
Alberta: a leader in responsible energy development





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This is Alberta

Alberta has a rich history of success, forged through the strength and hard work of our entrepreneurs. This entrepreneurial spirit has allowed businesses to adapt and families to grow, and has provided opportunities for citizens across North America. Building on a strong environmental legacy, Alberta's natural and civic diversity has helped foster an economy that has made it a leader and innovator in a number of sectors.

Alberta is Canada's energy province. The province has taken care to develop its resources in a manner that exceeds its environmental and social responsibilities by working with industry, Indigenous communities, the public and researchers to create a cleaner energy future. This collaborative environment has served to foster a balance of economic, environmental, and social outcomes.

As the global community begins to focus on a new energy future, Alberta is in an excellent position to help meet demand, share its technological innovation, and lead the way towards a responsible energy future.



- More than 6.8 million hectares of habitat are legislatively protected and conserved. This represents area larger than West Virginia and about 1.3 times bigger than the largest United States national park.
- Alberta ranks in the top three international centres for machine learning, a field estimated to be up to \$16 trillion in global economic output over the next decade.
- Energy from Alberta is produced under the world's highest environmental, human rights, and labour standards. As a leader in environmental, social, and governance outcomes, Alberta has a great and deep-rooted story for those looking for real actions that support responsible development.





Fueling the energy future

Over the last decade, the funding landscape for the energy sector has shifted significantly as the global investment community began building towards a new energy future. In this new future, global interests in energy investment are changing with an increased focus on Environment, Social, and Governance (ESG) related outcomes, clean products and operations, and heavier reliance on low-carbon alternative sources of energy.

Working towards this energy future, Alberta's 100 years of expertise in energy production, clean technology, and innovation gives it the potential to become a leading clean energy provider. Home to the fourth-largest proven oil reserves in the world, and as the globe's sixth-largest producer of oil, Alberta is well positioned to be a supplier of choice thanks to its transparent approach to managing economic, environmental, and social outcomes.

Alberta's highly-educated, hardworking population, established regulatory system, adherence to human rights, and support for diversity and inclusion follow the growing ESG investment trend. Alberta intends to balance its support for Albertans' livelihoods and continue the preservation of Alberta's unique landscapes.

The International Energy Agency predicts world energy demand will increase by one-third by 2040 under existing and planned government policies, with most of the growth coming from developing countries as their populations grow and their standards of living improve. Alberta has a vast endowment of natural resources and is working with global markets to seek new energy opportunities through entrepreneurship and innovation. The economic and social recovery following the COVID-19 pandemic will continue to be a key driver in short-term trends along with the need for affordable and reliable clean energy.



Several of Alberta's largest producers, including Cenovus Energy, Canadian Natural Resources, MEG Energy, Suncor Energy, Imperial Oil Limited, ConocoPhillips Canada, Repsol, and Seven Generations Energy have made net-zero commitments. Notably, on June 9, 2021, Canada's largest oil sands producers announced the Oil Sands Pathways to Net Zero alliance.

Alberta's part in North American energy security



Abundant resources

Alberta's secure supply of natural resources, including oil, gas, and emerging opportunities in minerals, hydrogen, petrochemical production, and solar and wind power position it as a crucial component of North America's energy security. As a trusted supplier of responsible energy within North America's integrated energy system, Alberta will continue to develop ethically and environmentally responsible energy for the mutual benefit of North Americans.



Reliable partner

Alberta's energy sector covers significant portions of the value chain from upstream production to downstream and end use in conventional and unconventional oil and natural gas extraction and processing. The integrated nature of the North American energy supply chain creates opportunities where collaboration and joint action are crucial to attaining mutual environmental goals. The development of large-scale international energy infrastructure projects and shared coordination of policy measures to adapt to the energy future allow Alberta to be a key partner in the North American energy sector.



Diversified energy mix

As energy demand is expected to grow, Alberta continues to make significant emission reduction actions to help achieve North America's environmental goals. The advantage of a secure supply of energy is enhanced by Canada's political stability and democratic accountability, exceptional education and labour standards, and globally recognized dedication to human rights. Through investments in petrochemicals; clean oil and gas technologies; carbon capture, utilization and storage; renewable energy (solar and wind); bio-energy; innovative hydrocarbon uses; and electricity transmission and distribution, Alberta's energy sector will continue to play a key role in maintaining North American energy security.



- The province is home to Keyera's Alberta EnviroFuels' iso-octane production facility, which makes approximately 14 kbbl/d of high-grade transportation fuel additives, operating the world's largest plant in this important sector.
- Alongside Alberta's abundant oil and gas resources, it also has excellent conditions for both solar and wind power. The largest wind and solar installations in Canada will soon be found in southeastern Alberta, with both Suncor Energy's 400-megawatt Forty Mile Wind Farm and the Travers 400-megawatt solar project on track for completion in late 2022.



Alberta's responsible resource development

Alberta has legislation and environmental management systems in place to ensure proper stewardship of air, water, land, and biodiversity in partnership with local and Indigenous communities, other governments, and strategic partners. Alberta's integrated land-use planning approach to manage land and natural resources is founded on social, economic, and environmental assessment, cumulative effects management, and public, Indigenous, and stakeholder consultation.

As part of the province's responsible resource development system, the *Alberta Land Stewardship Act* sets out the process for developing regional plans and making land-use decisions that consider economic, environmental, and social interests. To date, over 15 per cent of the provincial land base is protected and conserved as part of ongoing efforts to protect the health of over 60,000 species.

Alberta is committed to producing energy responsibly as it aspires to be a leader in the global energy future. Alberta has identified **three key pillars** to drive the energy sector forward over the next five years:

1. **Supporting our foundational energy industry**
2. **Maximizing value from hydrocarbons**
3. **Proactively identifying and supporting emerging opportunities**

Alberta is working hard to lead the world in ESG factors that will bring responsible investment to create jobs and a strong economy for generations.



Regulatory system

Alberta's energy system is complex, dynamic, and far-reaching. At the highest level, the energy system exists to ensure that Albertans benefit economically from investment in responsible energy and mineral development, and access to global markets. At the same time, the system is designed to effectively and efficiently steward and regulate those energy and mineral resources for both current and future generations.

Alberta's comprehensive Water for Life Strategy, air quality management frameworks, and other related regulatory tools ensure the continued stewardship of our air, water, land, and biodiversity.



Indigenous engagement

Alberta has long supported Indigenous consultation, participation, and perspectives as a core component to the development of Canada's energy resources. Alongside Indigenous consultation, initiatives such as the Oil Sands Monitoring Program and Alberta Indigenous Opportunities Corporation help Indigenous communities access capital to invest in natural resource projects, participate in environmental stewardship, share Traditional Ecological Knowledge, and ensure their voices are heard in natural resource decisions.

As one of the most significant investments in environmental monitoring worldwide, the Oil Sands Monitoring Program fosters collaboration between governments, industry, Indigenous communities, and others. From these relationships, the province and Indigenous communities have created cooperative management arrangements for long-term sustainability and protection, including the Ronald Lake bison herd, Writing-on-Stone Provincial Park, and others.



- **Three Nations Energy is a corporation owned by Athabasca Chipewyan First Nation, Mikisew Cree First Nation and Fort Chipewyan Métis Association. It completed Canada's largest off-grid solar farm, which will provide 25 per cent of the annual electricity needs of the hamlet of Fort Chipewyan. The project helped Indigenous tradespeople, workers and contractors to participate and build their skills in the green energy sector.**
- **The Alberta Indigenous Opportunities Corporation announced its first loan guarantee to Alexis Nakota Sioux Nation, Enoch Cree Nation, Kehewin Cree Nation, O'Chiese First Nation, Paul First Nation, and Whitefish Lake First Nation to enable their participation in the \$1.5 billion Cascade Power Project. The Cascade Power Project is a 900 megawatt combined cycle natural gas-fired power plant located near Edson, Alberta. The transaction involves multiple parties including Kinetikor Resource Corp., OPTrust, and Backwoods Energy Services (Alexis Nakota Sioux Nation-owned).**



Emissions management

Alberta's environmental legacy is strong, from introducing the first North American price on industrial emissions, to an internationally recognized methane emissions reduction framework, to setting an example for the world by investing in innovative technologies like carbon capture, utilization, and storage.

Alberta's climate policy goes beyond the emissions intensity of a type of crude oil. It also enhances ESG indicators, including data transparency, environmental protection, relationships with Indigenous Peoples, and stable governance and regulatory excellence.

Carbon pricing systems



Alberta has taken serious action on climate change focused on further reducing emissions. Alberta's Technology Innovation and Emissions Reduction (TIER), our carbon pricing approach, forces large emitters to find innovative technology solutions to reduce emissions.

As the third generation of Alberta's leading carbon pricing and emissions trading system, TIER has resulted in 175 million tonnes of compliance action as of January 2020. The TIER fund, generated through the purchase of carbon offsets, supports the development of emissions reductions technologies through research or commercialization. In response to the COVID-19 pandemic, the TIER fund will inject up to \$1.9 billion into the economy as it drives

significant emissions reduction projects. The TIER fund also helps municipalities and Indigenous communities adapt to the changing climate by supporting flood mitigation, waste heat recovery, and electricity co-generation projects.

Alberta agencies such as Emissions Reduction Alberta (ERA) and Alberta Innovates (AI) continue to invest in a diverse portfolio of advanced and clean energy co-generation projects that will reduce greenhouse gas emissions. ERA projects have supported an average of 1,500 jobs annually in Alberta since 2011.



- **Complementing TIER, Alberta's emission offset system is internationally recognized and encompasses a large number of emissions reduction activities.**
- **Each dollar of investment from Alberta Innovates has generated, on average, \$6.29 in net revenue growth for small and medium-sized enterprises (SMEs). This has enabled SMEs to create more than 2,000 jobs.**



Regulatory controls

Alberta has demonstrated dynamic early leadership in methane reduction efforts with the commitment to reduce methane emissions from upstream oil and gas operations by 45 per cent from 2014 levels by 2030. Alberta's early actions to regulate methane emissions have been recognized at the world stage and used to model the way for similar efforts.

Alberta's liability management system follows a lifecycle approach throughout any development type (exploration, operation, suspension, reclamation, and post closure of oil and gas, mining, renewables, etc.). Government's new liability management framework will ensure wells are managed throughout their lifecycle and inactive wells are cleaned up faster while supporting jobs.

Regulatory controls in Alberta call for the progressive reclamation of former energy sites, including the management of fluid tailings volumes. Through the Site Rehabilitation Program, the province has partnered with the federal government to create jobs and foster a healthy economy by providing up to \$1 billion in grants to oil field service contractors for well, pipeline, and oil and gas site closure and reclamation.

The Site Rehabilitation Program, which will run until the end of 2022, is expected to generate a total of nearly 5,300 direct jobs and support private landowners and Indigenous communities to reclaim inactive oil and gas sites.



- **Between 2014 and 2019, Alberta reduced gas flaring and venting volumes by 30 and 65 per cent, respectively.**
- **If Alberta's standards were adopted globally, associated greenhouse gas emissions would be reduced by up to 23 per cent.**
- **As part of Alberta's commitment to emissions management, coal-fired electricity generation will be phased out by 2023.**



- **Emissions Reduction Alberta accelerated \$10 million in payments to 74 active projects to support immediate operational needs at the onset of COVID-19.**
- **A 2020 study by the University of Calgary and Stanford University found that emerging technologies can further reduce the intensity of upstream in-situ emissions by an additional 14 to 19 per cent compared to current technology.**



Responsibly produced conventional energy

As home to one of the world's largest unconventional oil deposits—the oil sands—Alberta has the fourth-largest oil reserves in the world and is the sixth largest producer of oil globally. Given existing reservoirs are forecasted to last for decades to come, any future development will occur in an environmentally responsible and sustainable way.

Over the past 10 years, unprecedented demands and resource constraints on the energy sector have resulted in companies seeking out new and innovative processes. Alberta's oil and gas industry is constantly growing and improving technological applications across the hydrocarbons value chain, from extraction technologies through to resource processing.



- **Alberta Innovates' Bitumen Beyond Combustion program reinforces the trend to find non-fuel uses for bitumen. As the oil sands sector continues to advance its own decarbonizing performance, the production of asphalt plus advanced high carbon materials, such as carbon fibre, could turn bitumen into a crude oil of choice.**
- **Natural materials for carbon fibre and other innovative hydrocarbon products are plentiful in Alberta and have an added economic potential of approximately \$84 billion annually — three times the revenue of Alberta's current bitumen output.**

Oil sands



Extraction technologies and techniques associated with oil sands production continue to improve with advances such as solvent assisted thermal production, in-pit extraction processes and natural gas co-injection. These technologies not only reduce environmental impacts but help to reduce costs. Compared to 2011 levels, the average emissions from a barrel of oil produced in the oil sands has dropped almost 20 per cent and shows a trend towards further efficiencies as a result of technological and operational improvements.

Alberta's oil sands producers have saved tremendous amounts of fresh water by recycling 80 to 85 per cent of water in oil sands mining and 85 to 90 per cent in in-situ operations.

Advances in technology driven by our innovative industry continue to advance the environmental performance of oil production. Technologies such as in-pit extraction process, cyclic solvent process, and carbon cure are expected to contribute to further emissions reductions. Several of Alberta's large emitters, such as Cenovus Energy, Canadian Natural Resources, MEG Energy, Suncor Energy, Imperial Oil Limited, ConocoPhillips Canada, Repsol, and Seven Generations Energy have announced emissions reduction targets and plan on having net-zero operations by 2050.

In 2021, Alberta crude oil and equivalent production reached 3.8 million barrels per day, accounting for 81.9 per cent of total Canadian production.



Diversifying opportunities in energy

The strength of Alberta's traditional oil and gas sector has enabled several new opportunities to be leaders in innovation as we build towards the new global energy future.

Recognizing that the development of new sustainable forms of energy and electricity will increasingly become a driver of investment, Alberta is taking decisive action to create the conditions for a market-driven shift towards the energy future.

Alberta's existing oil and gas producers, downstream industry, and expert workforce are critical to emerging opportunities in fields like hydrogen; carbon capture, utilization and storage; petrochemicals; the circular plastics economy; and clean electricity generation. Through Alberta's diverse resource portfolio, it has an abundant supply of low-emission and affordable blue hydrogen, supplemented with experience in hydrogen production and leadership in carbon capture, utilization and storage.



Annual emissions from electricity generation are expected to decrease by 30 million tonnes from 2015 to 2023. Through an aggressive program of retiring and converting old coal plants to natural gas, Alberta's electricity industry is moving to end emissions from coal by the end of 2023, well ahead of its original 2030 target.

Carbon Capture, Utilization and Storage (CCUS)



Alberta is well-situated to capture emissions from various production processes and either store them underground permanently or put them to use in other processes where they can create value, like enhanced oil recovery. Among the global leaders in carbon capture, utilization and storage (CCUS) technology, Alberta has the ideal geographical conditions for carbon sequestration and is enhancing both policy and regulatory systems to do so. To date, over seven million tonnes of emissions have been captured and permanently stored underground in Alberta already.

Early investments in CCUS have already fostered the development of two major CCUS projects, Shell's Quest Project and the Carbon Trunk Line. Alberta continues to explore further fiscal and policy tools, including the development of carbon storage hubs, to accelerate carbon capture infrastructure and direct air-capture technology investment to help achieve their emissions reduction targets.



Hydrogen

As part of the global energy future, low-carbon hydrogen production is essential in achieving environmental outcomes. The development of a hydrogen economy will also create more jobs and increase the world's options for low-carbon, low-emission energy. The Hydrogen Council estimates that by 2050, the global hydrogen sector could generate US\$2.5 trillion per year and create 30 million jobs.

Thanks to Alberta's large, low-cost natural gas reserves, we are well positioned to be a competitive supplier of low-emission and affordable hydrogen to Canada and the world. In fact, Alberta is already a global leader in hydrogen production, producing approximately 2.4 million tonnes of hydrogen per year in 2018 for various industrial applications, including oil upgrading and refining, and chemical production.

Leveraging our favourable geology and expertise in CCUS, Alberta's Hydrogen Roadmap charts the province's path to becoming a leader in the global clean hydrogen economy to meet both domestic and global demand in the coming years. Clean hydrogen represents an enormous opportunity to expand the energy sector and leverage existing strengths in natural gas, CCUS, and renewable electricity. To that end, the Alberta government is currently working with federal and provincial government partners, industry, and academia to explore opportunities for hydrogen development in our province.



Alberta's Industrial Heartland Hydrogen Task Force recently released a report indicating that Canada has the potential to become an international supplier of affordable, low-emission hydrogen. Analysis from the Transition Accelerator and University of Alberta estimate Alberta can produce some of the lowest cost clean hydrogen in the world.

Renewables



Alberta uses a market-driven approach to electricity generation, which when combined with the industrial price on carbon has increased investment in renewables on the open power market. Alberta has seen over \$2 billion worth of utility scale renewable generation projects announced since 2019, accounting for over 2,000 MW (2GW) of capacity.

Renewables are also being used to support existing energy facilities, as evidenced by Alberta-based ENMAX's use of solar power and battery storage in industrial operations to offset peak power demand for a midstream energy facility.

Using emerging made-in-Alberta technical ingenuity and decades of drilling expertise, Alberta is taking a deep dive into its geothermal potential. Considering the private sector interest in geothermal energy, government is developing a framework to clarify the rules and processes for industry, establish the legislation authority around land use and liability management, and protect land and mineral rights owners.

The quality of renewable sources of energy in Alberta helps further the commitment to responsible energy production and can help limit the impacts of conventional energy production.



An Indigenous-owned solar farm opened in Fort Chipewyan, a community in Northeast Alberta that has long relied on diesel fuel. The nearly 6,000 new solar panels will supply about 25 per cent of the community's energy needs, and are expected to replace 800,000 litres of diesel a year, equivalent to about 2,400 tonnes of carbon emissions. The Canada Energy Regulator has recently forecasted that Alberta will be Canada's leader in growing renewable energy capacity over the next three years.

Natural gas



Canada is the world's third largest supplier of natural gas, with Alberta accounting for 62 per cent of Canadian production. Alberta's Natural Gas Vision and Strategy is a step towards economic diversification and revitalization of the natural gas sector. Alberta's natural gas industry is already exploring ways to improve well economics by reducing the cost of explorations and increasing productivity through technology and process improvements.

As part of the natural gas value chain, Alberta's petrochemical sector — already the largest in Canada — continues to grow and develop the economies of scale required to capture and retain the value of plastics across multiple lifecycles. The Alberta Petrochemicals Incentive Program is a next step towards economic diversification and the global energy future as it encourages investment in large petrochemical projects. Accessible oil and gas reserves, experienced workforce dynamics, and existing infrastructure all contribute to Alberta's future as a key supplier of petrochemical products. As the petrochemical and plastics industries grow within Alberta, we also see similar growth in addressing plastic waste and attaining environmental outcomes.

Alberta is also seeking liquefied natural gas (LNG) access to global markets. Once complete, the LNG Canada project will provide enough energy to displace between 20 and 40 coal-fired power plants in Asia, reducing global greenhouse gas emissions by 60 to 90 million tonnes of carbon dioxide each year. This is also equivalent to all of the greenhouse gases produced in British Columbia annually, and 10 percent of Canadian emissions. Alberta also has Canada's most comprehensive midstream natural gas and natural gas liquids processing capacity, with the Nova Gas Transmission Line system (11 bcf/d of deliveries in 2016), the Alberta Ethane Gathering System (320 kbbl/d of transmission capacity), and in-depth natural gas liquid extraction infrastructure integrating upstream hydrocarbon production with downstream consumers.



Alberta also has abundant supplies of methane and propane to develop new petrochemicals supply. The province currently produces an estimate of 10 bcf/d of natural gas and 160 kbbl/d of propane, both in excess of domestic demand, with large quantities available for petrochemicals applications.



The first project under the Alberta Petrochemicals Incentive Program is Inter Pipeline's (IPL) \$3.9 billion propane-to-polypropylene plastic facility, the first of its kind in North America. IPL's facility is eligible for \$408 million in eligible capital cost reimbursement, spread over three years.



Minerals

Alberta's new minerals strategy, *Renewing Alberta's Mineral Future*, will continue to strengthen and capitalize on our province's potential to become a preferred international producer and supplier of minerals and mineral products. Alberta's unique geology provides significant potential for mineral exploration and opportunity to become a critical minerals hub. Demand for minerals, such as lithium, vanadium, uranium, and rare earth elements, continues to increase to support the manufacturing of batteries, energy storage cells, and other products needed for a low-carbon future.

Alberta's unique geology positions it at the forefront of global mineral exploration and development as its wealth of natural resources, alongside its proven track record in responsible development, help support our aspirations to be a critical minerals hub. Alberta continues to work with federal, provincial and territorial governments and partners on the Canadian Minerals and Metals Plan and the Canada-U.S. joint action plan on critical minerals collaboration.



Small nuclear reactors

Alberta is home to a portion of the Athabasca basin, which hosts some of the world's greatest uranium deposits, and provides significant potential for high quality uranium resources within our borders. Alberta has recently joined an agreement with Saskatchewan, Ontario, and New Brunswick to explore emerging, small-scale nuclear power technology to lower emissions and add diversity to the province's energy sector. By working with our provincial partners and the federal government, Alberta can stay informed on latest developments and ensure the appropriate regulatory framework is in place should private industry pursue this promising technology.

This new and versatile technology could supply non-emitting, low-cost energy in a number of different applications, including in support of conventional energy production.



Oil sands facilities are often remote and require a lot of heat and power from the grid to operate. Small modular reactors could be scalable and help meet the energy needs of these facilities, while further reducing the emissions intensity of Alberta's oil.



Investing in Alberta

Investing in the energy future



Investors and shareholders in major energy companies are increasingly factoring in ESG perspectives in their decision-making. As the investment environment in the energy sector continues to evolve, Alberta is fostering positive ESG performance within the energy sector.

Supported by strong research institutions, universities, and industry innovators, Alberta's environmentally and socially responsible ways of developing resources with a focus on technological innovations make it well-suited for the energy future. We believe that Alberta is the right place to invest for those concerned about ESG factors.

Alberta's energy sector leaders

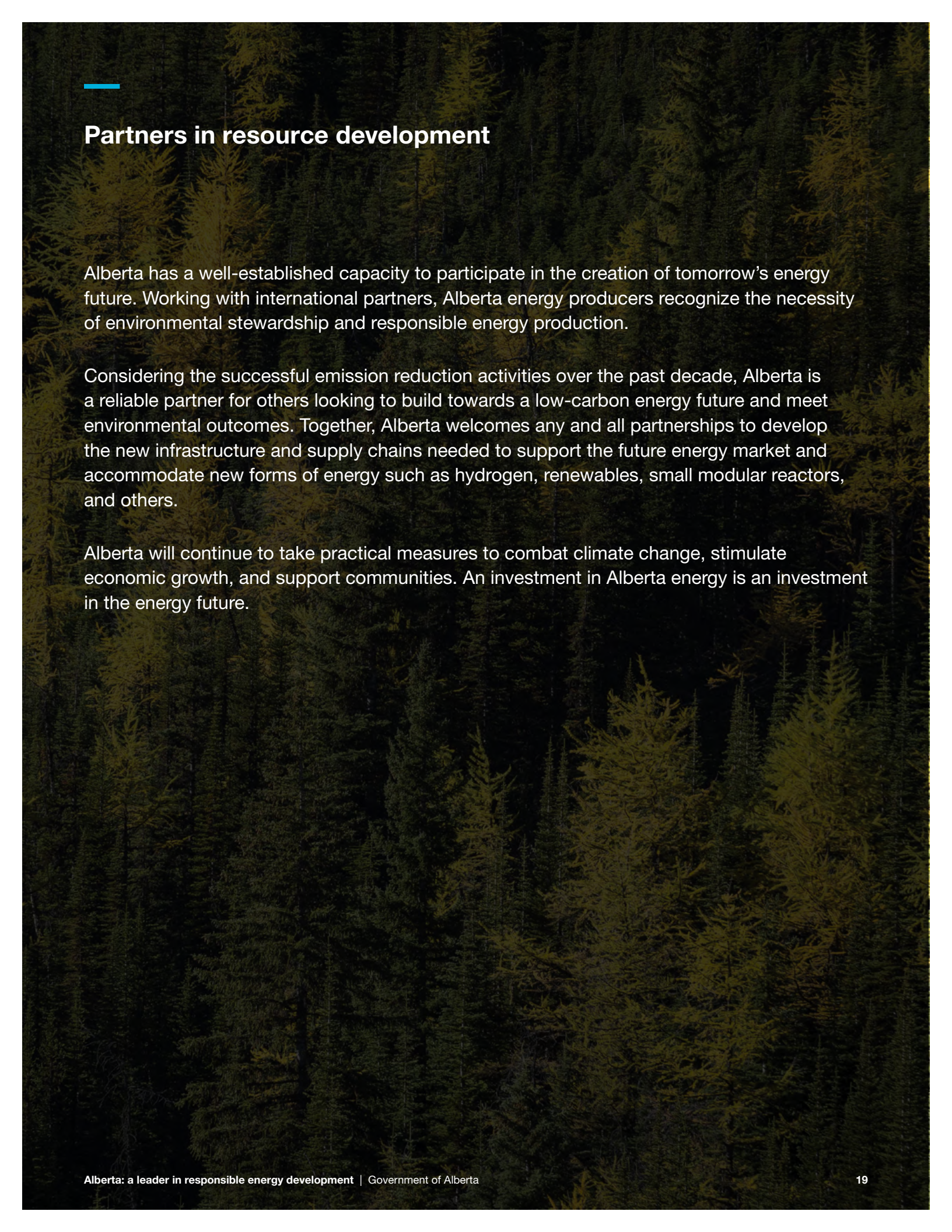


Encapsulating the full spirit of ESG, almost half of Alberta's natural gas and oil sands production is conducted by companies that have committed to becoming net-zero, and we continue to see growth in companies committed to this goal. Furthermore, many Alberta oil and gas companies have developed their own guidelines, policies, and/or programs for Indigenous engagement that go beyond regulatory requirements.

According to the Centre for Corporate Governance Innovation at the University of Toronto, an assessment of over 224 companies and trusts in the S&P/TSX Composite Index showed that many Alberta oil and gas companies placed above average in ESG scores.



Since 2015, the percentage of women on boards of oil and gas companies has more than doubled to 13 per cent, exceeding the average overall TSX-listed company gain (from around 12 per cent to 18.2 per cent) in the same period.



Partners in resource development

Alberta has a well-established capacity to participate in the creation of tomorrow's energy future. Working with international partners, Alberta energy producers recognize the necessity of environmental stewardship and responsible energy production.

Considering the successful emission reduction activities over the past decade, Alberta is a reliable partner for others looking to build towards a low-carbon energy future and meet environmental outcomes. Together, Alberta welcomes any and all partnerships to develop the new infrastructure and supply chains needed to support the future energy market and accommodate new forms of energy such as hydrogen, renewables, small modular reactors, and others.

Alberta will continue to take practical measures to combat climate change, stimulate economic growth, and support communities. An investment in Alberta energy is an investment in the energy future.

