WESTERN ENERGY CORRIDOR SUBMISSION TO INFRASTRUCTURE CANADA

The Western Energy Corridor will allow for the competitive movement of Canada's current and future net-zero resource commodities, with a focus on environmental and citizen-respected development

Western Energy Corridor Inc.

WesternEnergyCorridor.ca

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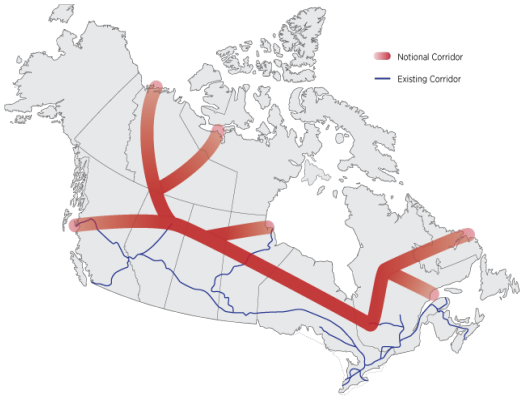
1 Western Energy Corridor

Popularized in the late 1960s by Richard Rohmer, Canada's famous visionary, novelist and war hero, Rohmer saw the importance of creating high-value corridors intended to: efficiently and economically move Canada's valuable natural resources; to engage its northern communities; protect its sovereignty; and, to promote the creation of substantial wealth for all Canadians. Rohmer recognized the value of joining Canada and its people through his view of promoting the value and use of what he coined as "*Mid-Canada*". However, Rohmer's work, while visionary, never won over the Canadian population to inherently live, work, and benefit from the resources of "Mid-Canada".

Source: The Walrus: *If You Build it, They will Stay, Sept 2014*

FIGURE 1: RICHARD ROHMER MID-CANADA VISION

The challenge of effectively developing new resource corridors has not gone silent. In work published by the University of Calgary (U of C) School of Public Policy, conceptual northern corridors provided theoretical and notional routings of resource corridors, as shown in Figure 2. Later in mid-2017, a standing committee on Canadian Banking, Trade and Commerce released a report entitled *National Corridor, Enhancing and Facilitating Commerce and Internal Trade*, which provided significant support to the concept of northern and mid-Canada corridors. In a press release, the Standing Senate Committee called the northern corridor concept "a visionary project that could unlock extraordinary economic potential".

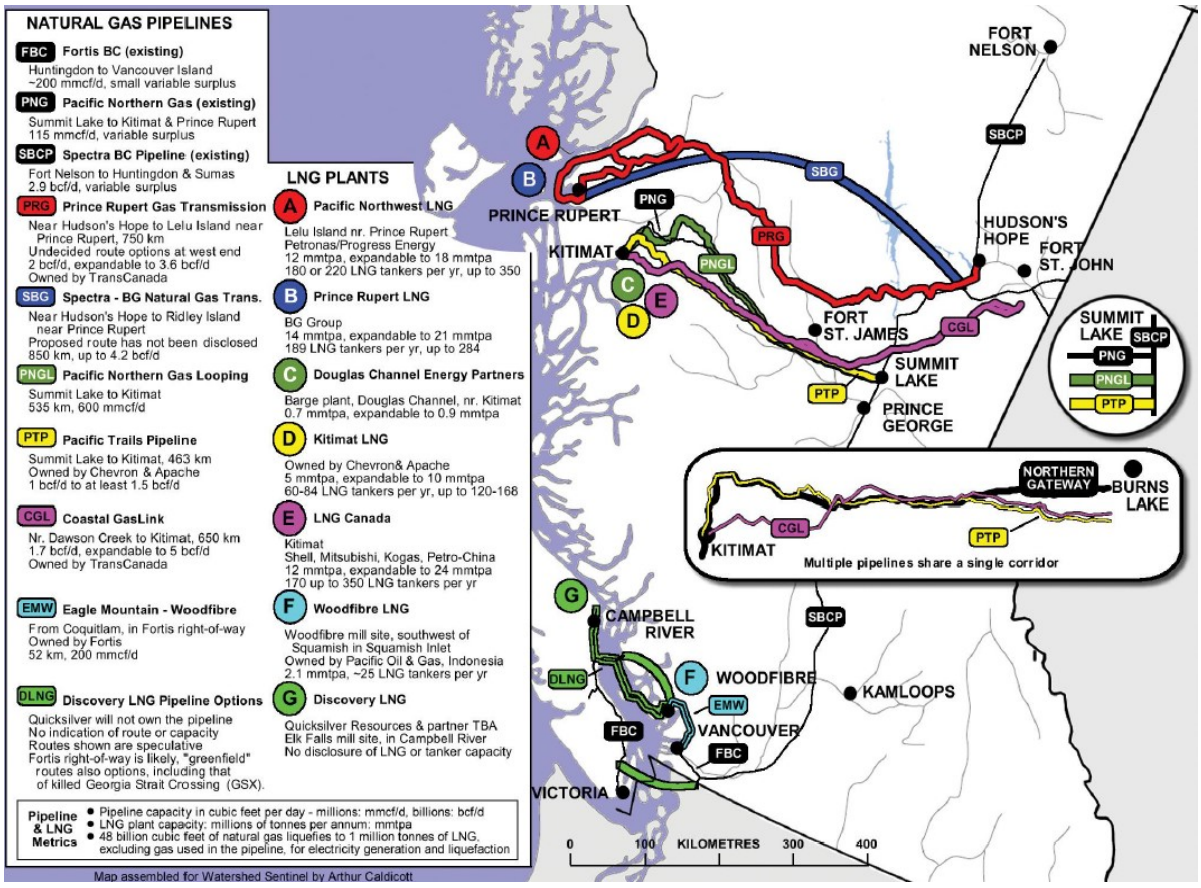


Source: U of C, School of Public Policy

FIGURE 2: U OF C SCHOOL OF PUBLIC POLICY - NOTIONAL CORRIDORS

Canada's corridor development is far from new. Railway leaders, major energy infrastructure developers, and the construction of substantial federal, provincial, and municipal highways provide evidence of the multitude of unique and multi-use corridors constructed in Canada.

From early 2010 to late 2018, Figure 3 shows multitudes of energy infrastructure developers seeking to develop new project routes to transport natural gas, oil, and NGLs originating from British Columbia and Alberta to Canada's west coast. Billions of dollars were expended by more than 12 unique players during that time, each believing they could develop a route or corridor across British Columbia to benefit their investment requirements. However, even with multiple levels of government and investor support, most failed.



Source: Watershed Sentinel, Available from the Internet

FIGURE 3: PROPOSED AND CURRENT OIL AND GAS PIPELINES ACROSS BRITISH COLUMBIA

This free-wheeling competitive experience destroyed tremendous amounts of capital and stressed the limits of those concerned about the environmental impact of new resource development. Moreover, this experience and the publicly charged part of Canada's political and economic history have caused many to question the value of individual competing resource projects. We believe that infrastructure developers, having the opportunity to compete for the use of a predefined, well-planned, multi-use corridor that minimizes environmental impacts, focuses on Indigenous and public consultation, and expedites regulatory approval, is a far better alternative. Most importantly, an all-Canadian corridor is needed to help preserve Canada's sovereignty and protect its economic interests in resource development.

With experience and knowledge, the Western Energy Corridor team (WEC team) has prepared an all-Canadian corridor concept (see Figure 4), which is of high value to infrastructure investors and governments that see the merit of developing a multi-use corridor.

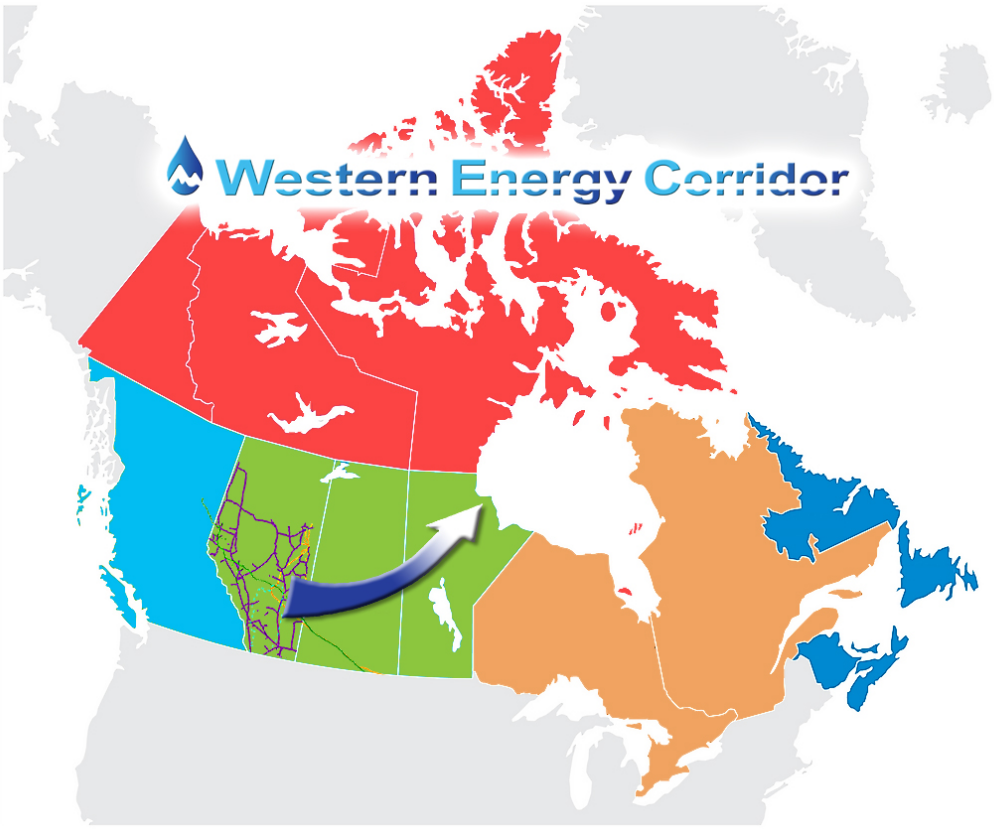


FIGURE 4: WESTERN ENERGY CORRIDOR – ALBERTA TO CHURCHILL

The Western Energy Corridor material is early development work typically completed before the more costly regulatory development phase, including Indigenous and social interaction, detailed environmental analysis and engineering design work, and other high-cost project activities. Based on recent large-infrastructure regulatory work, an experienced developer can anticipate expending at least $400 million on the remaining work to receive approval to construct.

2 Export of Western Canada's Energy Resources

The WEC team has spent considerable time examining opportunities to transport and export Western Canada's oil and gas resources. The review included consideration of technical planning to transition the traditional pipelines to eventually transport hydrogen or other future fuels, as needed by global energy markets.

The WEC team, in its evaluation of various coastal export ports to serve Canadian and global markets, determined that port prospects within the Churchill area on Hudson Bay provide an

undeveloped opportunity. Several economic and constructability factors drive this conclusion, but an overriding feature is that valid treaties cover all of the proposed corridor. Creating a Canadian energy corridor that links Western Canada to Churchill provides access to Atlantic tidewater, benefiting domestic and foreign markets. It is important to note that large-scale investment project(s) through Hudson Bay would provide significant collateral benefits to Canada's northern development and sovereignty and diversify Western Canada's market access to Canadian and global markets.

2.1 Environmental, Social, and Governance Considerations

With a length of approximately 1,560 km, the Western Energy Corridor should aid renewable energy projects in Alberta, Saskatchewan, and Manitoba. The corridor, containing pipelines and power lines, will support the expansion of renewable energy resources, such as hydro, wind, solar or geothermal energy, within the vicinity of the corridor. Optimally, the Western Energy Corridor will allow renewable energy to be transported to consumption markets and for renewable energy to be consumed within the corridor (for operating compressor stations, pump stations, or both on the proposed pipelines).

Commercially viable renewable energy resources, such as wind, solar, and large-scale hydropower, are within the corridor's proximity and can be developed in connection with the corridor. Specifically, natural gas, oil, or both moving eastward from Western Canada to Churchill, with large-scale hydropower moving westward to Saskatchewan and Alberta, will offset substantial carbon emissions. This concept will reduce Canada's overall greenhouse gas emissions and aid Canada in meeting its commitments under the Paris Accord.

Canada has a surplus of oil and natural gas available for export. Broadening its energy trade beyond North America will significantly improve economic netbacks to Western Canada's energy producers, particularly with expanding the Canadian energy market to include Europe, Asia, South America, Southeast Asia, and other regions of Canada. All of this can be achieved while providing an environmentally acceptable corridor that would assist in moving green energy within Canadian markets. With appropriate technical planning in advance, today's carbon-based pipelines, which currently bring the highest economic value to Canada, will eventually be capable of transitioning to transport other future high-value fuels such as hydrogen. These efforts will maximize financial benefits while enabling a future net-zero energy product to meet Canadian and global energy demands.

The Western Energy Corridor can bring new, greener energy resources to Canada's northern citizens and communities. Today, these communities must often rely on high carbon-intensive energy, high-cost energy, or, in some cases, no reliable energy forms at all.

2.2 Request for Regional Assessment by Under Canada's Impact Assessment Act

Canada's Impact Assessment Act and the Canadian Energy Regulator Act of 2019 require an applicant to understand and quantify the environmental effects of both new energy projects and

linear corridors utilized to transport energy and other resources. These thorough assessments take multiple years to complete in order to achieve regulatory and public acceptance. Even without knowledge of future economics or marketability of an energy form, the federal and provincial/territorial governments need to coordinate an environmental assessment of a prospective corridor. As a result, Canada must be more prepared and capable of minimizing timelines to monetize its high-value resources competitively.

Undertaking the task of having a pre-established energy and resource corridor, such as the Western Energy Corridor, will enhance the likelihood of these major infrastructure projects being completed. Otherwise, such projects may be viewed as too risky, too late, too cumbersome, or as seen from the viewpoint of international markets and financiers, as being too high of a risk burden resulting in Canada being unable to compete on the global stage. This failure was exemplified by the multitude of industry participants encouraged by British Columbia's provincial government to pursue large-scale development projects, only to have the investors curtail activities due to high costs, time delays, and unforeseen risks.

While designed and selected to have minimal impact, the Western Energy Corridor will still be a narrow corridor crossing approximately 1,560 kilometres of land. Some of the corridor lands are owned by private landowners, some by municipal and Indigenous peoples, and considerable portions by the federal and provincial governments. While intended to be benign over the long-term, all rights-of-way will impact lands within the corridor and adjacent lands. Consultation with governments, Indigenous peoples, landowners, and concerned citizens is essential in seeking Canadian regulatory approval. Where possible, short- and long-term considerations must be given to create partnerships and benefits to those impacted to make Canada's overall economy stronger and equitably distribute such development benefits.

Developing a large-scale infrastructure project, one that will easily surpass $30 - $40 billion in ultimate capital cost yet will provide hundreds of billions of long-term financial benefits, begs the question of who should take the development risk and who should fund that early risk?

Once a large-scale infrastructure project is approved, the costly detailed engineering and design, construction, materials, and owners' expenditures, which ultimately make up more than eighty percent of the total cost, will begin. However, the hundreds of millions of development dollars needed to secure the regulatory approvals often represent the most significant amount of risk, far surpassing the risk associated with expenditures after a government authorization to construct is issued.

Building out the Western Energy Corridor will require domestic and international financing involving both public and private sources on the basis that the infrastructure project(s) has appropriate contracts and regulatory approvals. Private and publicly traded companies might be keen to participate in this early development to receive a future risk-adjusted return. It is also possible that a large portion of the initial funding dollars needed to reach regulatory approval (for the designation of the corridor) may be best earmarked for funding by federal and provincial governments, pension funds, or equity investors that can accommodate the risk. An investment return on these dollars can then be recovered from the future users of the corridor.

Western Energy Corridor Inc. believes there is value in requesting the Canadian federal government to conduct a Regional Assessment of an interprovincial economic corridor from Alberta through to Churchill, including marine shipping in Canadian waters. Accordingly, Western Energy Corridor Inc. has made a Regional Assessment request to the federal government through the Impact Assessment Agency of Canada.

The overall purpose would be to expedite project-specific impact assessments, identify and manage cumulative effects, and advance concept approval.

As outlined by the Government of Canada, Regional Assessments are intended to inform and identify:

- A baseline against which to assess the incremental impact of a discrete project.
- Thresholds to support future project decisions.
- Standard mitigation measures for future projects.
- Potential impacts on rights and interests of Indigenous peoples.

In addition to assessing the land-based corridor concept, we believe the Regional Assessment should include the effects of Arctic marine shipping within, to, and from Hudson Bay. The assessment should develop strategies for maintaining ice-free shipping lanes, maritime interaction, and emergency and spill responses in Arctic waters.

We recommend that the Government of Canada, under Sections 92 and 93 of the Impact Assessment Act, authorize the Impact Assessment Agency to conduct a Regional Assessment of a corridor from Alberta to Churchill. The corridor traverses a wide variety of lands of varying ownership, uses and sensitivities. Therefore, under Section 93 of the Act, the federal government may see value in entering into agreements with the provinces of Alberta, Saskatchewan, and Manitoba, the Nunavut territorial government, and Indigenous peoples to obtain their respective involvement and collaboration on the assessment.

2.3 Western Energy Corridor

Unlike other energy proponents, the WEC team first examined the merit of multiple energy corridors before determining any specific commodity or market usage. The Western Energy Corridor, linking Western Canada to Churchill, Manitoba, has been designed and intended to contain one or more combinations of a natural gas transmission system, an oil pipeline, a fibre optic line and a high-voltage electric transmission line. Western Energy Corridor Inc. intends to make the corridor and related information available to governments or infrastructure investors that are financially knowledgeable and technically capable of the means to initiate, evaluate, and complete a project.

While concepts for a corridor from Alberta to Manitoba have been suggested several times during the last 60 years, this is the first serious effort at creating a defined corridor that has been conceptualized and planned to follow through to development, including, but not limited to, terrain analysis and regulatory requirements. Conceptual project designs were developed with estimated

capital and operating costs to illustrate some example projects that would use such a corridor. All areas of Canada will materially benefit from the implementation of the Western Energy Corridor.

Feasibility assessments for the Western Energy Corridor began in the latter part of 2018. The WEC team initially identified five alternative planning corridors. Analysis was undertaken by the WEC team that led to the selection of one of the alternative corridors, as shown in Figure 5. A Study Corridor was then determined within that evaluation. The Study Corridor, which has a width that varies between 25 km to 70 km, was delineated, among other things, to best benefit landowners and communities, rights holders, and to avoid environmentally sensitive areas.

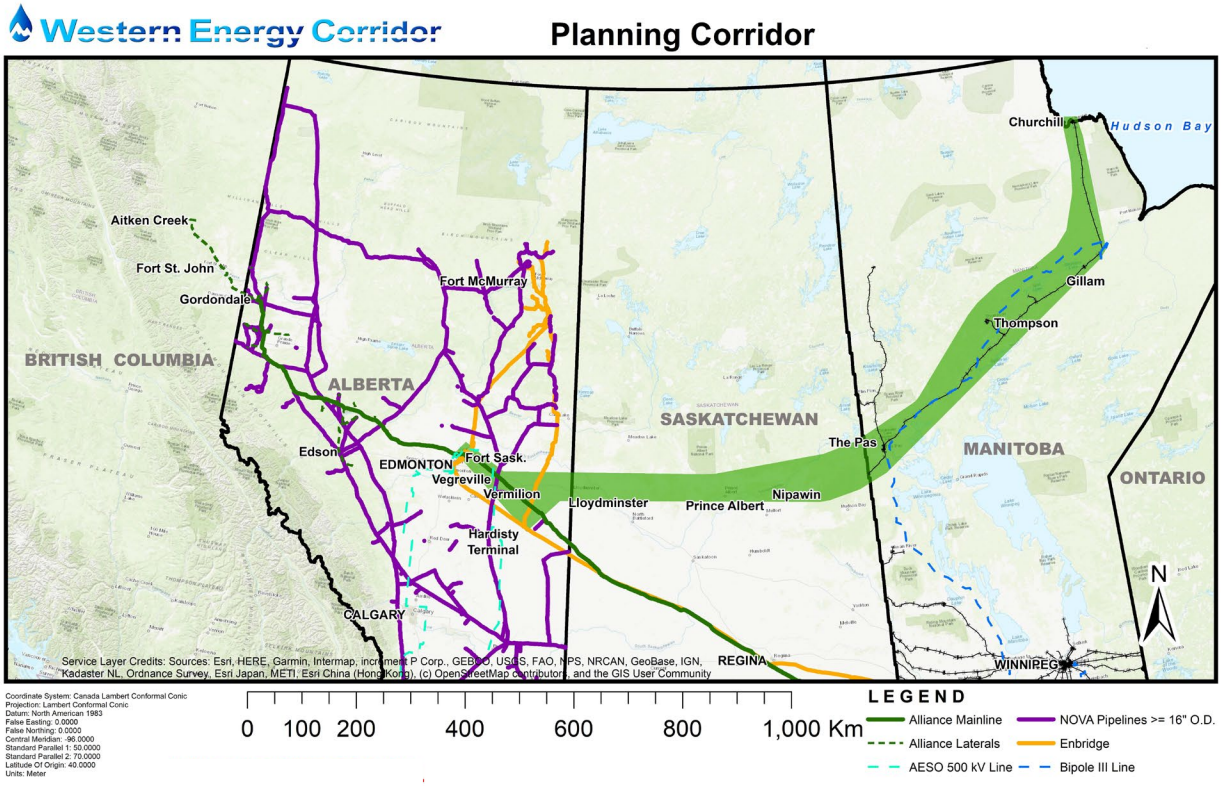


FIGURE 5: PROPOSED PLANNING CORRIDOR

2.4 Potential Uses of the Western Energy Corridor, transitioning to Net Zero Energy

The following example projects show the potential uses and benefits of the Western Energy Corridor, including transporting natural gas and crude oil eastward and green hydropower westward. Most of Canada's oil and gas reserves are located in British Columbia, Alberta, and Saskatchewan, with hydroelectric power being more plentiful in Manitoba. Alberta and Saskatchewan have considerable wind potential, and this renewable electricity could be transported by power lines within the corridor and to fuel pipeline compressors and pumps. In addition, the corridor will meet an all-important use of transporting future net-zero energy fuels such as hydrogen to Canadian and global markets.

Oil Pipeline and Facilities

For an oil pipeline, our example project is based on an initial throughput of 650,000 bbls/d delivered from Hardisty, Alberta, to a delivery point near Churchill, Manitoba. With oil storage located at Churchill, Manitoba, and with the ability to access global markets, it is conceived that marine-based delivery systems would also deliver oil to refineries located in Quebec and Atlantic Canada. Eastern and Atlantic Canada currently imports and consumes over 650,000 bbls/d of oil from world sources other than Canada, yet Western Canada cannot find markets for its expanding crude oil production. A disconnect currently exists between the lighter oils historically used by the importing Canadian refineries located in Eastern and Atlantic Canada and with heavier oils that Western Canada exports. However, this could be corrected with more upgrading in Western Canada or at refinery locations. Like many oil pipelines, our example oil pipeline would be capable of transmitting discrete "batches" of different oil types to meet the quality requirements of specific markets. With appropriate technical planning and construction techniques, and as future markets demand, the oil pipeline could eventually transition into a hydrogen pipeline.

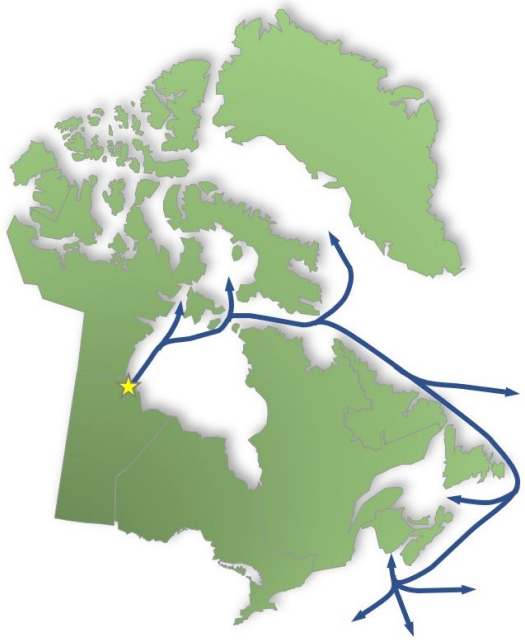


FIGURE 6: MARKET ACCESS FROM CHURCHILL TO CANADIAN AND GLOBAL MARKETS

Natural Gas Transmission System and Facilities

For the construction and operation of a natural gas pipeline, it is anticipated that a minimum 2.3 Bcf/d natural gas transmission system would connect various natural gas receipt points in Western Canada to a final delivery point near Churchill, Manitoba. Planned natural gas interconnections would include interconnections to TC Energy (NOVA Gas Transmission Ltd.), Alliance Pipeline's mainline, and, if beneficial, a new, high-pressure supply pipeline that interconnects with gas gathering systems in Northeast B.C. and Northwest Alberta. In addition, a natural gas transmission system located within the Western Energy Corridor would connect to a natural gas liquefaction facility, LNG storage, and an export facility near Churchill, Manitoba. Such a project could provide natural gas to large Canadian markets and remote northern communities (concepts might include transporting compressed natural gas (CNG) or small-scale LNG). An overriding goal, of course, would be to export Canada's natural gas resources to global LNG markets. Like planning for the future use of an oil pipeline, a natural gas pipeline could eventually transition to a hydrogen pipeline.

High Voltage DC Power Line

Another significant usage of the Western Energy Corridor, combined with either a natural gas or oil pipeline (or both), is to connect the massive hydroelectric sources and new potential hydro sources within Manitoba to all of Western Canada. A new, high voltage direct current (HVDC) electric transmission line could fully open the electrical power trade between Manitoba and other regions of Western Canada and would substantially benefit Canada's GHG emission goals. Power from the proposed electric transmission line may drive electric motors for natural gas compressors or oil pipeline pump stations within the corridor.

New, All-Season Road: Gillam, Manitoba to Churchill, Manitoba

Along the majority of the Western Energy Corridor, from east-central Alberta to Churchill, there is sufficient existing transportation infrastructure (i.e., highways, roads, and railways) that will facilitate the construction of oil pipelines, gas pipelines and power lines. However, the northern 250 km of the proposed energy corridor from just north of Gillam to Churchill only has access by the Hudson Bay Railway, which is currently incapable of meeting anticipated construction material movements.

Our WEC proposal suggests that a new all-season road be built parallel to the existing 138 kV transmission line that runs from the vicinity of Gillam to Churchill, approximately 250 km. Increasing Canada's access to its northern lands, enabled by an all-season road to Churchill and an

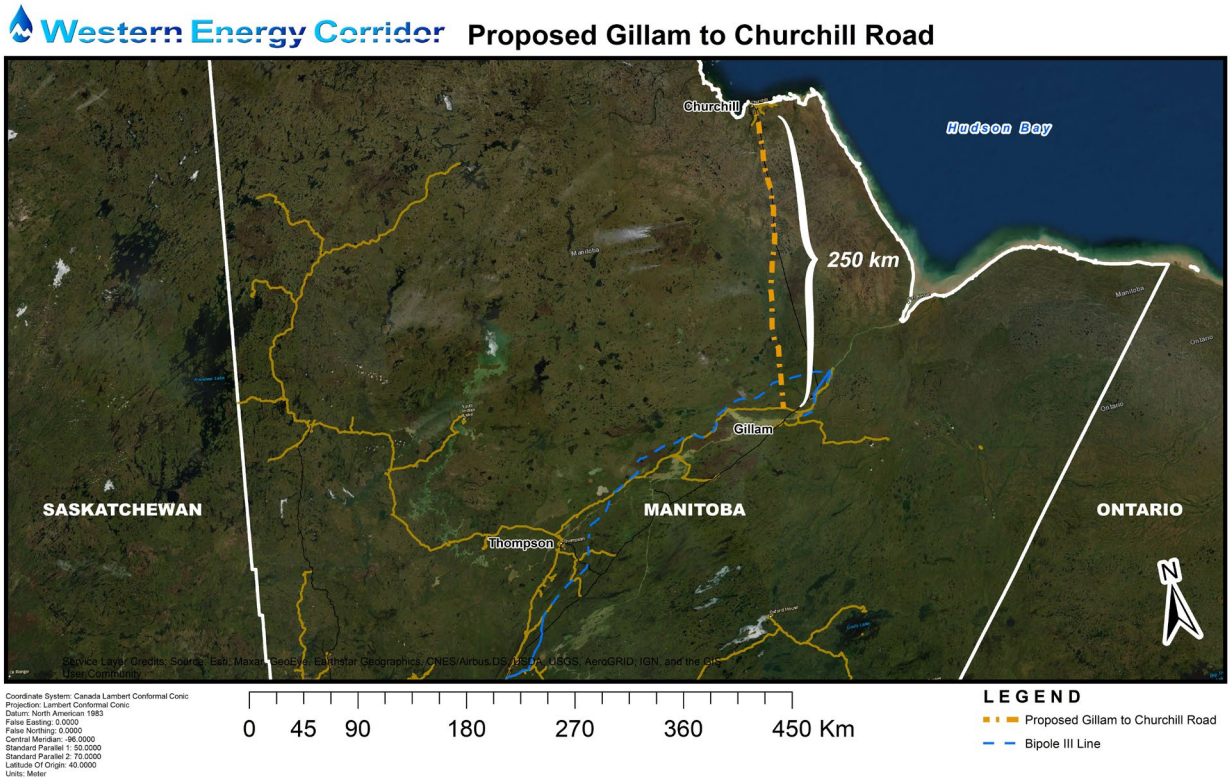


FIGURE 7: WESTERN ENERGY CORRIDOR PROPOSED GILLAM TO CHURCHILL ROAD

expanded world-class port, provides federal and provincial governments with an opportunity to participate in these specific but vitally essential initiatives.

From a federal government and sovereignty perspective, an all-season road to Churchill will reinforce Canada's northern sovereignty and strengthen its land and sea defence. As well, for Canada's northern citizens, an all-season road to Churchill and its access to a northern seaport will significantly improve transportation and distribution of primary goods, including food, energy supplies, materials, and health care. Consequently, it is anticipated that the current rail line to Churchill will continue to be upgraded to support larger and heavier rail loads.

Other Potential Economic Initiatives

Once a valid, high-use economic corridor is established and available, the corridor can be "updated" overtime to include economic change-outs or new economic initiatives. The following are "ideas" that might be included for future use – many other initiatives are, of course, possible.

Some future uses of an energy corridor might include:

Hydrogen transported as a blend within a natural gas pipeline

Recent studies suggest that hydrogen transported as a blend within a natural gas pipeline could be a viable solution for early adoption of transporting this potential next-generation fuel source. Natural gas pipelines are used to deliver hydrogen by mixing it in specific proportions with natural gas and then separating and purifying it for use by an end consumer. Eventually, the concept, with appropriate technical planning undertaken in advance, would see pure hydrogen being transported to the Churchill area port. Transportation of hydrogen to Churchill and then onward by ship may develop as a suitable alternative to monetizing Canada's carbon-based energy resources. Research and development initiatives are examining shipping methods to allow for cost-effective transportation of hydrogen to domestic and international markets (in forms like LNG).

Expanded fibre optic transmission and communications

A long-distance fibre optic transmission system is a commonsense addition to any high-use corridor. Fibre optic communication systems are typical for pipeline operating control systems. However, installing fibre optic facilities can also provide enhanced services to new and growing communities, provide better industrial product communication, and enable advanced international communications.

Railway improvements, including new, direct rail line construction and enhancement of existing rail

Establishing a wider corridor could allow for the installation and operation of new rail systems on improved rail beds. In addition, technological advances in transportation sectors, such as high-speed rail and hyperloop, will allow products, goods, resources, and people to move from an expanded Churchill port.

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