ABOUT PIPELINES
OUR ENERGY CONNECTIONS
This fact book is designed to provide easy access to information about the transmission pipeline industry in Canada. The facts are developed using CEPA member data or sourced from third parties. For more information about pipelines visit aboutpipelines.com.

An electronic version of this fact book is available at aboutpipelines.com, and printed copies can be obtained by contacting aboutpipelines@cepa.com.
The Canadian Energy Pipeline Association (CEPA) represents Canada’s transmission pipeline companies who operate **115,000 kilometres** of pipeline in Canada. CEPA’s mission is to enhance the operating excellence, business environment and recognized responsibility of the Canadian energy transmission pipeline industry through leadership and credible engagement between member companies, governments, the public and stakeholders.

CEPA’s members transport around **97 per cent** of Canada’s daily natural gas and onshore crude oil production.
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Unless otherwise indicated, all photos used in this fact book are courtesy of CEPA member companies.
The Importance of Canada’s Pipelines

Oil and gas products are an important part of our daily lives. We use them to heat our homes and fuel our cars. In fact, many consumer goods we use each day are made from petroleum products.

- More than half the homes in Canada are heated by furnaces that burn natural gas.
- Many pharmaceuticals, chemicals, oils, lubricants and plastics incorporate petroleum products.
- Production of many consumer goods, including shoes, telephones and tennis racquets, requires petroleum products.

94% of the energy used for transportation in Canada comes from refined petroleum products.
More than two-thirds of Canada's energy demand is met by natural gas or products made from crude oil. Most of that supply is transmitted by pipeline.
OUR ENERGY HIGHWAYS

Just like highways, railways and electricity transmission lines, pipelines criss-cross the country to service some of our most important needs. Oil and natural gas resources are typically located in rural and remote areas, while consumers are located predominantly in urban areas across Canada. As a result, transportation of oil and natural gas to markets by pipeline is a vital component of our energy infrastructure.

This vast network of pipelines, virtually all of which is buried underground, transports almost all of Canada’s crude oil and natural gas from areas of production to consumer markets. In fact, Canadians safely live, work and travel over pipelines every day without even knowing it.

Canada’s pipeline industry has contributed to our country’s economic prosperity and overall quality of life. Over the next five years, CEPA members propose to invest tens of billions of dollars in pipeline projects. They are proud to operate Canada’s pipeline network with the utmost regard for public safety and environmental stewardship.
If laid end-to-end, there are enough underground natural gas and liquids pipelines in Canada to circle the Earth at the equator 20 times.
DID YOU KNOW?
Canada’s transmission pipeline network is more than three times the length of Canada’s national highway system.

Types of Pipelines

1. Gathering Pipelines – move crude oil and natural gas (and combinations of these products) from wellheads to oil batteries and natural gas processing facilities. More than 250,000 kilometres of these lines are concentrated in the producing provinces of western Canada, primarily in Alberta.

2. Feeder Pipelines – transport crude oil and other products such as natural gas liquids from batteries, processing facilities and storage tanks to the transmission pipelines. There are more than 25,000 kilometres of feeder pipelines in the producing areas of western Canada.

3. Transmission Pipelines – these are the major energy highways of the pipeline network, transporting crude oil and natural gas within a province and across provincial or international boundaries. There are more than 115,000 kilometres of transmission pipelines in Canada, more than three times the length of Canada’s national highway system.

4. Distribution Pipelines – local distribution companies or provincial cooperatives operate natural gas distribution lines that deliver natural gas to homes, businesses and various industries. There are approximately 450,000 kilometres of these lines in Canada.
If a pipeline crosses provincial or international boundaries, the pipeline is regulated by the National Energy Board (NEB). The majority of pipelines operated by CEPA’s member companies are regulated under the NEB. The NEB is an independent federal agency established in 1959 by the Parliament of Canada. The purpose of the NEB is to regulate international and interprovincial aspects of the oil, gas and electric utility industries. The NEB regulates pipelines, energy development and trade in the best interest of Canadians.

THE REGULATORY LANDSCAPE

Canada has a robust regulatory system in place to oversee the construction and operation of pipelines. If a pipeline is contained within a province, the pipeline would fall under the jurisdiction of a provincial regulator. For example, in Alberta, these pipelines are regulated by the Alberta Energy Regulator. In British Columbia, such pipelines are regulated by the British Columbia Oil and Gas Commission.
THE APPLICATION PROCESS

In Canada, the regulatory process is thorough and comprehensive. Before a pipeline can be built, the pipeline operator must file an application with a regulator for approval. An application contains important information detailing consultation, environment, safety, commercial, and engineering elements related to the proposed project. Pipeline operators also consult with various provincial and federal agencies, depending on the pipeline route, to obtain specific permits relating to the pipeline application. In determining whether a pipeline project should proceed, the responsible regulatory agency reviews among other things, its economic, technical and financial feasibility, and the environmental and socio-economic impact of the project. To ensure that engineering, safety and environmental requirements are met, the responsible regulatory agency audits and inspects the construction and operation of the pipeline. If a project is approved, the regulator may attach conditions to the approval to ensure that the pipeline is operated safely and the surrounding environment is protected. These conditions are monitored and enforced throughout the life of the project.
Ongoing dialogue with stakeholders is an integral part of the pipeline industry. One of the most important steps in the pipeline application process involves communicating effectively with various stakeholders. CEPA member companies engage in cooperative and collaborative dialogue during the application process and continue this approach throughout the project lifecycle.

Maintaining communication throughout the life of a project keeps stakeholders informed and the pipeline operators aware of community issues and concerns. Outreach tools to share information include town hall meetings, websites, and collateral materials.

**Common stakeholders include:**
- Regulators
- Landowners
- Environmental Nongovernmental Organizations (ENGOs)
- Media
- Aboriginal, Local, Provincial, Territorial and Federal Government representatives
Designing and constructing a pipeline is a lengthy and complex process that considers a number of factors and requires a number of steps and commitments before product begins to flow. This includes extensive stakeholder engagement and a thorough review of the social and environmental factors.

Prior to construction, a detailed route analysis must be performed to adequately assess the specific topographical, environmental and social factors along the proposed right-of-way (a strip of land where a pipeline is located).
Canadian pipeline operators are subject to very specific regulatory and technical requirements ensuring that pipelines are built and operated with the utmost regard for public safety and environmental integrity.

THE CANADIAN STANDARDS ASSOCIATION

Pipeline design and construction decisions are guided by a set of comprehensive standards issued by the Canadian Standards Association (CSA).

In addition to federal, provincial, territorial and, in some cases, municipal regulations, CSA standards set out specific design criteria, including the depth at which pipeline is laid in the ground, the thickness and coating of pipe walls and the integrity of the welding process connecting the pipe. CSA standards cover the design, construction, operation and maintenance of oil and gas pipeline systems and underground storage of petroleum products and liquefied natural gas.

CSA pipeline standards are world renowned for their valuable guidance on issues of safety, performance, and pipeline integrity. Visit http://shop.csa.ca for more information.
ROUTING NEW PIPELINES

When planning a pipeline, the industry makes every effort to manage the unique environmental and socio-cultural aspects of the proposed pipeline route. Pipeline proponents conduct a thorough assessment of the proposed right-of-way and its surrounding natural environment to identify the unique features that must be protected throughout the full lifecycle of the pipeline. This detailed review helps pipeline companies develop appropriate mitigation strategies to protect the local environment.
2. Avoid constructing during excessively wet or thawed conditions. Install prefabricated matting or corduroy along the travel lane, if warranted, to minimize any rutting that may result from construction.

Additional environmental
1. Site specific environmental concerns and the corresponding environmental protection measures are positioned above the respective location of the photomosaic.

8. Seed disturbed portions of the right-of-way with appropriate seed mix or as directed by landowner.

6. Salvage strippings from the trench only to depth indicated.

4. Minimize grubbing throughout the route. Grub tree roots (where required) with a brush rake attachment on the dozer to preserve surface soils.

3. Temporary workspace will be shared with the adjacent right-of-way where feasible. Additional temporary workspace will be required at sharp sidebends, tie-ins, crossings of road and for the directional drill of the Wapiti River.

ENVIRONMENTAL ALIGNMENT SHEET 1 of 1

ENVIRONMENTAL SPECIFICATIONS

VEGETATION

FISH AND WILDLIFE

HERITAGE RESOURCES

SEED MIX

OWNERSHIP/DISPOSITION

MERCHANTABLE

LAND USE

MEASURES

LEGEND

Municipal Boundary

Resource Road

100 metre interval

Proposed Pipeline

CENTRAL MIXEDWOOD SUBREGION - BOREAL FOREST NATURAL REGION

KP 1

CULTIVATED FORESTED FORESTED

~25 cm

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ENVIRONMENTAL NOTES

SEE DWG. 1 AND NOTES 1, 2, 3, 5 SEE DWG. 2 AND NOTES 1, 2, 3, 4, 6

KP 2

REFERENCE DRAWINGS

SEE DWG. 3

RESTRICTED ACTIVITY PERIOD JANUARY 15 TO APRIL 30

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data should be aware of the potential for errors in the data and the potential for errors in the products derived from the data.

REFERENCE

SAFE OPERATIONS

Nothing is more important to CEPA members than the safe operations of their pipelines. As an industry, pipeline operators understand that a good track record in safety and environmental performance is expected by Canadians. CEPA members spend more than one billion dollars annually on monitoring and maintenance activities to ensure the safety of their pipelines.
MONITORING AND MAINTENANCE

The excellent safety record of CEPA members is due in large part to the management systems and pipeline integrity programs now in place that have evolved and improved over the past 60 years. Pipeline operators monitor their lines 24-hours-a-day, seven-days-a-week from remote control centres across the country. These control centres use devices, such as Supervisory Control and Data Acquisition (SCADA) systems, to collect information from sensors installed along the pipeline route.

This information is then transmitted back to the control centre. In the control room, technicians trained in pipeline operations and emergency response evaluate the information and determine what action is required to keep the pipeline running smoothly and safely. Pipeline operators also conduct regular visual surveys of the pipeline and deploy in-line inspection tools. Visual surveys are completed using aerial and ground patrols. In-line inspection tools can inspect pipelines from the inside to identify changes such as dents or wall thinning that could threaten the integrity of a pipeline.

Check the folded insert for an in-depth look into CEPA members’ pipeline integrity performance.
Despite the industry’s best efforts, no pipeline is completely risk-free. Unfortunately, incidents do occur and, when they do, pipeline operators are equipped and trained to manage the emergency situation. With an emergency response plan (ERP) in place, the chance of a long-term impact on the community or the environment is greatly reduced.

An ERP outlines the necessary steps and decisions required to manage an emergency situation. It contains specific steps the pipeline operator must take in order to control the incident. These plans include manuals on how to proceed with the deployment of emergency personnel, evacuation plans, and guidance on how to best manage information, communication and resource coordination.
Construction and excavation activities can cause damage to pipelines. But this risk is highly preventable.

PREVENTING PIPELINE DAMAGE

Pipeline companies work with the public and third-party construction and excavation companies to educate them about how they can help reduce the chance of damaging a pipeline when digging.

Click Before You Dig
Click Before You Dig is a resource for Canadians to help them learn about any buried utilities that might be present on a property. Before landscaping, building a new fence or planting a garden, visit www.clickbeforeyoudig.com to obtain written approval and ensure your project won’t impact a pipeline or other buried utility.
MONITORING COMPLIANCE

Regulators are extremely vigilant in monitoring a pipeline company’s level of compliance with all established requirements, from the project application stage through to the construction, operation, retirement or abandonment of a pipeline. They verify that what was committed to during the application stage, and set out as the terms and conditions of approval, is being honoured throughout the life of the project.

Regulators have a number of tools at their disposal to monitor compliance, including:

- Project audits
- On-site inspections
- Compliance meetings
- Emergency response exercise evaluations
- Incident investigations
WHAT HAPPENS WHEN THE RULES ARE BROKEN?

In cases of non-compliance, regulators can employ several different enforcement tactics to bring regulated companies into compliance and deter repeat offences. Tools include non-compliance notices, financial penalties, and potential prosecution by the Office of the Attorney General of Canada.
It’s a significant program because safety requires a high level of cooperation and particular attention to safety culture across the industry.

CEPA’s role is to enhance industry collaboration and enable companies to respectfully challenge each other to operate safely. CEPA Integrity First helps us to speed up our efforts to continuously improve to get to our publicly stated goal of zero incidents.

The industry carefully follows a strict set of safety standards and government regulations to ensure pipelines are operating safely and effectively. And since 2012, CEPA and its 12 member companies have been taking these standards to a new level, striving for zero pipeline incidents through CEPA Integrity First.

Similar to other sector programs, such as Responsible Care® in the chemicals industry, CEPA Integrity First is about the pipeline industry working together to define and apply best practices that will strengthen our performance.
The members of CEPA are dedicated to continuing the development of a safe, socially and environmentally sustainable energy pipeline industry for Canadians. We commit ourselves to advancing a safety culture aimed at protecting the health and safety of our communities, our workplaces and the environment everywhere we operate.

WE ARE COMMITTED TO:

Safety – Ensuring safe communities and workplaces

The Environment – Minimizing the impact of our operations on the environment and biodiversity throughout every phase of pipeline operations (design, construction, operations and retirement)

Socio-Economic Benefits – Creating lasting social and economic benefits to communities, regions and countries where we operate
HISTORY OF CANADA’S PIPELINE NETWORK

Canada has a proud history of pipeline construction and operation dating back to 1853 when a 25 kilometre cast-iron pipe moving natural gas to Trois Rivières, QC was completed. In 1862, Canada would complete one of the world’s first oil pipelines, from the Petrolia oilfield in Petrolia, ON to Sarnia, ON.

By 1947, only three oil pipelines moved products to market in Canada, including one that transported oil from Turner Valley, AB to Calgary, AB.

A second pipeline moved imported crude from coastal Maine to Montreal, QC, while a third brought American mid-continent oil to Ontario.

With the discovery of an abundant supply of crude oil and natural gas in the west, Canada’s oil and gas industry began expanding its vast pipeline network in the 1950s. This expansion contributed significantly to the development of domestic and international markets, while propelling the Canadian economy forward.

As Canada’s energy infrastructure matured, the country witnessed broad-based economic growth, industrial diversification, and rising living standards.

KEY DATES

1912
Canadian Western Natural Gas builds a natural gas pipeline from Bow Island, AB to Calgary, AB (275 km).

1923
Northwestern Utilities Company Limited completes construction of a 124 kilometre natural gas pipeline and 129 kilometres of distribution pipelines from Viking, AB to Edmonton, AB.

1941
Portland-Montreal Pipe Line completes its 380 kilometre oil pipeline from South Portland, Maine, USA to Montreal, QC.
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1944</td>
<td>The Canadian Oil Pipeline, otherwise known as Canol, completes a crude oil pipeline from Norman Wells, NT to Whitehorse, YK.</td>
</tr>
<tr>
<td>1950</td>
<td>Interprovincial Pipe Line Inc. (now Enbridge Pipelines Inc.) transports crude oil from Edmonton, AB to Superior, Wisconsin, USA.</td>
</tr>
<tr>
<td>1953</td>
<td>Trans Mountain Pipeline system (now Kinder Morgan Canada) transports crude oil from Edmonton, AB to Vancouver, BC. Interprovincial Pipe Line Inc. extends to Sarnia, ON.</td>
</tr>
<tr>
<td>1954</td>
<td>The Pembina Pipeline system is constructed to transport crude oil from the Pembina field near Drayton Valley, AB to Edmonton, AB. The Pembina system serves one of the oldest oil producing areas in Alberta.</td>
</tr>
<tr>
<td>1955</td>
<td>Westcoast Transmission Company Ltd. (now Spectra Energy Inc.) begins construction on a 24-inch pipeline from Taylor, BC to the USA.</td>
</tr>
<tr>
<td>1957</td>
<td>TransCanada PipeLines Ltd. begins construction on a natural gas pipeline across Canada. Westcoast Transmission Company Ltd. begins transporting natural gas from northeastern British Columbia to the BC/US border. TransCanada Pipelines Ltd.’s Alberta system, known as NOVA Gas Transmission Ltd. or NGTL, begins operations.</td>
</tr>
<tr>
<td>1974</td>
<td>Foothills Pipe Lines Ltd., a subsidiary of Westcoast Transmission Company Ltd., now TransCanada Pipe Lines Ltd., was created for the purpose of constructing and operating the Canadian portion of the Alaska Natural Gas Transportation System.</td>
</tr>
<tr>
<td>1976</td>
<td>Interprovincial Pipe Line Inc. extends to Montreal, QC.</td>
</tr>
<tr>
<td>1977</td>
<td>Alyeska Pipeline completes construction of its Trans Alaska Pipeline System, known as TAPS, which moves crude oil from Prudhoe Bay on Alaska’s North Slope to Valdez, Alaska, USA.</td>
</tr>
<tr>
<td>1979</td>
<td>Foothills Pipe Lines Ltd. begins transporting natural gas from central Alberta to the US border.</td>
</tr>
<tr>
<td>1981</td>
<td>Interprovincial Pipe Line Inc. completes construction of its Norman Wells, NT to Zama, AB pipeline, which is the first buried pipeline through permafrost in Canada.</td>
</tr>
<tr>
<td>1985</td>
<td>Kinder Morgan Canada begins operation of its Express Pipeline, which transports crude oil from Hardisty, AB to markets in Montana, Utah, Wyoming and Colorado, USA.</td>
</tr>
<tr>
<td>1997</td>
<td>Westcoast Transmission Company Ltd. begins construction on a 24-inch pipeline from Taylor, BC to the USA.</td>
</tr>
<tr>
<td>2000</td>
<td>Alliance Pipeline starts transporting natural gas from northeastern British Columbia and northwestern Alberta to Illinois, USA.</td>
</tr>
<tr>
<td>2011</td>
<td>TransCanada PipeLines Ltd. begins transporting crude oil on its Keystone pipeline from Hardisty, AB to Cushing, Oklahoma, USA. The Mackenzie Valley Pipeline Project, owned by a consortium, receives federal Cabinet approval to construct a 1,200 kilometre natural gas pipeline from the Mackenzie Delta, NT to Fort Simpson, NT and on to existing pipeline infrastructures in Alberta.</td>
</tr>
</tbody>
</table>
FUELLING STRONG ECONOMIC AND COMMUNITY GROWTH

The ability to transport large quantities of crude oil and natural gas over long distances has been a contributor to Canada's economic prosperity. Canada's crude oil and natural gas exports are valued at more than $80 billion annually, the majority of which are transported by pipeline.

CEPA member companies provide employment opportunities for Canadians. Transmission pipelines generate hundreds of millions of dollars in property tax revenue that is reinvested in the community and help fund important services. Local procurement, such as goods and services, and community investments by CEPA members provide an economic boost and improved quality of life to the local and regional municipalities in which they operate.
The Canadian Energy Pipeline Association (CEPA) represents Canada’s transmission pipeline companies who operate more than 115,000 kilometres of pipeline in Canada. CEPA’s mission is to enhance the operating excellence, business environment and recognized responsibility of the Canadian energy transmission pipeline industry through leadership and credible engagement between member companies, governments, the public and stakeholders.

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<table>
<thead>
<tr>
<th>CANADA</th>
</tr>
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<tbody>
<tr>
<td>PIPELINE LENGTH – KILOMETRES IN 2013</td>
</tr>
<tr>
<td>115,000 km</td>
</tr>
<tr>
<td>PROPERTY AND CORPORATE TAXES IN 2013 (MILLIONS $)</td>
</tr>
<tr>
<td>$1,100 M</td>
</tr>
<tr>
<td>LOCAL PROCUREMENTS IN 2013 (MILLIONS $)</td>
</tr>
<tr>
<td>$1,490 M</td>
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<tr>
<td>COMMUNITY INVESTMENT IN 2013 (MILLIONS $)</td>
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<td>$25 M</td>
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<td>FULL-TIME EQUIVALENT EMPLOYEES IN 2013</td>
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<tr>
<td>13,600</td>
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<td>SAFETY RECORD</td>
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<th>SK</th>
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<th>ON</th>
<th>QC</th>
<th>NB</th>
<th>NS</th>
<th>YK</th>
<th>NWT</th>
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<tr>
<td>Natural Gas Released (000s litres)</td>
<td>7,200</td>
<td>5,779</td>
<td>370</td>
<td>895</td>
<td>8</td>
<td>4</td>
<td>4,078</td>
<td>7,760</td>
<td>21</td>
<td>2,793</td>
<td>3</td>
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<td>Liquids Released (000s litres)</td>
<td>64</td>
<td>25</td>
<td>2</td>
<td>210</td>
<td>8</td>
<td>2,402</td>
<td>58</td>
<td>605</td>
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<td>1,099</td>
<td>185</td>
<td>24</td>
<td>58</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>1,381</td>
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<td>-</td>
<td>7</td>
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<td>24</td>
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<td>Aboriginal</td>
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<td>19</td>
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<tr>
<td>Total</td>
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<td>510</td>
<td>116</td>
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<tr>
<td>Number of Failure Incidents (per 1,000 km)</td>
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<td>0.075</td>
<td>0.089</td>
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<td>0.054</td>
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<td>0.050</td>
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<tr>
<td>Liquid Released (000s litres)</td>
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<td>5,779</td>
<td>370</td>
<td>895</td>
<td>8</td>
<td>4</td>
<td>4,078</td>
<td>7,760</td>
<td>21</td>
<td>2,793</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>
THE FACTS ABOUT PIPELINES

This fact book is designed to provide easy access to information about the transmission pipeline industry in Canada. The facts are developed using CEPA member data or sourced from third parties. For more information about pipelines visit aboutpipelines.com.

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