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2022/2023

Oil & Gas Report

Highlighting the different facets of B.C.'s oil and gas industry



Restoration work at an all-time high

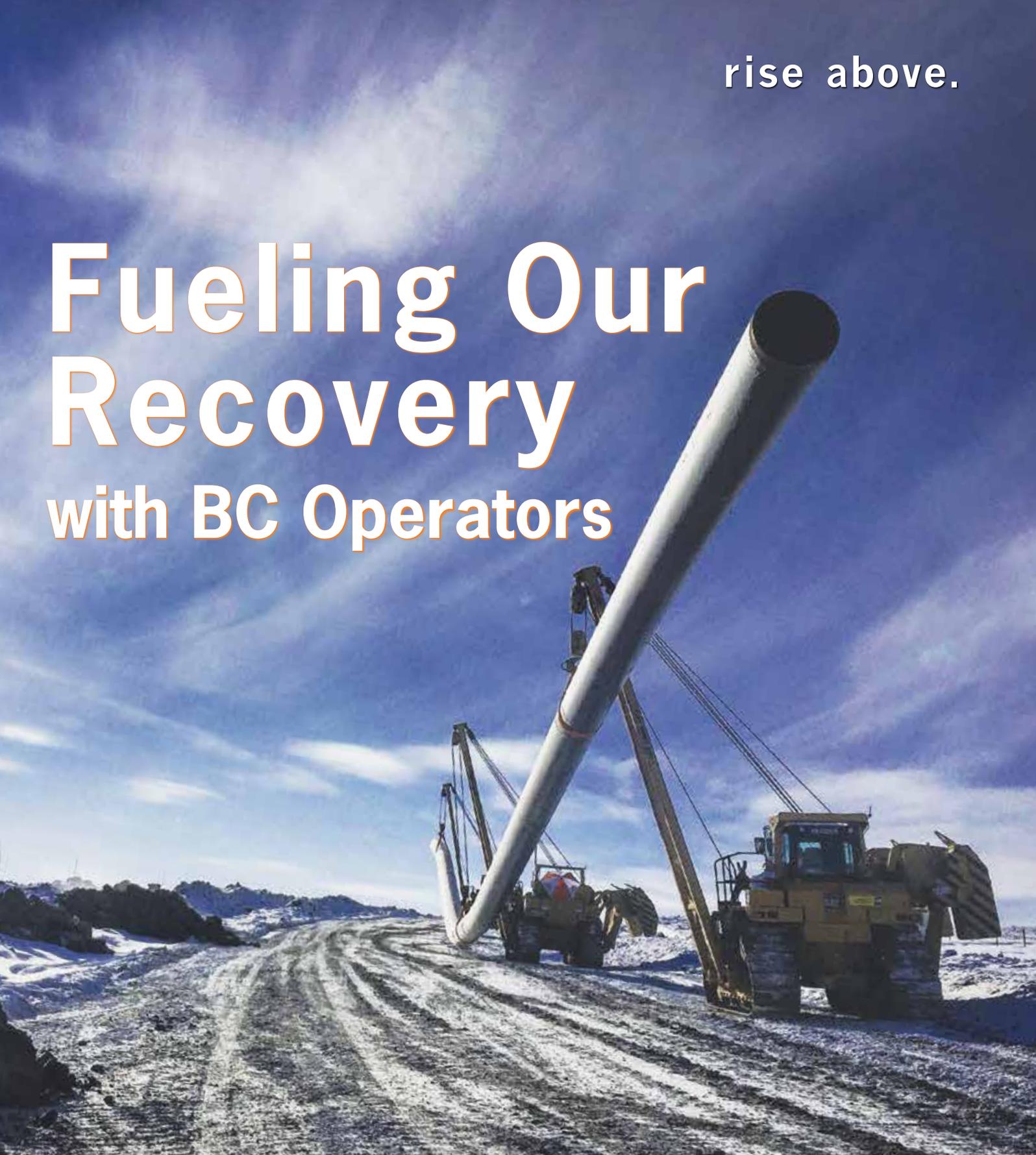
Increased drilling activity forecasted for 2022

Advanced technology changing the game for pipeline integrity

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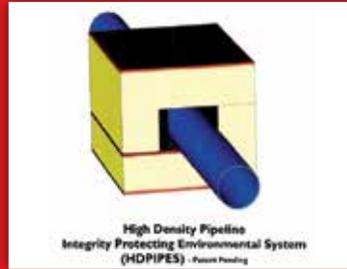
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Message from the editor

“The progress we have made over the past two years is remarkable when you consider the unforeseen challenges we have faced including the global pandemic, wildfires, and flooding,” says Ian Anderson, president and CEO of Trans Mountain Corporation. An excerpt from the progress update on the Trans Mountain Expansion Project (page 10), but something that rings true for the entire sector and province.

In the 2022/2023 *B.C. Oil and Gas Report*, the province's energy regulator, the B.C. Oil and Gas Commission reports on restoration work in B.C., the Petroleum Services Association of Canada provides their drilling activity forecast for 2022, and we also hear from the Canadian Association of Petroleum Producers and the International Brotherhood of Boilermakers union. This issue also provides insight into the Ksi Lisims LNG Project, a proposed 12-million-tonne-per-year LNG project on the northern tip of Pearse Island on the Portland Canal, west of Gingolx, B.C.

We hope you enjoy this issue of the *B.C. Oil and Gas Report*, and please contact us if you have any questions, comments, or ideas.

Tammy

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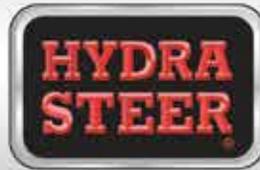


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Restoration work at an all-time high in B.C. for 2021



In B.C., companies are responsible for cleaning up oil and gas sites when they've reached the end of their productive life and returning the land back to a natural state. The BC Oil and Gas Commission collects a levy to ensure that clean up is paid for by industry.

If a company goes bankrupt or cannot be located before properly decommissioning and reclaiming its sites, the Commission steps in by designating the wells, facilities, pipelines, and associated areas as "orphans". This designation ensures the restoration work is done to strict standards and within a set timeline.

Last year was a banner year for orphan site restoration—with two-thirds (65 per cent) of B.C.'s 766 orphan sites decommissioned and 18 per cent reclaimed.

In addition to the planned \$30 million

collected from levies on oil and gas operators to restore orphan sites, B.C. received \$15 million from the federal government's COVID-19 stimulus package in April 2020, to help accelerate orphan site restoration.

The Orphan Sites Supplemental Reclamation Program (OSSRP) is now complete and all of the \$15 million has been spent. The total \$45 million for all programs between April 2020 and March 2021 went toward completing work on 515 sites. Of those:

- 106 sites had wells abandoned and/or equipment decommissioned;
- 120 sites underwent investigation activities;
- 21 sites underwent remediation activities;
- 70 sites had reclamation activities completed.

Abandoned/decommissioned means the well has been permanently plugged downhole with cement and the well head cut and capped, making it safe for the public and environment.

Remediation activities may include the removal and transport of contaminated soil to a licensed facility for disposal and/or treatment, to ensure environmental protection. Reclamation is the final phase of site restoration, where a site's soils are recontoured and planted to meet appropriate land use productivity standards.

Many Indigenous communities refer to this process as "healing the land" and to do this properly, their traditional knowledge, skills, and support throughout is necessary. The Commission continues to engage with Indigenous communities to discuss the restoration of oil and gas sites, as part of our commitment to reconciliation.

Almost 20 per cent of the orphan program's \$45 million was directed

to Indigenous-owned companies. There are seven Indigenous-owned contractors that have completed restoration work on orphan sites, as well as additional local service providers that have partnerships with Treaty 8 Indigenous communities.

In addition to the significant work completed in 2020/21, the Commission was on track to complete an additional 536 projects on 325 orphan sites

by March 31, 2022, funded by an \$18-million program that was sourced from the industry-paid orphan levy and surrendered security.

If you'd like to learn more about the restoration work completed in 2021, including photos of the sites worked on and interesting facts about each area, check out the Commission's new Orphan Report page at www.bcogc.ca. ■



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Improvements and enhancements to the Trans Mountain Expansion Project is building legacy for Canadians

As we enter the second half of construction on the Trans Mountain Expansion Project, and after more than a decade of review, engagement, planning, and

engineering, this complex and large-scale project is making steady progress and setting new standards for major pipeline project execution, while overcoming significant challenges and obstacles.

Trans Mountain has completed a full review of its project schedule and cost estimates. With all work fronts now active, mechanical completion of the project is anticipated to occur in the third quarter of 2023. The total project cost has increased from \$12.6 to \$21.4 billion. This estimate includes the costs of all known project enhancements, changes, delays, and financing, including impacts of the COVID-19 pandemic and the substantial preliminary impacts of the November 2021 floods in the Hope, Coquihalla, and Fraser Valley areas.

“The progress we have made over the past two years is remarkable when you consider the unforeseen challenges





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In addition, Trans Mountain will make payments to British Columbia of between \$25 million and \$50 million annually, for a total contribution over a 20-year period of up to \$1 billion.

we have faced including the global pandemic, wildfires, and flooding,” says Ian Anderson, president and CEO of Trans Mountain Corporation. “At every step of the way, we have found solutions and responded. As a result, the project is advancing with significantly improved safety and environmental management, and with a deep commitment to ensure this project is being built the right way.”

Notwithstanding the cost increase and revised completion schedule, the business case supporting the project remains sound. Canada will benefit from the economic and tax contributions

made by the project once it is in operation. Trans Mountain will pay billions in taxes and royalties to the federal and provincial governments through the construction and operation of the project over the next 20 years. In addition, Trans Mountain will make payments to British Columbia of between \$25 million and \$50 million annually, for a total contribution over a 20-year period of up to \$1 billion. These funds are to be used by the B.C. Clean Communities program to fund local environmental projects in the province. In addition, Trans Mountain has negotiated agreements with local governments across B.C. and Alberta

dedicating more than \$16 million to community legacy projects such as trails and recreational infrastructure improvements that will have positive and lasting impacts on the lives of thousands of Canadians.

The project proudly embodies unprecedented levels of involvement and shared decision making with Indigenous Peoples and communities. Through job creation, procurement opportunities, partnerships, and involvement in the environmental management and oversight process, long-term legacy and economic benefits for Indigenous Peoples are being created. Approximately 11 per cent of the project workforce is Indigenous and Trans Mountain has close to 4,000 contracts with Indigenous businesses and partnerships worth over \$2.7 billion.

Route changes and new construction techniques have been undertaken as a result of continuous Indigenous engagement and the project now has Mutual Benefit Agreements (MBA's) with 69 Indigenous communities.

The overall change in project costs is summarized by the following material impact areas: Project enhancements, scheduling pressures, safety and security requirements, financing costs, as well as other external challenges including the COVID-19 pandemic and the impacts of the 2021 B.C. flooding.

Project enhancements total approximately \$2.3 billion of the increase. This includes a substantial increase in trenchless construction activity, significantly more MBAs with Indigenous communities that provide enduring economic benefits, the installation of advanced leak detection systems, and new unplanned scope and route changes that avoid culturally and environmentally sensitive areas.

Schedule pressures total approximately \$2.6 billion of the increase and include permitting processes required for the several thousand permits that are required for the project, and significant construction challenges in both marine and difficult terrain which have extended the schedule into late 2023.

The project has had to contend with generational events such as the COVID-19 pandemic and recent extreme weather in B.C. These events, combined with contractor productivity shortfalls in some areas, have resulted in a \$1.7 billion increase. The combined effects of extreme weather and COVID measures is approximately \$1.4 billion.

Safety and security requirements total approximately \$500 million of the increase. These cost impacts include the voluntary two-month stand-down across the project in late 2020, including

the related termination and replacement of a major construction contractor; additional safety and security measures across the project; and worker safety measures during the extreme heat and fires in B.C. last year.

Financing costs have increased by approximately \$1.7 billion. The increase in financing costs will be incurred due to the increased cash expenditure

required to construct the project and the extended construction schedule. Financing costs include interest paid to Trans Mountain's owner for money borrowed for the project as well as an imputed non-cash cost of equity capital provided by the owner of the project.

For more updates on project construction, visit www.transmountain.com. ■

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PSAC forecasts increased drilling activity for 2022



In its 2022 Canadian Oilfield Services Activity Forecast, the Petroleum Services Association of Canada (PSAC) expects a total of 5,400 wells (rig releases) will be drilled in Canada in 2022. The Association is also lifting its 2021 forecast due to improved activity in the second half of the year.

“For 2022 we expect drilling activity to be higher than 2019. But, although we’ll be back to pre-COVID levels, we’re not going to be near where we were pre-downturn,” says Gurpreet Lail, President and CEO of PSAC. “Global supply-demand imbalances are leading to higher commodity prices, and we expect drilling activity to increase out of necessity. However, at the same time, we’re also seeing a severe labour shortage, which has the potential to impact how much growth the industry can achieve in the coming year.”

The final revised forecast for 2021 predicts a yearly total of 4,650 wells drilled. PSAC based its final 2021 forecast on average natural gas prices of \$3.60 CDN/mcf (AECO), crude oil prices of US\$67/barrel (WTI), and the Canadian dollar averaging \$0.80USD. PSAC’s forecast for 2022 has the WTI price at an average at \$70/barrel, and AECO natural gas average at \$4.10 CDN/mcf.

“Although the activity outlook is brighter than a year ago, exploration and production (E&P) companies are not deviating from strict capital discipline and are staying the course on preferring share buybacks, paying down debt, and increasing or issuing dividends,” says Lail.

On a provincial basis, PSAC estimates the following drilling activity for 2022:

- 3,125 wells in Alberta, representing a year-over-year increase of 450;
- 1,495 wells for Saskatchewan, an increase of 198 wells;
- 605 wells in British Columbia, a year-over-year increase of 79 wells from 526 drilled in 2021;
- 160 wells drilled in Manitoba, up 21 wells from the 139 drilled in 2021; and

- 15 wells expected for Eastern Canada, up from 13 wells the previous year.

Similar to 2021, the majority of activity is expected to occur in the Montney and Viking formations.

“The pandemic brought an extraordinary level of challenge to an already tense industry environment,” says Lail. “Through this difficult time, PSAC members supported our industry partners to produce essential oil and gas products. Those products warmed and brightened our homes – and our home offices — and enabled the manufacture of the many products that kept our hospitals, health care workers, and all Canadians safe.”

PSAC and its members know that Canada can be a world leader in responsible energy development.

“For decades, companies within our sector have made huge investments to advance innovation for sustainable oil and gas development, including lower GHG emissions,” says Lail. “However, the point of view that hydrocarbons can’t be any part of a sustainable future – even with responsible production and new carbon technologies – is a major setback for Canada and for our industry.”

To ensure Canadians get the benefit from our oil and gas resources, PSAC calls on all levels of government to come up with coherent policy approaches. And that includes clear policies to advance opportunities in carbon capture, utilization and storage, and policies for commercial development of blue hydrogen from natural gas.

PSAC is the national trade association representing the service, supply and manufacturing sectors within the upstream petroleum industry. PSAC is Working Energy and as the voice of this sector, advocates for its members to enable the continued innovation, technological advancement, and in-the-field experience they supply to energy explorers and producers in Canada and internationally, helping to increase efficiency, ensure safety, and protect the environment. ■

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For pipeline owners and operators, the risks are real. Pressure is mounting: rigorous and complex regulations, price volatility, environmental crusades, and even unpredictable weather and geohazards are writing a new chapter for oil and gas.

But thanks to forward-thinking companies for embracing digitalization to better manage their assets and mitigate risks—whether it's for designing, building, or operating a pipeline—they get to author the future.

Monitoring and mitigation

Pipeline integrity and maintenance programs are nothing new, but the way we can acquire the critical data is.

“More traditional methods for site visits and planning, including deploying large crews on foot, can be challenging,” says Mohamed Attia, Director of Pipeline Integrity & Advanced Technology, GeoVerra. The planning before data capture is detailed and intense, and the process itself is slow, with crews taking all the pictures by hand and working carefully to access hard-to-reach areas.

“We often work with hundreds of kilometres of pipeline under the ground, in the bush or hard-to-access terrain,” says Attia. “Sometimes because of the terrain or type of soil, it can't be accessed in the summer at all by crews.” Data capture becomes expensive, time intensive, and wrought with safety concerns.

Knowledge, metre by metre

Unless of course, Attia and his team enter the picture. What do they do? Hint: think fewer boots on the ground.

“We fly UAVs (Unmanned Aerial Vehicles)—drones—along the whole pipeline network,” says Attia. “That way, our client gets a view of everything. The visual is for the whole location, with 360-degree panoramic pictures, which we deliver through a customized web portal.”

GeoVerra's interactive web portals, containing all the data captured, are at the clients' fingertips. It becomes the knowledge base not only for these maintenance program, but also for any asset management program.

Shaving for savings

“We're still sending a crew to get the data,” says Attia. “But this is a two-person crew, instead of eight or ten. With this technology, our work can take a week instead of a month—with way fewer people.”

As for the client? They stay in their office and access the pictures and videos they need knowing they've experienced a cost savings of around 60 per cent. This value is undeniable: greater productivity, higher system efficiency, and savings from reduced resource usage.

In short notice

While GeoVerra isn't the only geomatics company using laser scanning, Mobile Mapping Systems, Ground Penetrating Radar, and 360 imaging—Attia believes they have one big differentiator.

"We have such high responsiveness," he says. "It's not uncommon to hear, 'Do you have the resources to do the work on short notice or no?' We have the pre-planning and manpower to be right there."

Attia's team is based in Alberta but works across the country. Current projects are located in British Columbia, Saskatchewan, Manitoba, Ontario, and Quebec.

The feedback factor

"Developing the web portal is about ease for these clients," says Attia. GeoVerra provides an interactive visualization tool so they can plan better, make informed decisions, and set future maintenance and operational programs. The web portals are fully customized and are commonly used for applications outside of pipelines too.

"Our clients can view everything they want—without needing to know about the sensors, how they work, or how we stitch



everything together," says Attia. "Like Google Maps, all I really need to know is where my friend's house is. We deliver exactly what they're looking for."

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CAPP responds to the federal budget



TIM MCMILLAN, PRESIDENT & CEO, CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS

The natural gas and oil industry is proud to be a major contributor to Canada's economy, providing significant social and economic benefits right across the country, and delivering substantial revenues to provincial and federal governments. The industry has increased its investment in Canada this year, protecting and creating jobs while delivering over an estimated \$20 billion in desperately needed revenues to federal and provincial governments. In fact, since 2017 Canada's natural gas and oil industry has contributed more than \$40 billion in revenues to governments across the country.

The announced tax credit in this year's budget for all industries to utilize Carbon Capture Utilization and Storage (CCUS) along with extending the Canadian Infrastructure Bank's mandate to support investment into hydrogen, nuclear, and carbon capture is an important step to achieve national reductions. The energy sector is keen to lead by making investments in CCUS and other emissions-reducing technologies. We will be reviewing the details of the budget in this regard to ensure these federal initiatives will work for the natural gas and oil industry. ■

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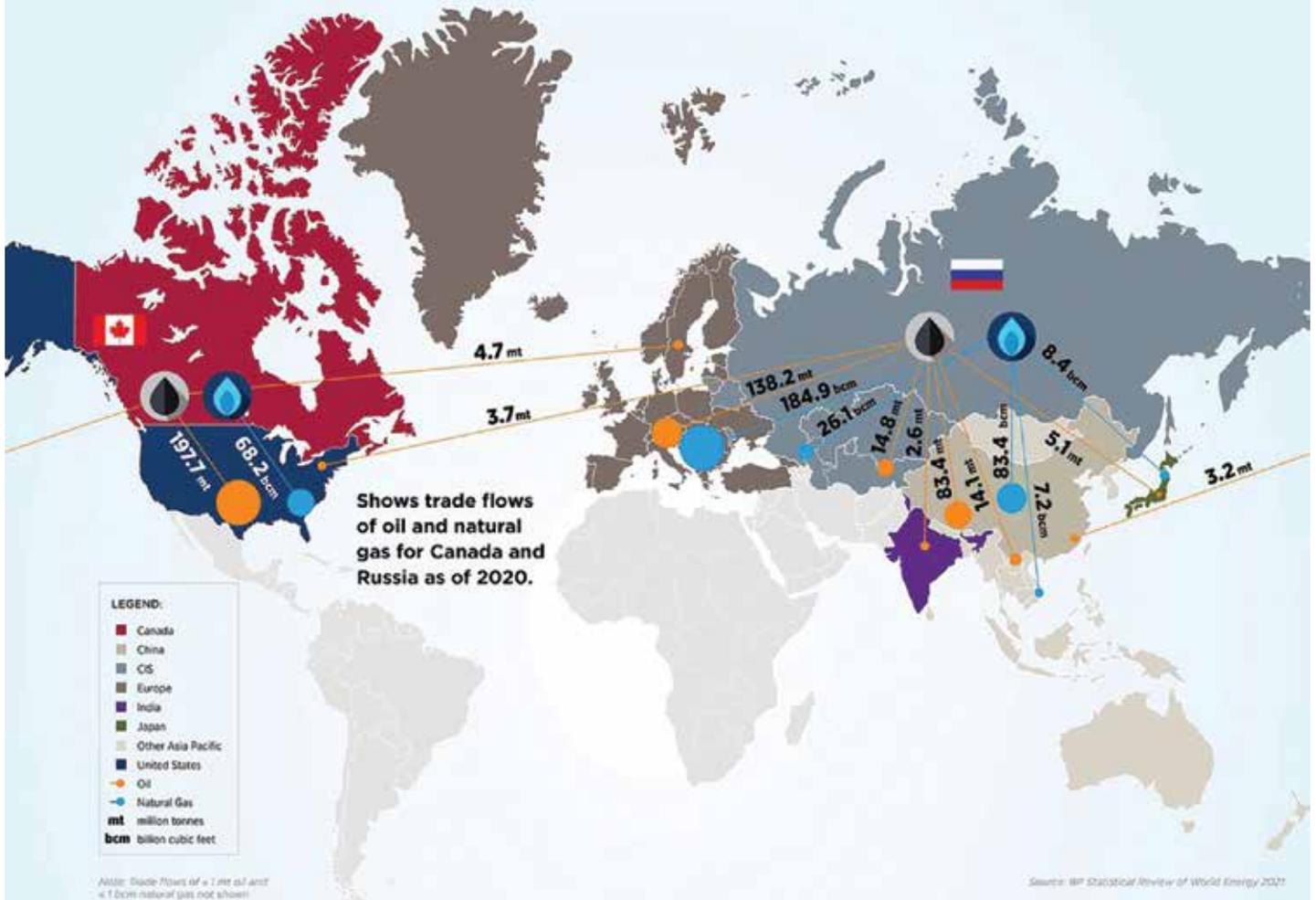
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RUSSIA VS CANADA ENERGY FACTS



¹ Source: BP Statistical Review of World Energy 2021

² Year: Environmental Performance Index

³ Economist Intelligence Unit



A Boilermaker working atop the massive LNG tank at Kitimat, securing the 92-metre-wide roof. LNG promises abundant opportunities for B.C.'s energy sector.

BOILERMAKERS: Always there for B.C. industry, from the beginning and into the future

BY RICHARD MACINTOSH

The Boilermaker trade was instrumental in 1860's British Columbia, when the industrial revolution roared its way into the province's economy. By 1890, the trade was organized into the International Brotherhood of Boilermakers union, and we've been building and maintaining B.C.'s industrial infrastructure ever since.

A key partner in the forward development of B.C.'s natural resources sector, our union's highly skilled

workers construct, repair, and revamp the industrial plants, terminals, and storage tanks that are at the heart of the energy sector. Always sharpening our skills and mastering the ever-evolving tools of the trade, Boilermakers are poised to usher in a new period of prosperity and innovation in the wake of the COVID pandemic.

We know how vital B.C.'s energy sector is to the Canadian economy and to the world's energy needs. Upstream conventional oil and natural gas

development provides about 12,000 jobs for British Columbians. The industry will be responsible for \$5.1 billion in government revenues (through federal, provincial, and municipal taxes) over the next decade and will represent \$122 billion in economic activity over that same period.

From B.C.'s bountiful reserves comes two per cent of Canada's daily conventional oil production and a whopping 32 per cent of its overall natural gas production. B.C. is a net

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exporter of energy — 68 per cent of its natural gas is delivered to other parts of Canada, and 23 per cent is exported to the US.

Opportunities loom for increased export to lucrative markets in Asia: not only is the distance from our shores to far eastern markets half as long as the route taken by American Gulf of Mexico suppliers, but B.C. is also emerging as a global leader in the development of liquefied natural gas (LNG) infrastructure.

We Boilermakers are at the heart of this world-changing, cleaner energy technology. We've converted ships at the Victoria Shipyard to a dual-fuel platform that supplements old-fashioned diesel power with cheaper, greener LNG. And we're busy building LNG Canada's massive terminal in Kitimat — one of the world's largest and most efficient LNG storage and export facilities, and the largest private-sector infrastructure project in Canada's history, an investment of over \$40 billion.

Our confidence in the potential of the Kitimat plant is unbounded, especially as the project enjoys the enthusiastic support of the Haisla First Nation, on whose traditional territory the facility is taking shape. Last year, Boilermakers raised and secured the roof on one of the world's largest LNG storage tanks — at 56 metres high and with a diameter of 92 metres, the 225,000-cubic-metre tank is the newest and most imposing sight on Kitimat's skyline.

The timing of the Kitimat development couldn't be better. According to the International Energy Agency (IEA), global demand for natural gas is expected to increase 36 per cent by 2040. Worldwide thirst for oil will also continue for decades. Boilermakers acknowledge that Canada must continue to strive towards harnessing more renewable and carbon-neutral energy solutions — and we'll be there to build tomorrow's green energy infrastructure, just as we are building Canada's revolutionary carbon capture, utilization and storage (CCUS) plants,

the intermediate step that's a vital part of our clean-energy future. We are under no misconception, however, that we will transition to renewables within the next 30 to 50 years. For decades to come, oil and gas will be in demand, and will constitute an important part of our economic prosperity.

Canadians, in vast numbers, agree and they support further development of our natural resources. Last year, an online Ipsos poll conducted for Resource Works and the Task Force on Real Jobs, Real Recovery found that 81 per cent of Canadians feel that "natural resource development is good for Canada," while 83 per cent agree that "Canada's natural resource sector is an important contributor to the Canadian economy today."

But we'll do it the Canadian way — with an eye to a future without carbon emissions, and by using the most advanced technological innovations available. B.C.'s Low Carbon Fuel Standard sets a bar we feel well-positioned to meet, and Boilermakers look forward to getting to work on the many newly planned low-carbon fuel projects slated for Merritt, Burnaby, Prince George, Vancouver Island, the Sunshine Coast, and others all over the province.

Just as it did in the early steam-driven days of B.C.'s industrial blossoming, industry will be looking to us — the Boilermakers.

Richard MacIntosh is an International Representative of the International Brotherhood of Boilermakers union, and the IBB's Assistant International Director of Climate Change Policy Solutions for its M.O.R.E. Work Investment Fund. He is based in Surrey, BC. ■



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Attracting a world-leading LNG project to treaty lands



The Nisga'a Nation, Rockies LNG, and Western LNG have filed the Initial Project Description for the Ksi Lisims LNG Natural Gas Liquefaction and Marine Terminal Project with the Government of British Columbia and the Government of Canada.

Ksi Lisims LNG (pronounced s'lisims), meaning "from the Nass River" in the Nisga'a language, is a proposed 12-million-tonne-per-year liquefied natural gas (LNG) project at Wil Milit near the Nisga'a village of Gingolx, B.C.

Filing the Initial Project Description is part of the ongoing first phase of engagement to ensure First Nations, local communities, and the public can work with the Ksi Lisims LNG proponents as project design is finalized and can provide input to assist the provincial, federal, and Nisga'a governments in scoping the environmental assessment process. Early engagement allows

the neighbours of Ksi Lisims LNG to provide meaningful input into how Ksi Lisims LNG can maximize benefits and minimize impact on the environment and nearby communities.

"Attracting an economic base to the Nass Valley has long been a priority for the Nisga'a Nation," says Eva Clayton, Nisga'a Nation President. "This is why, for close to a decade, our Nation has worked to attract a world-leading LNG project to our treaty lands, and why we are proud to commence the formal regulatory process for our project, Ksi Lisims LNG."

The proposed project site is owned by the Nisga'a Nation and is located within Nisga'a treaty lands on the northern tip of Pearse Island on the Portland Canal, west of Gingolx, B.C.

Ksi Lisims LNG will be designed to produce up to 12 million tonnes of LNG per year and will receive approximately 1.7 to 2.0 billion cubic feet of natural gas per day. Commercial operations are

anticipated to commence in late 2027 or 2028.

Two natural gas pipeline projects are being evaluated for Ksi Lisims LNG. Both pipeline projects have received regulatory approvals following robust environmental assessment processes and can connect resources in northeastern BC to the proposed project site. The selected natural gas pipeline will be owned and operated by a third party.

"Ksi Lisims LNG will provide Canadian natural gas producers with new access to growing global energy markets, and importantly, global LNG prices," says Charlotte Raggett, President and CEO of Rockies LNG. "We look forward to working with the Nisga'a Nation, other First Nations, governments and stakeholders as we advance Ksi Lisims LNG."

Ksi Lisims LNG will have one of the lowest unit carbon emissions rates of any large-scale LNG export project in

the world. Ksi Lisims LNG will provide global energy markets with low carbon, reliable LNG that helps meet growing energy needs and reduce need for base-load coal plant construction while supporting ongoing growth in intermittent renewable power sources such as wind and solar.

Replacing coal and oil with LNG exported from Ksi Lisims LNG would result in a reduction of global carbon emissions of more than 45 million tonnes per year, or 1.3 gigatonnes over a 30-year period, which is equivalent to nearly two years of total carbon emissions from Canada.

Ksi Lisims LNG's pathway to net zero carbon emissions includes the use of renewable BC Hydro power in combination with strong monitoring and measurement, energy efficiency, purchase of carbon offsets and potential carbon capture and storage. Ksi Lisims LNG is being designed to have a low level of carbon emissions, which reduces the amount of offsets required to achieve net zero.

Ksi Lisims LNG will generate significant

social and economic benefits, including public revenues, jobs, training and business opportunities for First Nations and other communities in British Columbia and Alberta. Total direct and indirect economic impact related to the Ksi Lisims LNG facility, infrastructure and upstream activities is estimated at approximately \$55 billion.

"Our floating design is central to delivering a project in a remote location on time and on budget, and we have commercial concepts we believe will be attractive to Pacific Basin customers," says Davis Thames, Founder, President, and CEO of Western LNG. "Together with the Nisga'a Nation and Rockies LNG, we have a tremendous opportunity to provide clean energy to the world, while creating good jobs in our neighbouring communities and economic benefits for western Canada for decades to come."

Ksi Lisims LNG is regulated under BC's 2018 Environmental Assessment Act and Canada's 2019 Impact Assessment Act, both of which emphasize the early identification and engagement of First

Nations, stakeholders, and impacted communities and encourage the exchange of information so appropriate mitigation of impacts can be identified and incorporated into a project early in its development. The filing of an Initial Project Description is one of the initial steps in both processes for identifying potential effects and formulating solutions between a project and impacted communities.

Ksi Lisims LNG has already commenced early engagement with a number of First Nations, government and regulatory officials, and community leaders to introduce the project and to solicit comments on early drafts of the Initial Project Description, many of which have been incorporated into the recent filing. Now that restrictions related to COVID-19 are being thoughtfully reduced, Ksi Lisims LNG anticipates it will have more opportunities to engage and consult with a broader range of stakeholders in a safe and respectful manner, subject to appropriate accommodation of their needs.

"This project will be important to the global LNG industry as it navigates the energy transition," says Thames. "Fueled by clean British Columbia hydropower and supplied by low carbon Canadian natural gas, Ksi Lisims LNG will achieve one of the world's lowest unit carbon emissions rates for a large-scale LNG export project, making net zero both feasible and achievable. We are very excited to work with the Nisga'a Nation and Rockies LNG to bring the Ksi Lisims LNG project to market."

For more information on Ksi Lisims LNG Project, visit www.ksilisimslng.com. ■



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