

Our commitment to pipeline safety

Safety:
Our number
one priority

**Design and
construction**

**Inspection,
maintenance
and monitoring**

**Leak detection
and innovation**

**Emergency
response**

Safety is one of Enbridge's core values. It's the very foundation of our business.

The people who live near our pipelines expect us to operate safely, and the protection of the public and the environment is our highest priority.

We see pipeline safety as 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;
- Robust pipeline maintenance;
- 24/7/365, system-wide monitoring;
- An inspection program that regularly examines our pipes, inside and out;
- Leak detection;
- Harnessing innovation and technology;
- Valve placement; and
- Strong emergency preparedness and response.

We believe all pipeline incidents can be prevented, and we back up that belief with vigilance and hard work.



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 include environmental evaluations, during the planning process.

Highest quality materials

Whether they carry crude oil, natural gas, condensate or natural gas liquids (NGLs), the core of Enbridge’s business is our pipeline infrastructure. 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.

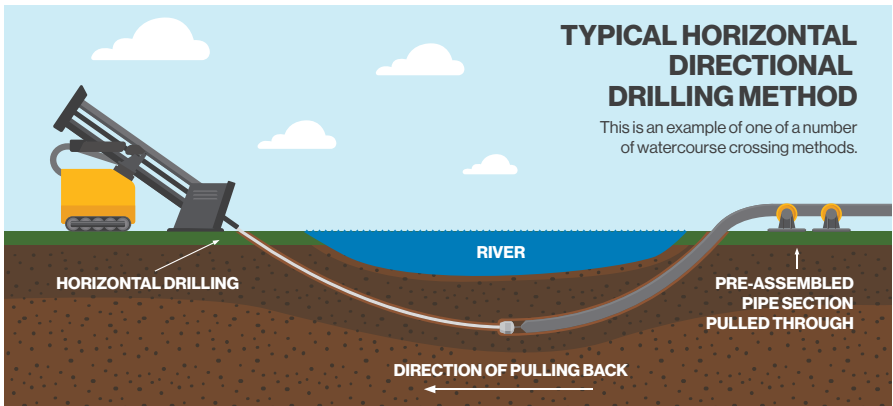
High standards of construction

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:

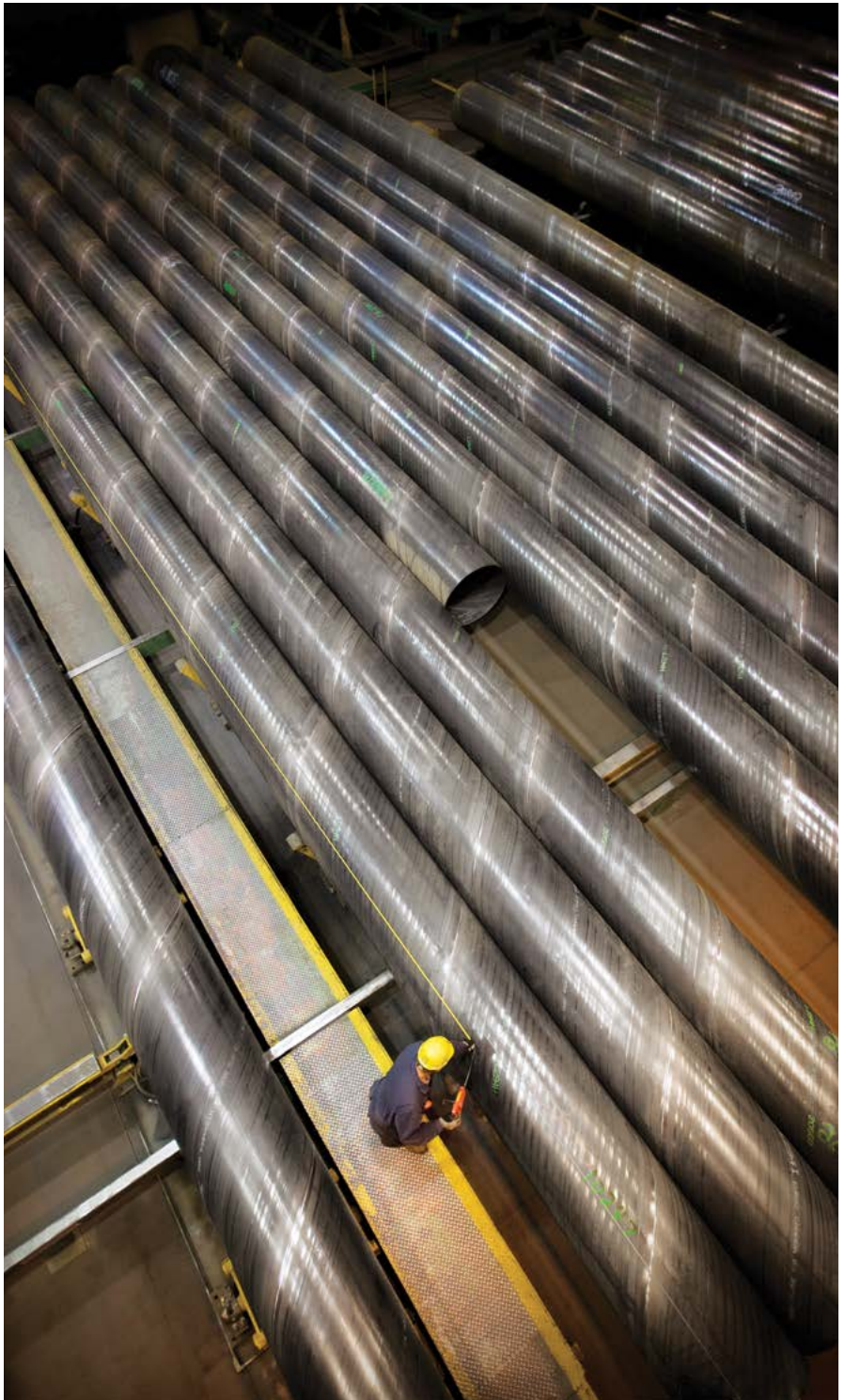
- Horizontal directional drilling (HDD) technology, which involves drilling an underground arched tunnel when building pipelines across large rivers or sensitive crossings, to minimize impact to people and the environment;
- Applying safe construction practices, while reducing ground disturbance; and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

Our pipes are coated with corrosion inhibitors, 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 (HDD) involves drilling an underground arched tunnel when building pipelines across large rivers or sensitive crossings.



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 an 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 a problem.

Eyes in the sky, boots on the ground

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

- Curbing corrosion through robust pipe coatings, cathodic protection (a low-level electrical current), and interior cleaning of pipes;
- An active public awareness program. We keep in regular contact with our neighbors to ensure they know how to stay safe around our pipelines and facilities; and
- Aerial and ground patrols. This includes 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.



- We conduct regular flyovers on our rights-of-way as part of our ongoing monitoring activities.

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

Sometimes, our ongoing monitoring and inspection program alerts us to pipeline features that may require a closer look. This means undertaking a preventative maintenance dig, or visual inspection, to expose the pipe, examine it, and make any necessary repairs to prevent a potential accident.

Safety

24/7/365

Eyes in the Sky

We regularly survey all 28,000 km of our crude oil and liquids pipeline rights-of-way.



Talking to our Neighbors

We regularly communicate with neighbors 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 2016, we conducted more than 1,300 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.



In-line 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 2016, we conducted 193 in-line inspections across our liquids and natural gas pipeline networks.

Enbridge's leak detection department harnesses innovations and technology to help us further control and minimize any potential issue that may arise.



In 2016, our research and development (R&D) and innovation-focused business segments and groups invested about **\$18.3 million** (USD and CAD) in technology development and innovation projects, largely focused on enhancing pipeline fitness, leak detection and damage prevention.

Some examples of our technology in motion are:

- SmartBall technology, consisting of bowling-ball-sized sensors inside our pipes that detect tiny leaks and mark their location;
- A multi-year, **\$20 million** project, announced in April 2017, that will see Enbridge and pipeline inspection firm NDT Global develop a next-generation inspection tool to advance crack assessment capabilities;
- The External Leak Detection Experimental Research test apparatus, a pipeline leak simulator created to test external leak-detection technologies, such as vapor-sensing tubes and fiber-optic cables;
- A joint industry partnership agreement between Enbridge, TransCanada Corporation, and Kinder Morgan Canada, announced in April 2015, to conduct research into aerial-based leak-detection technologies, such as infrared and laser-based spectroscopy systems.

128

The number of research projects Enbridge was actively involved in during 2016 to enhance pipeline and leak detection technology.

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.

335

drills, exercises and emergency equipment deployments in 2016.

\$80 million

spent on equipment and training from 2012 through 2016.

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 also spent more than **\$80 million** from 2012 through 2016 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.

Enbridge's Emergency Responder Education Program (EREP) offers free, unlimited online training and pipeline emergency response tactics for first responders near our projects and operations—including a training module targeted specifically at 9-1-1 call center personnel.

Through our Emergency Response Ambassador initiative, launched in 2013 as part of the EREP, our employee ambassadors have built meaningful relationships with emergency responders near our pipelines and facilities—arranging presentations, facility tours, and tabletop exercises.

Enbridge helps to provide a secure, sustainable and reliable supply of energy across the U.S. and Canada.

Millions of North Americans count on the energy we deliver daily. Providing safe and reliable infrastructure is the very foundation of our business. That's why our top priority is the protection of people and the environment. Our strategic investments in infrastructure upgrades help ensure the reliability and safety standards that all communities expect.

Enbridge transports, distributes and generates energy. We play a central role in providing heat and light for homes, offices and factories; fuel for vehicles and airplanes; and many other essential products and services that support prosperity and quality of life for millions of people.

Energy transportation

We operate the world's longest crude oil and liquids transportation system, and safely deliver an average of 2.8 million barrels a day—or 28% of the crude produced in North America.

We're also a North American leader in natural gas gathering, transportation, processing and storage, moving about 20% of the natural gas consumed in the U.S.

Energy distribution

We are Canada's largest natural gas distribution provider, with about 3.5 million retail customers in Ontario, Quebec, New Brunswick and New York State.

Energy generation

We've committed \$7.4 billion in capital in wind, solar, geothermal, power transmission, waste heat recovery, and a host of emerging technology projects. Collectively, these renewable energy and power transmission projects (in operation or under construction) have the capacity to generate more than 3,800 megawatts (MW) gross, or nearly 3,000 MW net, of zero-emission energy. That's enough, based on gross generation figures, to meet the electricity needs of more than 1,013,000 homes.

We believe that working towards lower-impact energy solutions is in everyone's best interest. Our portfolio of renewable energy projects is diversified and growing.

A North American company

We have a workforce of 15,400 people, primarily in the U.S. and Canada. Enbridge has been ranked on the Global 100 Most Sustainable Corporations index for eight straight years. Enbridge Inc. common shares trade on the New York and Toronto stock exchanges.



- 1 Enbridge Inc. and Enbridge Income Fund Holdings Inc. Headquarters, Calgary, Alberta, Canada
- 2 Enbridge Energy Partners, L.P. and Midcoast Energy Partners, L.P. Headquarters, Houston, Texas, USA
- 3 Enbridge Gas Distribution Headquarters Toronto, Ontario, Canada

- Liquids Pipelines
- Natural Gas Transmission Pipelines
- Natural Gas Gathering Pipelines
- ▲ Gas Processing Plants
- ▨ Enbridge Gas Distribution and Affiliates Service Territory
- ▩ Union Gas Service Territory
- Crude Storage and Terminals
- Gas Storage Facility
- NGL Storage

- Propane Terminals
- ▼ LNG US
- ⓔ Rail
- ⓔ Trucking Facility
- Power transmission
- ▲ Waste Heat Recovery
- Geothermal Power
- ⚡ Wind Assets
- ☀ Solar Assets
- 💧 Hydroelectric Power Assets

We want to hear from you

We want to address any concerns that you may have. You can get in touch with us at any time.

Here's how:

Call us:
403-231-3900

Write to us:
**200, 425 - 1st Street S.W.
Calgary, Alberta
Canada T2P 3L8**