

# Toward a Low-Carbon Future



**If you were asked to name a North American company supporting the transition to a low-carbon economy, which would it be?**

What if you were told this company has been in the renewable energy business for almost 15 years, is North America's largest distributor, processor, and transporter of low-carbon natural

gas, and plans to double its renewable generation capacity in the next five years?

The company we're talking about: Enbridge.

Surprised? You're probably not alone—the Enbridge most people know operates the world's longest oil and liquids pipelines network.

But the Enbridge people are getting to know is a diverse, integrated energy company that is fast emerging as a low-carbon energy leader.

For Enbridge President and CEO Al Monaco, it all comes down to fulfilling the company's purpose.



*“Governments, industry, environmental organizations—all citizens—share a common future. That means we also share in the responsibility to shape that future.”*

**AI Monaco**  
**PRESIDENT & CEO**

**Enbridge President and CEO AI Monaco points to five specific areas where action and collaboration can lower carbon emissions.**

“Enbridge helps fuel people’s quality of life. It’s why we exist,” says Monaco. “And as the energy needs of our customers change, we change too, investing in the technologies and services that can meet this demand.”

Monaco says success in the new energy landscape means working collaboratively with everyone involved in the energy business, from producer to customer.

“Governments, industry, environmental organizations—all citizens—share a common future. That means we also share in the responsibility to shape that future.”

Monaco points to five specific areas where action and collaboration can lower carbon emissions. “First, we need to implement carbon pricing strategies aimed at both supply and consumption. Second, we need to invest and incent the development of more renewable energy. Enbridge’s renewable portfolio has grown to \$5 billion in only 10 years. We want to double our renewable generating capacity in the next five years.

“Third, we can reduce emissions by generating electricity and fueling heavy-duty transportation with natural gas. As a

major natural gas distributor and a network of natural gas pipelines to electric generators to supply affordable and reliable natural gas, Enbridge is well-positioned to lead in that effort.

“Fourth, we should encourage policies that incent investment in innovation and new technologies that improve the environmental performance of all forms of energy.

“And finally, we need to take further steps to encourage conservation through new approaches to energy efficiency and conservation.” Taken together, Monaco believes these actions underpin a strong emissions strategy—a practical plan that can achieve meaningful results. He also credits leadership at the federal and provincial

**TIMELINE**

	1987	1992	
<p><i>Path to a sustainable future.</i></p> <p>GLOBAL ACTIONS / MILESTONES</p> <p>ENBRIDGE ACTIONS / MILESTONES</p>	<p>—</p> <p>The <b>UN Brundtland Commission</b> introduces the concept of “<b>sustainable development</b>,” defining it as “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”</p>		<p>—</p> <p>The first <b>UN Conference on Environment and Development</b> in Rio de Janeiro (the “<b>Earth Summit</b>”) develops a framework for multilateral agreements on global goals related to sustainable development and climate change, establishing the foundation for the:</p> <ul style="list-style-type: none"> <li>• <b>UN Framework Convention on Climate Change,</b></li> <li>• <b>1997 Kyoto Protocol, and</b></li> <li>• <b>2015 Paris Agreement.</b></li> </ul>

level—including the Alberta Government’s Climate Leadership Plan—for taking action on each of these fronts.

“To fulfill our purpose, grow our business and secure our future, we can show that economic prosperity and a low-carbon future is possible and achievable if we work together,” Monaco adds.

Collaborating with diverse interests to achieve lasting change has long been at the forefront of Linda Coady’s work.



**Linda Coady**  
CHIEF SUSTAINABILITY OFFICER

**A former vice president for Weyerhaeuser, World Wildlife Fund and the Vancouver 2010 Winter Olympics, Coady has been recognized as an innovator in corporate sustainability in Canada.**

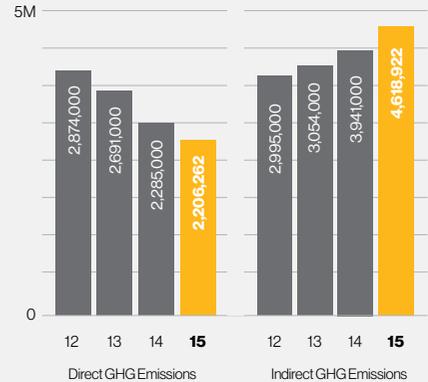
She has worked with industry, government and environmental organizations to achieve sustainability solutions. Coady joined Enbridge in 2013 to take on the newly-created position of Chief Sustainability Officer.

“Everyone agrees on the need for energy sustainability,” Coady says. “The key is to bring people together to find common ground on new solutions.”

**Enbridge GHG Emissions**

Tonnes of carbon dioxide equivalent (t CO2e)

Enbridge is focused on reducing our own operational carbon emissions in Canada. In 2015, we began internal assessments to set a multi-year, corporate-wide target for carbon reduction and energy efficiency improvements that each business segment can implement. Carbon and Energy Efficiency Plans for each business segment will serve as the foundation for an enterprise-wide target.



\*2016 Legacy-Enbridge data only. Legacy-Spectra data is available in their 2016 CSR Report.

“It’s critical that Enbridge is transparent and accountable for the actions it is taking to reduce its own emissions.”

In 2011, Enbridge reduced GHG emissions for its Canadian operations by 21 percent below 1990 levels. In 2014, the company’s Gas Distribution business cut its emissions by five percent below 2011 levels.

“Good progress,” says Coady. “But more work needs to be done.”

From eliminating fugitive emissions to finding opportunities to power pipelines

with renewable energy, Coady’s team is working with all of Enbridge’s business units to develop multi-year plans for emissions reduction and energy efficiency.

“The point to understand is this: in today’s world, strong sustainability measures and goals make good business sense,” Coady says. “It translates into access to capital, people and markets.”

Few understand that connection between business and the environment better than Laszlo Varsanyi. **CONTINUED >**



Variable speed drive electric motors at pump stations help to reduce the emissions profile of Enbridge’s liquids pipelines business.

**1995**

**Enbridge Gas Distribution establishes its first energy conservation and efficiency program**

providing education, incentives and other resources that help consumers reduce their energy consumption and save money over time.



**1999**

Enbridge forms its “Pathfinders Group” charged with finding new energy-related technologies that make strategic, long-term sense for investment. Enbridge’s current investments in renewable energy—as well as the company’s investments in emerging technologies—were all incubated within the Pathfinders Group.

**2000**

The UN launches three new initiatives that help frame a new global agenda for sustainability: the UN Global Compact (UNGC); the Millennium Development Goals (MDGs); and the UN Millennium Ecosystem Assessment. The UNGC is the world’s largest corporate citizenship initiative.

**2002**

Enbridge invests in the SunBridge Wind Project in Saskatchewan, launching the company’s renewable energy investment portfolio.

Enbridge is included for the first time in the Dow Jones Sustainability Index (DJSI). The DJSI is a family of indices that evaluate the systems companies have in place to manage sustainable development issues.



# Partners in Innovation

## Morgan Solar



**What's the future of solar-generated electricity? More energy at a reasonable cost.**

Morgan Solar has developed solar technology—called Sun Simba™—that captures and concentrates sunlight in a process that is 100 percent more efficient than conventional solar panels. It's also 50 percent smaller for a given power rating, and a fraction of the cost. When the panels are paired with Morgan Solar's revolutionary dual-axis sun tracking system—the Savanna Tracker—they are able to track both the east-west path of the sun and the seasonal changes in the sun's elevation. Together, the two technologies increase energy yields per acre by 25 to 50 percent. Enbridge is a partner in commercializing this new technology, helping to bring more cost-effective renewable electricity to the grids that power homes.

## Temporal Power



**The intermittent nature of wind and solar energy is a challenge for power grids, since an unstable grid is an unreliable grid.**

With an investment from Enbridge, Temporal Power's energy storage technology can help put more renewable energy into the homes and businesses of consumers. The intermittency of renewable energy increases the challenges of operating a reliable grid network because grids require perfect balance of supply and demand at all times. Temporal's flywheels use a motor to draw excess electricity from the grid, store it as kinetic energy, and then inject it back onto the grid when required. This technology can respond within milliseconds and output steady power for minutes at a time—ensuring fluctuations in the grid can be managed effectively as renewable generation capacity increases.

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**Laszlo Varsanyi**  
VP, NEW VENTURES, POWER

**An 18-year company veteran, Varsanyi leads Enbridge's renewable and alternative energy portfolio. With his extensive experience in the energy sector and enhancing pipeline performance, he's committed to growing Enbridge's \$7.8 billion renewable portfolio.**

As Vice President for New Ventures, Power, Varsanyi and his team are focused on growing Enbridge's global power generation business, spanning all technologies—including solar, onshore and offshore wind, hydro, gas turbine, waste heat, and geothermal.

"Only 10 years ago it was tough to make a business case for renewables, but it's incredible how quickly that has changed," says Varsanyi. "Growing market demand has triggered a technological revolution in renewables that has brought down costs to the point where they are competitive with the company's traditional business."

And that's where Varsanyi's experience will serve to grow Enbridge's renewable power generation.

## TIMELINE

2003

Enbridge begins publicly disclosing its own greenhouse gas emissions through the **Canadian Standards Association GHG Voluntary Challenge and Registry**.

Enbridge becomes a signatory of the UN Global Compact.

2005

Enbridge is included for the first time on the **Global 100 listing of the 100 Most Sustainable Corporations in the World**, which ranks corporations based on their performance on sustainable development indicators.



2006

Enbridge adopts the **Global Reporting Initiative (GRI) Guidelines for Sustainability Reporting** in its Corporate Social Responsibility Report. The GRI is an international not-for-profit organization that developed the world's most widely used framework for sustainability reporting.

2007

Enbridge submits its first response to the **Climate Change Questionnaire of the CDP** (formerly Carbon Disclosure Project). In 2014 Enbridge also began filing an annual submission to **CDP Water** that outlines actions being taken by the company to safeguard water resources.

2007

Enbridge establishes its first **Climate Change Policy**, under which the company commits to reducing its own greenhouse gas (GHG) emissions and energy use, and to working with external stakeholders and decision makers to advance new climate solutions.



"My day job at Enbridge has always been about growth. I have worked to find suitable assets or companies to support the company's Liquids Pipelines growth strategy and to find new platforms for growth," explains Varsanyi. "Because Enbridge looks at renewable opportunities in exactly the same way we look at pipelines—as low-risk, long-term investments—my team and I can not only make a solid business case for future acquisitions, but also deliver good returns to shareholders."

Varsanyi is also responsible for looking at new and innovative technologies that will help Enbridge lead the energy transition, with investments becoming repeatable platforms for growth.

"Over the past decade, we have built an impressive suite of renewable assets, but there's an even greater opportunity to sharpen our focus and lead in this space," says Varsanyi.

While investing in turbines and technology is an important way the company is helping make a difference, consumers of energy

are increasingly looking for ways to reduce their own energy use and costs—something Enbridge Gas Distribution has been championing since 1995.

With more than 3.5 million customers, Union Gas and Enbridge Gas are already contributing to emissions reductions by delivering a low-carbon fuel to homes and businesses. Enbridge Gas is also using its reach to make inroads into conservation,

enabling its customers to play a more active role in a sustainable energy future.

"We have a longstanding history of delivering conservation programs in Ontario. In fact, back in 1995, Enbridge Gas was one of the first companies in Canada to begin introducing these programs," says Enbridge Gas Vice President of Market Development, Malini Giridhar. **CONTINUED >**

Enbridge expands its power generation portfolio into the European offshore wind market.

In 2015, Enbridge announced its \$750-million investment of a 24.9 per cent stake in the 400-MW Rampion Offshore Wind Project off the coast of England, which is expected to be fully operational in 2018.

A second renewable investment was secured with a 50 per cent interest in French offshore wind development company Éolien Maritime France SAS, in 2016. Enbridge will participate in the development, construction and operation of three large-scale offshore wind farms, which will collectively produce 1,428 MW of power – enough to power as many as one million homes.

This year, Enbridge announced a 50 per cent ownership in the 497-MW Hohe See Offshore Wind Project and its 112-MW expansion, Albatros, from EnBW, a German utility. Hohe See is a late design-stage project located in the North Sea.

Enbridge has committed to spending \$2.7 billion in offshore wind projects in Europe over the past two years.

## Enbridge's renewable investments since 2002

Enbridge has committed more than \$7.8 billion in capital to renewable energy and power transmission projects currently in operation or under construction.

Together, these projects (either operating or under construction) have the capacity to generate and transmit more than 3,900 megawatts (MW) gross of zero-emission energy (nearly 3,000 MW net) – enough to power more than 1.8 million homes.



18 Wind Farms

3,400<sub>MW</sub>



4 Solar Energy Operations

150<sub>MW</sub>



1 Geothermal Project

23<sub>MW</sub>



5 Waste Heat Recovery Facilities

34<sub>MW</sub>



1 Hydroelectric Facility

2<sub>MW</sub>



Transmission

300<sub>MW</sub>

All megawatt figures are gross capacity

### 2008

The UN launches the **Principles for Responsible Investing (PRI)** to provide a set of guidelines for investors wishing to use environmental, social and governance (ESG) criteria in their investment decision making. By 2015, PRI signatories represented \$59 trillion USD in investments.

Enbridge sets its first **GHG reduction target** aimed at reducing direct emissions in its Canadian operations by 20 per cent below 1990 levels by 2010. In 2011, Enbridge reported it had achieved a 21 per cent reduction below 1990 levels, primarily through upgrading facilities and equipment.

### 2009

Enbridge accelerates the **expansion of its renewable energy portfolio** in North America with acquisitions in wind, solar and geothermal projects and facilities in the Canadian provinces of Ontario and Alberta, and the U.S. states of Colorado, Oregon, Texas and West Virginia.



### 2013

Enbridge Gas Distribution (EGD) reaches two million Ontario residents and businesses, serving customers in more than 100 Ontario communities. EGD is now the largest natural gas distribution utility in Canada, and one of the fastest growing in North America, **providing a low-carbon source of energy** that can help replace coal-fired electricity and support improved energy sustainability at the community level.

# Saving 10.3 billion cubic meters of natural gas through conservation

That's the equivalent of taking **4.1 million cars** off the road for a year or heating **4.3 million homes** for a year.



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**Malini Giridhar**  
VP, MARKET DEVELOPMENT AND PUBLIC & GOVERNMENT AFFAIRS

**“We showed our customers that there were real savings to be made in reducing both their energy consumption and their carbon footprint,” says Giridhar.**

The result: 10.3 billion cubic meters of natural gas have been saved through the programs delivered to customers, reducing emissions by 19.4 million tonnes.

“That’s the equivalent of taking 4.1 million cars off the road for a year, or enough energy to heat 4.3 million homes for an entire year,” says Giridhar.

Enbridge Gas Distribution provides conservation programs to residential, commercial and industrial customers. And in light of the introduction of cap and trade in Ontario, the company is in a prime position to continue with its successful energy efficiency programs, and to continue working with the province to meet its carbon reduction goals.

“What’s even more exciting is with new gas technologies like renewable natural gas and natural gas for transportation, we can help Ontario meet all its climate change targets,” says Giridhar.



Renewable natural gas, or RNG, is a clean and carbon-neutral fuel that is created from decomposing organic waste—like green bin collection waste (vegetable peelings), livestock waste, and landfill gas. Potential production of RNG is equivalent to 1,200 billion cubic feet per year—equal to a little more than 50 percent of Canada’s 2014 natural gas consumption.

Enbridge’s Executive Vice President and Chief Transformation Officer, Karen Radford, is encouraged by this innovation that will assist communities and government in meeting greenhouse gas emissions reduction targets, as well as supporting local economic development in a range of sectors.

## TIMELINE

### 2014

Between 1995 and 2014, **energy efficiency programs at Enbridge Gas Distribution** save about 9.6 billion cubic metres of natural gas and 18 million tonnes of carbon dioxide emissions. These reductions would be similar to taking about 3.5 million cars off the road for a year or serving approximately 4 million homes for a year. They result in net energy savings to homeowners and small businesses of nearly \$2.5 billion over time.

### 2015

Enbridge enters the European wind market with the **Rampion Offshore Wind Project** in the UK, bringing total investments in renewable energy to nearly \$5 billion.

The government of Alberta announces a new Alberta Climate Leadership Plan. Enbridge is one of several energy companies that publicly supports the new plan.

### 2016

The Government of Ontario invests \$100 million in an **Ontario Energy Retrofit Program** partnership with Enbridge Gas Distribution and Union Gas that will help homeowners conduct audits and undertake retrofits that improve energy efficiency.

Enbridge supported the ratification of the Paris Climate Agreement.

Enbridge updates its Climate Change Policy, which outlines our carbon footprint reductions

### 2017

Enbridge acquired a 50 per cent ownership in the 497-MW Hohe See offshore wind project from EnBW, a German utility, off the coast of Germany, and closed on its option for a 112-MW expansion.

Enbridge combines with Spectra Energy to become the largest energy infrastructure company in North America.

Placed Sabal Trail natural gas pipeline into service to provide critical gas supply into Florida and connect to a power generation facility.

## Renewable Natural Gas

RNG is a clean and carbon-neutral fuel that is created from decomposing organic waste—like green bin collection waste (vegetable peelings), cow and farm waste, and landfill gas.

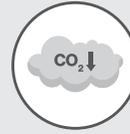
For more information, please visit [enbridgegas.com](http://enbridgegas.com)



## Renewable natural gas will



Be delivered through our existing natural gas pipeline system



Help lower greenhouse gas emissions by replacing the use of traditional natural gas



Be produced in Ontario



Replace diesel fuels in truck and bus fleets



Fuel all natural gas appliances and heat your home and water



**Bill Yardley**  
EVP AND PRESIDENT, GAS TRANSMISSION  
AND MIDSTREAM

**“Natural gas has a critical role to play in a low-carbon future,” says Yardley. “It’s one of the most versatile, abundant energy sources in North America. It’s cleaner-burning than other conventional fuels, so it’s a great replacement fuel for coal in electricity generation.”**

Yardley and his team are focused on the company’s extensive natural gas business – with gathering, transportation, processing and storage facilities across North America.

The shift to natural gas use in power generation is helping North America reduce energy-related emissions and improve air quality. Natural gas emits 52-56 percent less greenhouse gas than coal for the same amount of electricity. By using clean-burning natural gas for electric generation instead of other sources such as coal, the U.S. electric power sector prevented more than 1.2 billion metric tons of carbon emissions between 2006 and 2014.

**“We are rising to the challenge of this generation, helping to build the energy systems of tomorrow.”**

Of course, to realize the benefits of natural gas, the infrastructure to transport it must be in place. Enbridge is dedicated to building the infrastructure to deliver this vital fuel to key areas.

“We are rising to the challenge of this generation, helping to build the energy systems of tomorrow,” says Yardley.

A prime example is New York City. In late 2013, we placed the first natural gas transmission pipeline into Manhattan in more than 40 years, driven by customer demand for cleaner, affordable energy. Last year, the NYC mayor announced that all of the 5,300 buildings using No. 6 heating oil had converted to natural gas or other sources. Altogether, this pipeline has helped eliminate 6 million tons of CO<sub>2</sub> per year – the equivalent of removing 1 million cars from the road.

We’re bringing the benefits of natural gas to other areas as well.

“Recently, we placed our Sabal Trail Transmission project into service, delivering natural gas to power generators in the Southeast U.S. that are switching away from coal. We’re also constructing the Valley Crossing Pipeline, to provide Mexico with a source of clean natural gas, to help shift that country’s electric generation away from coal and fuel oil,” Yardley says.

Another major benefit of natural gas: It’s a great complement to renewable energy.

“Natural gas provides reliable, low-emission back-up generation to renewable energy sources like wind and solar. This ensures that we have electricity even when the sun isn’t shining and the wind isn’t blowing,” Yardley says. “Together with renewables, natural gas can help us achieve a low-carbon future.”



**E =**

**Soaring to new heights.** We didn't use it to fly a kite. Or spend an afternoon at the beach with the family. But we did recognize the potential of wind as a source of renewable energy. That's why we invest in renewable energy that will soon generate enough electricity to power more than one million homes. When our energy meets the energy from the wind, harnessing the future happens.

 **ENBRIDGE**<sup>®</sup>  
Life Takes Energy™

 **GLOBAL100**