

2018 Economic Report Series

**COMPETITIVE CLIMATE POLICY:
SUPPORTING INVESTMENT
AND INNOVATION**



CANADA'S OIL & NATURAL GAS PRODUCERS

Environmental performance is critical to realizing a vision for Canada as a global oil and natural gas supplier of choice.

The Canadian Association of Petroleum Producers (CAPP) and member companies support climate policies that efficiently and effectively manage greenhouse gas (GHG) emissions while maintaining a vibrant and competitive oil and natural gas sector. By developing innovative technologies, Canada has a significant role to play in meeting global energy demand and contributing to the important global ambition of GHG emissions reduction.

In this report, CAPP explores Canada's current climate policies; explains why current policies are having serious unintended consequences; outlines our industry's commitment to innovation; and presents recommendations we believe can spur industry growth, competitiveness, innovation, and emissions reduction.

Book three.





Competitive climate policy is crucial

It is crucial for Canada to develop our resources in a manner that reduces GHG emissions. We want to be leaders, especially in developing innovative technologies that reduce emissions and other environmental impacts.

The Canadian oil and natural gas sector is supportive of climate policies that are effective and efficient, and take into account cumulative impacts including taxation, market access, and regulatory review processes. With the right policies in place, the Canadian industry can be competitive, can attract investment and can reduce GHG emissions.

However, current climate and other policies are inefficient and duplicative, and are combining to create unintended consequences such as driving investment away from Canada into other countries that have less robust emissions-reduction policies. This emerging policy environment promotes carbon leakage and therefore does not lead to global emissions reduction. Moreover, Canadians lose the social and economic

benefits of the oil and natural gas sector, and the world loses the innovation that Canadian industry can bring to the international emissions reduction challenge.

As CAPP noted in our 2018 report *A Global Vision for the Future of Canadian Oil and Natural Gas*, "Climate change is bigger than one industry. It's bigger than one person, one province or one country – which makes it difficult for governments to strike the right balance between environmental stewardship, economic prosperity and energy security for our nation. The Canadian energy sector can continue to lead in a carbon-constrained future by reducing GHG emissions through the development of cost-effective, clean technology. In order to do so, industry needs the support of governments and Canadians to meet new and emerging innovation challenges. If we want to succeed as a nation, we must work together to develop competitive policies and increase access to international markets."

Getting climate policies right has huge long-term implications for the future of the Canadian industry, for Canadians in general (who benefit from a strong upstream industry) and for reducing GHG emissions globally.



"Western Canada can become the global hub for the development of new emissions-cutting technologies that we can then export internationally for greater global environmental benefit. In our generation, we can make our industry the high-tech environmental and economic leader of the world."

Tim McMillan, President and CEO, Canadian Association of Petroleum Producers

A history of technological innovation

The Canadian upstream oil and natural gas sector has a long history of innovation and technological advancements that have improved efficiency and environmental performance while growing production. With the right climate policies in place, this strong tradition of innovation and collaboration can position Canadian oil and natural gas to meet global energy demand instead of carbon-intensive fuels currently being used in emerging markets. Ultimately, the goal of such policies should be to decrease global GHG emissions, as opposed to reducing emissions only in Canada at high cost to Canada's economy and with minimal effect on global emissions.

The opportunity is clear: enable and continue investment in the innovation needed for economic diversification and successful long-term emissions

reduction. Canada urgently needs policies that enable the industry's commitment to innovation and technologies, before other suppliers – with weaker environmental standards – capture global markets without addressing climate concerns.

Currently, the cumulative effect of costly, inefficient and duplicative policies and regulations is damaging the industry's competitiveness and eroding investor confidence. Reduced investment in turn delays or halts the commercialization of promising innovative technologies that could significantly reduce emissions. Canada's policies and environmental regulations must be developed in parallel with attracting investment, spurring innovation, growing jobs and maintaining economic benefits across the country.

Canada's climate leadership challenge

In its 2017 *World Energy Outlook* the International Energy Agency (IEA) reinforces that oil and natural gas are expected to remain the dominant fuels for meeting growing global energy demand to at least 2040. Therefore, demand will continue for oil and natural gas that is globally cost- and carbon-competitive.

Canada can become the world's energy supplier of choice – responsibly producing our oil and natural gas resources, reducing GHG emissions at home and around the world, while continuing to generate economic benefits across the country.

This is an aspirational yet achievable goal. Working together, governments and industry have an opportunity to set policies that encourage investment, spur innovation and reduce emissions, contributing to national and international GHG emissions reductions.

At the provincial, territorial, and federal levels, governments have set goals around GHG emissions reduction and have followed through with policies and regulations. However, these goals and policies are uncoordinated and are subjecting industry to constraints that do not exist elsewhere. Thus, Canada is becoming uncompetitive. Instead, Canada needs a climate policy approach that recognizes the greater impact that responsibly produced Canadian oil and natural gas can have in reducing global emissions.

This is our challenge: make the Canadian oil and natural gas sector both environmentally and economically competitive on the world stage. The potential benefits – from generating employment and government revenues at home, to helping reduce GHG emissions globally – are substantial and could position Canadian oil and natural gas to become the world's energy for tomorrow.



Working together, governments and industry have an opportunity to set policies that encourage investment, spur innovation and reduce emissions, contributing to national and international GHG emissions reductions.

THEREFORE CAPP RECOMMENDS:

- **To protect the upstream oil and natural gas sector – an emissions-intense, trade-exposed (EITE) industry, and to foster innovation and technological advances to reduce emissions – CAPP recommends governments at all levels:**
 - Take into account the current economic environment for the oil and natural gas sector and continue to work with industry to develop regulations that help to reduce emissions while still allowing for the continued growth of the Canadian oil and natural gas sector.
 - Create protection mechanisms for EITE sectors to help avoid carbon leakage. These mechanisms need to include small and large producers.
 - Assess all costs and recognize the cumulative burden of any policies and regulations, corporate tax increases and royalty changes.
- **Regarding the proposed Clean Fuel Standard (CFS), CAPP recommends:**
 - Limit the scope of the CFS to exclude upstream oil and natural gas (including offshore production). CFS is duplicative and hence a cost with no material benefit given other programs in place or under development.
 - Work with the provinces and industry to ensure the appropriate levels of protection remain in place for EITE sectors under any potential climate regulations to ensure the ongoing competitiveness of the industry.
- **Regarding creation and implementation of domestic and international offset programs, CAPP recommends:**
 - Create a strong, robust and efficient domestic offset market to help make available low-cost emissions reduction.
 - Develop options to use international offsets to help Canada achieve its domestic emissions reduction goals.
- **Regarding innovation re-investment and immediate deductibility, CAPP recommends:**
 - Return carbon-related revenue to EITE industries through revenue recycling and innovation funding. By re-investing carbon revenue into EITE sectors, governments can help protect the competitiveness of internationally trade-exposed industries, create incentives to reduce emissions, and help unlock step change technologies.
 - Allow for immediate deductibility for investment in the oil and natural gas sector. This approach should apply to all industries that aspire to develop and implement emissions-reduction technologies toward a lower-carbon economic environment, including value-add technology.
 - Engage with industry to update the Scientific Research and Experimental Development tax credit, to encourage investment in technologies that diminish environmental impacts, improve competitiveness and spur productivity.



Getting climate policies right has huge long-term implications for the future of the Canadian industry, for Canadians in general and for reducing GHG emissions globally.



CANADA IS A WORLD LEADER IN CLIMATE POLICY

Environmental performance is critical to realizing a vision for Canada as a global oil and natural gas supplier of choice. The Canadian Association of Petroleum Producers (CAPP) and member companies support climate policies that efficiently and effectively manage greenhouse gas (GHG) emissions while maintaining a vibrant and competitive oil and natural gas sector. By developing innovative technologies, Canada has a significant role to play in meeting global energy demand and contributing to global GHG emissions reduction.

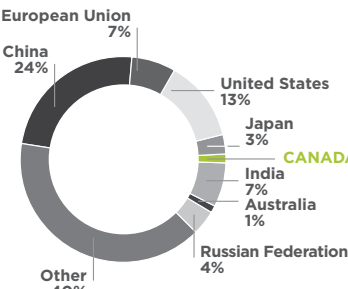
Canada is the most committed among the nations that have set out to reduce GHG emissions. Canada generates less than 1.5 per cent of global GHG emissions. Of that, Canada's upstream oil and natural gas industry – including the oil sands sector – contributes about 21 per cent of Canada's total emissions.

Source: Environment and Climate Change Canada 2018, World Resources Institute 2017

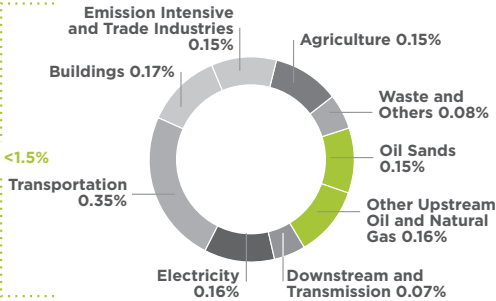
Canadian GHG Emissions in Global Context

Source: Environment and Climate Change Canada, 2018 & World Resources Institute, 2017

GLOBAL EMISSIONS - 2014



CANADIAN EMISSIONS - 2016 (Percentage of Global Emissions)



Canada has very high environmental performance standards, a commitment to Indigenous engagement, opportunity and potential for national prosperity, and thriving innovation research. Canada is a safe, reliable and technologically savvy energy producer.

However, many of our competitors are not subject to similar regulation. In addition, many of Canada's current emissions-reduction policies are duplicative and inefficient. This contributes to making the Canadian upstream oil and natural gas industry globally uncompetitive. Investment is leaving Canada, taking with it the substantial funding we need to underwrite the innovation and technology that will help ensure the upstream industry can continue to reduce GHG emissions and overall environmental impact. A decrease in investment also stunts industry growth and revenues, which in turn reduces employment and government revenues such as royalties, corporate and personal taxes, and other revenue sources.

But there is reason for optimism and aspiration. CAPP believes it is possible – in fact, it is crucial – for governments to set or revise emissions-reduction policies that achieve GHG reduction while also enabling the oil and natural gas industry's competitiveness. By working together, we can develop innovation and technology that promises to break the link between production growth and emissions growth.

1.1 CAPP's Climate Policy Principles

Canada's oil and natural gas sector is an important source of technologies and innovations that can underpin emissions reduction efforts at home and around the world. In its 2017 *World Energy Outlook* the (IEA) reinforces that oil and natural gas are expected to remain the dominant fuels for meeting growing global energy demand to at least 2040. Therefore, demand will continue for oil and natural gas that is globally cost- and carbon-competitive.

CAPP and our member companies have developed four fundamental principles we believe should guide Canada's climate change policies:

Collaborative and solutions-oriented



- Given Canada's climate goals and industry impacts, CAPP will proactively collaborate with governments and stakeholders towards appropriate policy solutions.
- Policy solutions need to be adaptive and carefully consider environmental, economic, and social outcomes.

Efficient, effective and predictable



- Climate policy should target reductions where they are most efficient and effective across the entire energy value chain from production to end use, and should fairly consider all sectors and jurisdictions.
- Climate change policies should achieve emissions reduction at the least cost to Canadians, the economy and industry.
- Revenues from climate policy should be fully recycled back into the economy to enable innovation, assist transition or reduce other taxes and levies.

Technology and innovation focused



- Policy should spur technology and innovation to address climate change and capture the opportunity to export solutions to the world.
- Considerable future emissions reduction will stem from improving the hydrocarbon energy sector, requiring continuing strong innovation and policy effort.

Globally competitive



- Canada's climate policies must ensure our resource development is cost and carbon competitive with other jurisdictions, especially the U.S. as our largest trading partner.
- Canada's climate policy leadership should bring proportionate benefits to Canada, including ensuring we receive full value for Canadian energy products through effective access to global markets.
- Canada is highly dependent on the development and trade of our natural resources, and on our ability to attract foreign investment. Canada's climate policies must be designed to maintain our ability to raise global investment capital.

1.2 Unintended Consequences: Investment and Carbon Leakage

Cost influences consumer choice. Market instruments create options; consumers can make decisions to reduce costs.

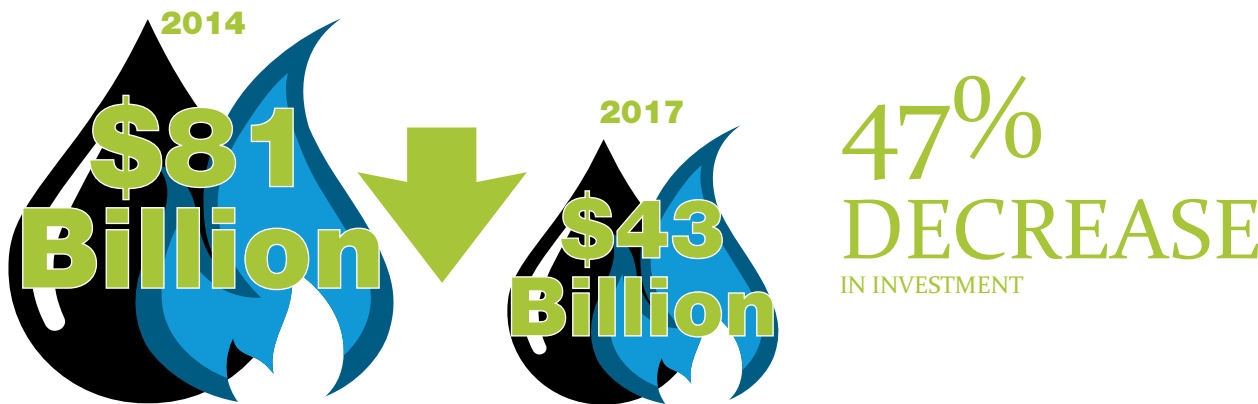
That is exactly what is happening in the Canadian oil and natural gas industry. As the cost of doing business increases – resulting from policies such as carbon pricing, and compounded by other policies and regulations – investment is decreasing – or leaving Canada altogether.

In 2014, capital spending in the Canadian upstream sector was about \$81 billion. CAPP estimates capital spending in 2017 to be about \$43 billion, a 47-per-cent decrease from 2014.

As the cost of doing business increases – resulting from policies such as carbon pricing, and compounded by other policies and regulations – investment is decreasing or leaving Canada altogether.

Capital Investment in Canada’s Oil and Natural Gas Industry

Source: CAPP, 2018



1.2.1 Investment / Carbon Leakage

Carbon leakage is an unintended consequence of uncompetitive government policies that diminish domestic economic activity but do not diminish global emissions. Carbon leakage occurs when investment – and therefore oil and natural gas production – shifts from places with high regulatory standards and other costs (i.e., Canada) to places with lower or no standards and associated costs (i.e., Saudi Arabia, Russia, U.S.). This means no reduction of overall global emissions, because international demand that could be met with responsibly produced Canadian oil and natural gas will be filled by other global energy sources that are likely to be produced with less environmental regulation and potentially higher emissions.

Carbon leakage also contributes to a loss of Canadian jobs and government revenues, and a loss of funding and expertise necessary to develop new and groundbreaking emissions-reduction technologies.

1.2.2 How Canadian Climate Policies Promote Leakage

Currently, many different GHG management regimes around the world utilize an emission-intense, trade-exposed (EITE) methodology to protect industries’ competitiveness under carbon pricing. If emissions-reduction policies are placed on activities in Canada but not elsewhere, companies within EITE industries, such as the upstream oil and natural gas sector, may choose to leave Canada or to decrease investment.

For example, Alberta’s implementation of the Carbon Competitiveness Incentive Regulation is already impacting investment decisions, making some existing projects uneconomical and limiting investment in new projects. In addition, multi-national firms with opportunities outside of Canada are choosing to grow their production in other parts of the world. CAPP notes that in 2017 several companies divested holdings in Canada and made capital allocations elsewhere, although this is not attributable solely to emissions-reduction policies.

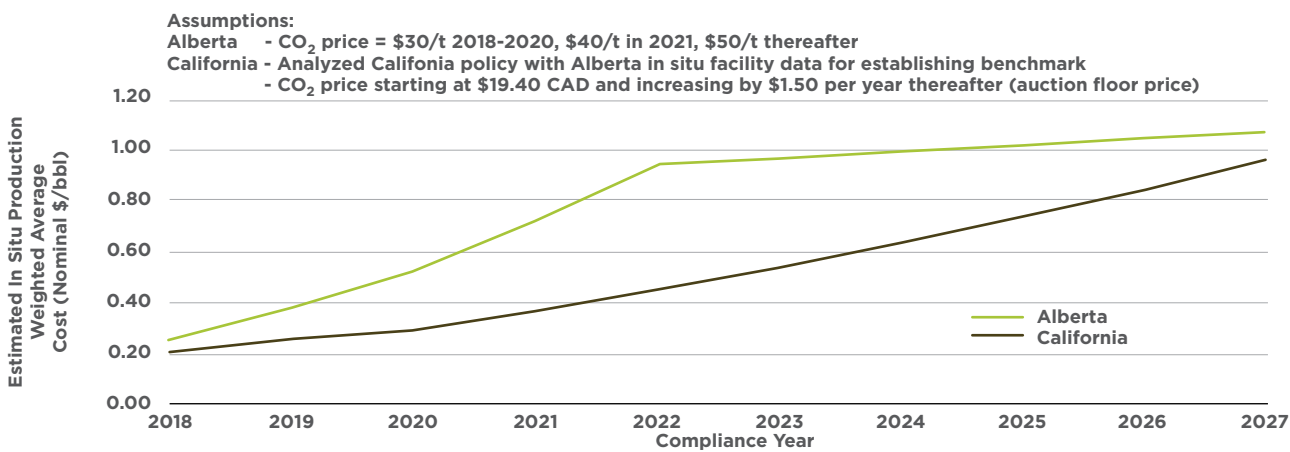
Unlike many petroleum-producing jurisdictions, Canada has introduced carbon pricing systems. It is important that Canadian governments look to prevent carbon leakage and protect the competitiveness of the oil and natural gas industry until other jurisdictions introduce similar pricing. These systems cannot be limited to large emitters; smaller producers share the same exposure when faced with the full impact of the policies.

To avoid carbon leakage, governments need to balance effective climate policy and competitiveness. Canada must look beyond our borders when considering how EITE industries are to be treated. Many other jurisdictions, including California and the European Union, use various methods to determine carbon leakage risk. California, in particular, is acknowledged as a world leader in climate policy. Although California's policies are stringent, the state has also taken steps to protect EITE industries.

Both California and Alberta have implemented leading climate policies and mechanisms to protect their EITE industries. As illustrated in the following figure, Alberta's policy is and will continue to be more stringent – and costly – than California's over the next 10 years, for the sector analyzed.

Alberta vs. California Climate Policies Comparison

Source: CAPP, 2018





1.2.3 Carbon Offsets

Governments can help prevent carbon leakage with domestic and international carbon offsets. Offsets allow the oil and natural gas industry to invest in alternative compliance options that enable low-cost emissions reduction opportunities. Existing offset systems contribute to real emissions reduction and help Canadian jurisdictions to meet GHG reduction goals while also protecting competitiveness.

A well-designed offset system has two important roles: to provide high-quality compliance options to the regulated sectors; and to incent and engage non-regulated sectors to participate in creating and implementing innovative, project-based GHG emissions reductions. The participation of both regulated and non-regulated sectors supports overall policy objectives in managing GHG emissions and fosters a culture of innovation and collaboration between sectors.

Vital to the success of any offset program is to have an open, flexible system with robust, credible markets and flexible compliance mechanisms. To that end, limits on the use of offsets recently implemented in Alberta, or limited markets such as the current system in British Columbia, impede the development of an efficient offset market. It's important to note that offsets would not be a replacement for investing in emissions-reduction technologies.

A large opportunity for managing GHG emissions in the future is through the world's forests, which are carbon sinks (trees absorb carbon and release oxygen). Natural Resources Canada estimates that over the past four decades global forests have absorbed about one-quarter of the carbon emitted by human activities¹. Oil and natural gas producers plant millions of trees as part of reclamation programs. This has the added benefit of providing carbon sinks and could therefore be considered as effective offsets.

Another opportunity exists in international offsets. Many countries – Norway is a prime example – use United Nations-approved international offsets to create credits that can be used to meet domestic emissions goals. Norway utilizes the Clean Development Mechanism of the United Nations Framework Convention on Climate Change (UNFCCC) and has a program of procuring some 60 million Certified Emission Reductions (CERs). Procurement of CERs supplements national measures to reduce global GHG emissions. Accessing funds to finance emissions reduction in other countries has enabled Norway to take on a more ambitious emissions reduction program than if all reductions were to be taken domestically².

Another example of international offsets is the potential for using Canadian-produced liquefied natural gas (LNG) instead of higher-carbon intensity fuels in China, India and other markets – effectively a carbon offset.

CAPP continues to support a robust and credible offsets system. CAPP believes that creating flexible climate policy compliance mechanisms is critical to the development of an efficient and effective carbon offset market that can help protect industry's competitiveness and help reduce GHG emissions.

Regarding the implementation of domestic and international offset programs,

CAPP RECOMMENDS

- Create a strong, robust and efficient domestic offset market to help make available low-cost emissions reduction.
- Develop options to use international offsets to help Canada achieve its domestic emissions reduction goals.

CURRENT CANADIAN CLIMATE POLICIES

It is crucial for Canada to develop our resources in a manner that reduces environmental impacts including GHG emissions. However, current climate and other policies are combining to drive investment away from Canada, into other countries that have less robust emissions-reduction policies.

2.1 A Model for Emissions Control Success: Flaring and Venting

In Canada, British Columbia and Alberta have regulations for flaring and venting from upstream facilities. CAPP believes these provincial regulations can serve as models of success for other jurisdictions, domestically and internationally.

In Alberta, these regulations have cut the volume of natural gas flared by 80 per cent from 1996 to 2010, reducing GHG emissions by more than eight million tonnes.

Recent reports by the Alberta Energy Regulator (ST60 and ST60B, see bibliography) indicate that conservation rates for solution gas (natural gas and liquids produced in association with oil, which formerly may have been flared) have increased to 96 per cent. According to the BC Oil and Gas Commission (BCOGC), the industry in B.C. has achieved a reduction of 23 per cent in annual flare volumes since 2006, the baseline year. Total flaring now accounts for less than two per cent of GHG emissions in B.C.

In addition, oil and natural gas producers in Alberta are required to have fugitive emissions management programs to detect and repair leaks. These programs include the use of infrared camera surveys, screening surveys and operator best practices.

Saskatchewan requires operators to comply with regulations for reducing flaring, venting, and incinerating of associated (solution) gas at licensed oil well and oil facility sites. All flaring and incineration systems must be designed and operated to destroy the waste gases to specifications in the regulations. Licensees must conserve associated (solution) gas above a prescribed threshold unless deemed uneconomic. The province is currently reviewing this framework and may revise it to realize improved emissions reduction.

2.2 Canada's Many Carbon Price Policies

Carbon pricing uses market-based instruments such as carbon levies (taxes), output-based allocation (OBA), or emissions trading systems (cap-and-trade), designed to put a price on GHG emissions and ultimately to reduce emissions over time. Carbon pricing is meant to offer incentives to energy consumers to reduce emissions through a variety of choices, from reducing energy use to changing energy sources to improving efficiencies.

Canadian federal climate policies, including carbon pricing, are intended to reduce Canada's GHG emissions by 30 per cent below 2005 levels by 2030. The federal benchmark includes a carbon levy applied to fossil fuels set at \$10 per tonne of carbon-dioxide equivalent (CO₂e) for 2018, and increasing by \$10 per tonne annually to \$50 per tonne by 2022. The benchmark also includes an output-based, industry-specific performance standard for large industrial emitters that emit more than 50,000 tonnes of CO₂e per year, and optional for smaller facilities.

By mid-2018 there will be a multitude of carbon pricing regimes across Canada. From a cost and competitiveness perspective, significant uncertainty remains around how consumers and industries will be affected by multiple, region-specific or industry-specific carbon prices. Table 1 presents current carbon policies in selected oil and natural gas producing provinces.

With the right policies in place, the Canadian industry can be competitive, attract investment – and reduce GHG emissions.

Table 1: Selected Canadian Carbon Policies, 2018



British Columbia

- Launched its Climate Action Plan in 2008, which introduced North America's first carbon tax. This revenue-neutral tax was frozen at \$30 per tonne in 2013 for five years.
- Starting in April 2018, carbon tax will increase by \$5 per year to a maximum of \$50 per tonne.
- The August 2016 Climate Leadership Plan commits the province to reduce net annual GHG emissions by up to 25 million tonnes below current forecasts by 2050.
- This equates to a 2050 goal of an 80 per cent reduction in emissions from 2007 levels.



Alberta

- Alberta introduced its first carbon price in 2008, the Specific Gas Emitter Regulation, which imposed facility-specific emissions reduction benchmarks on large final emitters.
- Announced new Climate Leadership Plan in November 2015.
- The plan includes an economy-wide carbon tax for non-large final emitters and a new output-based allocation system for facilities emitting more than 100,000 tonnes per year.
- Carbon levies on transportation and heating fuels started at \$20 per tonne in 2017 and rose to \$30 per tonne in 2018 and are expected to rise to \$50 per tonne by 2022.
- For large emitters, a levy of \$20 per tonne, started January 1, 2017 and rose to \$30 per tonne January 1, 2018.



Saskatchewan

- Released climate strategy December 2017 that focuses on 'climate resilience' – leveraging innovation and technology to reduce emissions instead of imposing a direct carbon price.
- Two key initiatives:
 - Generate up to 50 per cent electricity capacity from renewables,
 - Determine the viability of extending carbon capture use and storage technology to remaining coal power plants (currently in place at Boundary Dam).
- Looking to introduce new emissions reduction strategy in 2018.



Newfoundland and Labrador

- Approved the Management of Greenhouse Gas Act in June 2016, which requires industrial facilities onshore that emit more than 15,000 tonnes to report GHG emissions.
- Industrial facilities that emit more than 25,000 tonnes are required to reduce their GHG emissions compared to their baseline at a future date.
- Government is currently creating a similar carbon pricing for offshore oil operations.



2.3 Methane Policies

According to the federal government, the oil and natural gas sector is responsible for 44 per cent of Canada's total methane emissions, about 48 megatonnes (MT) of CO₂e, the bulk of which comes from western Canada's energy sector. The reduction of methane emissions is seen as a critical step for meaningful action on climate change.

In March 2016, the federal government announced a methane emissions reduction target for the oil and natural gas sector. The goal is to reduce methane emissions by 40 to 45 per cent from 2012 levels by 2025. This commitment served to augment targets adopted by Alberta under its *Climate Leadership Plan* and B.C. in *Leading by Example and Creating Green Jobs at Home*.

CAPP believes the provinces have mature regulatory regimes for flaring and venting, and have extensive experience in implementation. Methane emissions reduction through retrofit of existing equipment tends to be more costly than adopting more efficient and advanced technology during the construction of new facilities. For this reason, CAPP supports an approach to methane emissions reduction that provides regulated standards for new developments based on economically achievable thresholds, and enables implementation of new technology to address methane emissions reduction at existing facilities.

At the same time, continued performance improvement depends on ongoing research and innovation through the Petroleum Technology Alliance Canada (PTAC), Canada's Oil Sands Innovation Alliance (COSIA), Geoscience B.C., InnoTech Alberta, and the Saskatchewan Research Council. One vital element of industry's action to achieve the methane

emissions goal is the implementation of a methane research and technology roadmap through PTAC. This roadmap enables cost-effective regulatory implementation and will target different regions throughout Western Canada to advance side-by-side comparisons of detection and control technologies. Through the mass deployment and testing of detection and control technologies, we will take immediate action to reduce methane emissions as we continue to assess alternative approaches for the cost-effective management of methane emissions.

Independent of new regulations, industry has already taken significant voluntary action to reduce methane emissions and will continue to do so with the help of provincial incentives (e.g., Alberta Offset Protocol and B.C.'s Clean Infrastructure Royalty Credit Program). While these mechanisms have made transition more affordable, they have not made retrofitting cost-neutral. New fiscal mechanisms have started to emerge to improve further the accessibility of control technologies for a broader cross-section of industry.

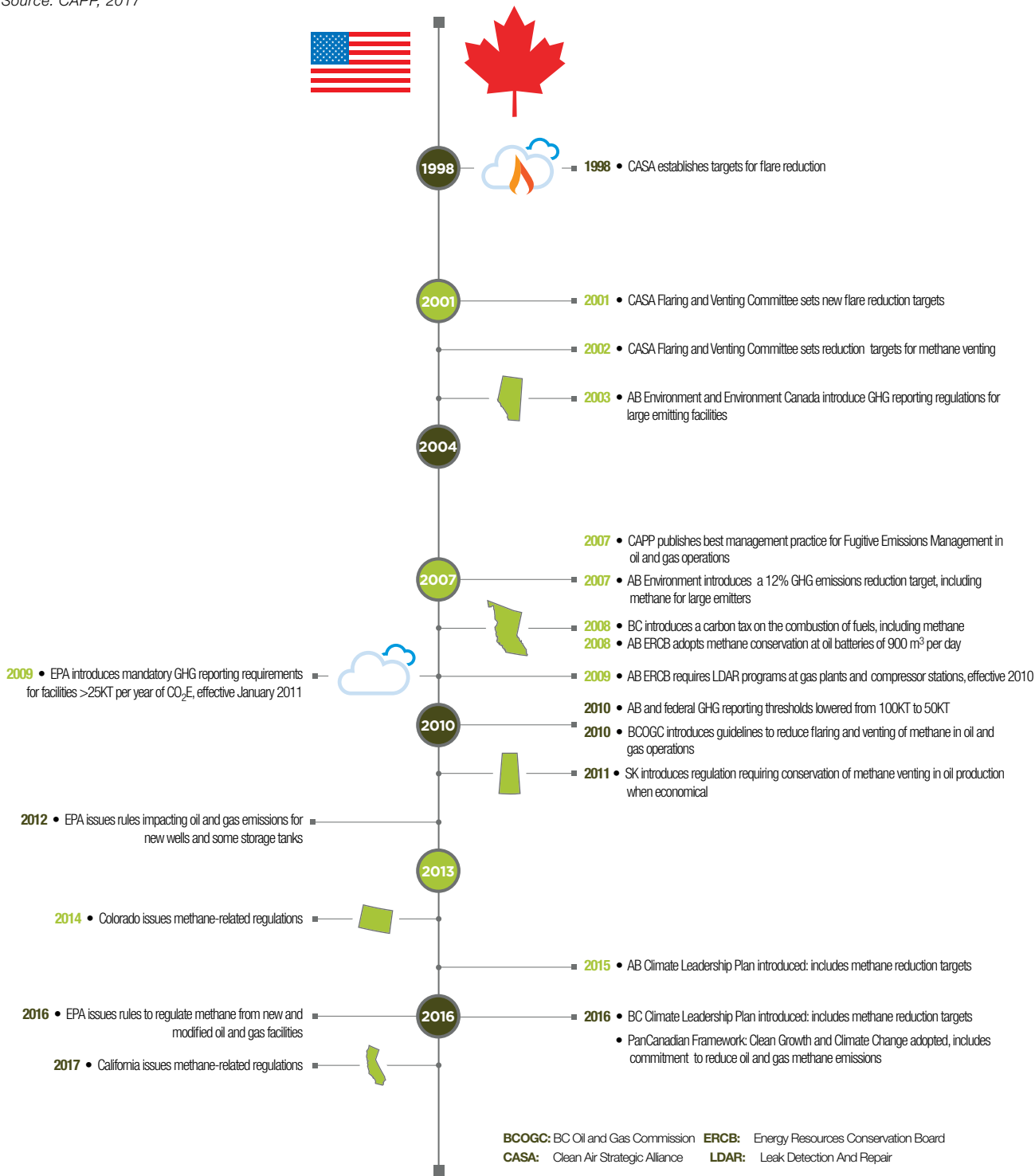
Meanwhile, the U.S. has retreated from several joint targets on climate change including methane emissions reduction. While the states of California, Colorado, Utah, and Pennsylvania have committed to action, those with the majority of production have not – including North Dakota, Oklahoma and Texas. This regulatory uncertainty adds to the cumulative cost burden and drives away investment from the Canadian upstream sector.

The economic benefit of methane conserved has featured prominently in the cost-benefit analysis of various regulatory models. However, the value of methane conservation can only be realized when the Canadian product has a buyer. Constraints to global market access have fundamentally changed this opportunity. Canada's number-one energy customer – the U.S. – is now our number-one energy competitor. Consequently, the economic benefit that Canadians can expect from methane conservation is overstated until market access is improved.

Independent of new regulations, industry has already taken significant voluntary action to reduce methane emissions and will continue to do so with the help of provincial incentives.

Taking Action on Methane Emissions

Source: CAPP, 2017



- Canada’s targets for emissions management were first introduced in 1998 in Alberta (the area of highest oil and natural gas production in the country) through the Clean Air Strategic Alliance (CASA).
- The U.S. Environmental Protection Agency (EPA) issued mandatory GHG reporting requirements for facilities emitting more than 25 kilotons of CO₂e annually in 2009.
- U.S. methane regulations only target new facilities, whereas Canadian regulations target new and existing facilities to reduce methane emissions.

2.4 Clean Fuel Standard

The *Clean Fuel Standard* (CFS) is a new policy being proposed by the federal government that seeks to establish life cycle carbon intensity reduction requirements for liquid, gaseous and solid fuels used in transportation, industry and buildings. The CFS is proposed to be applied to all fuels combusted for the purpose of creating energy, which includes everything from driving vehicles, to heating homes and buildings, to powering major industrial processes.

In CAPP’s opinion, the CFS policy is highly duplicative. CFS overlaps with existing policies created to drive emissions reduction. Further, the proposed CFS impedes industry’s already challenged competitiveness but offers no protection for EITE sectors such as the upstream petroleum industry. CFS will lead to minimal incremental emissions reduction from our sector in addition to what will already occur under other provincial and federal climate policies.

The principle of EITE protection, and how it would be achieved through an output-based allocation (OBA) system, has been outlined in draft regulations and legislative proposals for the federal GHG emissions backstop policy and the details of the OBA framework, as well as in the Pan-Canadian Framework on Clean Growth and Climate Change. Layering of the CFS regulation outside of the OBA system moves an agreed-upon benchmark, eroding the principle of providing competitiveness protection.











Regarding the proposed CFS, **CAPP RECOMMENDS** that the federal government:

- Limit the scope of the CFS to exclude upstream oil and natural gas (including offshore) production. CFS is duplicative and hence a cost with no material benefit given other programs in place or under development.
- Work with the provinces and industry to ensure the appropriate levels of protection remain in place for EITE sectors under any potential climate regulations to ensure the ongoing competitiveness of the industry.

2.5 Global Climate Policy Comparison: Canada in Context

As Canada enacts stringent GHG emissions-reduction policies, many competing jurisdictions are not following similar emissions-reduction programs. In particular, the current U.S. administration has aggressively streamlined regulations, re-adjusted tax rates, and relaxed emissions reduction rules.

Table 2: World Exporters and Implemented Carbon Pricing Initiatives

Country	Exporter Rank*	Carbon Pricing Initiatives
Saudi Arabia	1	
Russia	2	
Iraq	3	
Canada	4	 Yes
United Arab Emirates	5	
Kuwait	6	
Iran	7	
Venezuela	8	
Nigeria	9	
Angola	10	

* Rank by volume exported, based on information from the OPEC Annual Statistical Bulletin, and climate policy from the World Bank Carbon Pricing Dashboard. The U.S. is absent from this list because while it is a large producer, the U.S. is not yet within the world’s top 10 net exporters. CAPP notes the states of California and Washington do have cap-and-trade carbon pricing and of these two, California is the only producing jurisdiction.

2.6 Cost and Economic Impacts of Inefficient Climate Policies

In April 2018, the Parliamentary Budget Office (PBO) released its Economic and Fiscal Outlook report, which estimates that the federal carbon tax will negatively impact the Canadian economy. The report states the carbon tax will "... generate a headwind for the Canadian economy over the medium term as the levy rises from \$10 per tonne of CO₂e in 2018 to \$50 per tonne in 2022. Based on analysis conducted by Canada's Ecofiscal Commission, [the PBO] projects that real gross domestic product (GDP) will be 0.5 per cent lower in 2022 than it would otherwise be. This amounts to \$10 billion in 2022."

In addition, emissions reduction measures in the oil and natural gas sector are capital intensive – though cost effective over time – but the immediate carbon price can act as an economic barrier to the uptake of GHG emissions-reduction technologies. The carbon price takes operating revenue away from GHG emissions abatement projects and stalls innovation in the industry. Consequently, oil and natural gas producers may be unable to make significant steps towards de-carbonization and increased efficiency.

An economic analysis conducted by CAPP shows some cost and economic impacts to the Canadian industry include:

- CAPP estimates that Canada's upstream oil and natural gas sector will pay in excess of \$25 billion over the next 10 years to the combined current provincial and federal climate initiatives.
- The cost burden of the combined climate initiatives is estimated to be an average of about \$1.40 per barrel for the in situ oil sands sector. The combined effect of these policies could reduce the net present value of a new steam-assisted gravity drainage (SAGD) project by as much as half.
- The cost burden of the combined climate initiatives is estimated to be \$1.10 per barrel of oil equivalent (boe) for conventional oil and natural gas developments (non-oil sands). Lean natural gas plays in Canada, which are already facing strong headwinds, could see returns cut in half due to the proposed climate policies.
- The fixed-dollar nature of climate policies increases financial burden on producers as project economics become more challenging.

The costs shown above were derived using these assumptions:

- Methane - costs based upon the Environment and Climate Change Canada (ECCC) costs issued in Canada Gazette Part 2 (CG2).
- CFS - used cost for offset credit purchase at \$100 per tonne CO₂e to meet carbon intensity reduction targets.
- Carbon price - applied provincial carbon prices in place or in the development phase. Federal carbon pricing was used in some cases.
- Production and cost calculations based on Wood Mackenzie sector research and projections utilizing CAPP climate cost estimates and the following detailed assumptions:
 - C\$70 per bbl, WTI
 - C\$2.65 per mcf, AECO
 - Foreign exchange rate: US\$1.00 = C\$1.20
 - WCS versus WTI differential = C\$15.96 per bbl
 - Condensate = C\$73.87 per bbl
- Data - used most representative data from provincial data sources, from 2015 to 2016.

INNOVATION AND TECHNOLOGY: KEYS TO EMISSIONS REDUCTION

Developing energy resources, and transporting those resources to consumers, is a challenge that demands high-tech, innovative solutions. Innovation is nothing new for Canada's energy sector, which could be characterized as a technology-driven industry, not a resource-driven industry.

For decades, Canada's upstream petroleum industry has been working to break the link between energy growth and emissions growth. The Alberta Oil Sands Technology and Research Authority (AOSTRA) was established in 1974 to promote development of new technologies for oil sands and heavy oil production. Today, numerous organizations and alliances facilitate research and innovation across the industry and across the country. Investment in innovation and technology is the backbone of improvements in production, efficiency and environmental performance – and thus a competitive advantage.

Across virtually all sectors of Canada's economy, the pace of change is exponential – for example, innovations and advances in vehicles, phones, electronics, and medicine have occurred in the past 20 years. Similarly, innovation is steadily occurring within the oil and natural gas sector, but the chief challenge remains the extended timelines needed to test and implement advanced technologies – and, in some cases, the significant associated costs.

Developing advanced technologies is a complex process. From concept through engineering design, testing at lab scale, then at field scale, and finally commercialization, this is a multi-year journey – often a decade or more. Critics of the oil and natural gas industry maintain the industry is not doing enough to address emissions and other environmental impacts. This is untrue. Through the work of companies, organizations, and academic and research institutions, innovation and technological advances are ongoing. Technologies that have been deployed at commercial scale are improving environmental performance and reducing emissions.

Since global demand for oil and natural gas is expected to remain robust for decades to come, investment to improve environmental performance makes sense. If demand for oil and natural gas was forecast to drop dramatically over the next 20 years, then there would be little incentive to make major capital investment aimed at reducing emissions, since there would be a relatively short timeframe for these investments to return a profit or have an impact on emissions. Canada's resource developments are therefore worthwhile candidates for investment in efficiency and emissions-reduction measures.



3.1 Innovation in Action

Canada is home to organizations and funding agencies that enable research and technology development in the oil and natural gas sector. While emerging technologies in the oil sands hold the potential for large emissions reductions, innovation is not limited to that region; the upstream oil and natural gas industry across Canada is developing technologies and processes that reduce emissions, promote efficiency, and lead to environmental performance improvement.

Below is a list of some of these organizations and agencies. Readers are encouraged to explore the websites shown for specific information on the array of research, innovations and technologies in development and already deployed.

Canada's Oil Sands Innovation Alliance (COSIA) cosia.ca	<ul style="list-style-type: none">• Launched in 2012 to improve measurement, accountability and environmental performance in four priority areas; greenhouse gases, land, water, and tailings.• The research and implementation of new technologies and processes through collaboration and transparent exchange.• As of March 2018, COSIA member companies have shared 981 distinct technologies and innovations that cost more than \$1.4 billion to develop.
Petroleum Technology Alliance Canada (PTAC) ptac.org	<ul style="list-style-type: none">• Facilitates collaborative research and development (R&D) and technology development by leveraging financial resources and technical expertise.• Funds research through the Alberta Upstream Petroleum Research Fund.• To date, has launched more than 600 projects and currently has a roster of nearly 100 active projects.
Emissions Reduction Alberta (ERA) eralberta.ca	<ul style="list-style-type: none">• Formerly Climate Change Emissions Management Corporation (CCEMC).• Supports funding for research and innovation aimed at reducing emissions.• From 2007 to 2015, industry paid \$740 million into the CCEMC fund, now administered by ERA.• Launched the Oil Sands Innovation Challenge in 2017 to accelerate deployment of transformative technology that will enhance the competitiveness of Alberta's oil sands industry.<ul style="list-style-type: none">- In May 2018, ERA announced funding for nine projects, leveraging a combined project value of more than \$720 million.- ERA committed up to \$70.6 million toward the projects, estimated to result in potential GHG emissions reduction of up to four MT of CO₂e annually by 2030.
Petroleum Research Newfoundland and Labrador (PRNL) petroleumresearch.ca	<ul style="list-style-type: none">• Maximizes R&D investments made by the offshore oil and natural gas industry.• Focus areas include health and safety, Arctic and harsh environments, environmental performance improvement, maximizing economic recovery from offshore resources, and integrated operations.
Canada's Ocean Supercluster https://oceansupercluster.ca	<ul style="list-style-type: none">• In February 2018, PRNL and more than 25 innovation partners were selected for the federal government's Innovation Superclusters Initiative program.• The supercluster will address shared innovation needs to improve productivity and global competitiveness by investing in digital ocean technologies.
Clean Resource Innovation Network (CRIN) cleanresourceinnovation.com	<ul style="list-style-type: none">• Unites Canada's oil and natural gas industry, innovators, technology vendors, academia, research institutes, financiers and government.• Plans to accelerate the commercialization of ground-breaking technologies through investments in research, testing and large-scale field pilots.

<p>Natural Gas Innovation Fund (NGIF)</p> <p>cga.ca</p> <p>(Canada Gas Association)</p>	<ul style="list-style-type: none"> • Created by the Canadian Gas Association to fund innovation in the natural gas value chain. • Develop a diversified portfolio of investments and strategic partnerships to continuously improve environmental performance.
<p>Alberta Innovates</p> <p>https://albertainnovates.ca</p>	<ul style="list-style-type: none"> • Formed in 2010, includes two applied research subsidiaries: <ul style="list-style-type: none"> - InnoTech Alberta – funding research such as hybrid steam-solvent processes for in situ oil sands extraction. - C-FER Technologies - full-scale testing and engineering consulting.
<p>B.C. Oil and Gas Research and Innovation Society (BC OGRIS)</p> <p>bcogris.ca</p>	<ul style="list-style-type: none"> • Enables relevant applied research in environmental matters related to oil and natural gas exploration and development in B.C. • Members include the BC Oil and Gas Commission, CAPP, and the Explorers and Producers Association of Canada.
<p>Saskatchewan Research Council (SRC)</p> <p>https://www.src.sk.ca</p>	<ul style="list-style-type: none"> • Among Canada's leading providers of applied research, development and demonstration, and technology commercialization, including (but not limited to) emissions-reduction technologies.
<p>B.C. Innovation Council (BCIC)</p> <p>https://bcic.ca</p>	<ul style="list-style-type: none"> • Provincial Crown agency that encourages the development and application of advanced or innovative technologies to meet the needs of industry in B.C.





Building a Culture of Collaboration

As a scientist, I know that the path towards meaningful innovation is seldom linear. The concept of trial and error sits at the core of scientific discovery and technological progress. Success requires diligence, patience and a willingness to build on lessons learned.

Like many things in life, collaboration and innovation get better with practice. You learn what works and what doesn't. And, if you are smart and have the courage, you make adjustments to maximize your successes and minimize the potential for failure.

What I call COSIA's "culture of collaboration" is key — the insight that nurturing our culture is about much more than establishing and adhering to strict rules of engagement. When we founded COSIA, we spent a lot of time on structure, process and legal agreements. This was essential when we were new. After all, we were doing what no industry had done before — bringing together a group of fierce competitors and asking them to share knowledge and technologies that had traditionally been considered proprietary.

The power of the COSIA model is that it is about true collaboration, rather than simple co-operation. There are many examples of companies coming together to co-operate in other sectors so long as it serves their individual corporate interests. But as far as we know, COSIA is unique in the world, the only example of competitors agreeing to share hard-earned innovations and intellectual property to serve the common interests of an entire industry.

The fact is that collaboration is a skill and, like any other skill, it can be taught and refined. And because of that, COSIA can put in place incentives and training to ensure the quality of collaboration steadily improves at the individual, company and sector level.

There are those who say we should be doing more and they express impatience that it can take several years or more for a potentially transformative oil sands technology to move from concept to implementation. I share their desire for faster outcomes. But my scientific background tells me that when you are developing and testing major changes in technology, the best way to accelerate progress is to tap into as much different experience and expertise as you can. This is what COSIA does. The teams within COSIA care deeply about the environmental future of our country, and we will continue to use our collaboration model to accelerate the pace of progress.

Dan Wicklum, CEO
Canada's Oil Sands Innovation Alliance
(COSIA)

Dr. Dan Wicklum, Ph.D., has been COSIA's CEO since its inception in March 2012. Prior to joining COSIA, he held senior positions with Environment Canada and Natural Resources Canada including Director General of Wildlife and Landscape Science and Director General of Water Science and Technology. He was a Senior Policy Advisor to the Canadian Federal Minister of Natural Resources and the Government House Leader.

3.2 Carbon Capture and Storage

Carbon capture and storage (CCS) is a safe and permanent means of CO₂ emissions reduction. CCS facilities capture emissions that would otherwise be vented into the atmosphere and inject the CO₂ deep underground for permanent storage. Notable CCS projects in Western Canada include:

- The first commercial-scale carbon sequestration facility, the Weyburn-Midale project launched in 2000, transports CO₂ from North Dakota through a 320-kilometre pipeline and injects it into the Weyburn oilfield in Saskatchewan. The CO₂ has given new life to the Weyburn field, which was discovered 50 years ago: 155 million gross barrels of incremental oil are expected to be recovered by 2035 and the field is projected to store 30 million tonnes of CO₂ over 30 years.
- In 2014, SaskPower developed the world's first and largest commercial-scale CCS project of its kind at the Boundary Dam Power Station near Estevan, Saskatchewan. CCS technology installed on Unit 3 of this coal-fired power station is capable of reducing up to 90 per cent of generated CO₂ emissions.
Source: SaskPower <http://www.saskpower.com/our-power-future/carbon-capture-and-storage/boundary-dam-carbon-capture-project>
- The Shell Scotford Quest CCS facility, operated by Shell on behalf of the Athabasca Oil Sands Project, started operation in 2015. In its first two years of operation, Quest has captured and safely stored two million tonnes of CO₂.
Source: https://www.shell.ca/en_ca/about-us/projects-and-sites/quest-carbon-capture-and-storage-project.html
- At Canadian Natural Resources Limited's Horizon oil sands mine, a recovery plant captures CO₂ from a hydrogen plant and injects the CO₂ into tailings. In addition, the company is a partner in the North West Redwater Sturgeon Refinery, which will capture CO₂ during processing. Canadian Natural estimates that its current projects will have CO₂ capture capacity of 2.7 million tonnes per year, making it one of the largest industry owners of CCS capacity in the world.

3.3 The Potential for Step Change: Emerging Technologies

It is crucial for Canada to develop our resources in a manner that reduces environmental impacts including GHG emissions. In the oil sands, a number of technologies, especially injected hydrocarbon ('solvent') extraction, hold significant promise to reduce the industry's GHG footprint. The proven ability of the oil sands industry to overcome technical hurdles, and the sheer size of the oil sands resource, gives Canadian producers an opportunity to be major players in global energy markets while also leading development technologies that reduce emissions associated with bitumen extraction.

For example, the process of partial upgrading is primarily aimed at reducing or eliminating the need to dilute bitumen to make it suitable for pipeline transport. Partial upgrading also has potential to reduce overall emissions, because partially upgraded bitumen requires less diluent (if any) to make it flow. By reducing diluent requirements, less liquid volume must be transported in order to get bitumen to market. This decreases the energy required for transportation and, by extension, GHG emissions. Emissions reduction from partial upgrading can range from five to 12 per cent from existing wells-to-refinery bitumen emissions, depending on the reduction of diluent (based on CAPP calculations and inputs, source: Balwinder Nimama – see bibliography).

CAPP intends to further address the advantages of partial upgrading in a forthcoming report.

The proven ability of the oil sands industry to overcome technical hurdles, and the sheer size of the oil sands resource, gives Canadian producers an opportunity to be major players in global energy markets.

3.3.1 Advanced Oil Sands Recovery

Various advanced oil sands recovery (AOSR) technologies have the potential to transform the industry by significantly reducing costs and emissions intensity. Economic commercialization of AOSR techniques would create a new standard for oil sands development – including possible retrofitting of existing production facilities – and would strengthen Canada’s position as a global leader in emissions-reduction technology.

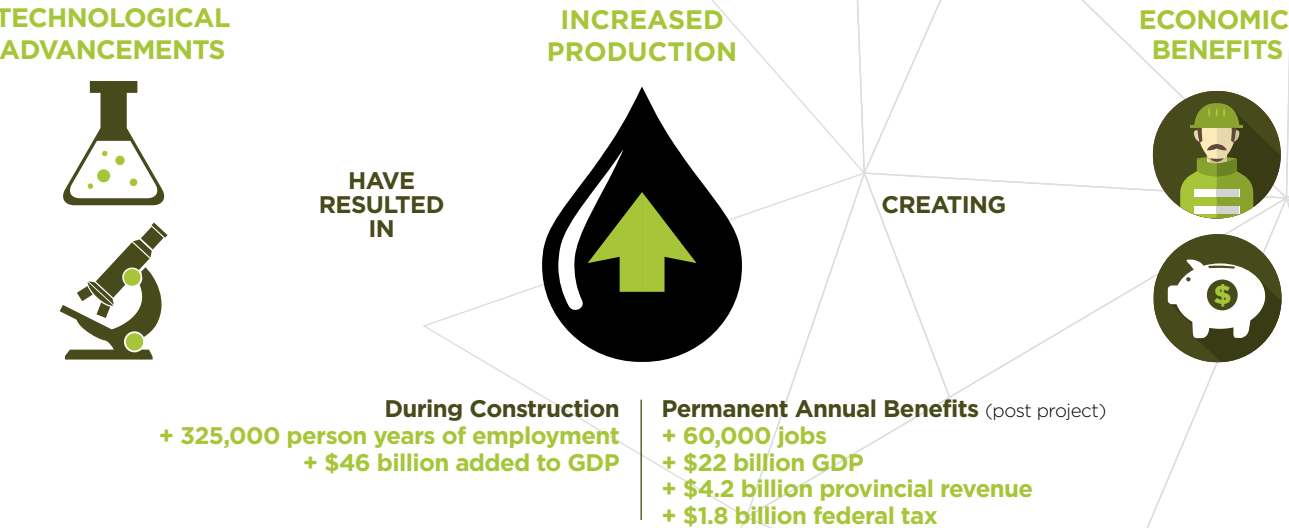
Steam generation is a major driver of GHG emissions from oil sands developments. AOSR represents any new technology that replaces or enhances SAGD, accelerates the extraction process and reduces energy intensity, which in turn lowers GHG emissions.

Currently, the most promising AOSR technology is injected hydrocarbon (‘solvent’) recovery. This technique involves injecting hydrocarbons into a bitumen reservoir. The lighter hydrocarbons mix with the bitumen and reduce its viscosity, performing a similar function as steam in SAGD. Reducing or eliminating the need to generate and inject steam has implications for reducing energy intensity and emissions. Injected hydrocarbon recovery is currently being deployed in a number of pilot projects. This technology is expected to enable continued production growth, emissions intensity improvement, and maximize the use of the existing steam capacity in the field.

Unlocking AOSR would be a game-changing advance, rivalling the commercialization of SAGD. That groundbreaking technology, commercialized in the 1990s, enabled producers to shatter investment and production forecasts, and provide significant job creation and GDP growth over the next two decades. An enormous opportunity exists around economic commercialization of AOSR; the potential for similar production capacity increases as the industry experienced with SAGD, along with corresponding job and government revenue increases – this time coupled with significant emissions intensity reduction.

Potential Impact of Unlocking AOSR Technology

Source: CAPP, 2018



For this opportunity to be realized, the industry needs the right fiscal framework to encourage commercialization of these promising but expensive technologies. Current market conditions make it very difficult for companies to commercialize new technologies due to the drain on cash flow during the commercialization stage of technological development. This has led to postponing or discontinuing commercialization, together with the loss of potential economic and environmental benefits.

Innovation of this magnitude requires ongoing investment. See Part 4 for CAPP’s recommendations concerning re-investment of government revenues generated from carbon pricing and other emissions-reduction policies.



The Alberta Carbon Conversion Technology Centre

Canada's new carbon conversion test facility advances real-world testing of potentially game-changing CO₂ emissions-reduction technologies.

The Alberta Carbon Conversion Technology Centre (ACCTC) opened in Calgary in May 2018. It's a new carbon conversion research facility located at the Shepard Energy Centre in southeast Calgary. It becomes one of the few purpose-built test sites anywhere in the world where carbon conversion and utilization technologies can be tested at an industrial scale under real-world conditions.

Carbon conversion is a burgeoning area of research inspired by the need to address climate change through reductions in greenhouse gas emissions. It recognizes that carbon is a key element in a vast array of materials. If we can find ways through chemical and physical processes to convert carbon dioxide into useful materials, we would have a way to simultaneously eliminate a source of atmospheric carbon dioxide emissions while generating economically valuable products.

Starting June 2018, five natural gas track finalist teams from the NRG COSIA Carbon XPRIZE will take up residence at the ACCTC for a two-year period. They'll work in five outdoor testing bays to refine and demonstrate their carbon capture and conversion systems, tapping into flue emissions from the nearby Shepard power plant.

The results could lead to a breakthrough: turning CO₂ into a range of usable products. Teams have proposed converting CO₂ into everything from cement-free concrete to liquid fuels to plastics and carbon fibre. Learn more about the prize and follow the teams at <http://carbon-xprize.cosia.ca>





Soheil Asgarpour, President
Petroleum Technology Alliance Canada
(PTAC)

Soheil Asgarpour has been president of PTAC since 2007. He has more than three decades of experience in the energy sector, as a senior government official and in executive positions with large oil and natural gas producers. PTAC draws from a membership base of more than 200 upstream producers, service and supply companies, government agencies and academic institutions.

Nurturing Oil and Natural Gas Innovation

A perspective from Soheil Asgarpour, President, Petroleum Technology Alliance Canada

Today, the oil and natural gas industry is driven more by technology and innovation than by resources.

Some 25 years ago, a first wave of innovation delivered sustainable technologies such as 3-D seismic and horizontal drilling – and pushed out the ultimate date for so-called “peak oil.” A second wave provided disruptive technologies, such as SAGD and multistage hydraulic fracturing, which resulted in major changes in the market, reduced oil and natural gas prices, and led to the United States becoming Canada’s biggest competitor.

Now a third wave of innovation is fast approaching, and it will have a profound and lasting impact on our sector and will focus on foundational digital technologies, which will result in a seismic shift throughout our sector.

In addition, market demand is rapidly changing; a growing number of consumers are willing to pay for clean energy, thus creating a new market for responsibly produced oil and natural gas. This presents both an opportunity and a challenge for Canada’s industry. The clear opportunity is to make fossil fuels reliable, affordable and clean energy, to the extent that we can compete with renewable energy sources. The challenge is developing and implementing the necessary technologies.

Bringing new inventions into the world is never an easy task. Innovators may come up with a great idea, but often they’ll struggle to get innovations tested in the field because they cannot secure funding or host sites for their work. Getting past these hurdles can be difficult, especially in the oil and natural gas industry where new technologies must clearly fill a need and be effective under real-world operating conditions.

What has PTAC done to position Canada as a global leader in the clean hydrocarbon energy economy?

Since its founding in 1997, PTAC has been a forum for hundreds of technology providers, producers, academia, regulators, government organizations, and investors to collaborate and advance new technologies. PTAC acts as facilitator, project manager, and even funder (contributing up to 15 per cent seed money to help move projects forward). A portion of the projects are supported through the Alberta Upstream Petroleum Research Fund (AUPRF), a research and development program sponsored by industry and managed by PTAC.

To date, PTAC has been instrumental in launching over 600 R&D and technology projects through consortiums and joint industry partnerships, and currently has a roster of nearly 100 active projects. These include managing industry's environmental footprint, improving oil and natural gas recovery, reducing operating cost or creating value-added products.

In 2017, PTAC's work focused on methane and GHG emissions. PTAC established a network of producers and technology firms studying more than 20 different methane-reduction technologies. Moreover, in November 2017, PTAC announced a partnership with the federal government and others on a multi-million-dollar initiative to support research aimed at improving the industry's ability to detect and reduce methane emissions during production.

PTAC's consortia have developed and field tested numerous technologies that currently have the collective capacity to reduce overall sector methane emissions by more than 30 per cent. In fact, four technologies are reducing GHG emissions equivalent to taking 160,000 cars off the road annually, while reducing industry costs by \$16 million annually.

PTAC intends to remain one of the industry's strongest technology champions to help more producers, more technology providers and more partners get engaged in expanding our industry's innovation ecosystem.



RECOMMENDATIONS: FOSTERING INNOVATION AND INVESTMENT

In its 2017 report *Investing in a Resilient Canadian Economy*, the Advisory Council on Economic Growth said, “To thrive in a rapidly evolving world, Canadian businesses in nearly every industry must enter new markets and develop more innovative products and services. Policy makers must ensure businesses and workers can make the investments necessary to do so. Furthermore, the definition of investment needs to be broadened beyond the traditional categories of structures, machinery and equipment, and intellectual property. Investments in human capital, in data assets, and in the adoption of new technology are increasingly vital drivers of growth and competitiveness.”

However, current climate and other policies are combining to drive investment away from Canada, into other countries that have less robust emissions-reduction policies. This creates real costs for Canadian industry and society without large reductions in global emissions.

With the right policies in place, the Canadian industry can be competitive, can attract investment and can reduce GHG emissions.

4.1 Emissions-intensive, Trade-exposed (EITE) Policy

As we have outlined in this report, the oil and natural gas sector is an emissions-intensive, trade-exposed (EITE) sector. Many jurisdictions across Canada and the world incorporate mechanisms to help manage EITE sectors to address carbon leakage. For example, in Alberta, the government has used output-based allocation (OBA) to help manage competitiveness, and in California the state provides allocation credits under the cap-and-trade system to help manage the competitiveness of the Californian oil and natural gas sector. As shown in Part 2, the overall competitiveness resulting from different systems varies depending on a number of factors. Currently Alberta is shown to be more costly to operate in than California.



CAPP RECOMMENDS that governments at all levels:

- Take into account the current economic environment for the oil and natural gas sector and continue to work with industry to develop regulations that help to reduce emissions while still allowing for the continued growth of the Canadian oil and natural gas sector.
- Create protection mechanisms for EITE sectors to help avoid carbon leakage. These mechanisms need to include small and large producers.
- Assess all costs and recognize the cumulative burden of any policies and regulations, corporate tax increases and royalty changes.

4.2 Innovation Investment Policy

While many of the world's oil and natural gas producers operate in jurisdictions with minimal or no environmental and emissions standards, Canada is already demonstrating what it takes to be a responsible energy developer. Canada has already set standards that are more stringent than those in most countries, and in many instances Canadian oil and natural gas producers are operating above and beyond regulatory standards. Furthermore, industry continuously invests in innovation that can move environmental performance beyond compliance.

4.2.1 Innovation Re-investment

CAPP advocates for turning a substantial portion of carbon pricing revenues toward enabling innovation.

Key points* in support of revenue recycling include:

- The re-investment of carbon pricing revenues can significantly boost the overall impact of carbon pricing on long-term emissions reduction. The oil and natural gas sector is ideal to achieve this amplified impact because of the potential for significant emissions reduction.
- Carbon pricing comes with several drawbacks, such as carbon leakage and decreased competitiveness, which can be counteracted by recycling revenue back into the oil and natural gas sector.
- Canada's oil and natural gas sector already has an unparalleled, largely self-funded innovation system, an opportunity that could be optimally leveraged if carbon pricing funds were to be re-invested.
- A revenue-recycling approach is an excellent basis for establishing a carbon pricing re-investment strategy that eliminates the effects of short-term political priorities.
- Technological outcomes advanced through this process could be applied globally, driving abatement and efficiency in Canada and around the world.

* Source: ICF Canada (see bibliography).

Ensuring carbon pricing revenues from the upstream sector are paid into a government fund that returns revenue to enable GHG abatement specifically in the oil and natural gas sector is key to creating effective, long-term benefits from carbon pricing.

CAPP RECOMMENDS:

- **Return carbon-related revenue to EITE industries through revenue recycling and innovation funding. By re-investing carbon revenue into EITE sectors, governments can help protect the competitiveness of internationally trade-exposed industries, create incentives to reduce emissions, and help unlock step change technologies.**

4.2.2 Immediate Deductibility

The amortization of capital is the most efficient fiscal lever available to governments to promote investment in large value-added and innovation technologies. This approach, known as 'immediate deductibility' or 'immediate expensing,' rewards new investment. This fiscal tool is especially effective for industries with high up-front capital costs and long lead times until projects are cash-flow positive.

Immediate deductibility of capital is widely recognized as a key driver for successful investment and commercialization of new technologies in the oil sands, envisioned by the 1993 National Oil Sands Task Force. By leveraging tax credits as a funding tool, immediate deductibility also avoids government subsidies and recognizes the inherent risk of investing in new technology, versus carrying on with existing technology. The Scientific Research and Experimental Development (SR&ED) Tax Credit is another key fiscal tool for enabling investment in oil and natural gas innovation and technology, however SR&ED requires updating to ensure efficiency and effectiveness.

CAPP RECOMMENDS:

- **Allow for immediate deductibility for investment in oil and natural gas sector. This approach should apply to all industries that aspire to develop and implement emissions-reduction technologies toward a lower-carbon economic environment, including value-add technology.**
- **Engage with industry to update the SR&ED to encourage investment in technologies that diminish environmental impacts, improve competitiveness and spur productivity.**

4.3 Canada’s Role in Global Emissions Reduction

With robust and efficient emissions-reduction policies, responsibly produced Canadian oil and natural gas could be well positioned to meet global energy demand instead of carbon-intensive fuels currently being used in emerging markets. Ultimately, the goal of such policies should be to decrease global GHG emissions, as opposed to reducing emissions only in Canada at high cost to the Canadian economy but with minimal effect on global emissions.

Getting our climate policies right has huge long-term implications for the future of the Canadian industry, for Canadians in general (who benefit from a strong upstream industry) and for reducing GHG emissions globally.

As CAPP noted in our 2018 report *A Global Vision for the Future of Canadian Oil and Natural Gas*, “Climate change is bigger than one industry. It’s bigger than one person, one province or one country – which makes it difficult for governments to strike the right balance between environmental stewardship, economic prosperity and energy security for our nation. The Canadian energy sector can thrive in a carbon-constrained future by reducing GHG emissions through the development of cost-effective, clean technology. But in order to do so, industry needs the support of governments and Canadians to meet new and emerging innovation challenges. If we want to succeed as a nation, we must work together to develop competitive policies and increase access to international markets.”

The opportunity is clear: enable and continue investment in the innovation needed for economic diversification and successful long-term emissions reduction. Canada urgently needs policies that enable the industry’s commitment to innovation and technologies, before other suppliers – with weaker environmental standards – capture global markets without addressing climate concerns.

Currently, the cumulative effect of costly, inefficient and duplicative policies and regulations is damaging the industry’s competitiveness and eroding investor confidence. Reduced investment in turn delays or halts the commercialization of promising innovative technologies that could significantly reduce emissions. Canada’s policies and environmental regulations must be developed in parallel with attracting investment, spurring innovation, growing jobs and maintaining economic benefits across the country.



Environmental performance is critical to realizing a vision for Canada as a global oil and natural gas supplier of choice. CAPP supports climate policy that maintains a vibrant and competitive oil and natural gas sector while efficiently and effectively managing GHG emissions and other environmental impacts with technology and innovation.



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GLOSSARY

- AECO** – a hub for natural gas traded in Alberta
- AOSR** – advanced oil sands recovery
- bbl** – barrel (of oil); a standard oil barrel is about 35 Imperial gallons (42 U.S. gallons) or 159 litres
- boe** – barrels of oil equivalent
- b/d** – barrels per day
- BCOGC** – BC Oil and Gas Commission
- CO₂e** – carbon-dioxide equivalent
- CAPP** – Canadian Association of Petroleum Producers
- CO₂** – carbon dioxide
- ECCC** – Environment and Climate Change Canada
- EITE** – emissions-intensive, trade-exposed
- GDP** – gross domestic product
- GHG** – greenhouse gases
- IEA** – International Energy Agency
- mcf** – million cubic feet (of natural gas)
- MT** – megatonne
- OBA** – output-based allocations
- PBO** – Parliamentary Budget Office
- R&D** – research and development
- SAGD** – steam assisted gravity drainage
- SR&ED** – Scientific Research and Experimental Development
- WCS** – Western Canada Select heavy oil blend produced in Western Canada and shipped from Hardisty, Alberta. WCS is the benchmark price for western Canadian heavy oil
- WTI** – West Texas Intermediate light sweet oil produced in the U.S., which is the benchmark grade of oil for North American price quotations

**The Canadian Association
of Petroleum Producers
(CAPP)**

represents companies, large and small, that explore for, develop and produce natural gas and crude oil throughout Canada. CAPP's member companies produce about 80 per cent of Canada's natural gas and crude oil. CAPP's associate members provide a wide range of services that support the upstream crude oil and natural gas industry. Together CAPP's members and associate members are an important part of a national industry with revenues from crude oil and natural gas production of about \$110 billion a year. CAPP's mission, on behalf of the Canadian upstream crude oil and natural gas industry, is to advocate for and enable economic competitiveness and safe, environmentally and socially responsible performance.





CANADA'S OIL & NATURAL GAS PRODUCERS

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