume. Transparent, super-insulating silica aerogels exhibit the lowest thermal conductivity of any known solid.

Ultrahigh surface-area carbon aerogels power today’s fast-charging supercapacitors and ultra-strong, bendable x-aerogels are the lowest-density structural materials ever developed.

Mitchell said a Calgary company is using electro dialysis with aerogel filters to desalinate water. Normally desalination takes a lot of energy but it is generating electricity. “It’s a really promising technology. It was developed in the oil sands but it could be applicable around the world.”

Now, with advanced plastics and materials, he said lighter, stronger buildings might be able to deal with catastrophes such as earthquakes and hurricanes because carbon-based materials have the ability to sway better than steel and concrete do.

Hydrogen can be removed from hydrocarbons to make more hydrogen-rich fuels and other products so that the emissions are not contaminating the atmosphere and affecting people’s health, he said.

Mitchell belongs to a voluntary organization that meets after work and on weekends to advance technology and innovation.

“There is an opportunity for you to get into the open innovation world, play around, deal with people all around the world. You can use [websites] NineSigma and InnoCentive, Yet2.com ... and see what we come up with. Let’s embrace the opportunities.”

*Lynda Harrison is a writer for the Daily Oil Bulletin, a JuneWarren-Nickle publication, part of Glacier Media, which owns Business Information Group, publisher of PLANT West.*

Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca)

## » CESCO Report

Canadian Energy Supply Chain Forum highlights technology development to close productivity gaps and keep costs in check.

BY MATT POWELL, ASSISTANT EDITOR

Major energy sector players voicing growing concern related to productivity and innovation are likely to get a collective eye roll from their manufacturing sector counterparts in central and eastern Canada.

Indeed, Canadian industry's problems with both issues are seemingly neverending. But the message relayed at the 2014 Canadian Energy Supply Chain Forum in Calgary is: there's opportunity for both sides. They just need to work together.

The forum, convened by JuneWarren-Nickle's Energy Group (part of Glacier Media, which publishes **PLANT**), brings together energy companies and supply chain partners to explore long-term strategies for maintenance, repair and operations within the energy sector.

The solution lies in collaboration on technology and innovation to streamline energy supply chains, which will improve productivity and lower the cost of production, improve environmental performance and address shakiness in the job market.

Suzanne West, CEO of Calgary-based Imaginea Energy Corp., a newish oil and gas company that wants to bridge the growing gap between environmental impact and profitability, said the industry is plagued by quarter-to-quarter thinking.

"We have to start making better choices and imagine new ways of doing business...innovation needs to be part of the organizational model," she said "This can't be about the tree huggers versus the greedy capitalists anymore."

The forum was highlighted by a significant innovation stream thanks to a partnership with the Canada 3.0 event, which is produced by the Canadian Digital Media Network; TR Tech, an industry-driven, not-for-profit technology commercialization company; and JuneWarren-Nickle's. It brought along a network of technology players to discuss ways to build the new "technology supply chain" for Canada's energy industry.

"CO2 is intensifying, those numbers are going up and now more than ever we have to think about new technology," said Ian Gates, head of chemical and petroleum engineering at the University of Calgary's Schulich School of Engineering.

Public-private partnerships will drive technology adoption, he added.

"You can't build all capacity in-house."

"A call to action: building the technology supply chain for the Canadian energy industry," explored some of Canada's unique strengths and weaknesses when it comes to fostering innovation.

There also needs to be a more innovative approach to regulatory processes,



# Calling all COLLABORATORS

## INNOVATION IS KEY TO GROWTH IN THE ENERGY SUPPLY CHAIN

said Dawn Ferrell, CEO of TransAlta Corp., the Calgary-based electricity producer that operates more than 70 power plants in Canada, Australia and the US. Increased collaboration between business, society and government will move more decisions along quickly to unlock hidden potential.

She said Australia, where TransAlta is building two major projects, is a striking contrast to Canada's regulatory space.

"We'll finish these projects in 13 months. In Canada, that timeline would more likely be around 13 years," she said, adding tighter margins are compounding the problem even further.

Ferrell also believes the sector needs to develop technologies that make operations cheaper to run.

"Can you figure out if something's going to break before it does?"

### Harnessing the cloud

Developing the "Digital Oilfield," a cloud-based computing model will help the next generation of oil sands technologies, said Whitney Rockley, managing director at McRock Capital, a Toronto-based venture capital firm that focuses on Industrial Internet of Things projects.

The "Digital Oilfield" provides data to develop predictive models that enable process design and optimization, such as infield mobile technologies that identify maintenance needs and avoid downtime.

"Mobile technologies will drive the adoption of big data," she said.

Networking giant Cisco, Rockley added, estimates the Industrial Internet of Things will bypass non-industrial Internet of Things by 2017, with 76,000 new devices being connected every week.

But there's a problem, Gates said.

"There are data analytics technologies providing us with new ways to interpret data. But no one's analyzing it."

He said energy producers must rec-

ognize innovation processes in the oil sands are changing if it wants to solve cost and productivity problems.

"Innovation must be brought into the

Big data and mobile tools represent the next wave of energy sector innovation and technology.

PHOTO: THINKSTOCK

culture of your company."

The forum also launched a new Productivity Alberta initiative directed at oil sands productivity issues.

Mike MacSween, executive vice-president of major projects at Suncor Energy in Calgary and member of the board of directors at Productivity Alberta, said the Project Alignment and Delivery initiative (PADD) will address critical execution and productivity challenges.

"This is our call to action," he said. "A systems approach will facilitate change and address productivity gaps."

It aims to identify where there are opportunities to improve competitiveness across the full value chain, he added.

If the energy sector is to keep wandering hands out of its deep pockets as razor-thin margins dwindle further, it must be more collaborative to develop technologies that will cut productivity gaps and reduce its environmental impact.

West said solutions to the clinks in energy's armour require new thinking.

"Hyper-competitiveness hasn't served the industry well."

Comments? Email [mpowell@plant.ca](mailto:mpowell@plant.ca).



### HOW A LITTLE RED CAN HELP MAKE YOU GREEN.

#### "THESE DAYS, YOU HAVE TO BE PICKY."

Second-generation cucumber farmer Ron Voorberg chats with the SEW United team about the importance of choosing like-minded partners that can fully appreciate his vision of managing and growing an environmentally sustainable business that is both viable and profitable.



The SEW United Tour CONTINUES

FEATURING:  
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SEW EURODRIVE

>> Strategies

# Sustaining CHANGE

## HOW POTASH CORP. TRANSFORMED MAINTENANCE AND MADE IT STICK



Underground, moving potash.

PHOTO: POTASH CORP.

**A**dapting the company culture to change and how to manage it is challenging enough, but it doesn't end there. Change has to stick.

Implementing and sustaining it was the topic of a joint presentation at the MainTrain conference in Calgary presented by the Plant Engineering and Maintenance Association of Canada.

Javier Sanchez, manager of change management for Saskatoon-based Potash Corp., the world's largest fertilizer company (by capacity), and Doug Stretton, a manager with PwC's People and Change Practice, offered suggestions on how to implement change and sustain it.

The large-scale maintenance transformation project at the mining company, enabled by a single software implementation across multiple sites, allowed employees to leverage new tools and maximize the return on investment.

"Change management is a structural approach to help individuals accept and embrace a transition from a current state to a desired future state," said Stretton, director of PwC's Enterprise Asset Management Practice and a subject matter expert (SME) with specialized knowledge in maintenance and supply chain business processes.

He stressed the benefits of change management depend on people's ability to follow aligned processes and use the system. In Potash Corp.'s case, it was a given that the work in the maintenance, procurement and inventory functions would change significantly.

The change management strategy was to help employees eagerly accept the transition from different business processes to an aligned process and a single enterprise

asset management (EAM) system. This strategy followed a logical route from first contact, creating awareness and fostering understanding, to engagement, enabling people, and commitment to continuous improvement.

### Creating a simple system

Each of the company's 16 sites had a different business process for maintenance, procurement and inventory. The challenge was to align these individual business processes into a single system.

During the first year (2012-2013) the company went from design to construct to implement, starting with business process alignment, a software solution, system configuration, and then testing, training, set-up support mechanisms, schedules and site preparation.

During the second year (2013-2014) the company went through the implementation process with a deployment schedule driven by data collection and conversion, and by operational requirements.

This involved developing leadership at all levels, from senior executives and site management to front line positions. It also involved improving leadership buy-in and understanding the aligned processes and the proposed single EAM system.

It was necessary to create a change champion network plus awareness of, and interest in the EAM initiative as a priority for maintenance. That's why it was so important to ensure the initiative was marked by clear and frequent project team communication.

The strategy ensured EAM stakeholders improved their understanding of how processes are changing and what the benefits of the new tools would be. This was accomplished by comprehensive system and process training at all sites.

To sustain the change:

- leaders from all areas are enabled and eager to support it;
- there's a change champion network at every site;
- training is an ongoing activity;
- a tiered support model is in place; and
- all sites are leveraging the new processes, software and systems.

As a result, Potash Corp. is now enjoying the benefits of a transformed maintenance department.

— Contributing editor Steve Gahbauer



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## » Litigation



# The legal costs of CLIMATE CHANGE

## ENERGY COMPANIES COULD BE ON THE HOOK FOR BILLIONS IN DAMAGES

BY PLANT STAFF

Are the decades of what critics would describe as slack environmental efforts finally catching up with Canadian oil and gas companies?

A report makes that claim, suggesting advances in climate change science are altering the legal landscape concerning climate damages to create a major liability for Canadian energy companies from foreign and domestic judgments.

*Payback Time? What the internationalization of climate litigation could mean for Canadian oil and gas companies*, by the Canadian Centre for Policy Alternatives (CCPA), a centre-left think tank, and West Coast Environmental Law (West Coast). It considers total potential liability of five oil and gas companies – EnCanada, Suncor, Canadian Natural Resources, Talisman, and Husky Energy – and concludes they could be incurring a global liability as high as \$2.4 billion per year for their contribution to climate change.

The study, by Andrew Gage, staff counsel at West Coast, and UBC professor Michael Byers, joins a body of research that considers how the law might be used to recoup the costs of climate change from companies that contribute to it.

“As with tobacco companies in the 1980s, these producers are confident the law will not hold them responsible for these damages,” says Gage. “But rising levels of climate damage, increasing scientific evidence about the links between emissions and the damage they cause, and an emerging public debate about who is financially responsible for this damage, could change the situation very quickly.”

### Climate change litigation

Because the impacts and causes of climate change are global, climate damages litigation could take place in, and apply the laws of, any of the countries where damage occurs. These countries may also choose to adopt new laws clarifying the legal rules around climate damages litigation, much as Canadian provinces did to facilitate tobacco litigation. As a result, large-scale greenhouse gas producers and their shareholders are exposed to significant legal risks that will only grow into the future.

Energy companies need to consider how to manage the risk of climate change litigation.

PHOTO: THINKSTOCK

“Substantial shifts will be required of large-scale greenhouse gas producers and their investors if they hope to manage the risk of climate damages litigation, such as moving away from fossil fuels, and supporting the adoption of international agreements that could link the reduction of liability risk to the provision of financial assistance or future emission reductions,” says Byers.

The National Roundtable on the Environment and the Economy (now shut down) pegged the costs of climate change at \$5 billion annually by 2020. A report by the commission revealed

Canada was nowhere near the Harper government’s goal of reducing emissions by 17% from 2005 levels by 2020.

Scientists are also honing in on the sources of greenhouse gases. Research from the Climate Accountability Institute in Snowmass, Colo. has narrowed the source of two-thirds of all carbon emissions from 1854-2010 to 90 private and state-owned corporations, including the five based in Canada.

The study concludes civil liability for large-scale greenhouse gas emitters is extremely likely, particularly as the costs associated with climate change rise.

Download a copy of the report at [www.wcel.org](http://www.wcel.org).

Comments? E-mail [mpowell@plant.ca](mailto:mpowell@plant.ca).

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# C I E N

CANADIAN INDUSTRIAL EQUIPMENT NEWS

» Additive Manufacturing

## GUARDIANS of the GALAXY in 3D

STRATASYS TECHNOLOGY KEEPS THE UNIVERSE SAFE



The Star Lord's helmet, made from various 3D-printed parts.

PHOTOS: STRATASYS

Objet500 Connex multi-material 3D printers revolutionize the production of costumes and props.

Guardians of the Galaxy, the latest addition to the comic book/super hero/science fiction genre, has established itself as a franchise, thanks to a box office take (since August 1) of more than \$770 million worldwide.

Props and costumes were key to this space yarn's "awesome" effects, an area in which Stratasy Ltd., a 3D printing and additive manufacturing provider (based in Minneapolis and Rehovot, Israel), played a starring role.

UK movie costumes and props spe-

cialists FBFX Ltd. created various 3D printed pieces including the entire armour outfit for the character, Korath, played by Djimon Hounsou.

Grant Pearmain, director of costume and props at FBFX, said it was produced almost entirely using Stratasy's Objet500 Connex multi-materials 3D printers and represents the first time the company has produced a fully 3D-printed costume worn in a movie.

The same Objet500 Connex technology produced the memorable Star Lord helmet worn by lead-actor, Chris Pratt. Several prototypes were 3D-printed, and vacuum-cast versions were created from a 3D-printed mould. The actual prop worn in the movie featured 3D-printed interior and exterior detailing using Stratasy's VeroGray material.

Pearmain said 3D printing technology has improved quality and accelerated turnaround times compared to traditional methods involving model makers working with clay. The company now uses 3D printing in 90% of its projects – a leap from 10% four years ago.

"We know exactly what the 3D printed piece will look like, regardless of how many pieces we're producing," he explained. And there was at least a 50% savings on lead times.



Korath (Djimon Hounsou) looks positively galactic in this fetching, fully 3D-printed armour ensemble.

Time savings allow Pearmain and his team to go from design to virtually complete, accurate prototypes in a few days, rather than a few weeks. FBFX now shows highly detailed pieces to production companies more quickly and turns around pieces faster for directors' sudden demands for camera tests.

It also allows teams in different countries to work on the same project.

"We will often receive digital files from concept designers in Los Angeles that we finalize and 3D print via our service bureau IPF, with whom we've collaborated on a number of major motion pictures," he explains. "Similarly, we might send concept files to the team there to tweak and return for outputting here."

Stay tuned for the inevitable Guardians follow-up to see what otherworldly wonders are manufactured in 3D.

*This article is an edited version of a contribution provided by Stratasy Ltd.*

Comments? [jterrett@plant.ca](mailto:jterrett@plant.ca).

» Plantware



Improves application performance.

### FACTORYTALK REFRESHED

Rockwell Automation has updated its FactoryTalk ProductionCentre manufacturing execution system (MES) software to improve application performance and scalability, speed up deployment, and support mobile and cloud infrastructures.

The latest Java Enterprise Edition 7 (EE7) standards reduce development and deployment while maintaining adherence to open standards.

New HTML5 user interfaces run in a web browser, easily integrating into an HMI terminal for implementation across multiple networks without local installation.

The I/O server supports clustering and load balancing servers can be assigned a single IP address, so more are added as the data load grows.

The I/O server also provides store and forward services for controlled, real-time data exchange with remote or cloud-based databases.

Rockwell Automation Inc. is a developer and manufacturer of automation technology based in Milwaukee, Wis.

[www.rockwellautomation.com](http://www.rockwellautomation.com)



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### GoTo REXROTH PRODUCTS

Bosch Rexroth's GoTo Products app accesses the GoTo Focused Delivery Program provided by the industrial products manufacturer for a range of electric drives and controls, hydraulics, linear motion and aluminum structural framing products.

Link in using an iPad, iPhone and Android devices for specific pricing and sales contact information.

It also provides useful how-to videos, podcasts and technical information. Users can easily share content to social media channels directly through the app and its resources feature allows users to save frequently accessed content.

Bosch Rexroth Canada is based in Burlington, Ont.

[www.boschrexroth.ca/GoTo](http://www.boschrexroth.ca/GoTo)

ANSI/RIA R15.06-2012-compliant.

**MATERIAL HANDLING**

**ROBOT HANDLES HEAVY LOADS**

The Motoman MA3120 arc welding robot from Yaskawa Motoman has an extra-long reach arm that reduces the need for tracks to deliver twice the payload of the previous model.

Available in floor-, wall- or ceiling-mounted configurations, it's used in workcells with larger workpieces and for applications that require access to parts in tight spots or possible interference from fixtures.

The robot, compliant to ANSI/RIA R15.06-2012 and other relevant ISO and CSA safety standards, has a 6-kg payload, 3,121-mm horizontal reach and ±0.15 mm repeatability. Integrated through-the-arm cabling eliminates interference, simplifies programming and reduces wear.

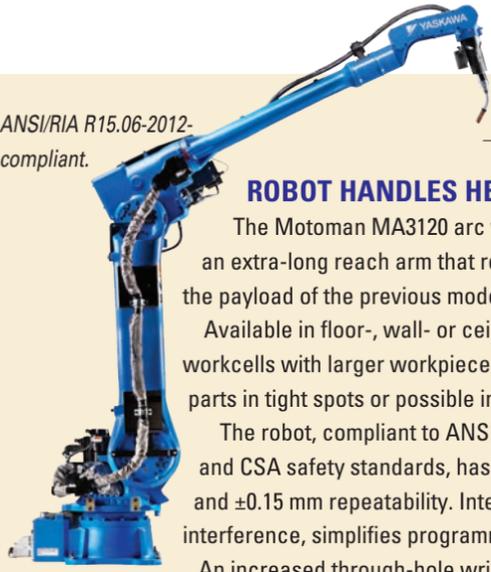
An increased through-hole wrist diameter makes it easier to integrate pull-torches or welding sensors. Welding utilities are routed through the robot base and the wire feeder mounts to the upper arm to reduce torch length.

It uses a DX200 controller that handles multiple tasks and controls up to eight robots (72 axes), I/O devices and communication protocols.

An I/O suite includes integral PLC and HMI pendant displays, high-speed ethernet communication, 4,096 I/O addresses and a graphical ladder editor that monitors system level control.

Yaskawa Motoman is a robotics automation manufacturer based in West Carrollton, Ohio.

[www.motoman.com](http://www.motoman.com)



**PUMPS**



*Wear resistant.*

**METERING PUMPS HANDLE HARSH MATERIALS**

Fluid Metering Inc.'s (FMI's) V-300 variable speed metering system and CeramPump valveless rotating and reciprocation piston pump provide drift free fluid control and eliminate the need for check valves, which clog, leak or fail over time.

Internal, chemically inert components are wear resistant and dimensionally stable.

The V-300 control unit is used manually, but also accepts industry standard electronic control signals from process instrumentation. Along with electronic speed control, the pumps are capable of manual displacement adjustment.

They're also available in a duplex design with independent pump head adjustment for proportional mixing and diluting.

FMI is a manufacturer of metering pumps and dispensers based in Syosset, NY.

[www.fmipump.com](http://www.fmipump.com)

**PIPES**

**PIPING SYSTEMS HANDLES HARSH CHEMICALS**

GF Piping Systems' ecoFIT polyethylene piping system handles a range of applica-



*Safety and reliability.*

tions thanks to a welded system that resists chemical and abrasion in harsh industrial applications.

Operating in temperatures between -50 to 60 degrees C, the lightweight system is UV and weather resistant. Sizes range from 2 to 36 in. IPS, SDR11 and SDR17, and metric size ranges from 20 to 250 mm. A range of components includes valves and connection options that install easily.

The system installs with joining technologies that include infrared butt fusion, contact butt fusion and electrofusion. Built-in electro-fusion coils and a visual fusion indicator show when a joint has been completed and integrated fasteners allow for pre-assembly system dry-fit.

GF Piping Systems is a supplier of plastic pipes and fittings based in Irvine, Calif.

[www.gfps.com](http://www.gfps.com)

**AUTOMATION**



*Manages all processes.*

**ONE STOP FOR HMI**

Human-machine interfaces play a key role when choosing manufacturing equipment. Rittal's one-stop support arm and housing system has a programmable logic controller that manages all processes with a human-machine interface that includes a panel PC and a touch screen to operate the equipment and monitor current status.

The set-up, for example, by engineering specialist Laempe & Mössner (a manufacturer of several lines of core shooters) to equip its core shooting machines includes an emergency off switch, signal pillars, valves and a pressure indicator in compact housings from Rittal's Comfort Panel range.

Each housing is divided into three sections with the panel PC mounted in the centre, while the lower third accommodates the switches, signal pillars and other control and display elements. The top part contains pressure and vacuum indicators, plus valves to control the pneumatic and vacuum systems. This arrangement and a spacious housing layout allows a significant degree of standardization.

Rittal's CP 120 support arm system mounts the housing securely on the machine.

Rittal GmbH & Co. KG, based in Herborn, Germany, provides systems for industrial enclosures. Rittal Systems Ltd. has offices in Mississauga, Ont.

[www.rittal.ca](http://www.rittal.ca)

**PACKAGING ON THE FAST TRACK**

B&R Automation's reACTION technology reduces response times in industrial automation applications down to 1 µs, allowing extremely time-critical subprocesses to be managed using standard hardware within the requirements of IEC 61131.



*Reduces response times.*

The system cuts costs and enhances performance by reducing the load on the controller and optimizing performance to match high-end packaging machines demands.

Digital output patterns are controlled with a resolution of 125 ns, and fast input edges such as registration marks or product detection are recorded with a

timestamp of 1 µs.

For example, high-speed packaging machine functions such as code stamping and bad product rejection combine reACTION and NetTime technologies to synchronize motion control and distributed I/O to achieve absolute precision.

B&R is a manufacturer of industrial automation products based in Atlanta.

[www.br-automation.com](http://www.br-automation.com)

**WIRING**



*Crimp-free, push-in butt splice.*

**SPICELINE CUTS CONNECTION TIME**

Ideal Industries' SpliceLine in-line wire connector provides an alternative to traditional butt splices with a push-in version that eliminates time-consuming crimping, soldering or heat shrinking.

The connectors, rated to 32 A, install easily on wires from 0.5 to 2.5 mm in diameter.

They're rated to EN 60998-1 and EN 60998-2-2 connecting device standards and are BS 7671:2008 compliant.

SpliceLine's two ports support industry standard solid and stranded wires, allowing a single connector to take the place of three standard butt splice sizes.

The ultra-slim connectors are made of a transparent polycarbonate for easy visual inspection, pass easily through 1/2 in. knockouts found in most electrical boxes.

Ideal Industries is a manufacturer of connectors, hand tools, and instrumentation based in Chicago.

[www.idealindustries.com](http://www.idealindustries.com)

» **Events**

**Cargo Logistics Canada Expo+Conference Informa**

**Jan. 28-29, Vancouver**

Speakers will discuss issues relevant to the entire freight spectrum. CLC also includes exclusive distribution centre tours, networking events and a supply chain tradeshow. Visit [www.CargoLogisticsCanada.com](http://www.CargoLogisticsCanada.com).

**STLE 70th Annual Meeting & Exhibition STLE**

**May 17-21, Dallas**

The Society of Tribologists and Lubrication Engineers (STLE) conference showcases more than 400 technical papers, application-based case studies and best practice reports, and discussion panels on technical or market trends. Visit [www.stle.org](http://www.stle.org).

**Motor & Drive Systems 2015 ISA**

**Jan. 21-22, Orlando, Fla.**

Sponsored by the International Society of Automation (ISA), the 12th annual conference focuses on technical advancements impacting the design and integration of motor, drive systems and motion control for manufacturing. Visit [www.e-driveonline.com/conferences](http://www.e-driveonline.com/conferences).

**Asset Reliability CI Energy Group**

**Feb. 4-5, Edmonton**

Processes and strategies needed to drive best reliability practices. Visit [www.canadianinstitute.com/2015/268/asset-reliability](http://www.canadianinstitute.com/2015/268/asset-reliability).

**Shutdowns Fort McMurray CI Energy Group**

**March 3-4, Fort McMurray, Alta.**

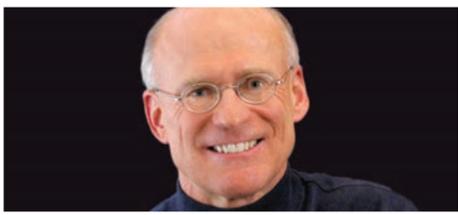
Sawridge Inn and Conference Centre The 4th annual conference covers the delivering of shutdown projects that meet budget, stay within targeted timelines and put safety at the forefront. Visit [www.shutdownsfortmurray.com](http://www.shutdownsfortmurray.com).

**ISA Convention ISA**

**April 25-28, Cleveland**

**Cleveland Convention Center/Westin Cleveland Downtown**

The International Society of Automation (ISA) annual conference is for distributors, manufacturers/suppliers, industrial manufacturer representatives and service providers in MROP. Visit [www.isapartners.org/events/annual-convention](http://www.isapartners.org/events/annual-convention).



# Keep your dirty oil, just send the cheque

BY GWYN MORGAN

New Brunswick's recent election campaign featured starkly different visions of how to lift the province's moribund economy. The governing Progressive Conservatives saw unlocking shale gas resources as a job and wealth-creating opportunity while the Liberals, playing on fears instilled by anti-fracking protestors, promised increased infrastructure spending.

In a choice between building wealth and building debt, frack-fearing voters

## “Adding fuel to these sentiments is opposition to Trans Canada’s critically needed Energy East Pipeline...”

chose debt. Just days after newly elected Liberal Premier Brian Gallant vowed to institute a moratorium on hydraulic fracturing for natural gas, Nova Scotia introduced legislation prohibiting fracking. Yet a report by a government-appointed commission that acknowledged unlocking shale gas resources could bring billions of dollars into the province's economy and recommended baseline monitoring with effective and

enforceable regulations.

The two Atlantic provinces have joined Quebec in shunning a technology that has one of the most impressive industrial safety records ever compiled. In the US, where some 1.2 million wells have been hydraulically fractured over the past 60 years, the Bureau of Land Management and the Environmental Protection Agency have found no supportable evidence of fracture induced water contamination.

In Canada, more than 200,000 wells have been fractured in Alberta, BC and Saskatchewan with a similarly sterling record.

News that these eastern provinces are shunning technology that helps generate the funds they receive through Canada's equalization program is stirring an undercurrent of resentment in the West. Letters on editorial pages echo an “OK in our back yard, but not in yours” sentiment while a “no fracking-no cheque” quip went viral on the internet.

Adding fuel to these sentiments is opposition to TransCanada's critically needed Energy East Pipeline, which would move oil sands production – so called “dirty oil” – through Quebec and New Brunswick to international export markets. Led by environmental NGO's, the same groundless apocalyptic rhetoric used to foment opposition against hydraulic fracturing is being adopted against Energy East.

### Jobs at risk

Matthew Abbott of the Conservation Council of New Brunswick alleges, “The Energy East pipeline would put thousands of fishery jobs at risk.” Greenpeace campaigner Patrick Bonan pronounces “Quebec should not have to assume the risks . . . which only serve the interests of oil companies.” Here again, the message that Westerners hear is, “Keep your dirty oil, just send us the cheques.”

Of course, Canada's equalization system doesn't actually involve “have provinces” sending cheques to “have-not” provinces. But in practice that's what happens, through the federal treasury. The system ties equalization grants to per-capita “fiscal capacity.” Unlocking shale gas and oil sands resources results in a higher fiscal capacity for BC, Alberta and Saskatchewan, which means higher tax payments to the federal treasury. The money is redistributed to lower fiscal capacity provinces including Quebec, Nova Scotia and New Brunswick. Without natural gas and oil sands revenues, those funds simply wouldn't be available for redistribution.

Quebec's fiscal plan for 2014-15 would project a deficit of \$11.7 billion without a \$9.3 billion equalization payment. New Brunswick's deficit would jump to \$2.1 billion from \$400 million without an equalization payment of \$1.7 billion. Nova Scotia's deficit minus an equalization payment of \$1.6 billion would jump to \$1.9 billion.

Without gas and oil funded equalization payments, the three provinces would have little choice but to make dramatic cuts to healthcare, education and social programs. Perhaps then, gas well fracturing and “dirty oil” might not seem so awful anymore.

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

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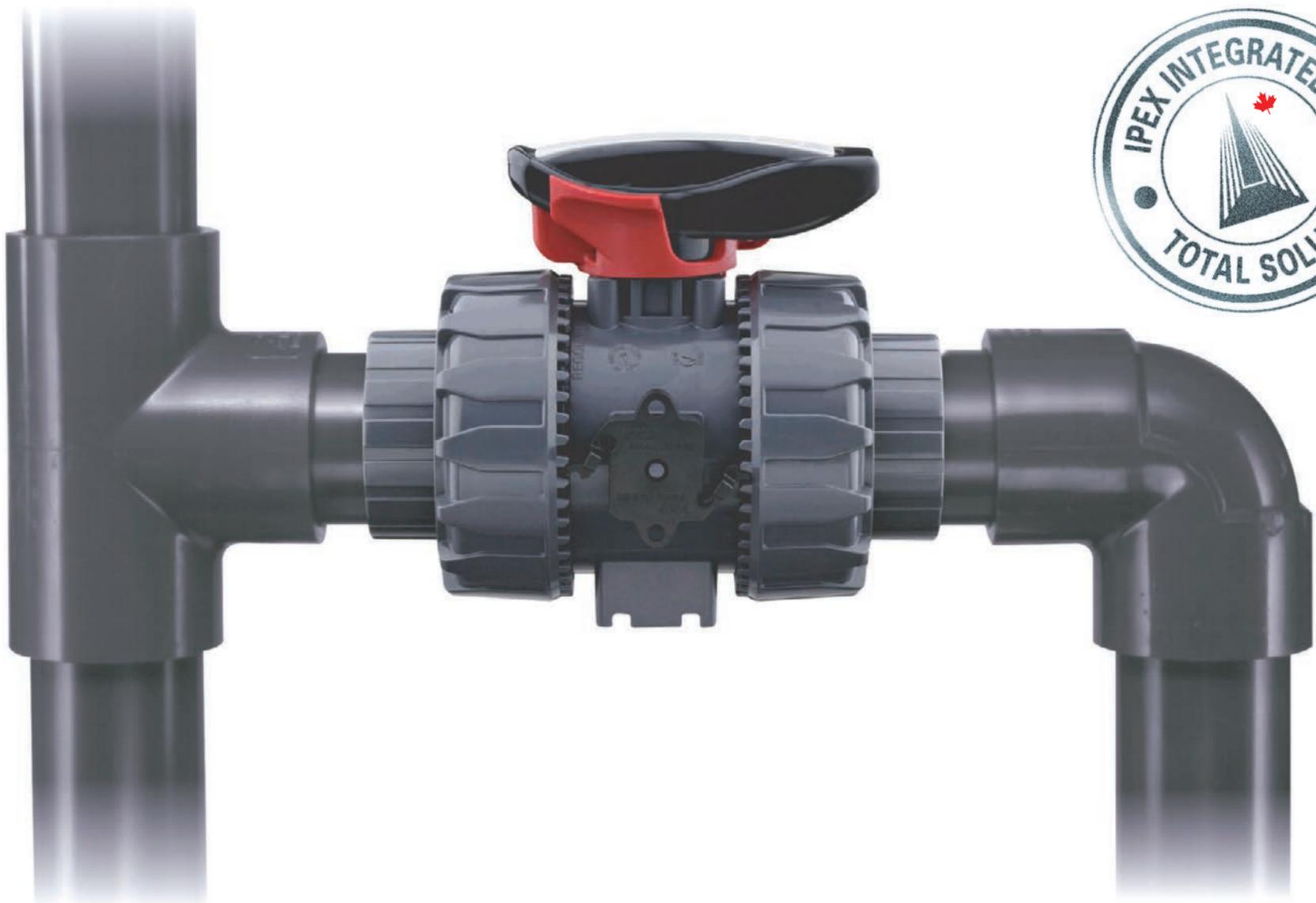
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