



# How we build and maintain a safe pipeline

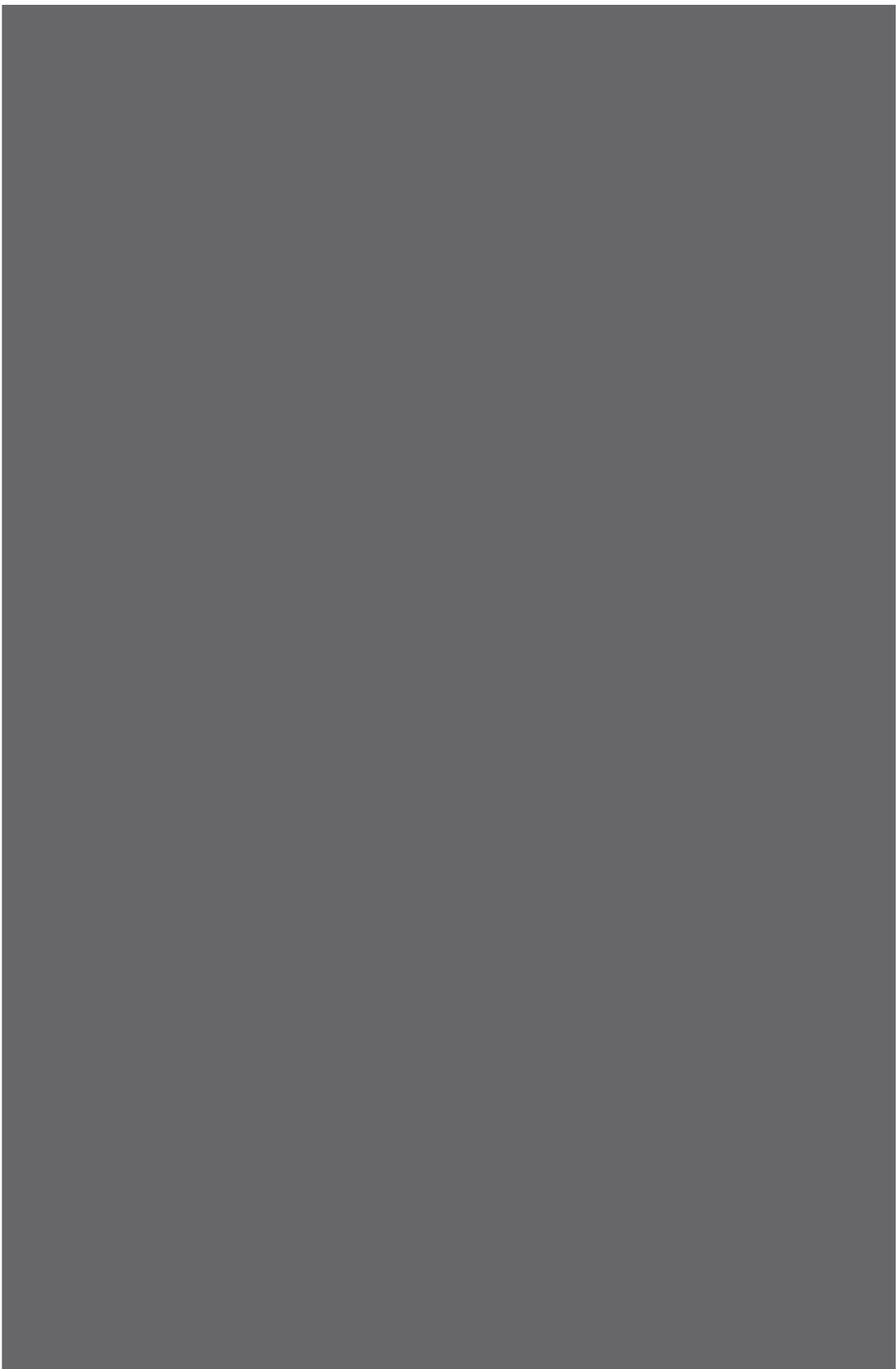
**Safety:**  
Our number  
one priority

Design and  
construction

Inspection,  
monitoring and  
maintenance

Research,  
development  
and innovation

Emergency  
response



## Safety: Our number one priority

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Safety is a core value at Enbridge. It's the very foundation of our business.

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The protection of the public and environment are paramount for Enbridge. The people who live near our pipelines and others expect us to operate them safely.

We believe pipeline safety is both an investment, and an obligation. And we use the latest tools, technologies and strategies—while closely monitoring the products we transport—to keep our pipelines operating safely, reliably, and in an environmentally responsible manner.

Our multi-faceted approach to safety includes:

- Rigorous design and construction standards
- 24/7/365, system-wide monitoring
- Harnessing innovation and technology
- An inspection program that regularly examines our pipes, inside and out
- Robust pipeline maintenance
- Leak detection
- Valve placement
- Strong emergency preparedness and response

We believe all pipeline incidents can be prevented, and we back up that belief with vigilance by applying state-of-the-art technology and a sophisticated live monitoring system.



Safety and reliability are built in to Enbridge’s energy infrastructure—long before the construction process begins.

We plan our projects with care, and look for ways to reduce our environmental footprint—including the use of pre-existing rights-of-way, such as utility corridors, where possible. We also work closely and continuously with regulatory agencies and the public, and include environmental evaluations, during the planning process.

**Building with superior materials**

The heart of Enbridge’s business is the pipe in the ground. We select, inspect and test our pipe to standards that meet or exceed regulatory requirements. Our specifications for pipeline steel exceed industry and regulatory standards, and we look for higher-quality pipe that undergoes more rigorous and frequent testing.

**High standards of construction**

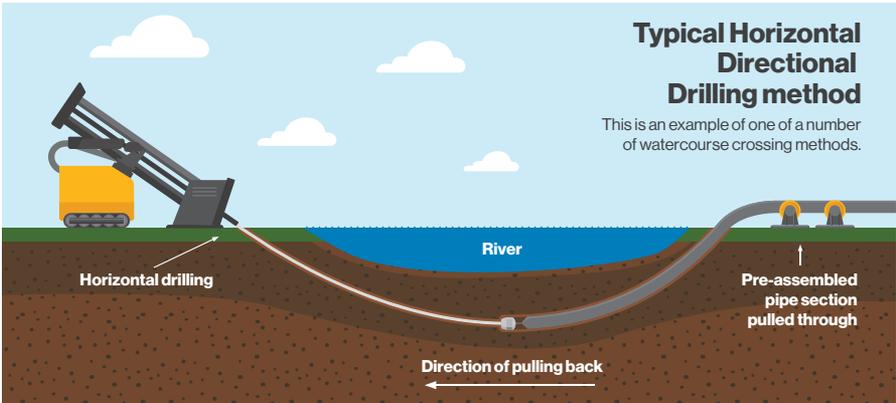
Once construction begins, we take care to limit our footprint, and actively manage a project’s potential effects on communities and the environment.

Examples include:

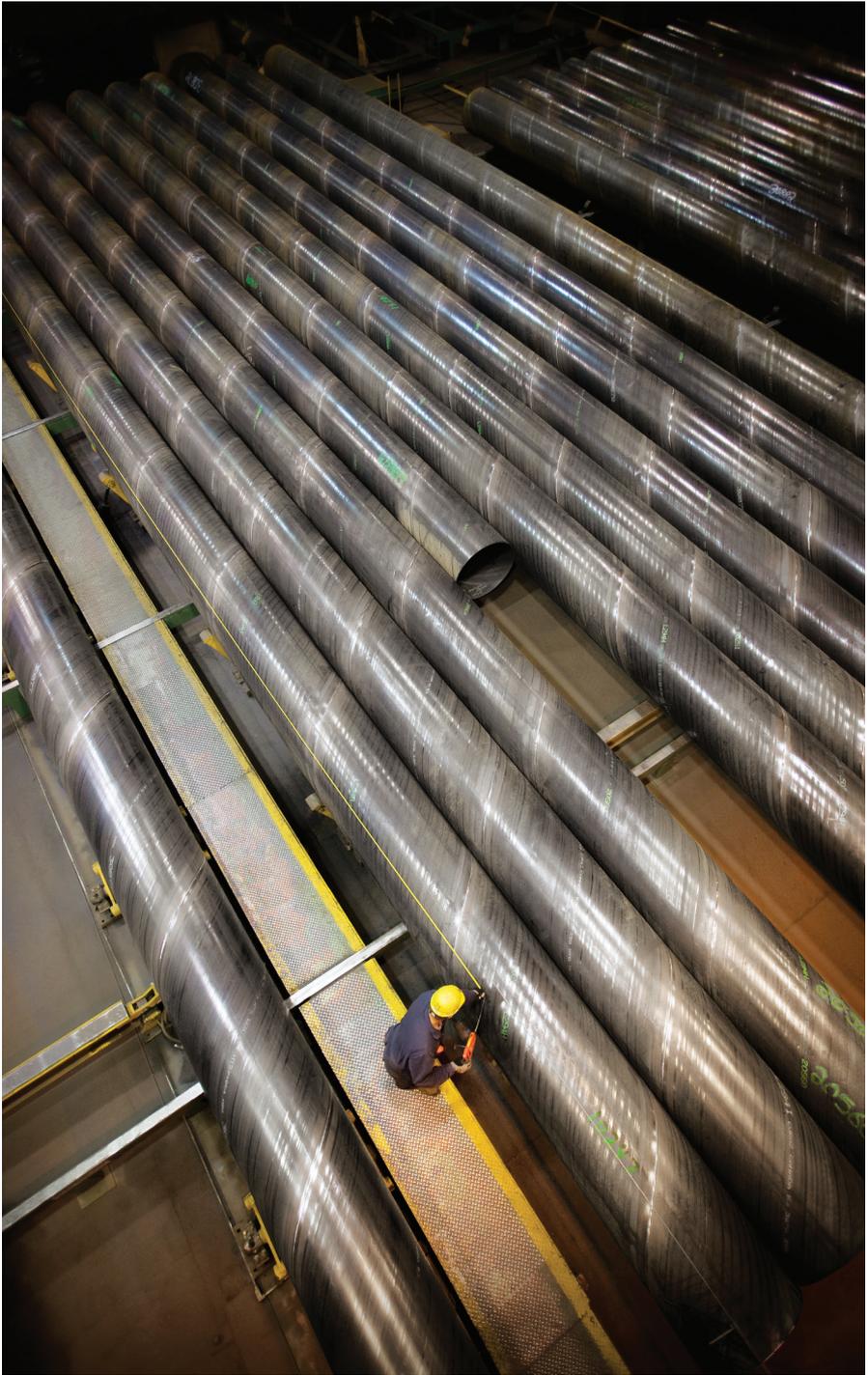
- Horizontal directional drilling (HDD) technology, which involves drilling an underground arched tunnel when building pipelines across large rivers or sensitive crossings, to minimize impact to people and the environment.
- Applying safe construction practices, while reducing ground disturbance.
- Complying at all times with all environmental requirements.

Our pipes are coated with fusion-bonded epoxy, and weld joints are subjected to ultrasonic and X-ray testing before they, too, are coated.

Before a new pipeline is put into service, it undergoes rigorous hydrostatic testing. Each pipe section is filled with water and subjected to 1.25 to 1.5 times the pipe’s maximum operating pressure to ensure the strength of the pipe and welds.



› Horizontal Directional Drilling involves drilling an underground arched tunnel when building pipelines across large rivers or sensitive crossings.



- › Pipe steel is thoroughly inspected in the mill by the manufacturer using automated ultrasonic devices, and Enbridge inspectors audit those results for enhanced quality assurance.

Prevention is a critical component of pipeline safety at Enbridge, and we focus on prevention—with vigorous monitoring, maintenance, and inspection programs—before issues arise.

By staying vigilant, and using the latest technology, we ensure our pipelines are healthy, both inside and out.

### Scanning our pipes, inch by inch

We regularly schedule inspections using in-line inspection tools—which use advanced imaging technology, like Magnetic Resonance Imaging (MRI) or an ultrasound in the medical industry—to scan our pipelines inch by inch, alerting us to small features that may require further attention before they become an issue.

### Eyes in the sky, boots on the ground

We use many other prevention tactics to ensure the fitness of our pipelines:

- Curbing corrosion through robust pipe coatings, cathodic protection (a low-level electrical current), interior cleaning of pipes, and anti-corrosion additives in the oil we transport.
- Strictly enforcing quality specifications for the products we move, including viscosity, density, temperature, sediment-and-water content, by testing every batch of product entering our Mainline system.
- Regular flyovers on our rights-of-way, and the use of imaging technology and GPS on ground patrols to check pipeline depth and position, as well as possible ground movement.
- An active North America-wide public awareness program.



- ▶ Motor operated ball valves allow our control staff to remotely close sections of our pipelines immediately upon detection of a potential issue.

### 24/7/365 monitoring

We also monitor our entire pipeline network, around the clock, using both people and highly computerized analysis.

Specially trained staff at our operations center keep an eye on our pipelines 24/7, and undergo a comprehensive six- to nine-month training program before they are qualified to operate consoles independently.

Upon detection of a problem, our staff can close remotely controlled isolation valves immediately, with full closure occurring within three minutes of activation to isolate the affected section of the pipeline.

Our various computerized monitoring systems, meanwhile, analyze pressure, temperature, and other important information from thousands of points all the way along our pipelines.

### Preventative maintenance dig

When our ongoing monitoring and inspection program alerts us to pipeline features that may require a closer look, we undertake a preventative maintenance dig, or visual inspection. We expose the pipe, examine it and make any necessary repairs to prevent a potential leak.

# Safety

## 24/7/365



### • Eyes in the sky

We regularly survey all 59,500 km of our liquids and gas pipeline rights-of-way. We also use satellite imagery to help identify, monitor and address any instances of incremental slope movement.



### • Talking to our neighbours

We regularly communicate with neighbours and customers about how to stay safe around our pipelines and facilities.

### • Eyes on the ground

We monitor and respond to any potential problems along our rights-of-way.



### • Preventative maintenance dig

If our in-line inspections reveal a pipeline anomaly, we expose the pipe, examine it and make any necessary repairs. In 2023, we conducted 1,264 preventative maintenance digs across our liquids and natural gas pipeline networks.



### Ensuring pipeline integrity

Each pipeline is precisely manufactured and rigorously inspected and tested.

Routes are carefully selected to meet stringent engineering, design and environmental standards and regulations.

We carefully manage pipeline pressures and monitor temperature, pipe movement and vibration.



### • Inline inspection

Ultra-high-tech tools allow us to monitor the fitness of our pipelines from the inside out. Using imaging technologies, such as ultrasound and MRI, we scan our mainline systems, major natural gas mains and transmission lines. In 2023, we conducted 687 inline inspections across our liquids and natural gas pipeline networks.

Enbridge continuously looks for opportunities to enhance existing technologies, and advance new ones, in the areas of design, prevention, monitoring and leak detection to keep our pipelines and distribution systems safe.



In 2023, Enbridge invested about \$23.8 million in technology development and innovation projects, and we are regularly involved in dozens of projects focusing largely on innovation to improve pipeline safety and fitness, leak detection and damage prevention.

Some examples of our technology in motion include:

- SmartBall technology, consisting of bowling-ball-sized sensors inside our pipes that detect tiny leaks and mark their location.
- The development of a next-generation inspection tool to advance crack assessment capabilities, as part of a partnership with pipeline inspection firm NDT Global.
- The ELDER test apparatus, a pipeline leak simulator created to test external leak-detection technologies, such as vapor-sensing tubes and fiber-optic cables.
- Our partnership with Hifi Engineering to test and enhance its High Fidelity Dynamic Sensing (HDS) technology.
- Our ongoing use of satellite data to identify pipeline displacement, down to the millimeter, caused by incremental slope movement over time.

- A joint industry partnership agreement to conduct research into aerial-based leak-detection technologies, such as infrared and laser-based spectroscopy systems.

# \$2<sub>B</sub>

The amount we spent in 2023 on programs that help us to maintain the fitness of our systems across our operations in the U.S. and Canada.

While prevention is Enbridge's primary focus, we also maintain strong emergency preparedness and response systems that we regularly test and continuously improve—sharing with first responders and community members near our pipelines and facilities.

In the event of an incident, Enbridge personnel and contractors have robust and tested emergency response expertise, training and equipment to ensure a quick and effective response.

We hope we never have to respond to a pipeline leak. But if we do, we're ready.

# 242

drills, exercises and emergency equipment deployments in 2023.

# \$80 million

spent on equipment and training since 2012.

### Testing and improving our plans

Enbridge employees in the U.S. and Canada participate in regular emergency response drills and full-scale simulations, many involving local first responder groups, to test and improve our procedures.

We've also spent more than **\$80 million** since 2012 on training and new response equipment, ranging from boom to boats, and deployed them across our systems.

### Online training and engagement

We meet regularly with first responders—including police, fire, and EMS—to share Enbridge's emergency response procedures, and identify the roles and responsibilities of external responders who would support Enbridge in the event of an incident.

Through 2023, we've provided emergency response training to more than 2,700 of our employees and direct contractors, including in-depth Incident Command System (ICS) training.

At Enbridge, our goal is to be the first-choice energy delivery company in North America and beyond—for customers, communities, investors, regulators and policymakers, and employees.

As a diversified energy company, we are uniquely positioned to help accelerate the global transition to a cleaner energy future, and we're doing it in ways that are ethical, sustainable and socially responsible.

We're advancing new low-carbon energy technologies—including hydrogen, renewable natural gas, and carbon capture and storage. We're committed to reducing the carbon footprint of the energy we deliver, and to achieving net-zero emissions from our operations by 2050<sup>1,2</sup>.

We also recognize the importance of a secure, reliable and affordable supply of energy. We safely connect millions of people around the world to the energy they rely on every day through our four core businesses—natural gas pipelines, liquids pipelines, gas utilities and storage, and renewable energy.

Through our cross-continent natural gas transmission pipeline system, we deliver about 20% of the natural gas consumed in the U.S.—and serve the rapidly expanding North American LNG export market. In the Gulf Coast, we serve 15% of LNG export capacity, and expect to double that number by 2030. In Canada, we're integral to all West Coast LNG export projects aiming to serve growing global markets.

We move about 30% of the crude oil produced in North America, and load about 25% of the continent's crude exports via our Enbridge Ingleside Energy Center (IEEC).

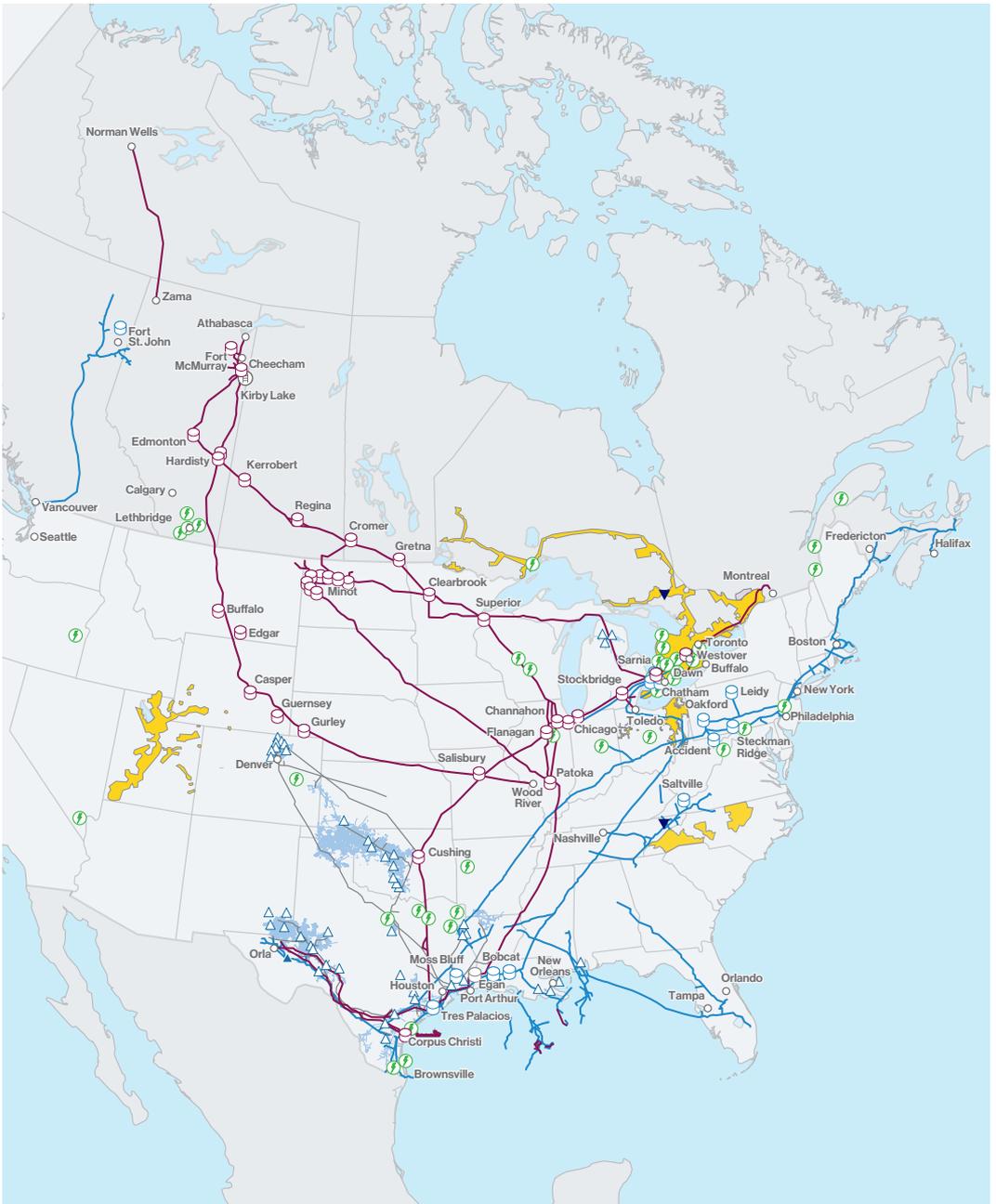
Enbridge operates North America's largest natural gas utility by volume, following the acquisition of Dominion Energy assets in Ohio, Utah-Wyoming-Idaho and North Carolina through 2024. Enbridge Gas was the first utility in North America to blend renewable hydrogen gas into its distribution system, and continues to pioneer lower-carbon energy sources.

Enbridge was an early investor in renewable energy, and we have a growing offshore wind portfolio in Europe. Collectively, our interests in renewable energy projects in operation or under construction have capacity to generate more than 2.3 net GW of zero-emission energy.

We value Safety, Integrity, Respect, Inclusion and High Performance. Above all else, we aim to make a difference, economically and socially—as an industry leader, as a responsible corporate citizen, as an exceptional employer.

Enbridge has been selected to Bloomberg's Gender Equality Index five years running, most recently in 2023; we've been named to the Dow Jones Sustainability Indices' (DJSI) North American index 14 times, most recently in 2022; we've earned an A-minus climate change grade from the Carbon Disclosure Project (CDP) for three straight years, most recently in 2022; and we have been ranked among Canada's Top 100 Employers 20 times, most recently in 2023.

Enbridge Inc. is headquartered in Calgary, Canada. We have a workforce of more than 15,500 people, primarily in the United States and Canada. Enbridge (ENB) is traded on the New York and Toronto stock exchanges.



**Enbridge is North America's premier energy infrastructure company, with assets stretching from well above the Arctic Circle to the Gulf of Mexico.**

- Liquids Pipeline
- - - Liquids Pipeline (proposed)
- Natural Gas Transmission Pipeline
- Natural Gas Gathering Pipeline
- Natural Gas Liquids Pipeline
- Crude Storage or Terminal
- Gas Storage Facility
- NGL Storage Facility
- △ Gas Processing Plant
- Gas Distribution Service Territory
- Affiliated Gas Distribution Territory
- ▼ LNG Facility
- ⊕ Rail Terminal
- ⚡ Renewable Energy

## **We want to hear from you**

You can get in touch with us  
at any time.

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### **General contact information**

Canada Liquids Head Office: **1-780-420-5210**

Canada Gas Transmission Head Office: **1-403-231-3900**

### **Public Awareness Program**

Canada toll free: **1-877-640-8665**  
(non-emergency calls)

E-mail: **CdnPublicAwareness@enbridge.com**

### **For pipeline emergencies**

Canada Liquids: **1-877-420-8800**

Canada Gas Transmission and Midstream  
(B.C.): **1-800-663-9931**

Canada Gas Transmission and Midstream  
(Maritimes): **1-888-444-6677**

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### **Learn more:**

[enbridge.com/safety](https://enbridge.com/safety)

<sup>1</sup> GHG emissions included within our targets are from assets over which we have operational control (Scope 1 and Scope 2 emissions). Projected reductions of GHG emissions intensity and absolute emissions is relative to the 2018 baseline year. For more information, see our Sustainability Report.

<sup>2</sup> Absolute emissions.