From:	Kapac de Frias, Martina E ENV:EX
To:	XT:Morrison, Geoff FLNR:IN
Subject:	RE: Meeting request for next week
Date:	Tuesday, March 15, 2016 5:33:00 PM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png

---

Yes, 9am works – thanks, M

From: Morrison, Geoff [mailto:geoff.morrison@capp.ca]
Sent: Tuesday, March 15, 2016 5:33 PM
To: Kapac de Frias, Martina E ENV:EX
Subject: RE: Meeting request for next week

Does this still work for tomorrow?

At your office I assume.

Geoff Morrison | Manager of British Columbia Operations

Victoria: 778.410.5040 | Cell: 250.634.4010| Calgary: 403.776.1409

From: Kapac de Frias, Martina E ENV:EX [mailto:Martina.KapacdeFrias@gov.bc.ca]
Sent: Thursday, March 10, 2016 1:39 PM
To: Morrison, Geoff
Subject: RE: Meeting request for next week [WARNING: SPF validation unavailable]

Lets make it 9am- thanks

From: Morrison, Geoff [mailto:geoff.morrison@capp.ca]
Sent: Thursday, March 10, 2016 11:12 AM
To: Kapac de Frias, Martina E ENV:EX
Subject: Re: Meeting request for next week

Yes. Either time is good next Wednesday.

Sent from my BlackBerry 10 smartphone on the TELUS network.

From: Kapac de Frias, Martina E ENV:EX
Sent: Thursday, March 10, 2016 9:43 AM
To: Morrison, Geoff
Subject: RE: Meeting request for next week [WARNING: SPF validation unavailable]

Geoff,

Would wed 9am work? Or 10am?

From: Morrison, Geoff [mailto:geoff.morrison@capp.ca]
Sent: Monday, March 7, 2016 4:47 PM
To: Kapac de Frias, Martina E ENV:EX
Subject: Meeting request for next week

Hi Martina

It was nice to see you last week. I'm hoping we can find at time to connect next week (week of the 14 of March).

I know the house is still in session, so you may not have too much flexibility, but hopefully you have some time. I'm away the week of March 21.

I'd like to catch up on Climate Change Policy/Carbon Tax/methane reductions and we should touch on spill prevention work too.

Geoff

Geoff Morrison | Manager of British Columbia Operations

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From:	Kapac de Frias, Martina E ENV:EX
To:	Scott, Heidi ENV:EX
Subject:	FW: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers
Date:	Monday, April 11, 2016 3:27:00 PM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png Microsoft Word - CAPP_EDMS-#279029-v18-DRAFT_submission_to_BC_regarding_....pdf

For meeting file pls ☺ thanks!

From: Morrison, Geoff [mailto:geoff.morrison@capp.ca]
Sent: Monday, April 11, 2016 3:26 PM
To: Minister, ENV ENV:EX
Cc: Kapac de Frias, Martina E ENV:EX
Subject: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers

Dear Minister Polak:

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Attending the meeting from CAPP would be:

- Tim McMillian, CAPP President
- Michael Gatens, CAPP Chairman & CEO, Unconventional Gas Resources Canada
- Brad Herald, Vice President of Western Operations and
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We are requesting a meeting on Monday May 16 in Victoria if possible. We will also be approaching other members of the *Cabinet Working Group on Climate Leadership* for meetings that same day.

Thank you for your consideration. Please contact me if you have any questions or need further information, my phone number in Victoria is (250) 634-4010.

Regards;

Geoff Morrison

Geoff Morrison | Manager of British Columbia Operations

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CANADIAN ASSOCIATION
OF PETROLEUM PRODUCERS

Canada's Oil and Natural Gas Producers

April 8, 2016

Honourable Mary Polak
Climate Leadership Consultation
Ministry of Environment Climate Action Secretariat
PO BOX 9486, STN PROV GOVT
Victoria B.C. V8W 9W6

via e-mail: climateleadershipplan@gov.bc.ca

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CAPP supports a climate policy framework in British Columbia that creates a vibrant and competitive oil and gas sector while efficiently and effectively managing greenhouse gas emissions. To this end, CAPP provides the following key recommendations, aligned with the relevant sections of the Consultation Guide. These views remain consistent with CAPP's submission made to Government September 2015, in response to the Climate Leadership Plan Discussion Paper, which outlined the importance of competitiveness and supporting further emissions reductions opportunities for oil and gas, such as electrification and methane emissions reductions. [1]

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From a competitiveness standpoint, BC's upstream natural gas industry faces significant challenges due to a continued low commodity price environment coupled with the unique challenges associated

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Fax 778-410-5001

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with BC's resource plays. We recommend that the BC government consider how any climate policy initiatives undertaken by the province can not only preserve, but enhance the economic competitiveness of BC's upstream oil and gas sector to attract investment and create jobs. Carbon policy design requires full cost accounting of options when evaluating the cumulative burden across policies and regulations in order to prevent further deterioration of industry competitiveness and to minimize the risk of carbon leakage to competing jurisdictions. We offer the following carbon policy recommendation for how to minimize both carbon and investment leakage from BC.

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The CLT recommended increases to the current $30/tonne carbon price commencing in 2018. Applying additional increases to our sector would further diminish competitiveness of the natural gas industry and increase the risk of carbon leakage to competing jurisdictions. Economic competitiveness is of paramount importance to ensure the industry is able to thrive, attract new investment, create jobs and generate revenues for government.

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CAPP strongly supports the efforts of the Government of BC to protect EITE industries. On November 27, 2015, Minister Polak stated that the province would only consider changes to its carbon tax under a regime where EITE industries are "fully protected from any carbon tax increase."

CAPP fully supports the government's position to protect EITE industries, and believes the upstream industry clearly qualifies as an EITE industry.

Given BC's strong leadership on carbon pricing, applying further increases in BC's carbon price to our sector without full protection would further impair the competitiveness of the province's oil and gas sector, especially in the current low price environment when operating margins are already suppressed. An EITE policy applied to carbon price increases would recognize the importance of managing inter-jurisdictional competitiveness, until the carbon policies in key trading jurisdictions are equivalent and/or aligned in level of effort and price. Additional policy principles are provided in the Appendix.

The Way We Work: GHG Emissions Reduction Opportunities

CAPP is looking forward to engaging with the B.C. government in the development of the province's Climate Leadership Plan to meaningfully address GHG emission from upstream oil and natural gas activities while enhancing the overall competiveness of the industry in British Columbia. The following section provides recommendations on key emissions reductions opportunities from our industry.

Electrification

The consultation guide references the Climate Leadership Team's recommendation 14 to supply clean electricity for the electrification of the upstream industry in a competitive and timely manner.

CAPP believes competitive electrification of the upstream will help BC move toward its provincial GHG reduction targets, representing a foremost opportunity for significant GHG mitigation for the oil and gas sector in BC. Based on our sector's experience, there exists two significant risks to competitive electrification: Reliable and timely in-service transmission capacity; and economic considerations related to rates and tariffs. Practical work is required by BC Hydro and government to work with our sector to align business processes and to find equitable means to balance risks.

Methane

In 2013, upstream oil and gas methane emissions accounted for approximately 20 per cent of BC's total methane emissions. CAPP is committed to making reductions to methane emissions and recommends the following, taking care that responses to each of these demonstrate leadership in seeking alignment with Canada, other provincial jurisdictions and, where appropriate, with competing jurisdictions like the US:

- Applying enhanced regulated standards to new facilities and a regulated standard of practice for leak detection and repair (LDAR) of fugitive equipment leaks; building on existing LDAR requirements.
- A market-based approach to achieve a specified reduction target using fiscal measures focused on reductions from legacy methane emissions sources installed at existing facilities.
- A specific reduction target for vented and fugitives sources at existing facilities that is ambitious yet achievable with the appropriate policy and fiscal mechanisms in place to provide industry with a pathway to achieve the specified reductions. In addition, this target should align appropriately with other provincial and federal goals, including Alberta's Climate Leadership Plan.

CAPP believes properly designed and prescribed programs will achieve greater reductions than those that would be achieved through a carbon tax approach, which increases operating costs and could discourage needed investment in BC. Consequently, CAPP does not at this time support recommendations to increase the rate or scope of the BC carbon tax, as applied to our sector, and believes that all uncombusted methane should be exempt from carbon tax to enable reductions using the market-based mechanisms above. For legacy assets, a market-based approach to achieving a specified methane emissions reduction target is critical to mitigate the costs of retro-fitting industry's inventory of existing equipment to lower emitting devices.

Fiscal Measures

To incent methane emissions reductions, and to incent greater uptake in electrification, a viable path forward hinges on the development of fiscal mechanisms to enable investment. Given the current competitiveness pressures on our sector (including the cost burden of the carbon tax), industry and government will need to work together on ways to improve the economic value of emission reduction projects. By doing so will contribute to more reductions being achieved.

The following fiscal measures should be considered further by the BC government for application by the industry to emissions reductions opportunities:

- *Offsets*: Could be achieved via BC government guaranteed/targeted purchase of offsets, to provide certainty around supply and price, and/or enabling linkages to other offset markets, to expand demand for BC offsets.
- *Carbon compliance certification*: Reduction in carbon tax payable based on emission reductions achieved.
- *Clean infrastructure royalty credit program*: Investing in innovation and technology will enable BC to reduce emissions while also creating and maintaining jobs. CAPP recommends that the province create a broad clean royalty infrastructure credit program that would support investments in infrastructure/technology to reduce methane emissions. A royalty credit program would contribute to investment economics supplemented by fiscal support through offsets or compliance certificates.

In conclusion, BC needs to find the balance so that it can be both a strong world leader in the fight against climate change and a more competitive place to invest in oil and gas. Climate policy should be designed to focus on targeted emissions reductions through enhanced technology investment and deployment, enable flexible compliance options and prioritize economic competitiveness in order to simultaneously enhance competiveness, attract new investment, while achieving the emissions performance objectives. Going forward industry and government will need to work together to achieve greater GHG reductions in a way that can support or enhance industry's competitiveness. We believe a significant opportunity does exist and can be supported by BC in its climate action plan by: designating EITE industries, supporting upstream electrification, and providing the fiscal mechanism that will enable methane emission reductions. CAPP is committed to working together to find ways to help achieve BC's emissions reduction targets while continuing to grow the economy.

Sincerely,

Brad Herald

Brad Herald
Vice-President, Western Canada

Cc: Hon. Rich Coleman, Minister of Natural Gas Development
Hon. Michael de Jong, Minister of Finance
Hon. Shirley Bond, Minister of Jobs, Tourism and Skills Training and Responsible for Labour
Hon. Todd Stone, Minister of Transportation and Infrastructure
Hon. Peter Fassbender, Minister of Community, Sport and Cultural Development and Responsible for TransLink

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April 8, 2016

Appendix: Emission-Intensive, Trade-Exposed (EITE) Policy Design Principles

Currently, many different carbon management regimes around the world utilize an emission-intense trade-exposed (EITE) methodology to determine the need to protect industries competiveness and minimize carbon leakage under carbon pricing policies. The EITE designation serves to recognize those segments of the economy that represent a leakage risk, whereby investment could shift jurisdiction with less stringent carbon policies providing no gain in global GHG reductions but shrinking economic benefit for BC through loss of investment, jobs and government revenue.

CAPP has worked with industry associations along the natural gas value-chain in British Columbia to consider other jurisdictions' EITE methodologies and develop policy design principles for EITE. Through this effort, the following principles have been established and should be part of a BC mechanism for EITE determination:

- *Fair and transparent*, creating competitive parity across competing jurisdictions.
- *Science-based*, with a strong analyses and understanding of implications in practice.
- *Clear, predictable and simple to administer*, with clear and established processes for review of EITE protection.
- *Cost-efficient*, offsetting the difference in incremental carbon price that exists between competing jurisdictions.
- *Balanced and efficient*, recognizing the totality of emissions policies on industry.
- *Viable*, with readily available compliance pathways that support open market mechanisms.
- *Consistent with developing a clean LNG industry*, achievable within the context of a growing and transitioning lower carbon economy.
- *Recognizes the risk of carbon leakage*, and that BC is currently a world leader in carbon price and industry emissions regulations.
- *Does not disadvantage BC natural gas producers*, in existing North America markets and in emerging international markets.

Using these principles as a framework for EITE policy design, CAPP looks forward to working further with the BC government to further develop a BC solution to EITE determination and application.

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310, 1321 Blanshard Street
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Canada V8W 0B5
Tel 778-410-5000
Fax 778-410-5001

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From:	Kapac de Frias, Martina E ENV:EX
To:	Wallace-Deering, Eric
Cc:	Denniston, Tristan M MEM:EX; Knudsen, Mark ENV:EX
Subject:	RE: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers
Date:	Monday, April 11, 2016 4:52:00 PM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png

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Thanks Eric – Geoff sent over to us as well.

From: Wallace-Deering, Eric MEM:EX
Sent: Monday, April 11, 2016 4:49 PM
To: Kapac de Frias, Martina E ENV:EX
Cc: Denniston, Tristan M MEM:EX; Knudsen, Mark ENV:EX
Subject: FW: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers
FYI Martina

From: Morrison, Geoff [mailto:geoff.morrison@capp.ca]
Sent: Monday, April 11, 2016 3:27 PM
To: Minister, MEM MEM:EX
Cc: Wallace-Deering, Eric MEM:EX
Subject: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers

Dear Minister Bennett:

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Barlow, John ENV:EX

From: Scott, Heidi ENV:EX
Sent: Tuesday, April 12, 2016 4:22 PM
To: Brosz, Corinne M ENV:EX
Subject: 298188 - FW: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers
Attachments: Microsoft Word - CAPP_EDMS-#279029-v18-DRAFT_submission_to_BC_regarding_....pdf

Follow Up Flag: Follow up
Flag Status: Flagged

For cliff and blue folder please, thanks.

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To: Scott, Heidi ENV:EX
Subject: FW: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers

For meeting file pls ☺ thanks!

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Cc: Kapac de Frias, Martina E ENV:EX
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April 8, 2016

Honourable Mary Polak
Climate Leadership Consultation
Ministry of Environment Climate Action Secretariat
PO BOX 9486, STN PROV GOVT
Victoria B.C. V8W 9W6

via e-mail: climateleadershipplan@gov.bc.ca

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- A specific reduction target for vented and fugitives sources at existing facilities that is ambitious yet achievable with the appropriate policy and fiscal mechanisms in place to provide industry with a pathway to achieve the specified reductions. In addition, this target should align appropriately with other provincial and federal goals, including Alberta's Climate Leadership Plan.

CAPP believes properly designed and prescribed programs will achieve greater reductions than those that would be achieved through a carbon tax approach, which increases operating costs and could discourage needed investment in BC. Consequently, CAPP does not at this time support recommendations to increase the rate or scope of the BC carbon tax, as applied to our sector, and believes that all uncombusted methane should be exempt from carbon tax to enable reductions using the market-based mechanisms above. For legacy assets, a market-based approach to achieving a specified methane emissions reduction target is critical to mitigate the costs of retro-fitting industry's inventory of existing equipment to lower emitting devices.

Fiscal Measures

To incent methane emissions reductions, and to incent greater uptake in electrification, a viable path forward hinges on the development of fiscal mechanisms to enable investment. Given the current competitiveness pressures on our sector (including the cost burden of the carbon tax), industry and government will need to work together on ways to improve the economic value of emission reduction projects. By doing so will contribute to more reductions being achieved.

The following fiscal measures should be considered further by the BC government for application by the industry to emissions reductions opportunities:

- *Offsets*: Could be achieved via BC government guaranteed/targeted purchase of offsets, to provide certainty around supply and price, and/or enabling linkages to other offset markets, to expand demand for BC offsets.
- *Carbon compliance certification*: Reduction in carbon tax payable based on emission reductions achieved.
- *Clean infrastructure royalty credit program*: Investing in innovation and technology will enable BC to reduce emissions while also creating and maintaining jobs. CAPP recommends that the province create a broad clean royalty infrastructure credit program that would support investments in infrastructure/technology to reduce methane emissions. A royalty credit program would contribute to investment economics supplemented by fiscal support through offsets or compliance certificates.

In conclusion, BC needs to find the balance so that it can be both a strong world leader in the fight against climate change and a more competitive place to invest in oil and gas. Climate policy should be designed to focus on targeted emissions reductions through enhanced technology investment and deployment, enable flexible compliance options and prioritize economic competitiveness in order to simultaneously enhance competiveness, attract new investment, while achieving the emissions performance objectives. Going forward industry and government will need to work together to achieve greater GHG reductions in a way that can support or enhance industry's competitiveness. We believe a significant opportunity does exist and can be supported by BC in its climate action plan by: designating EITE industries, supporting upstream electrification, and providing the fiscal mechanism that will enable methane emission reductions. CAPP is committed to working together to find ways to help achieve BC's emissions reduction targets while continuing to grow the economy.

Sincerely,

Brad Herald

Brad Herald
Vice-President, Western Canada

Cc: Hon. Rich Coleman, Minister of Natural Gas Development
Hon. Michael de Jong, Minister of Finance
Hon. Shirley Bond, Minister of Jobs, Tourism and Skills Training and Responsible for Labour
Hon. Todd Stone, Minister of Transportation and Infrastructure
Hon. Peter Fassbender, Minister of Community, Sport and Cultural Development and Responsible for TransLink

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April 8, 2016

Appendix: Emission-Intensive, Trade-Exposed (EITE) Policy Design Principles

Currently, many different carbon management regimes around the world utilize an emission-intense trade-exposed (EITE) methodology to determine the need to protect industries competiveness and minimize carbon leakage under carbon pricing policies. The EITE designation serves to recognize those segments of the economy that represent a leakage risk, whereby investment could shift jurisdiction with less stringent carbon policies providing no gain in global GHG reductions but shrinking economic benefit for BC through loss of investment, jobs and government revenue.

CAPP has worked with industry associations along the natural gas value-chain in British Columbia to consider other jurisdictions' EITE methodologies and develop policy design principles for EITE. Through this effort, the following principles have been established and should be part of a BC mechanism for EITE determination:

- *Fair and transparent*, creating competitive parity across competing jurisdictions.
- *Science-based*, with a strong analyses and understanding of implications in practice.
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- *Does not disadvantage BC natural gas producers*, in existing North America markets and in emerging international markets.

Using these principles as a framework for EITE policy design, CAPP looks forward to working further with the BC government to further develop a BC solution to EITE determination and application.

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310, 1321 Blanshard Street
Victoria, British Columbia
Canada V8W 0B5
Tel 778-410-5000
Fax 778-410-5001

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From:	Kapac de Frias, Martina E ENV:EX
To:	XT:Morrison, Geoff FLNR:IN
Cc:	Scott, Heidi ENV:EX
Subject:	RE: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers
Date:	Thursday, April 21, 2016 10:00:00 AM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png

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Thanks Geoff – Heidi in our office will be getting back to you shortly.

From: Morrison, Geoff [mailto:geoff.morrison@capp.ca]
Sent: Thursday, April 21, 2016 9:38 AM
To: Kapac de Frias, Martina E ENV:EX
Subject: FW: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers

Hi Martina

Checking in on this meeting request to see if there is any update. We have confirmed a meeting with Minister Coleman at 10 am on Monday May 16th in Victoria.

Regards,

Geoff

Geoff Morrison | Manager of British Columbia Operations

ATTENTION: New phone number

New Victoria #: 778.265.3819 | Same Cell: 250.634.4010| Same Calgary: 403.776.1409 |

New Victoiria Address: 360B Harbour Road, Victoria BC, V9A 3S1

From: Morrison, Geoff
Sent: Monday, April 11, 2016 3:26 PM
To: 'ENV.minister@gov.bc.ca'
Cc: Kapac de Frias, Martina E ENV:EX
Subject: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers

Dear Minister Polak:

I am writing to request a to review and discuss CAPP's feedback on the *Consultation Guide: Building B.C.'s Climate Leadership Plan* (please see attached document which was submitted April 8th, 2016). In addition to this feedback CAPP has been actively participating with government through the sectoral engagement process led by Deputy Minister Dave Nikolejsin at the Ministry of Natural Gas Development. CAPP would appreciate the opportunity to have a dialogue about our submission and the progress made during the sectoral engagement process. As the BC Government finalizes the development of its updated Climate Leadership Plan, CAPP believes it would be useful to have an opportunity to address any questions about the upstream industry's response. Furthermore, CAPP would like to highlight opportunities to reduce GHG through methane management programs, electrification and the importance of maintaining and enhancing competiveness to attract new investment for upstream development and potential LNG exports; creating jobs and developing BC's resources responsibly.

Attending the meeting from CAPP would be:

- Tim McMillian, CAPP President
- Michael Gatens, CAPP Chairman & CEO, Unconventional Gas Resources Canada
- Brad Herald, Vice President of Western Operations and
- myself, Geoff Morrison Manager of British Columbia Operations.

We are requesting a meeting on Monday May 16 in Victoria if possible. We will also be

approaching other members of the *Cabinet Working Group on Climate Leadership* for meetings that same day.

Thank you for your consideration. Please contact me if you have any questions or need further information, my phone number in Victoria is (250) 634-4010.
Regards;
Geoff Morrison

Geoff Morrison | Manager of British Columbia Operations



| Cell: 250.634.4010| Calgary: 403.776.1409 | Website: www.capp.ca



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entity to which it is addressed and may contain confidential and/or privileged
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MINISTRY OF ENVIRONMENT
MEETING INFORMATION NOTE

April 22, 2016
File:
CLIFF/tracking #: 298188

PREPARED FOR: Honourable Mary Polak, Minister of Environment

DATE AND TIME OF MEETING: May 16th at 9:00am

ATTENDEES: Tim McMillian, Canadian Association of Petroleum Producers (CAPP) President, Michael Gatens, CAPP Chairman & CEO, Unconventional Gas Resources Canada, Brad Herald, Vice President of Western Operations, Geoff Morrison Manager of British Columbia Operations, Fazil Mihlar, Deputy Minister, Climate Leadership and Susanna Laaksonen-Craig, Head, CAS

ISSUE(S): CAPP's submission for the Climate Leadership Plan

BACKGROUND:

The Canadian Association of Petroleum Producers (CAPP) represents companies that explore for, develop, and produce natural gas and crude oil throughout Canada. CAPP's member companies produce about 90 per cent of Canada's natural gas and crude oil. CAPP's mission is to advocate for and enable economic competitiveness and safe, environmentally and socially responsible performance.

As part of the development of its Climate Leadership Plan (CLP), the Province recently held the second of two consultation periods. Individuals, businesses, First Nations, communities and other stakeholders were invited to provide their ideas, input and comments for the plan. The Ministry of Natural Gas Development has held 5 consultation meetings with CAPP between December and February 2016, with CAS participation. On April 8th, CAPP provided their submission on the CLP. They have requested a meeting in order to discuss their feedback.

DISCUSSION:

CAPP's submission acknowledged BC's climate leadership and affirmed the viability of the Province's plan to meet its GHG reduction goals while maintaining a strong economy and robust natural gas sector. CAPP cited BC's opportunity for BC liquefied natural gas to lower global GHG emissions by displacing the use of coal in growing economies. CAPP also noted the challenges that the natural gas sector faced in the current low commodity price environment and recommended that climate policy be developed with the lens of how it can not only preserve, but enhance the sector's competitiveness.

CAPP cautioned the Province against taking the Climate Leadership Team's recommendation of annual carbon tax increases, stating that this would further diminish competitiveness of the natural gas industry and increase the risk of carbon leakage to competing jurisdictions. They applauded the Province's intentions to protect Emissions

Intensive Trade Exposed (EITE) industries, citing Minister Polak's statement that EITE industries would be "fully protected from any carbon tax increase". CAPP believes that the natural gas sector is an EITE sector.

CAPP stated that greater electrification of the natural gas sector could help BC progress to its emission reduction targets. They cautioned that for electrification to be feasible, they would require reliable and timely in-service transmission capacity and affordable rates and tariffs. CAPP also stated that significant methane emission reductions at existing and new facilities were possible through the use of targets and "fiscal measures" rather than an expansion of the carbon tax. "Fiscal measures" were defined as programs and tools like offsets, royalty credits, or carbon tax credits, that would incentivize the adoption of methane reduction policies and practices.

SUGGESTED RESPONSE:

The Province thanks CAPP for their thoughts on BC's upcoming Climate Leadership Plan. BC shares CAPP's conviction that the Province can meet its emission reduction targets while maintaining a strong natural gas sector. The Province has consulted with the sector and continues to work with them to develop effective climate policy. CAPP's input will help inform the development of the Climate Leadership Plan, which will be delivered in the coming months.

Attachments: Appendix A: Bios for Tim McMillan, Mike Gatens, and Geoff Morrison

Contact:	**Alternate Contact:**	**Prepared by:**
Susanna Laaksonen-Craig, Head	*Neil Dobson*	*Hurrian Peyman*
Climate Action Secretariat	*Climate Action Secretariat*	*Economist, CAS*
250 356-9443	*250 387-9981*	*250 356-7544*

Reviewed by	Initials	Date
DM	FM	FM
DMO	--	--
ADM	SLC	05/05/16
Dir./Mgr.		
Author		

Appendix A: Bios for Tim McMillan, Mike Gatens, and Geoff Morrison



Tim Mcmillan: Tim McMillan was appointed President and incoming CEO of the Canadian Association of Petroleum Producers (CAPP) in 2014. The Saskatchewan native is responsible for leading activities in education and communications as well as policy and regulatory advocacy on behalf of CAPP. After earning an economics degree from the University of Victoria, he traveled and worked overseas as an Information Technology professional. He later returned to the family farm near Lloydminster and founded and operated an oilfield services company. In 2007, Tim was elected as a Saskatchewan Party MLA in the riding of Lloydminster. From 2010 until his appointment as President of CAPP, Tim held several strategic cabinet portfolios in the Government of Saskatchewan, including Minister of Energy and Resources and Minister of Rural Health.



Mike Gatens: Mr. Gatens has 34 years of oil and gas experience, primarily in unconventional gas, and currently serves as CEO and Director of Unconventional Gas Resources. He also co-founded and is on the Board of Directors of the American affiliate, Unconventional Resources, LLC. Prior to this he co-founded MGV Energy Inc. MGV developed the first commercial Coal Bed Methane (CBM) production in Canada in the Horseshoe Canyon coals. Prior to founding MGV, he was a director and vice president with the consulting firm S.A. Holditch & Associates, specializing in the analysis and development of shale, CBM, and tight gas reservoirs, where he authored or co-authored numerous technical articles. He was also the founding Chairman of the Canadian Society for Unconventional Gas (CSUG). Mike is a registered professional engineer in Texas and Alberta., He served on the Canadian Association of Petroleum Producers (CAPP) Board of Governors from 2004-2008 and 2012-present.



Geoff Morrison: Geoff is the Manager of British Columbia Operations of CAPP. Prior to this position he was the General Manager at Global Public Affairs, a Canadian public relations and lobbying firm. Geoff spent five years as Vice President of Public Affairs at Hill and Knowlton, a global public relations and integrated communications company. He was also a Senior Consultant at National Public Affairs prior to that.

From:	Kapac de Frias, Martina E ENV:EX
To:	Polak, Mary ENV:EX
Subject:	Fwd: Request for Staff and Materials: Canadian Association of Petroleum Producers
Date:	Monday, May 9, 2016 1:23:17 PM
Attachments:	image001.png ATT00001.htm image002.png ATT00002.htm image003.png ATT00003.htm image004.png ATT00004.htm image005.png ATT00005.htm image006.png ATT00006.htm Microsoft Word - CAPP_EDMS-#279029-v18-DRAFT_submission_to_BC_regarding_....pdf ATT00007.htm

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Thoughts?

Begin forwarded message:

From: "Scott, Heidi ENV:EX" <Heidi.Scott@gov.bc.ca>
Date: May 9, 2016 at 10:49:28 AM PDT
To: "Kapac de Frias, Martina E ENV:EX" <Martina.KapacdeFrias@gov.bc.ca>
Subject: FW: Request for Staff and Materials: Canadian Association of Petroleum Producers

FYI Minister Fassbender requested to join this meeting next Monday.

From: Scott, Heidi ENV:EX
Sent: Friday, April 22, 2016 3:07 PM
To: Draper, Ashley ENV:EX
Cc: Quin, Melissa ENV:EX; Crozier, Bev ENV:EX; Brosz, Corinne M ENV:EX
Subject: Request for Staff and Materials: Canadian Association of Petroleum Producers

Meeting Purpose	Meeting with MMP for feedback on the *Consultation Guide: Building B.C.'s Climate Leadership Plan*
Staff Attendees Y/N/Who	yes
Request BN?	yes
Date/Location	May 16, 9:00-9:30am
Meeting Duration	30 min
Cliff Log #	298188

From: Morrison, Geoff
Sent: Monday, April 11, 2016 3:26 PM
To: 'ENV.minister@gov.bc.ca'
Cc: Kapac de Frias, Martina E ENV:EX
Subject: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers

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feedback CAPP has been actively participating with government through the sectoral engagement process led by Deputy Minister Dave Nikolejsin at the Ministry of Natural Gas Development. CAPP would appreciate the opportunity to have a dialogue about our submission and the progress made during the sectoral engagement process. As the BC Government finalizes the development of its updated Climate Leadership Plan, CAPP believes it would be useful to have an opportunity to address any questions about the upstream industry's response. Furthermore, CAPP would like to highlight opportunities to reduce GHG through methane management programs, electrification and the importance of maintaining and enhancing competiveness to attract new investment for upstream development and potential LNG exports; creating jobs and developing BC's resources responsibly.

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We are requesting a meeting on Monday May 16 in Victoria if possible. We will also be approaching other members of the *Cabinet Working Group on Climate Leadership* for meetings that same day.

Thank you for your consideration. Please contact me if you have any questions or need further information, my phone number in Victoria is (250) 634-4010.

Regards;

Geoff Morrison

Geoff Morrison | Manager of British Columbia Operations

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April 8, 2016

Honourable Mary Polak
Climate Leadership Consultation
Ministry of Environment Climate Action Secretariat
PO BOX 9486, STN PROV GOVT
Victoria B.C. V8W 9W6

via e-mail: climateleadershipplan@gov.bc.ca

Dear Minister Polak:

Re.: Feedback on BC's Climate Leadership Plan Consultation Guide

The Canadian Association of Petroleum Producers (CAPP) submits the following comments in response to the *Consultation Guide: Building B.C.'s Climate Leadership Plan*. CAPP appreciates the opportunity to provide our industry's perspective on addressing climate change in British Columbia as the province finalizes the development of the new Climate Leadership Plan.

It is clear that both generally and in the context of natural gas producing and LNG exporting jurisdictions that BC is a leader on carbon policy and addressing greenhouse gas (GHG) emissions. BC has a unique opportunity to help tackle global climate change by making LNG available to countries looking to move off of coal-fired power generation. We are firmly of the view that the economic benefits from responsible natural-gas production and export can be achieved while also meeting BC's ambitions to tackle global climate change.

CAPP supports a climate policy framework in British Columbia that creates a vibrant and competitive oil and gas sector while efficiently and effectively managing greenhouse gas emissions. To this end, CAPP provides the following key recommendations, aligned with the relevant sections of the Consultation Guide. These views remain consistent with CAPP's submission made to Government September 2015, in response to the Climate Leadership Plan Discussion Paper, which outlined the importance of competitiveness and supporting further emissions reductions opportunities for oil and gas, such as electrification and methane emissions reductions. [1]

What We Value: Protecting BC's Competitiveness & Minimizing Carbon Leakage

From a competitiveness standpoint, BC's upstream natural gas industry faces significant challenges due to a continued low commodity price environment coupled with the unique challenges associated

[1] https://engage.gov.bc.ca/climateleadership/files/2015/12/179_-Canadian-Association-of-Petroleum-Producers.pdf

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with BC's resource plays. We recommend that the BC government consider how any climate policy initiatives undertaken by the province can not only preserve, but enhance the economic competitiveness of BC's upstream oil and gas sector to attract investment and create jobs. Carbon policy design requires full cost accounting of options when evaluating the cumulative burden across policies and regulations in order to prevent further deterioration of industry competitiveness and to minimize the risk of carbon leakage to competing jurisdictions. We offer the following carbon policy recommendation for how to minimize both carbon and investment leakage from BC.

Carbon Tax

The CLT recommended increases to the current $30/tonne carbon price commencing in 2018. Applying additional increases to our sector would further diminish competitiveness of the natural gas industry and increase the risk of carbon leakage to competing jurisdictions. Economic competitiveness is of paramount importance to ensure the industry is able to thrive, attract new investment, create jobs and generate revenues for government.

Emission-Intensive, Trade-Exposed (EITE)

CAPP strongly supports the efforts of the Government of BC to protect EITE industries. On November 27, 2015, Minister Polak stated that the province would only consider changes to its carbon tax under a regime where EITE industries are "fully protected from any carbon tax increase."

CAPP fully supports the government's position to protect EITE industries, and believes the upstream industry clearly qualifies as an EITE industry.

Given BC's strong leadership on carbon pricing, applying further increases in BC's carbon price to our sector without full protection would further impair the competitiveness of the province's oil and gas sector, especially in the current low price environment when operating margins are already suppressed. An EITE policy applied to carbon price increases would recognize the importance of managing inter-jurisdictional competitiveness, until the carbon policies in key trading jurisdictions are equivalent and/or aligned in level of effort and price. Additional policy principles are provided in the Appendix.

The Way We Work: GHG Emissions Reduction Opportunities

CAPP is looking forward to engaging with the B.C. government in the development of the province's Climate Leadership Plan to meaningfully address GHG emission from upstream oil and natural gas activities while enhancing the overall competiveness of the industry in British Columbia. The following section provides recommendations on key emissions reductions opportunities from our industry.

Electrification

The consultation guide references the Climate Leadership Team's recommendation 14 to supply clean electricity for the electrification of the upstream industry in a competitive and timely manner.

CAPP believes competitive electrification of the upstream will help BC move toward its provincial GHG reduction targets, representing a foremost opportunity for significant GHG mitigation for the oil and gas sector in BC. Based on our sector's experience, there exists two significant risks to competitive electrification: Reliable and timely in-service transmission capacity; and economic considerations related to rates and tariffs. Practical work is required by BC Hydro and government to work with our sector to align business processes and to find equitable means to balance risks.

Methane

In 2013, upstream oil and gas methane emissions accounted for approximately 20 per cent of BC's total methane emissions. CAPP is committed to making reductions to methane emissions and recommends the following, taking care that responses to each of these demonstrate leadership in seeking alignment with Canada, other provincial jurisdictions and, where appropriate, with competing jurisdictions like the US:

- Applying enhanced regulated standards to new facilities and a regulated standard of practice for leak detection and repair (LDAR) of fugitive equipment leaks; building on existing LDAR requirements.
- A market-based approach to achieve a specified reduction target using fiscal measures focused on reductions from legacy methane emissions sources installed at existing facilities.
- A specific reduction target for vented and fugitives sources at existing facilities that is ambitious yet achievable with the appropriate policy and fiscal mechanisms in place to provide industry with a pathway to achieve the specified reductions. In addition, this target should align appropriately with other provincial and federal goals, including Alberta's Climate Leadership Plan.

CAPP believes properly designed and prescribed programs will achieve greater reductions than those that would be achieved through a carbon tax approach, which increases operating costs and could discourage needed investment in BC. Consequently, CAPP does not at this time support recommendations to increase the rate or scope of the BC carbon tax, as applied to our sector, and believes that all uncombusted methane should be exempt from carbon tax to enable reductions using the market-based mechanisms above. For legacy assets, a market-based approach to achieving a specified methane emissions reduction target is critical to mitigate the costs of retro-fitting industry's inventory of existing equipment to lower emitting devices.

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Sincerely,

Brad Herald

Brad Herald
Vice-President, Western Canada

Cc: Hon. Rich Coleman, Minister of Natural Gas Development
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Fax 778-410-5001

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From:	Kapac de Frias, Martina E ENV:EX
To:	Polak, Mary ENV:EX
Subject:	RE: Request for Staff and Materials: Canadian Association of Petroleum Producers
Date:	Monday, May 9, 2016 2:53:00 PM

Ok

From: Polak, Mary ENV:EX
Sent: Monday, May 9, 2016 2:53 PM
To: Kapac de Frias, Martina E ENV:EX
Subject: Re: Request for Staff and Materials: Canadian Association of Petroleum Producers

Let's make sure Fazil is there either in person or by phone.

Sent from my iPad

On May 9, 2016, at 1:23 PM, "Kapac de Frias, Martina E ENV:EX" <Martina.KapacdeFrias@gov.bc.ca> wrote:

> Thoughts?
>
> Begin forwarded message:
>
> **From:** "Scott, Heidi ENV:EX" <Heidi.Scott@gov.bc.ca>
> **Date:** May 9, 2016 at 10:49:28 AM PDT
> **To:** "Kapac de Frias, Martina E ENV:EX" <Martina.KapacdeFrias@gov.bc.ca>
> **Subject: FW: Request for Staff and Materials: Canadian Association of Petroleum Producers**
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> FYI Minister Fassbender requested to join this meeting next Monday.
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> **Sent:** Friday, April 22, 2016 3:07 PM
> **To:** Draper, Ashley ENV:EX
> **Cc:** Quin, Melissa ENV:EX; Crozier, Bev ENV:EX; Brosz, Corinne M ENV:EX
> **Subject:** Request for Staff and Materials: Canadian Association of Petroleum Producers
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Meeting Purpose	Meeting with MMP for feedback on the *Consultation Guide: Building B.C.'s Climate Leadership Plan*
Staff Attendees Y/N/Who	yes
Request BN?	yes
Date/Location	May 16, 9:00-9:30am
Meeting Duration	30 min
Cliff Log #	298188

> **From:** Morrison, Geoff
> **Sent:** Monday, April 11, 2016 3:26 PM
> **To:** 'ENV.minister@gov.bc.ca'
> **Cc:** Kapac de Frias, Martina E ENV:EX
> **Subject:** May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers
>
> Dear Minister Polak:

I am writing to request a to review and discuss CAPP's feedback on the *Consultation Guide: Building B.C.'s Climate Leadership Plan* (please see attached document which was submitted April 8th, 2016). In addition to this feedback CAPP has been actively participating with government through the sectoral engagement process led by Deputy Minister Dave Nikolejsin at the Ministry of Natural Gas Development. CAPP would appreciate the opportunity to have a dialogue about our submission and the progress made during the sectoral engagement process. As the BC Government finalizes the development of its updated Climate Leadership Plan, CAPP believes it would be useful to have an opportunity to address any questions about the upstream industry's response. Furthermore, CAPP would like to highlight opportunities to reduce GHG through methane management programs, electrification and the importance of maintaining and enhancing competiveness to attract new investment for upstream development and potential LNG exports; creating jobs and developing BC's resources responsibly.

Attending the meeting from CAPP would be:

- Tim McMillian, CAPP President
- Michael Gatens, CAPP Chairman & CEO, Unconventional Gas Resources Canada
- Brad Herald, Vice President of Western Operations and
- myself, Geoff Morrison Manager of British Columbia Operations.

We are requesting a meeting on Monday May 16 in Victoria if possible. We will also be approaching other members of the *Cabinet Working Group on Climate Leadership* for meetings that same day.

Thank you for your consideration. Please contact me if you have any questions or need further information, my phone number in Victoria is (250) 634-4010.

Regards;

Geoff Morrison

Geoff Morrison | Manager of British Columbia Operations

| Cell: 250.634.4010| Calgary: 403.776.1409 | Website: www.capp.ca

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70711

Polak, Mary ENV:EX

From: Polak, Mary ENV:EX
Sent: Monday, May 9, 2016 2:53 PM
To: Kapac de Frias, Martina E ENV:EX
Subject: Re: Request for Staff and Materials: Canadian Association of Petroleum Producers

Let's make sure Fazil is there either in person or by phone.

Sent from my iPad

On May 9, 2016, at 1:23 PM, "Kapac de Frias, Martina E ENV:EX" <Martina.KapacdeFrias@gov.bc.ca> wrote:

Thoughts?

Begin forwarded message:

From: "Scott, Heidi ENV:EX" <Heidi.Scott@gov.bc.ca>
Date: May 9, 2016 at 10:49:28 AM PDT
To: "Kapac de Frias, Martina E ENV:EX" <Martina.KapacdeFrias@gov.bc.ca>
Subject: FW: Request for Staff and Materials: Canadian Association of Petroleum Producers

FYI Minister Fassbender requested to join this meeting next Monday.

From: Scott, Heidi ENV:EX
Sent: Friday, April 22, 2016 3:07 PM
To: Draper, Ashley ENV:EX
Cc: Quin, Melissa ENV:EX; Crozier, Bev ENV:EX; Brosz, Corinne M ENV:EX
Subject: Request for Staff and Materials: Canadian Association of Petroleum Producers

Meeting Purpose	Meeting with MMP for feedback on the *Consultation Guide: Building B.C.'s Climate Leadership Plan*
Staff Attendees Y/N/Who	yes
Request BN?	yes
Date/Location	May 16, 9:00-9:30am
Meeting Duration	30 min
Cliff Log #	298188

From: Morrison, Geoff
Sent: Monday, April 11, 2016 3:26 PM
To: 'ENV.minister@gov.bc.ca'
Cc: Kapac de Frias, Martina E ENV:EX

Subject: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers

Dear Minister Polak:

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Regards;

Geoff Morrison

Geoff Morrison | Manager of British Columbia Operations

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<Microsoft Word - CAPP_EDMS-#279029-v18-DRAFT_submission_to_BC_regarding_....pdf>

Barlow, John ENV:EX

From: Minister, ENV ENV:EX
Sent: Friday, August 12, 2016 9:37 AM
To: Correspondence Unit ENV:EX
Subject: FW: For Review: Climate Change Perspectives - Canadian Association of Petroleum Producers
Attachments: August 2016 Climate Submission - Hon. Mary Polak BC Min of Env.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Lindsay

From: Tate, Shirley [mailto:shirley.tate@capp.ca]
Sent: Thursday, August 11, 2016 2:14 PM
To: Minister, ENV ENV:EX
Cc: Minister, MNGD MNGD:EX; Minister, MEM MEM:EX
Subject: For Review: Climate Change Perspectives - Canadian Association of Petroleum Producers

To: Hon. Mary Polak
Minister of Environment
Government of BC

Cc: Honourable Rich Coleman, Minister of Natural Gas Development
Honourable Bill Bennett, Minister of Energy and Mines

I am writing today on behalf of our members to provide our perspectives on how to best advance the fight against climate change, and promote clean economic growth for all Canadians. Please see the attached with CAPP's perspective on the four key areas of the *pan-Canadian framework for clean growth and climate change* where we can lead and support in the fight against climate change.

Sincerely,

Alex Ferguson | Vice President, Policy and Performance

CAPP CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS
Canada's Oil and Natural Gas Producers

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CAPP CANADA'S OIL & NATURAL GAS PRODUCERS

August 10, 2016

Honourable Mary Polak
Minister of Environment
Government of British Columbia
PO BOX 9047 STN PROV GOVT
Parliament Buildings, Room 112
Victoria, BC V8V 1X4
(via e-mail: ENV.Minister@gov.bc.ca)

Dear Minister Polak:

I am writing today on behalf of our members to provide our perspectives on how to best advance the fight against climate change, and promote clean economic growth for all Canadians.

We all feel the effects of climate change – around the world and here at home across Canada. We believe that solutions are found the same way – through both global and local action.

We are committed to action on climate change.

This means leading on efforts to reduce greenhouse gas emissions, creating more and new jobs, and developing Canada's natural resources through continual advances in technology and innovation.

The attached materials are intended to provide you with CAPP's perspective on the four key areas of the *pan-Canadian framework for clean growth and climate change* where we can lead and support in the fight against climate change:

1. Opportunities for emissions reduction;
2. Innovation, technology and job creation generated by action on climate change;
3. Our support for carbon emissions pricing and valuation;
4. Managing for adaptation and resiliency in a changing climate.

As the world continues progress toward a carbon emissions constrained future, we believe Canada's oil and natural gas sector will be a supplier of choice to many markets.

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1000, 275 Slater Street
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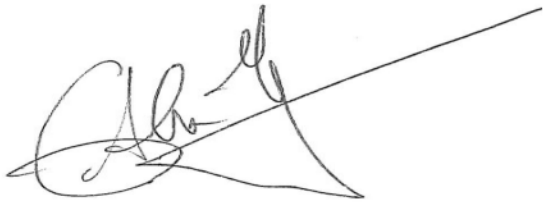
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Tel 778-265-3819
Fax 403-261-4622

www.capp.ca • communication@capp.ca

We look forward to working with you in ensuring this becomes a reality.

Yours in partnership,



Alex Ferguson
Vice-President, Policy and Performance
Canadian Association of Petroleum Producers

/attachment

Cc: Honourable Rich Coleman, Minister of Natural Gas Development
Honourable Bill Bennett, Minister of Energy and Mines

CAPP CANADA'S OIL & NATURAL GAS PRODUCERS

A Partner in Climate Leadership

August 2016

1 Contents

1 Contents 1

2 Introduction - A partner in climate leadership 2

3 Opportunities for emissions reductions 3

3.1 Provincial climate policies 4

3.2 Enabling innovation and technology development 5

3.3 Enabling innovation and technology deployment 5

4 Innovation, technology and job creation generated by action on climate change 11

4.1 Enabling an economically-viable transition to a low-carbon economy 12

4.2 Long-term low carbon technology implementation through improved innovation policy 14

4.3 Directed innovation to forge a deliberate future for Canada's natural resources 15

4.4 Leveraging existing and enabling new collaborative partnerships 16

5 Our support for carbon pricing mechanisms and valuation 18

5.1 Principles for design 18

6 Managing for adaptation and resiliency in a changing climate 22

2 Introduction - A partner in climate leadership

The Government of Canada – in close partnership with the provinces, territories and Indigenous Peoples – is taking leadership on climate action by putting a price on carbon and reducing greenhouse gas emissions.

The Government of Canada has committed to consult with Canadians through an open and online process to find ways to encourage clean economic growth, reduce greenhouse gas emissions and prepare for the impacts of climate change. The letstalkclimateaction.ca web portal is a new and innovative approach to climate consultations that supports the Government of Canada's commitment to transparency, openness and collaboration.

Canada's oil and natural gas industry is also committed to leadership on climate action. We believe that responsible energy development, driven by technology and innovation, plays a crucial role not only for our industry, but for the Canadian economy. To that end, we support effective government policies that recognize the key role of technology in reducing emissions while maintaining a strong economy.

The Canadian economy has recently experienced a period of hard choices, turbulent markets and stark reminders that climate change is a real and present threat. The message for all of us is clear: adapt or fail. Our sector has a long history of adapting through technology and innovation. We expect to leverage and repeat these successes into our future.

As part of this commitment to lead, CAPP offers this submission which provides Canada's oil and natural gas industry perspective and recommendations for the Government of Canada's *Let's Talk Climate* initiative. The submission will address the following priority areas:

- Opportunities for emissions reductions;
- Innovation, technology and job creation generated by action on climate change;
- Our support for carbon pricing and valuation;
- Managing for adaptation and resiliency in a changing climate.

We propose solutions that will reduce greenhouse gas emissions while developing a strong economy that benefits all Canadians.

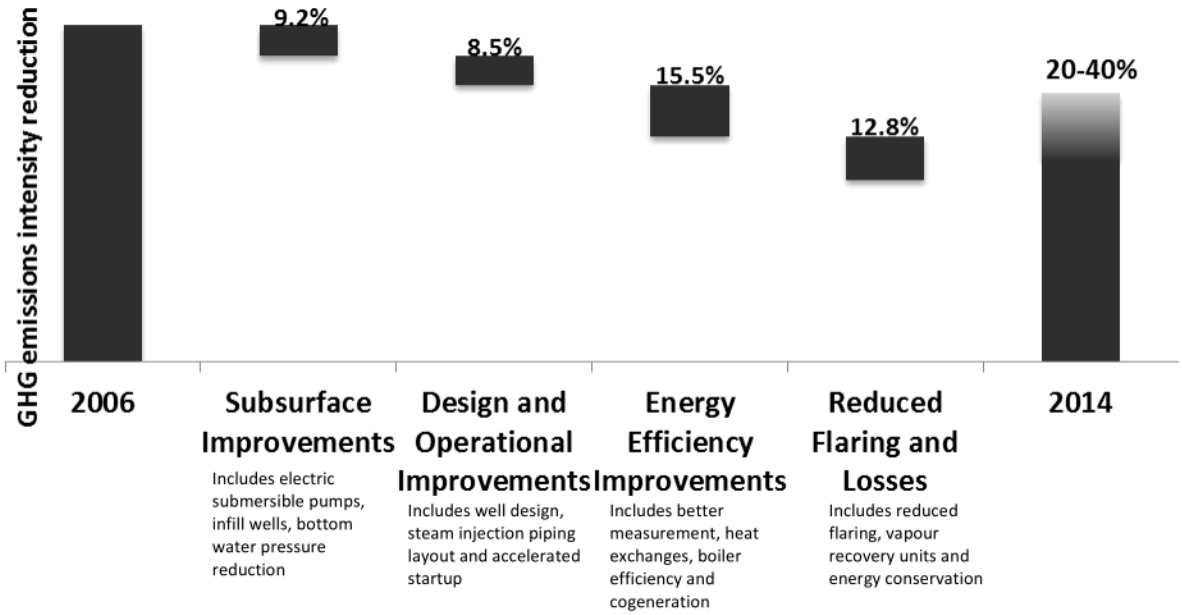
3 Opportunities for emissions reductions

In 2014, Canada's total GHG emissions were 732 megatonnes of carbon dioxide equivalent (CO_2e). Canada's oil and natural gas industry accounted for 26% of these emissions. While the oil and natural gas industry is the largest industrial contributor for emissions across the country, it is also a sector that has done a tremendous amount to reduce emissions.

According to Environment Canada data, the oil sands industry has a successful history of reducing GHG emissions. This achievement has resulted from innovation, technology deployment and policy signals provided by the climate policies and climate-related regulations that have been introduced in Western Canada. Figure 1 illustrates a number of typical examples of emissions intensity improvements made over the eight year period based at a single oil sands in situ facility.

Collectively, the reductions amount to 20-40 per cent of the emissions intensity of the in situ facility that was built in 2006. Though this set of emissions intensity reductions does not include all possible emission reduction opportunities, it is illustrative of the scope, breadth and priority given to emissions intensity reductions measures already and increasingly being deployed by oil and natural gas producers.

Figure 1: Example emissions intensity improvements between 2006 and 2014



Emissions intensity improvements between 2006 and 2014 collectively amount to 20-40%
The list is not exhaustive and not all technologies can be applied at each facility
Reductions are not necessarily additive
Graphic assumes consistent reservoir quality (SOR=3)

Our industry has demonstrated excellence in environmental performance, regulatory compliance and job creation. Canada and the oil and natural gas industry have a significant opportunity to demonstrate that Canada's oil and natural gas is and should be a preferred supplier of petroleum products across the globe.

According to the IEA's World Energy Outlook 2015[1], the demand for oil will remain strong, even under their scenario which charts out what the global community must do to meet the pledge to keep global warming to less than two degrees Celsius. According to the IEA, even in this scenario, there will still be a global demand of 67 million barrels per day in 2040. Canada has a choice to make: help fill this demand or step back and allow countries with lesser rankings on the Environmental Performance Index and Social Progress Index to develop resources and meet energy needs domestically and internationally.

Our industry will work with the Government of Canada, along with its provincial, territorial and Indigenous partners, to ensure that the Canada's oil and natural gas sector becomes the world-leading low-carbon emissions oil and natural gas producing jurisdiction. We offer the following opportunities for consideration to continue to reduce the GHG intensity of oil and natural gas production in Canada.

3.1 Provincial climate policies

British Columbia (B.C.) and Alberta have introduced climate policies that are some of the most rigorous in the world. These policies have already led to significant changes in industry practices. B.C. currently has a carbon tax of $30 per tonne and Alberta was the first North American jurisdiction to introduce a GHG emission pricing policy targeted at large industrial emitters, including all oil sands facilities.

Although these aforementioned policies currently exist, both provinces are committed to further improving their climate policies to achieve further reductions from the industry and their citizens. Alberta's Climate Leadership Plan, announced in November 2015, will target the oil and natural gas industry through three distinct policies: Implementing an ambitious methane reduction target of 45 per cent reduction from 2015 levels by 2025; legislating a 100 megatonne (MT) limit on emissions from the oil sands sector; and through implementation of an output-based performance benchmarking system for large industrial facilities. These policies, combined with the broad-based carbon levy, will invariably lead to further reductions from industry beyond current levels.

The B.C. government has also indicated its intention to release a new Climate Leadership Plan to augment its existing climate change policy, which already includes an economy wide carbon tax. The new Climate Leadership Plan is expected to be released in summer 2016, and will result in further emissions reductions from the oil and natural gas sector.

[1] Retrieved from: http://www.worldenergyoutlook.org/weo2015/

In addition to carbon pricing schemes, all three western provinces have regulatory frameworks that target GHG emissions reductions from flares, vents and fugitive equipment leaks at applicable facilities. Alberta's *Directive 60: Upstream Petroleum Industry Flaring, Incinerating and Venting*, B.C.'s *Flaring and Venting Reduction Guideline*, and Saskatchewan's Directive S10: *Upstream Petroleum Industry Associated Gas Conservation Directive* and *Directive S20: Upstream Flaring and Incineration Requirements*, all have mechanisms that ensure facilities have technologies and business operating practices in place to minimize the amount of methane and CO_2 from these activities.

3.2 Enabling innovation and technology development

CAPP submits that the most efficient means to achieve emissions reductions from the oil and natural gas industry is to enable and invest in GHG reducing innovation and technology development. Supporting and enabling the development and adoption of cost-effective technologies to reduce emissions is the optimal path for the Government of Canada to continue to promote investment, jobs and growth in the oil and natural gas sector – all while continuing to lower GHG emissions.

Substantial emissions reductions have already been achieved as the result of technology investment and adoption across the oil and natural gas sector in Canada. Under the constraints of emission-limiting environmental policy, future growth of Canada's oil and natural gas sector will depend on investment to address the commercial, operational and financial barriers to technological innovation. As such, climate policy should be designed to support technology investment, research and development (R&D), and deployment in order to simultaneously grow the sector and achieve emissions reductions.

3.3 Enabling innovation and technology deployment

In addition to encouraging innovation and clean technology development, further opportunities exist for technology deployment to achieve substantial emissions reductions from the upstream oil and natural gas sector. Government support is vital to the broad adoption of these technologies while minimizing the impact on sector growth and carbon leakage. Support may be offered through direct investment in infrastructure and/or by enabling and promoting fiscal mechanisms through climate or other economic policies (e.g., offsets). Below are five emissions reductions opportunities currently available to Canada and the industry through the implementation of appropriate policy mechanisms (see Subsection 4.1 and Section 5) to enable deployment of currently available technology.

British Columbia upstream electrification

One of the most important mechanisms that industry has to achieve a substantial reduction in upstream greenhouse gas emissions, while allowing for economic growth, is to reinforce the electric transmission grid in northeastern British Columbia and address operational cost gaps between the use of natural gas and electricity. Preliminary estimates suggest that upstream electrification could reduce industry emissions by up to 25 per cent from the wellhead to the LNG tanker or 3 – 4 MT/year of CO_2 by electrifying 6 Bcf/d of new production.

CAPP supports the economically viable expansion and reinforcement of electricity transmission to support load growth for new facilities and positioning electrification on a competitive economic footing relative to gas drive technologies. However, the cost associated with electrifying the industry is significant. Building out access to transmission and promoting a novel pricing scheme for electricity in B.C., coupled with an ability to generate GHG offset credits for electrification will assist in bolstering competitiveness while reducing emissions at the same time.

Carbon capture and storage

Carbon capture and storage (CCS) is a promising option to substantially reduce GHG emissions in the near future, and to help Canada achieve its GHG reduction targets. There are already examples of CAPP member companies who capture CO_2 and store (sequester) it underground or transport it to conventional oil and natural gas wells to help recover more resources from those wells. While CCS has significant potential for emissions reductions, it requires a large amount of investment to build capture facilities and to develop infrastructure to move CO2 from source to storage or use locations. CAPP supports the development of CCS but cautions that market mechanisms alone will likely not be sufficient to incent commercial viability.

Methane emissions

While significant attention has been directed to the role of CO_2 emissions in climate change, emphasis on methane emissions and other short-lived climate forcers is seen as a critical step as part of near-term and meaningful action on climate change. The global warming potential for methane is at least 25 times that of CO_2. Contributing 43 per cent of Canada's national methane emissions, those industries involved in the production, processing and storage of oil and natural gas resources in Canada are expected to make significant performance improvements.

The initiative to collaborate with both the United States and Mexico on a North American priority to reduce methane emissions is welcomed by our members. This effort, which began with the *U.S.-Canada Joint Statement on Energy, Climate and Arctic Leadership*, set the path forward by describing key requirements of an achievable approach to methane emissions reductions by the oil and natural gas sector, namely to:

- Regulate existing sources of methane emissions in the oil and gas sector.
- Work collaboratively on federal measures to reduce methane emissions.

- Improve data collection, transparency, and R&D and share knowledge of cost-effective methane reduction technologies and practices.
- Jointly endorse the World Bank's Zero Routine Flaring by 2030 Initiative.

Since this seminal announcement, we have observed divergence in the regulatory development approach in Canada versus the U.S. While Canada launched consultation on a draft regulatory framework for new and existing equipment in May 2016, the U.S. began its process for regulating existing equipment through an Information Collection Request to better characterize methane emission sources and Voluntary Information Request on emerging technologies to detect, measure and mitigate emissions which is anticipated to be completed by early 2017. Since July 2016, fourteen states have launched lawsuits over the new Environmental Protection Agency (EPA) rule[2] to limit methane emissions at oil and natural gas sites. This action is likely to impede regulatory action to reduce methane emissions in the U.S. while Environment and Climate Change Canada (ECCC) continues to proceed expeditiously to publish an initial phase of national regulations by early 2017.

Given this circumstance and the economic conditions that are tempering activity and moderating methane emissions, we now have time to design a system that allows us to meet the targets in a cost effective and appropriate way. We believe that Canada should use this opportunity to work with the provinces, industry and other engaged partners to develop a hybrid program built upon a performance management program for methane emissions reduction. This is the only practical way of addressing the Canada/U.S. agreement's objective of enhancing evidence-based and cost-effective actions to reduce methane emissions. Using smart regulatory tools to guide leak detection and repair, new performance standards, non-regulatory retrofit programs and practice improvements for existing equipment would yield the same environmental outcome at a significantly lower cost to industry. Regulatory development should be collaborative, while providing for periodic reviews of progress.

While we think that the target of 45% methane emissions reduction by 2025 from a known 2012 baseline is ambitious yet achievable, the current level of methane emissions from the oil and natural gas sector is uncertain in the absence of robust reporting. We recommend the government establish a process to standardize provincial reporting and improve aggregation in national reporting to confirm the scale of the reduction (in megatonnes) opportunity. This effort would enable better analytics on the apportionment of source emissions to prioritize cost-effective, methane emission reduction opportunities and to affirm the achievability of the national target. In absence of this analysis, the proposed regulatory framework under *Canadian Environmental Protection Act* is overly prescriptive and risks diverting limited resources from the most effective action for methane emissions reduction, dampening investment in innovation, and reducing Canada's competitive position as a producer of oil and natural gas.

[2] Retrieved from: http://thehill.com/policy/energy-environment/290159-thirteen-states-sue-over-epa-methane-rule

It is for this reason that CAPP continues to support a performance management approach to guide cost-effective action under a hybrid model. This model consists of:

1. *Robust performance framework and data analytics.*
   We recognize the value of data-informed analytics. This approach to performance management could help to pinpoint improvements for non-regulatory and regulatory tools to be more effective and to identify new, low-cost opportunities necessary to meet the 45% methane emission reduction target. This analysis can be used to focus near-term action and long-term innovation on methane emissions sources with greatest opportunities for cost effective methane emissions reduction.

2. *Early industry action to improve practices and retrofit existing equipment enabled by fiscal tools.*
   We support an outcomes-based approach that allows industry to identify the most cost-effective actions to achieve methane emissions reductions. Many oil and natural gas companies have corporate programs and rely on industry best practices to reduce methane emissions. More refined analytics would enable the verification of reductions already achieved, many of which we believe are not yet reflected in the National Inventory and should be acknowledged as progress towards the target. Analytics further guide the development of new programs: broad deployment of clean technology, industry mentorship to facilitate knowledge exchange for practice improvement.

   Fiscal mechanisms including technology offset protocols and/or credits should be used to encourage and accelerate technology deployment. Where transition to regulation is contemplated, we encourage the consideration of the timelines for business decisions to support technology deployment at oil and natural gas operations given current cost constraints faced by these operations. Based on the oil and natural gas industry's collective experience, we know that retrofitting existing equipment takes time and money. Industry estimates there are 100,000+ pieces of equipment. In recognition of the magnitude of this undertaking, natural capital stock turnover and capital constraints, incentives for retrofits can enable this work to progress at a faster rate than proposed under regulation.

   We believe that mandatory retrofitting of all equipment would not be cost effective in meeting emissions targets. Companies should be given discretion over determining which equipment to retrofit and when to meet targets. A more measured approach enables the regulations to consider natural capital stock turnover, which will contribute to reductions as older equipment is replaced, over the next decade.

   We believe that progress for existing equipment is best achieved by a non-legislative industry/government/ENGO partnership designed to consider methane emissions sources and reduction opportunities on a priority basis with the breadth of mandate to consider critical enablers to address marginal cost of abatement, safety obligations and technical constraints. Industry is committed to achieving methane reductions from

existing sources but need the enabling policy framework to allow this to occur at the lowest cost.

3. *Assess existing provincial and federal policy and regulatory frameworks to define performance standards for new equipment.*
   The provinces and federal government already have policy and regulatory frameworks to address emissions. To this end, alignment on targets should be enough to satisfy equivalency and to allow provincial governments to build on their existing frameworks to avoid duplicative regulation. The effectiveness of existing programs should be assessed and refined prior to contemplating new policy or regulation. That said, where necessary, the design of the regulatory approach in Canada should take into account the variability of oil and natural gas resources throughout the country, as well as the tailored regulatory regimes designed to guide the responsible development of oil and natural gas resources (both from the vantage point of industry practices as well as environmental and safety performance). As a result, tegulation for new facilities and equipment should focus on the most cost-effective methane emissions reduction opportunities suitable to the particular circumstances of each jurisdiction. As has occurred in the U.S. emission standards for new sources are significantly easier for industry to manage (than existing sources) as it can be built into new facilities at the design stage.

   The different mix of oil and natural gas production across the provinces requires a different focus area for each province to meet the 45% reduction target. The current policy framework in Alberta and British Columbia reflects these differences. For this reason, a collaborative approach, building off the work of the provinces, would yield better results than having duplicative regulatory frameworks across Canada. In this way, a federal approach could leverage the strengths within the provinces, such as such as Alberta's achievement of a 95% solution gas conservation rate since the early 2000s. Competitiveness impacts arising from the implementation of methane regulations should be mitigated through alignment of international policy.

Cogeneration

Cogeneration, the combined generation of electricity and other (primarily heat) energy jointly, represents a significant opportunity for new power generation while reducing the GHG emission intensity of the electricity grid. The projected growth of oil sands facilities with both thermal and power requirements represents an opportunity for additional cogeneration in the country.

The oil and natural gas industry has a current and growing demand for heat (steam) and power. Under the right policy and economic conditions, industry could incorporate cogeneration for both on-site thermal and power demands, with the potential to increase sizing to fully match process steam loads and export surplus electricity to Canada's power market.

Cogeneration benefits both industry and the country with reliable, baseload electricity at industrial load sites. Exported power is typically bid at or near zero dollars per megawatt hour (MWh) into the power pool to ensure thermal demands are satisfied, reducing the average cost of power for all consumers. Cogeneration can also be designed to provide flexibility which can help balance the intermittency of renewables. Combined heat and power synergies at industrial facilities also produce considerably lower GHG emissions per MWh than other forms of fossil fuel electricity generation.

A recent *EDC Associates* report estimates that there is an opportunity for new cogeneration growth of between one and a half to two times EDC's current cogeneration growth forecast and that additional cogeneration would reduce the grid's overall GHG intensity. This reduction would be relative to coal generation and future combined-cycle additions, and could be built at a lower levelized cost than could additional natural gas combined-cycle capacity.[3]

Natural Gas

Natural gas is the cleanest burning fossil fuel. As an energy source, it provides a cost-effective pathway for countries to reduce the carbon intensity of their economies. CAPP recognizes the potential that natural gas has to not only reduce emissions from electricity infrastructure in the near-term, but also to provide further grid stability for the benefit of producers and consumers alike.

As a transition fuel, the development, use, and export of natural gas resources from Canada can support clean energy strategies around the world.

The Government of Canada recognizes the critical role that the provinces play in contributing to not only provincial and national, but global emissions reductions. With world demand for energy forecasted to grow by 32% by 2040, natural gas is a desirable choice to meet this growing demand while helping to curb GHG emissions growth and also achieving local air quality improvements in rapidly developing nations.

[3] EDC Associates Ltd. February 2015. GHG Emissions Reduction Strategy in the Alberta Electricity Market with Increased Cogen Capacity.

4 Innovation, technology and job creation generated by action on climate change

Canada is an environmental leader. According to Yale University's Environmental Performance Index from 2016[4], Canada ranks 25th out of 178 countries — ahead of countries like USA (26th), Japan (39th), Belgium (41st), and South Korea (80th). While Canadians can be proud of our globally competitive environmental performance, there is a strategic opportunity for government to leverage further environmental improvements, while also stimulating economic growth. By enabling this opportunity, governments can provide confidence to Canadians and the globe that government agencies and industries are working hard to protect Canada's environment.

In fall 2015, Canada joined 185 countries in committing to significantly reducing global GHG emissions. Since that time, our government has made significant and laudable commitments to support innovation and transformative clean technology throughout the economy to achieve these goals.

Canada must enable investments in innovation and technology to achieve deep GHG reductions while ensuring continued economic growth and stable, high quality jobs. To fully understand implications of policy and regulation in this area, our industry believes government policy needs to be crafted with an understanding of our emissions by sector within a globally-competitive commodity market. Building from a position of strength, our government can choose the most appropriate pathways and technology road maps.

Our sector provides a unique and innovation-ready opportunity for government focus, through the emerging "super innovation cluster" which has Canada's Oil Sands Innovation Alliance (COSIA) and the Petroleum Technology Alliance of Canada (PTAC) at its core, along with their various provincial, national and international partners.

Due to our industry's capacity for innovation, we believe the upstream oil and natural gas industry, along with the entire natural resource sector, will play a lead role in achieving Canada's desired low-carbon economy. Canada's natural resource sector offers the country a significant comparative advantage on the global market; by continuing to harness the wealth of these sectors, and using this wealth to make deliberate investments in transformative low-emissions extraction technologies and business processes, our country can become the world-leader in providing the global market with low-carbon natural resources.

Canada's oil and natural gas industry is accelerating innovation**.** With low commodity prices, a shift in export markets creating a need for pipelines to offshore markets, and a global move to a low-carbon economy, our industry is under significant pressure to find new ways to remain competitive while reducing the environmental impacts of development and production.

[4] Retrieved from: http://epi.yale.edu/reports/2016-report

This challenge presents a great opportunity to innovate and deploy new technologies and processes to reduce our footprint, and become global leaders in low intensity oil and natural gas production. We also have an opportunity to move Canada's oil and natural gas to supply domestic and global markets for new and traditional non-combustion products and uses[5].

Combining smart climate policy with enabling innovation policy – while leveraging existing and creating new collaborative partnerships with government and industry – is critical for ensuring that Canada becomes a global leader in innovation and clean technology development in the oil and natural gas sector. Successful innovation will create new global market opportunities for Canada's industry and for innovators across the country. We offer the following recommendations for the federal and all provincial governments to consider when developing options for the First Ministers on innovation, technology and job creation.

4.1 Enabling an economically-viable transition to a low-carbon economy

Canada and most provinces have committed to significantly reduce domestic GHG emissions to meet global goals for limiting climate change. There are many tools and programs available to the government to enable reductions by governments, industries, business enterprises and consumers. But not all tools and programs have equal effect. Climate policy can be a critical enabler for innovation and clean technology development, but it can also set up costly barriers and administrative hindrances. It is critical for governments to choose and implement the right mix of tools and programs to maximize innovation and technology adoption and deployment to forge a low-carbon economy in the most efficient and cost-effective manner.

CAPP offers the following recommendations to design carbon policies and enable opportunities for clean technology development and deployment.

Climate policy criteria

Smart climate policy should stimulate investment in the technologies necessary for significant reductions in GHG emissions in Canada and globally.

To ensure long-term investment in innovation and the industry, policies should be outcomes-based, flexible, predictable, fair and administratively simple. Policies that do not meet these criteria create barriers to industry investment and to investment in technology research, development, innovation and deployment. Additionally, governments should ensure that policies align across Canadian provinces to avoid duplication and minimize impacts to industry competitiveness, thereby increasing the likelihood of successful achievement of policy objectives.

[5] Examples of traditional non-combustion uses for petroleum products available here: http://www.oilandgasinfo.ca/oil-gas-you/products/

Revenue recycling

Carbon pricing mechanisms are becoming an increasingly popular policy tools used by governments to flexibly enable cost-effective GHG reductions across the economy. When a government moves forward with carbon pricing, there are many decisions to be made to ensure the policy is implemented to maximize GHG emissions reductions efficiently and without weakening the economy. One of the decisions governments need to make is what to do with the revenue generated from the carbon pricing mechanism. There are many options available for distribution of this generated revenue; CAPP recommends that to enable innovation, revenue generated by industrial emitters is best recycled back to the industry for technology and innovation.

Ensuring the revenue generated from carbon emissions is recycled back through a technology fund to R&D and technology deployment and adoption is critical to incenting domestic GHG emissions reductions using clean technology. It is also important that the revenue generated is recycled back to technology investments by those who pay into the fund, using transparent and consistent funding criteria. Recycling revenue in this manner creates the incentive to reduce emissions while enabling competiveness for Canadian industry. The investment opportunities available to the government and industry through this technology fund are critical to de-risking technologies at all stages of development, and will enable long term technology advancements that will help to bend the curve and help Canada reach its climate goals.

Offsets

Offsets are another policy tool available to governments for achieving GHG reductions. Offsets can be enabled through many mechanisms, including direct purchase by government or consumer, or through a cap and trade system. Regardless of the enabling policy, offsets can play a critical part in enabling emissions reductions across the broader economy, while incenting industry and businesses to invest in technological advancements over the long-term, specifically:

- Offsets can help to overcome financial barriers. For example, generation of offsets by the oil and natural gas industry at smaller facilities would allow project proponents to partially or wholly overcome financial barriers to the deployment of emission-reducing environmental technologies.
- Offsets allow the regulated industry and the wider economy to choose the lowest cost options. They allow for the discovery and delivery of lowest cost GHG abatement options for emission reductions.
- Offsets enable credible emissions reductions. To encourage participation in offset projects and markets, government can take measures to ensure minimize risk for buyers of offsets using tools like certification, registration, and streamlined but appropriate verification. In doing so, the federal or provincial governments can maintain market credibility by continuing to ensure that offsets are real, additional, permanent, verifiable, quantifiable,

and enforceable, while bolstering market participation and subsequent emission reductions.

CAPP continues to recommend a robust and credible offset system for Canada to achieve low-cost GHG reducing activities and expand the opportunities for innovation and clean technology investment. CAPP also recommends the expansion of the offset across provinces as a means to expand offset opportunities and to promote an interprovincial climate strategy, energy strategy and harmonized carbon regimes.

4.2 Long-term low carbon technology implementation through improved innovation policy

Canada's oil and natural gas industry is an R&D leader. Canada's *Science, Technology and Innovation System's State of the Nation 2014*[6] report recognized that R&D investment by the oil and natural gas extraction industry rose by 1400 percent between 1999 and 2015. While Canada's overall R&D investment fell by $1 billion between 2007 and 2015 – with substantial declines in many key industries – investments by the mining, quarrying, and oil and natural gas extraction industries increased by 74 percent.

CAPP believes there are significant opportunities to enable and accelerate technology implementation within the oil and natural gas sector over the long-term.

There are a number of barriers within Canada's existing innovation policy that hinder the implementation of emissions intensity reduction measures in the oil and natural gas sector. Coordinated, efficient and deliberate innovation policy is critical to help Canadian governments and businesses to overcome these barriers.

A key barrier to the development of transformative technologies in the oil and natural gas sector is scale and lack of deliberate focus. There are many opportunities to offer direct investments into technologies, small and big, across the industry. However, transformative technologies need government and industry to focus and make long-term, deep and deliberate investments in these key innovative ideas that can leverage significant partnerships, knowledge centres and global comparative advantages. It is important for governments to pick specific ideas out of the thousands available to move our country forward to become a global leader in low-carbon natural resource development.

Following successful R&D, viable technologies must be de-risked to ensure ongoing reliability – a critically important step for both project economics as well as safe and efficient operations. The cost of such development programs should not be underestimated – pre-commercial

[6] Retrieved from: http://www.stic-csti.ca/eic/site/stic-csti.nsf/vwapj/STIC_1500_SON_Report_e_proof4.pdf/$file/STIC_1500_SON_Report_e_proof4.pdf

demonstrations alone can cost tens of millions of dollars. Given these factors, even successful technologies take time to develop and deploy industry-wide.

Multiyear commitments must be made and reasonable timelines must be anticipated for a suite of potential technologies to yield successful projects that can be deployed at scale. Any improvements to ensure regulatory certainty around returns on investment will help producers to include more of these technologies in their business planning.

Barriers also come into play at the deployment stage – even when commercial technology exists, financial and operational barriers may remain. Many available emissions reduction technologies add engineering, construction and operational complexity to facilities. Any economic benefit realized can often be diminished through decreased reliability and additional maintenance requirements. This is especially relevant in cost-constrained environments.

4.3 Directed innovation to forge a deliberate future for Canada's natural resources

The majority of the publically funded innovation in the past, regardless of funding source or managing organization, has been administered by general calls for proposals, with financial support going to support good ideas, but good ideas that may not necessarily target key challenges for Canadian industry. As global innovation systems learn and mature, there is evidence that suggests a more directed approach to innovation can result in stronger outcomes than using just more traditional, general, passive calls for ideas.

Directed innovation starts with strategic leaders (e.g. business and government leaders) defining bold, ambitious and desired outcomes or "moon shots" with support and advice from innovation leaders. In this context, the moonshot can be thought of as a single, or a small number of key strategic GHG reduction technology development initiatives.

After definition, the bold outcomes are unpacked or further defined into a series of smaller steps or deliverables that in sum allow attainment of the bolder outcome. Critically, directed innovation defines technically-actionable innovation challenges that can be more easily understood and solved by innovation providers to achieve the targeted outcomes.

With a defined outcome, resolve in senior strategic leaders, and strong governance, the unique strengths of organizations (e.g. capacity, funding, and infrastructure) can be brought to play alone or in partnership to solve the challenges.

The concept of directed innovation can be adopted at different scales. One option is to adopt a series of smaller-scale challenges; another option is to adopt directed innovation at a large, bold scale. Directed innovation can also be used in conjunction with more passive paradigms like calls for proposals.

4.4 Leveraging existing and enabling new collaborative partnerships

Industry is continuing to work collaboratively, leveraging individual company efforts, to advance new technologies and best practices across the sector. Organizations including Canada's Oil Sands Innovation Alliance (COSIA), Alberta Innovates, the Petroleum Technology Alliance of Canada, and the Climate Change Emissions Management Corporation (CCEMC) are working to explore and address technological, operational and financial barriers to innovation. These organizations are able to identify, develop and apply solutions-oriented innovation to the most pressing oil and gas environmental challenges.

Together, these organizations should be considered as a Canadian "super innovation cluster" that leverages Canada's strengths in our oil and natural gas resources.

The oil sands industry has already shared and developed 819 distinct technologies and innovations with a value of almost $1.3 billion through COSIA. COSIA is a collaborative of 13 companies who came together in March 2012 to find innovative solutions in the oil sands to reduce GHGs, minimize impact on land, reduce water use and improve the management of tailings. This type of collaborative body facilitates the channeling of individual company expertise and contributes to solution sets for collective problems, benefitting the entire industry and supporting the government's environmental policy objectives.

CAPP recommends that the federal and provincial governments band together to prioritize and coordinate investment in clean infrastructure, and develop stronger partnerships between the government and the oil and natural gas industry for clean technology research, with the objective of reducing and/or offsetting GHG emissions in the development of Canada's oil and gas natural resources.

CAPP also recommends that governments take advantage of learnings available to the rest of Canada from the unique opportunities made by collaborative partnerships initiated by the oil and natural gas sector, and enable new collaborative partnerships between and within other sectors where Canada has a comparative advantage.

The collaborative partnerships formed by our sector, such as COSIA, have a head start in ambition, priority-setting and technology road mapping, as well as governance and administration. Governments can incent other sectors to replicate (or, where appropriate, coordinate with) these collaborative industry partnerships to focus R&D and innovation towards improved environmental performance. There is tremendous opportunity for government partners to leverage the learnings that are available through our industry sector to move forward strategic innovation across the economy.

Lastly, a complementary approach is to support a stronger partnership between Sustainable Development Technology Canada (SDTC) and COSIA to accelerate advancements in clean technology and GHG mitigation innovations. A stronger partnership between SDTC and

Canadian natural gas technology and innovation development for clean technologies would also be beneficial.

Ensuring that industry continues to work collaboratively on emission reductions is vital to encourage the industry and the country to maximize the emission reduction capability from the oil and natural gas sector. Outcomes of these efforts could result in the achievement of objectives relating to GHG reductions and sequestration, conversion to less carbon intensive machinery and equipment, stimulation of new, clean technology innovation, promotion of wider use of renewable energy technologies, and demonstration of leadership in environmental sustainability.

5 Our support for carbon pricing mechanisms and valuation

CAPP supports carbon emissions pricing mechanisms in Canada and internationally.

Given the important role the oil and natural gas industry will continue to play in our economy, it is critical that climate policy be addressed with balanced and realistic solutions that allow for growth in investment and jobs while continually reducing greenhouse gas (GHG) emissions.

Any pricing mechanism implemented should contribute to a vibrant and competitive oil and natural gas sector while efficiently and effectively facilitating reductions in GHG emissions. This means ensuring that Canada can compete with other jurisdictions for the necessary capital investment needed to support economic growth and the development of Canada's oil and natural gas resources, and ensures efficient access to international markets for our products.

Canada needs to be both a stronger world leader in the fight against climate change and a more competitive place to invest in low emissions oil and natural gas development.

Supporting and enabling the development and adoption of cost-effective technologies to reduce emissions is the optimal path for the Government of Canada to continue to promote investment, jobs, oil and natural gas sector growth while lowering GHG emissions.

5.1 Principles for design

CAPP submits that the following principles are critical considerations for any Canadian government, federal or provincial, when designing carbon pricing mechanisms that affects the oil and gas industry, which is an industry that competes for market share on a global scale and must ensure a globally-competitive production cost profile to remain competitive.

Price

The price paid for carbon by emitters goes beyond the marginal price of carbon set by governments through a taxation or cap and trade regime. When considering carbon pricing mechanisms – or comparing mechanisms across jurisdictions – it is important to consider all of the costs incurred by emitters to comply with relevant policy instruments, including mitigative regulatory requirements and/or renewable portfolio standards. The carbon pricing mechanisms considered by governments should be inclusive of all policy costs, and set at levels that continue to incent environmental change but without damaging the competiveness of Canadian industries, and possibly leading to carbon and investment leakage abroad.

CAPP recommends that any policy initiatives undertaken by the government should seek to not only preserve, but enhance the economic competitiveness of the upstream oil and natural gas

sector, in consideration of carbon price mechanisms that are inclusive of all policy costs and cumulative burden across policies and regulations, corporate tax increases and royalty changes.

As indicated, we also recommend that price considerations include the suite of emissions mitigation mechanisms that are in place across Canada; for example, regulatory and other initiatives undertaken in many provinces that are leading to emissions mitigation.

Cross-jurisdiction Coordination

Many provinces have already taken action to create carbon pricing mechanisms. A national program consisting of a mosaic of provincial approaches will provide regulatory certainty for those already subject to carbon regulations, while also contributing to achievement of the country's overall GHG emissions reduction objectives.

Broad based

A broad based, flexible carbon pricing system, inclusive of all policy costs, is most efficient if it is applied to emitters across the global economy. Meaningful emission reductions can only be achieved if all industrial emitters are subject to some form of environmental pricing. CAPP recommends that government take a full sector view approach when designing a climate policy pricing mechanism.

There is also a strong case to be made that variations across sectors can enhance the effectiveness of a broad-based approach. Canada's economy does not follow a truly homogenous pattern of sectors with respect to their contribution to either emissions or wealth creation. We recommend a pricing policy approach that gives appropriate consideration to this diversity. Elements of diversity include investment patterns, international competitiveness factors (including for foreign investment as well as markets), wealth creation patterns, and technology readiness.

Carbon price certainty

One of the most important aspects of an effective and appropriate climate pricing mechanism is price certainty. Industry's financial decisions are made on long time frames, which require making complex investment decisions. Having a carbon price that is transparent and provides some certainty can help promote sound investment decisions through the long term. CAPP also recommends that any increase in a carbon price is phased in to ensure businesses have time to adjust to changes in cost levels. Any new carbon policy should have pricing review dates or other triggers in order to allow industry to make investment decisions.

Strong data

The development of technically sound emission reduction policies and regulations relies on good quality emissions data in order to identify potential opportunities for emissions

reductions and to determine industry performance and emissions reductions in future years. Any climate policy must have mechanisms for robust, transparent and scientifically valid data at its core.

Avoid duplicative measures

It is important when designing climate policies to ensure that there are limited duplicative measures and no double taxation or cost burden. Regulations or other government interventions on industry should not be used when a corresponding carbon pricing mechanism exists to deal with the emission reductions. Duplicative systems are often costly for both government and industry and do not result in additional incremental emission reductions.

Ensuring that industry is not double priced on the same carbon unit is essential in designing a fair climate policy. The oil and natural gas industry already has a large cost burden and any double taxation would severely impact the competiveness of the industry. CAPP recommends that any federal government climate policy take into full account the provincial climate policies that already exist and ensure they receive equivalency for the emission reductions that industry is doing at the provincial level.

Revenue Recycling

A key consideration under any market-based carbon pricing system – such as carbon tax or a cap and trade regime – is how and where to recycle the revenue. An option available to governments is to recycle some or all of the revenue generated by industry back to achieve further emissions reductions from the emitting sectors. One of the key purposes for carbon pricing mechanisms is to reduce emissions while not weakening industry's competiveness. By recycling revenue, through a technology fund or alternative, governments create the incentive for companies to reduce emissions while helping to protect their competiveness. This opportunity allows companies to further their reduce emissions and develop and deploy long term technology advancements that will help to bend the curve and help Canada reach its climate goals.

Preventing carbon leakage

Carbon leakage occurs if constraints on emissions are placed on activities in Canada but not elsewhere because there is a possibility that industry may choose to leave Canada (or new investment could be discouraged) and go to a jurisdiction where there is little or no carbon price, which will allow companies to produce and potentially release more emissions in a jurisdiction without a climate policy.

If carbon leakage occurs, Canada will lose the economic value from production and there will be no consequential global reduction in emissions. Many jurisdictions around the world such as California, the European Union (E.U.) and Ontario protect emission-intensive, trade-exposed (EITE) sectors to help prevent carbon leakage.

CAPP recommends that government take into account carbon leakage and includes provisions to protect EITE industries.

6 Managing for adaptation and resiliency in a changing climate

Adapting to climate change is an important consideration for the oil and natural gas industry. Our industry's operations and support infrastructure span the nation, from small one-well onshore facilities to large offshore production facilities in Atlantic Canada. This infrastructure includes small gathering pipelines crossing rural lands and large transmission pipelines covering a significant diversity of geographical landscapes.

The impact of a changing climate and risks presented by changing weather patterns presents new and evolving risks to the production, transportation and reliable supply of petroleum products to the end consumer.

Planning and preparation for the impacts of a changing climate on the operating environment is vital. Companies employ risk management and contingency planning approaches, which are common and well-developed practices in the energy sector. Climate change adaptation in the oil and natural gas sector is often discussed and addressed in these terms.

The oil and natural gas industry currently has robust and widely used risk management systems in place. Risk management analyses are employed at all stages of a production facilities lifecycle and beyond operations to infrastructure, through the value chain, and to each operating location (including corporate headquarters). Risks considered by industry that are impacted by climate change include wildfires, floods, droughts, compromised infrastructure, water supply concerns and ambient temperature extremes.

As adaptation becomes an increasingly important management consideration, industry will continue to exercise sound risk management practices and to plan construction, operation and decommissioning stages of projects to address the expected range of weather, water and ecological conditions over the life of each project and operation.

Industry offers the following recommendations to enable broader and higher quality application of risk management strategies by regions, provinces and the industry using consistent, current, relevant and timely information:

1. Undertake assessments of the cost and financial impacts of climate change to provide industry with a common and relevant understanding of the financial risks to industry and stakeholders.
2. Incorporate climate change adaptation and risk management into land-use planning frameworks to better understand planning and adaptive management scenarios on a regional basis. These scenarios would promote a more consistent approach to risk assessment and emergency response across industry.

3. Undertake risk management and contingency planning on a regional basis for common infrastructure, focusing on regional water infrastructure, key transportation hubs (rain, pipeline and road), and land-use planning.
4. Focus federal infrastructure funding on improving and redesigning the robustness of existing critical infrastructure, such as bridges, roads, pipeline culvert and regional networks such as rail and pipeline hubs and water networks.
5. Enable collaboration between government and industry to focus on understanding the risk to surface water access, availability and use in drought conditions. Understanding these risks will further improve contingency planning, risk mitigation strategies and enable further technological innovation into water intensity reductions.
6. Collaborate with industry and focus research and innovation towards reducing the risks to surface water access, availability and use in drought conditions.
7. Support and promote open, common and timely data sources for understanding the challenges that government, industry and stakeholders face due to climate change. Further to this, provide transparent, current and reliable forecasting data to stakeholders to improve long-term projections in risk management and business continuity planning. Continue to support ongoing surface water monitoring through hydrometric networks, and temperature and climate prediction through weather forecasting.
8. Ensure a rapid response to emergencies by municipalities, provincial and federal governments. Review of government responses to extreme weather events, and that emergency response protocols are in place to respond rapidly and efficiently.
9. Ensure government policies and legal frameworks are flexible and responsive to reflect and adapt to the impacts that climate change has on policy objectives and desired outcomes. Policy outcomes enabled through legislation and/or regulation should remain flexible and adaptable over time (e.g., impact of climate change on biodiversity conservation objectives).

Barlow, John ENV:EX

From: Visco, Greg ENV:EX on behalf of Minister, ENV ENV:EX
Sent: Thursday, September 8, 2016 11:56 AM
To: 'shirley.tate@capp.ca'
Subject: RE: For Review: Climate Change Perspectives - Canadian Association of Petroleum Producers
Attachments: August 2016 Climate Submission - Hon. Mary Polak BC Min of Env.pdf

Reference: 303426

September 8, 2016

Alex Ferguson
Vice President
Policy and Performance
Canadian Association of Petroleum Producers
c/o Shirley Tate
Email: shirley.tate@capp.ca

Dear Mr. Ferguson:

Thank you for your letter of August 10, 2016, regarding climate leadership in Canada.

I appreciate receiving the perspectives of the Canadian Association of Petroleum Producers on how to reduce greenhouse gas emissions while achieving clean economic growth. We will review *A Partner in Climate Leadership* to help inform our ongoing work in developing climate policy in collaboration with our federal and provincial/territorial counterparts.

For continued updates on climate leadership in British Columbia please visit https://engage.gov.bc.ca/climateleadership.

Thank you again for writing.

Sincerely,

Mary Polak
Minister

From: Tate, Shirley [mailto:shirley.tate@capp.ca]
Sent: Thursday, August 11, 2016 2:14 PM
To: Minister, ENV ENV:EX
Cc: Minister, MNGD MNGD:EX; Minister, MEM MEM:EX
Subject: For Review: Climate Change Perspectives - Canadian Association of Petroleum Producers

To: Hon. Mary Polak
Minister of Environment
Government of BC

Cc: Honourable Rich Coleman, Minister of Natural Gas Development
Honourable Bill Bennett, Minister of Energy and Mines

I am writing today on behalf of our members to provide our perspectives on how to best advance the fight against climate change, and promote clean economic growth for all Canadians. Please see the attached with CAPP's perspective on the four key areas of the *pan-Canadian framework for clean growth and climate change* where we can lead and support in the fight against climate change.

Sincerely,

Alex Ferguson | Vice President, Policy and Performance

CAPP CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS
Canada's Oil and Natural Gas Producers

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From:	Mihlar, Fazil ENV:EX
To:	Kapac de Frias, Martina E ENV:EX
Subject:	Methane: CAPP vs ECCC cost impact slides
Date:	Saturday, October 1, 2016 9:47:33 AM
Attachments:	CAPP ECCC Summary slides.pdf ATT00001.htm

Hi Martina; These 2 slides will be useful in hard copy for MMP to make the case. This material is from CAPP. I did brief the minister yesterday. Any questions, you know where to reach me. Thx. Fazil
Sent from my iPhone

Page 068 to/à Page 069

Withheld pursuant to/removed as

s.17

From:	Kapac de Frias, Martina E ENV:EX
To:	La Forge, Jessica MTIC:EX
Subject:	Re: For advice: CAPP"s Perspective on Tax Competitiveness (306026)
Date:	Monday, January 2, 2017 11:19:22 PM
Attachments:	image001.png image002.png image003.png image004.png image005.jpg image006.png

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Yes pls. Thank you. M

On Dec 21, 2016, at 4:22 PM, La Forge, Jessica ENV:EX <Jessica.LaForge@gov.bc.ca> wrote:

> Hey Martina –
> I followed up with MNGD per below to find out why no response was being considered. They are treating it as a meeting request. Not sure where they are in that process, but is this a type of meeting that MMP would usually like to join? Should I send to Rhiannon for consideration as a meeting request?
> Thanks,
> Jess
>
> ---
>
> **From:** Ainsworth, Diana ENV:EX
> **Sent:** Tuesday, December 20, 2016 4:15 PM
> **To:** La Forge, Jessica ENV:EX
> **Cc:** Visco, Greg ENV:EX
> **Subject:** For advice: CAPP's Perspective on Tax Competitiveness (306026)
> Hi Jess,
> CAS staff advised that the attached letter from CAPP should be responded to by MEM or MNGD, and that CAS can provide input as required. However, Janine Crockett (Policy and Project Support for both MEM and MNGD) has advised that they (presumably both ministries) are not responding as per the MO's instructions. We have also been in contact with FIN's CU, but have not heard back with regard to their plan.
> The letter closes with "I look forward to a response to these matters raised. I would like to suggest a meeting in the near future to review and seek solutions."
> How would you like us to proceed?
> Thanks!
> Diana
>
> ---
>
> **From:** Minister, ENV ENV:EX
> **Sent:** Tuesday, December 20, 2016 1:35 PM
> **To:** Correspondence Unit ENV:EX
> **Subject:** FW: CAPP's Perspective on Tax Competitiveness
> **Importance:** High
> **From:** Hadzoglou, Eleni [mailto:eleni.hadzoglou@capp.ca]
> **Sent:** Monday, December 19, 2016 9:40 AM
> **To:** Minister, FIN FIN:EX; Minister, MNGD MNGD:EX; Minister, MEM MEM:EX; Minister, ENV ENV:EX
> **Cc:** Minister, MEM MEM:EX; Petrie, Cynthia

Subject: CAPP's Perspective on Tax Competitiveness
Importance: High

Hon. Mike de Jong, Minister of Finance and Government House Leader
Hon. Rich Coleman, Minister of Natural Gas Development
Hon. Bill Bennett, Minister of Energy and Mines
Hon. Mary Polak, Minister of Environment

Dear Ministers,

On behalf of Tim McMillan please find attached the above referenced letter.

Eleni

Eleni Hadzoglou | Executive Assistant to the President and CEO
D: 403.267.1103 | C: 403.462.2960 | Email: hadzoglou@capp.ca | Website: www.capp.ca

Baker, Jelene A ENV:EX

From: Scott, Heidi ENV:EX
Sent: Tuesday, April 12, 2016 4:22 PM
To: Brosz, Corinne M ENV:EX
Subject: 298188 - FW: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers
Attachments: Microsoft Word - CAPP_EDMS-#279029-v18-DRAFT_submission_to_BC_regarding_....pdf

Follow Up Flag: Follow up
Flag Status: Flagged

For cliff and blue folder please, thanks.

From: Kapac de Frias, Martina E ENV:EX
Sent: Monday, April 11, 2016 3:27 PM
To: Scott, Heidi ENV:EX
Subject: FW: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers

For meeting file pls ☺ thanks!

From: Morrison, Geoff [mailto:geoff.morrison@capp.ca]
Sent: Monday, April 11, 2016 3:26 PM
To: Minister, ENV ENV:EX
Cc: Kapac de Frias, Martina E ENV:EX
Subject: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers

Dear Minister Polak:

I am writing to request a to review and discuss CAPP's feedback on the *Consultation Guide: Building B.C.'s Climate Leadership Plan* (please see attached document which was submitted April 8th, 2016). In addition to this feedback CAPP has been actively participating with government through the sectoral engagement process led by Deputy Minister Dave Nikolejsin at the Ministry of Natural Gas Development. CAPP would appreciate the opportunity to have a dialogue about our submission and the progress made during the sectoral engagement process. As the BC Government finalizes the development of its updated Climate Leadership Plan, CAPP believes it would be useful to have an opportunity to address any questions about the upstream industry's response. Furthermore, CAPP would like to highlight opportunities to reduce GHG through methane management programs, electrification and the importance of maintaining and enhancing competiveness to attract new investment for upstream development and potential LNG exports; creating jobs and developing BC's resources responsibly.

Attending the meeting from CAPP would be:

- Tim McMillian, CAPP President
- Michael Gatens, CAPP Chairman & CEO, Unconventional Gas Resources Canada
- Brad Herald, Vice President of Western Operations and
- myself, Geoff Morrison Manager of British Columbia Operations.

We are requesting a meeting on Monday May 16 in Victoria if possible. We will also be approaching other members of the *Cabinet Working Group on Climate Leadership* for meetings that same day.

Thank you for your consideration. Please contact me if you have any questions or need further information, my phone number in Victoria is (250) 634-4010.

Regards;

Geoff Morrison

Geoff Morrison | Manager of British Columbia Operations

CAPP CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS
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CAPP

CANADIAN ASSOCIATION
OF PETROLEUM PRODUCERS

Canada's Oil and Natural Gas Producers

April 8, 2016

Honourable Mary Polak
Climate Leadership Consultation
Ministry of Environment Climate Action Secretariat
PO BOX 9486, STN PROV GOVT
Victoria B.C. V8W 9W6

via e-mail: climateleadershipplan@gov.bc.ca

Dear Minister Polak:

Re.: Feedback on BC's Climate Leadership Plan Consultation Guide

The Canadian Association of Petroleum Producers (CAPP) submits the following comments in response to the *Consultation Guide: Building B.C.'s Climate Leadership Plan.* CAPP appreciates the opportunity to provide our industry's perspective on addressing climate change in British Columbia as the province finalizes the development of the new Climate Leadership Plan.

It is clear that both generally and in the context of natural gas producing and LNG exporting jurisdictions that BC is a leader on carbon policy and addressing greenhouse gas (GHG) emissions. BC has a unique opportunity to help tackle global climate change by making LNG available to countries looking to move off of coal-fired power generation. We are firmly of the view that the economic benefits from responsible natural-gas production and export can be achieved while also meeting BC's ambitions to tackle global climate change.

CAPP supports a climate policy framework in British Columbia that creates a vibrant and competitive oil and gas sector while efficiently and effectively managing greenhouse gas emissions. To this end, CAPP provides the following key recommendations, aligned with the relevant sections of the Consultation Guide. These views remain consistent with CAPP's submission made to Government September 2015, in response to the Climate Leadership Plan Discussion Paper, which outlined the importance of competitiveness and supporting further emissions reductions opportunities for oil and gas, such as electrification and methane emissions reductions. [1]

***What We Value:* Protecting BC's Competitiveness & Minimizing Carbon Leakage**

From a competitiveness standpoint, BC's upstream natural gas industry faces significant challenges due to a continued low commodity price environment coupled with the unique challenges associated

[1] https://engage.gov.bc.ca/climateleadership/files/2015/12/179_-Canadian-Association-of-Petroleum-Producers.pdf

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with BC's resource plays. We recommend that the BC government consider how any climate policy initiatives undertaken by the province can not only preserve, but enhance the economic competitiveness of BC's upstream oil and gas sector to attract investment and create jobs. Carbon policy design requires full cost accounting of options when evaluating the cumulative burden across policies and regulations in order to prevent further deterioration of industry competitiveness and to minimize the risk of carbon leakage to competing jurisdictions. We offer the following carbon policy recommendation for how to minimize both carbon and investment leakage from BC.

Carbon Tax

The CLT recommended increases to the current $30/tonne carbon price commencing in 2018. Applying additional increases to our sector would further diminish competitiveness of the natural gas industry and increase the risk of carbon leakage to competing jurisdictions. Economic competitiveness is of paramount importance to ensure the industry is able to thrive, attract new investment, create jobs and generate revenues for government.

Emission-Intensive, Trade-Exposed (EITE)

CAPP strongly supports the efforts of the Government of BC to protect EITE industries. On November 27, 2015, Minister Polak stated that the province would only consider changes to its carbon tax under a regime where EITE industries are "fully protected from any carbon tax increase."

CAPP fully supports the government's position to protect EITE industries, and believes the upstream industry clearly qualifies as an EITE industry.

Given BC's strong leadership on carbon pricing, applying further increases in BC's carbon price to our sector without full protection would further impair the competitiveness of the province's oil and gas sector, especially in the current low price environment when operating margins are already suppressed. An EITE policy applied to carbon price increases would recognize the importance of managing inter-jurisdictional competitiveness, until the carbon policies in key trading jurisdictions are equivalent and/or aligned in level of effort and price. Additional policy principles are provided in the Appendix.

The Way We Work: GHG Emissions Reduction Opportunities

CAPP is looking forward to engaging with the B.C. government in the development of the province's Climate Leadership Plan to meaningfully address GHG emission from upstream oil and natural gas activities while enhancing the overall competiveness of the industry in British Columbia. The following section provides recommendations on key emissions reductions opportunities from our industry.

Electrification

The consultation guide references the Climate Leadership Team's recommendation 14 to supply clean electricity for the electrification of the upstream industry in a competitive and timely manner.

CAPP believes competitive electrification of the upstream will help BC move toward its provincial GHG reduction targets, representing a foremost opportunity for significant GHG mitigation for the oil and gas sector in BC. Based on our sector's experience, there exists two significant risks to competitive electrification: Reliable and timely in-service transmission capacity; and economic considerations related to rates and tariffs. Practical work is required by BC Hydro and government to work with our sector to align business processes and to find equitable means to balance risks.

Methane

In 2013, upstream oil and gas methane emissions accounted for approximately 20 per cent of BC's total methane emissions. CAPP is committed to making reductions to methane emissions and recommends the following, taking care that responses to each of these demonstrate leadership in seeking alignment with Canada, other provincial jurisdictions and, where appropriate, with competing jurisdictions like the US:

- Applying enhanced regulated standards to new facilities and a regulated standard of practice for leak detection and repair (LDAR) of fugitive equipment leaks; building on existing LDAR requirements.
- A market-based approach to achieve a specified reduction target using fiscal measures focused on reductions from legacy methane emissions sources installed at existing facilities.
- A specific reduction target for vented and fugitives sources at existing facilities that is ambitious yet achievable with the appropriate policy and fiscal mechanisms in place to provide industry with a pathway to achieve the specified reductions. In addition, this target should align appropriately with other provincial and federal goals, including Alberta's Climate Leadership Plan.

CAPP believes properly designed and prescribed programs will achieve greater reductions than those that would be achieved through a carbon tax approach, which increases operating costs and could discourage needed investment in BC. Consequently, CAPP does not at this time support recommendations to increase the rate or scope of the BC carbon tax, as applied to our sector, and believes that all uncombusted methane should be exempt from carbon tax to enable reductions using the market-based mechanisms above. For legacy assets, a market-based approach to achieving a specified methane emissions reduction target is critical to mitigate the costs of retro-fitting industry's inventory of existing equipment to lower emitting devices.

Fiscal Measures

To incent methane emissions reductions, and to incent greater uptake in electrification, a viable path forward hinges on the development of fiscal mechanisms to enable investment. Given the current competitiveness pressures on our sector (including the cost burden of the carbon tax), industry and government will need to work together on ways to improve the economic value of emission reduction projects. By doing so will contribute to more reductions being achieved.

The following fiscal measures should be considered further by the BC government for application by the industry to emissions reductions opportunities:

- *Offsets*: Could be achieved via BC government guaranteed/targeted purchase of offsets, to provide certainty around supply and price, and/or enabling linkages to other offset markets, to expand demand for BC offsets.
- *Carbon compliance certification*: Reduction in carbon tax payable based on emission reductions achieved.
- *Clean infrastructure royalty credit program*: Investing in innovation and technology will enable BC to reduce emissions while also creating and maintaining jobs. CAPP recommends that the province create a broad clean royalty infrastructure credit program that would support investments in infrastructure/technology to reduce methane emissions. A royalty credit program would contribute to investment economics supplemented by fiscal support through offsets or compliance certificates.

In conclusion, BC needs to find the balance so that it can be both a strong world leader in the fight against climate change and a more competitive place to invest in oil and gas. Climate policy should be designed to focus on targeted emissions reductions through enhanced technology investment and deployment, enable flexible compliance options and prioritize economic competitiveness in order to simultaneously enhance competiveness, attract new investment, while achieving the emissions performance objectives. Going forward industry and government will need to work together to achieve greater GHG reductions in a way that can support or enhance industry's competitiveness. We believe a significant opportunity does exist and can be supported by BC in its climate action plan by: designating EITE industries, supporting upstream electrification, and providing the fiscal mechanism that will enable methane emission reductions. CAPP is committed to working together to find ways to help achieve BC's emissions reduction targets while continuing to grow the economy.

Sincerely,

Brad Herald

Brad Herald
Vice-President, Western Canada

Cc: Hon. Rich Coleman, Minister of Natural Gas Development
Hon. Michael de Jong, Minister of Finance
Hon. Shirley Bond, Minister of Jobs, Tourism and Skills Training and Responsible for Labour
Hon. Todd Stone, Minister of Transportation and Infrastructure
Hon. Peter Fassbender, Minister of Community, Sport and Cultural Development and Responsible for TransLink

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Appendix: Emission-Intensive, Trade-Exposed (EITE) Policy Design Principles

Currently, many different carbon management regimes around the world utilize an emission-intense trade-exposed (EITE) methodology to determine the need to protect industries competiveness and minimize carbon leakage under carbon pricing policies. The EITE designation serves to recognize those segments of the economy that represent a leakage risk, whereby investment could shift jurisdiction with less stringent carbon policies providing no gain in global GHG reductions but shrinking economic benefit for BC through loss of investment, jobs and government revenue.

CAPP has worked with industry associations along the natural gas value-chain in British Columbia to consider other jurisdictions' EITE methodologies and develop policy design principles for EITE. Through this effort, the following principles have been established and should be part of a BC mechanism for EITE determination:

- *Fair and transparent*, creating competitive parity across competing jurisdictions.
- *Science-based*, with a strong analyses and understanding of implications in practice.
- *Clear, predictable and simple to administer*, with clear and established processes for review of EITE protection.
- *Cost-efficient*, offsetting the difference in incremental carbon price that exists between competing jurisdictions.
- *Balanced and efficient*, recognizing the totality of emissions policies on industry.
- *Viable*, with readily available compliance pathways that support open market mechanisms.
- *Consistent with developing a clean LNG industry*, achievable within the context of a growing and transitioning lower carbon economy.
- *Recognizes the risk of carbon leakage*, and that BC is currently a world leader in carbon price and industry emissions regulations.
- *Does not disadvantage BC natural gas producers*, in existing North America markets and in emerging international markets.

Using these principles as a framework for EITE policy design, CAPP looks forward to working further with the BC government to further develop a BC solution to EITE determination and application.

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Baker, Jelene A ENV:EX

From:	Visco, Greg ENV:EX on behalf of Minister, ENV ENV:EX
Sent:	Tuesday, September 6, 2016 11:41 AM
To:	'david.keane@BCLNGA.CA'
Subject:	RE: Letter regarding Energy Intensive and Trade Exposed Industries
Attachments:	EITE Letter - June 21, 2016 - Final.pdf

Reference: 301988

September 6, 2016

David Keane
BC EITE Industry Coalition
and Co-Signers
Email: david.keane@BCLNGA.CA

Dear Mr. Keane and Co-Signers:

Thank you for your letter of June 21, 2016, explaining your concerns regarding climate leadership policies in British Columbia (BC). I appreciate receiving comments and insights on climate leadership in BC from BC's industrial sector.

The Province recognizes the importance of the resource industry to today's economy. As stewards of our natural resources, we see business as a valuable partner in helping BC reach its climate action and economic goals, now and in the future. For that reason, BC has consulted with many companies and industrial sectors over the past 18 months, including yours, to ensure our policies align with a pathway to a strong, long term, clean economy with globally competitive industries here in BC.

As we introduced the revenue neutral carbon tax in BC, we were careful to make a gradual transition with attention to alignment of tax reductions for business and industry that maintained their competitiveness. Since that time we have frozen the carbon tax, allowing actions in other jurisdictions to advance to our level of effort; this approach has not changed with the release of the new Climate Leadership Plan. We work closely with federal, provincial and territorial governments in the context of Pan-Canadian Framework for Clean Growth and Climate Change, and we intend to continue to seek the advice and input of business, industry, First Nations and British Columbians as additional climate leadership policies, necessary to keep us on track to meet our 2050 target, are developed.

For continued updates on climate leadership in BC and to obtain a copy of the new Climate Leadership Plan, please visit http://climate.gov.bc.ca.

Thank you again for taking the time to write.

Sincerely,

Mary Polak
Minister

From: David Keane [mailto:david.keane@BCLNGA.CA]
Sent: Tuesday, June 21, 2016 6:24 PM
To: Climate Leadership Plan ENV:EX
Cc: OfficeofthePremier, Office PREM:EX; Minister, CSCD CSCD:EX; Minister, MNGD MNGD:EX; Minister, JTST JTST:EX; Minister, FIN FIN:EX; Transportation, Minister TRAN:EX; Minister, MEM MEM:EX; Bigler, Michael D (michael.d.bigler@exxonmobil.com); Bryan Cox (bcox@mining.bc.ca); Chisholm, Carolyn (RTCMI); David Moliniski (david.molinski@chevron.com); DavidA.Bennett@fortisbc.com; Karina Brino (kbrino@mining.bc.ca); Ken Carrusca; Schick, Dave (DSchick); T. J Parhar (tjparhar@cement.ca); 'Talarico, Trina [Talarico Consulting Inc] (TrinaTalarico@chevron.com)'; 'Tom.Syer@teck.com'; 'colleen sweet'; Mihlar, Fazil ENV:EX
Subject: Letter regarding Energy Intensive and Trade Exposed Industries

Dear Minster Polak,

Please find the attached letter from David Keane, in regard to Energy Intensive and Trade Exposed Industries.

If you have any questions or require any follow-up, please do not hesitate to get in touch.

Thanks kindly,

Jessica Hollingsworth
Executive Assistant to David Keane, President | BC LNG Alliance
#615-625 Howe Street, Vancouver, BC V6C 2T6
t: 778.379.7646 | e: jessica.hollingsworth@bclnga.ca

Honourable Mary Polak
Minister of Environment
Climate Leadership Consultation
Ministry of Environment Climate Action Secretariat
P.O. Box 9486, Stn. Prov Govt
Victoria, B.C.
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Submitted via e-mail to climateleadershipplan@gov.bc.ca

Re: British Columbia Climate Leadership

Dear Minister Polak:

As government continues to move British Columbia's (B.C.) climate leadership forward with an updated plan, the industries that steward the responsible development of British Columbia's natural resources, and are emissions intensive and trade exposed (EITE), formed an EITE industry coalition in April 2016. The Mining Association of British Columbia, RioTinto, Canadian Association of Petroleum Producers, the Cement Association of Canada, the Chevron Burnaby Refinery and the BC LNG Alliance appreciate the opportunity to share our perspective with the Government of B.C. regarding the 2016 Climate Action Plan.

EITE industries employ approximately 111,000 British Columbians and contribute to B.C.'s diverse economy:

For context setting, according to Natural Resources Canada, B.C. natural resource industries contribute 11% to overall provincial GDP.[1] This translates into more than 111,000 people with natural resource-related careers spanning 75+ resource dependent communities from across British Columbia. Continued investment in B.C.'s natural resources also matters in the lower mainland. In fact, 55.5% of all jobs generated by B.C.'s natural resource industries in the province — direct, indirect, and induced — are in the urban region, according to a 2014 study by Resource Works.[2] It is widely recognized that the natural resource industries have a myriad of economic linkages with different sectors; however, many don't realize the convergence of natural resource development and clean technology (cleantech). For example, among the largest customers of innovative technology products are EITE industries. In order to drive the breakthrough

[1] Source: Employment and GDP: Natural Resources Canada estimates, based on Statistics Canada 2014 data
[2] Resource Works

innovations required to reach climate targets, partnerships with industry, cleantech, government and academia will continue to be needed. B.C. has a proven track record in this regard with such companies as Evok Innovations and Saltworks.

B.C. EITE industries must be globally competitive in order to contribute to B.C.'s Climate Leadership:

Not only do B.C. EITE industries positively impact the provincial economy and provide 111,000 good paying jobs, we contribute significantly to B.C.'s climate leadership. We recognize the challenges in addressing climate change and the need for local and global action. The EITE industries acknowledge the importance of the Ministry of Environment's recent sectorial consultations and the recommendations being offered by British Columbians on opportunities to support greenhouse gas (GHG) reductions domestically through energy efficiency, built environments, increased renewable energy, transportation infrastructure, and fuel switching.

To support the creation of an effective Climate Leadership plan, we are pleased to offer the Government of B.C. a number of important considerations to support competitiveness and climate action results. Our recommendations include proposed improvements to B.C.'s carbon-pricing regime to provide greater investment certainty and eliminate the trade disparity caused by the existing framework for EITE industries. We currently pay amongst the highest carbon prices in the world. Absent targeted policies to address trade exposure, the Government of B.C. risks creating further competitive disadvantages for its EITE industries, disadvantages that could negatively impact jobs and investment across the province and actually lead to higher global emissions through carbon leakage to other jurisdictions without climate policies in place.

B.C. stands out as one of the few jurisdictions with robust carbon pricing, but lacks a comprehensive approach to mitigating the unintended consequences to EITE industries. Other jurisdictions that price carbon, including Alberta, Ontario, Quebec, California and the European Union, have mechanisms in place or consultation is currently underway to address trade disparity. Protecting EITE industries was a major focal point of the 2015 Climate Leadership Team's recommendations to government. B.C., however, has yet to implement a solution, thereby removing a critical pathway to address trade disparity, preventing carbon leakage and preserving B.C.'s competitiveness.

We look forward to reinvigorating the carbon-pricing discussions with the Province, and collaborating with government to define a plan, which ensures a competitive EITE mechanism for B.C. industries. To begin our dialogue, we offer the following five recommendations:

Recommendations:

1. Enable economic investment and jobs in B.C.'s natural resource sector by taking steps to address tax fairness and equity, avoiding carbon leakage.
2. Recognize that B.C.'s EITE industries are an integral part of the global transition to a lower carbon footprint.
3. Utilize flexible, harmonized market-based, cost-effective compliance mechanisms to address tax fairness, and trade disparity.
4. Design a carbon pricing mechanism that is achievable within the context of a growing and transitioning lower carbon economy; this should include principles to ensure fairness, predictability and competitiveness.

5. During the transition period to a lower carbon economy, reward early action and support innovation through fiscal policies enabling research, development and demonstration, resulting in Canadian EITE industry competitiveness and innovation for export globally.

Please see *Schedule A* for a detailed overview of these recommendations.

Conclusion:

The Government of B.C. must take global market realities into account when making any changes to the Province's Climate Leadership Plan and factor this into the carbon-pricing policy. Among B.C.'s most significant positive contributions to global climate action is to produce some of the lowest carbon footprint natural resource products and commodities for the end-use sector. This will contribute towards a global transition to lower GHG-intensity fuels, promote improved energy efficient building materials and enable investment in public transportation.

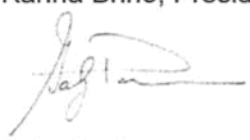
The EITE industries note that growing demand for commodities could be met by B.C.'s natural resource sector, within one of the most stringent environmental regulatory frameworks in the world, while supporting British Columbian families and workers, or alternatively the demand could be met by jurisdictions with weaker regulations and climate policies. B.C,'s EITE industries require carbon policy certainty that provides for carbon tax fairness and equity between asymmetrical carbon policies across competing jurisdictions. We also encourage the Government of B.C. to work with the Federal Government to avoid regulatory overlap, as well as to ensure the most effective emission reduction pathways, while addressing trade disparity.

We are supportive of B.C.'s Climate Leadership. The EITE industries look forward to meaningful dialogue and consultation with the Government of B.C. on the design of competitive carbon pricing mechanisms that will provide much-needed cost certainty for EITE industries as we maintain and expand investment in B.C., creating new jobs and economic prosperity for all British Columbians.

Sincerely,



Karina Brino, President and CEO of the Mining Association of British Columbia



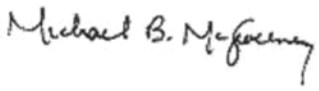
Gaby Poirier, General Manager, B.C. Operations Rio Tinto



David Keane, President and CEO of the BC LNG Alliance



Alex Ferguson, Vice President of Policy and Performance, Canadian Association of Petroleum Producers



Michael McSweeney, President & CEO, Cement Association of Canada



Steve Parker, GM Burnaby Refinery & Canada Country Chairman, Downstream

cc: Honourable Christy Clark, Premier, Province of British Columbia
Honourable Peter Fassbender, Minister of Community, Sport and Culture Development and Minister responsible for Intergovernmental Relations, Province of British Columbia
Honourable Rich Coleman, Minister of Natural Gas Development, Province of British Columbia
Honourable Mike De Jong, Minister of Finance, Province of British Columbia
Honourable Shirley Bond, Minister of Jobs, Tourism and Skills Training, Province of British Columbia
Honourable Bill Bennett, Minister of Energy and Mines
Honourable Todd Stone, Minister of Transportation and Infrastructure

SCHEDULE A:

The EITE industries are pleased to offer recommendations to the Government of B.C. to support considerations for the 2016 Climate Action. Our recommendations include proposed improvements to B.C.'s carbon-pricing regime to provide greater investment certainty and eliminate the trade disparity caused by the existing framework.

RECOMMENDATION ONE: Enable economic investment and jobs in British Columbia's EITE sectors by taking steps to address tax fairness and equity, avoiding carbon leakage.

The EITE industries advocate that the B.C. Government consider the fiscal competitiveness of EITE industries in a manner that acknowledges the dynamics of global commodities supply and demand. EITE industries by definition are sensitive to carbon-related pricing escalation. Investment mobility means that B.C. projects and industry must be competitive, including carbon-pricing expenditures, with other global investment prospects, if our Province is to attract the necessary capital and the jobs and the benefits that they bring. Comparable carbon pricing on EITE industries is absent in competing global jurisdictions. This has numerous negative consequences both for B.C.'s economy and for global GHG emissions, including:

- redeployment of investment capital away from B.C. to competing jurisdictions without the same fiscal hurdles or stringent carbon policies;
- increased proportionate global GHG emissions by, or carbon leakage to, jurisdictions with less stringent carbon policies; and
- lost opportunities for jobs and tax revenue in B.C.

RECOMMENDATION TWO: Recognize that B.C.'s EITE industries are an integral part of the global transition to a lower carbon footprint.

Climate change is a global challenge, requiring global solutions. Canada and B.C. must do their part to reduce domestic GHG emissions to meet Canada's international commitments. While Canada represents approximately 1.8% of global GHG emissions,[3] there are actions we can take as a province and country that will positively affect climate change locally and globally. This was acknowledged by the Government of Canada in its five principles leading into the United Nations Conference of Parties (COP 21), including committing Canada to support developing countries in accessing clean technologies and promoting lower carbon economies. We support this goal.

We believe that providing access to B.C.'s lower carbon-intensity natural resources is amongst the most significant global GHG abatement effort that B.C. can provide towards the global effort to reduce emissions. We encourage the Government of B.C. to recognize in its Climate Action Plan that 93% or more of B.C.'s electricity is generated through hydro-electricity, and as such, the EITE industry that operates in B.C. already leverages a best-in-class GHG generation mix. For the global end-use sector to reduce its own carbon footprint, B.C.'s natural resources and products can support improved reliability and durability, energy efficiency, fuel switching and enable new public infrastructure. The EITE industries note that growing demand for commodities could be met by B.C.'s natural resources, within one of the most stringent regulatory environmental frameworks in the world, while supporting British Columbian families and workers.

[3] International Energy Agency (2012) CO2 Emissions from Fuel Combustion Highlights

RECOMMENDATION THREE: Utilize flexible, harmonized, market-based, cost-effective compliance mechanisms to address tax fairness and trade disparity.

It is imperative that the B.C. Government also engage the Federal Government in order that cross-border tax issues be effectively resolved.

When reviewing the history of carbon pricing policy in British Columbia relative to EITE sectors, it is important to understand the context within which EITE industries were expecting the policy to develop over time. When the B.C. carbon tax came into effect, there were significant and substantive parallel activities occurring within the Western Climate Initiative (WCI) that envisioned a transition to a cap-and-trade system. Such a transition would have involved a more comprehensive approach to carbon pricing amongst WCI members and helped to address EITE industries competing within these jurisdictions.

With the subsequent demise of a transition to a comprehensive cap-and-trade system, the EITE sectors in B.C. were left without an adequate policy framework to address competiveness (trade) impacts. While characterized as "revenue-neutral", the revenue-neutral provisions of the carbon tax provided only a small amount of tax relief relative to carbon tax payments paid by many industries, and did not effectively reduce their carbon tax compliance costs to a level comparable to that faced by competing jurisdictions. Over the past number of years, only modest adjustments have occurred to recognize the negative impact the B.C. carbon tax policy has on EITE sectors.

While some sectors had limited ability to absorb the cost of the carbon tax in times of higher commodity prices, the same cannot be said when prices are low, such as we see in today's environment. For example, the B.C. carbon tax as a percentage of overall costs, relative to the natural gas sales price, has increasingly grown and now exceeds all royalties paid by the natural gas industry to the Government of B.C. Within the B.C. cement manufacturing sector, the carbon tax burden actually exceeds the cost of purchasing fuel. During times of low commodity prices, the impacts of the carbon tax on capital allocation and investment decision-making become more pronounced. Even in higher commodity price environments, the carbon tax has had a distortive effect on capital allocation – which can exacerbate carbon leakage.

Therefore, we are pleased that following COP 21, both Premier Clark and Minister Polak confirmed that B.C.'s approach to Climate Action will be about reducing emissions, while also benefiting the economy and protecting jobs. We believe that this is best achieved through a market-based carbon-pricing approach that includes a fair and transparent mechanism to address unequal carbon policies across competing jurisdictions.

Moving forward, the EITE industry looks forward to resetting the discussion with the Province on designing an empirically supportive EITE policy framework that will provide much-needed regulatory and cost certainty for EITE industries wanting to maintain and expand investment in B.C.

RECOMMENDATION FOUR: The design of the carbon pricing mechanism should be achievable within the context of a growing and transitioning lower carbon economy and include principles to ensure fairness, predictability and competitiveness.

In designing the 2016 Climate Action Plan, we recommend that government develop a framework that will achieve GHG emissions reductions while protecting jobs and improve the competitiveness in EITE sectors based on the following principles:

- ***Fair and transparent***, creating tax fairness and equity across competing jurisdictions.

- ***Data driven***, underpinned by strong analyses and a firm understanding of the implications in practice.
- ***Clear, predictable and simple to administer***, with clear and established processes for review and withdrawal.
- ***Cost-efficient***, fully offsetting the difference in carbon price that exists between jurisdictions.
- ***Balanced and efficient***, recognizing the totality of emissions policies on industry.
- ***Viable*, with readily available compliance pathways** that support open market mechanisms.
- ***Consistent with developing B.C.'s industries***, achievable within the context of a growing and transitioning lower carbon economy.
- ***Recognizes the risk of carbon leakage***, and that B.C. is currently a world leader in carbon price and industry emissions regulations.
- ***Does not further disadvantage B.C's. EITE industries***, in existing, emerging North American and international markets.

RECOMMENDATION FIVE: During the transition period to a lower carbon economy, reward early action and support clean technology through fiscal policies enabling EITE industries to complete clean tech research, development and demonstration, resulting in Canadian EITE competitiveness and innovation for export globally.

Breakthrough innovation requires fundamental research be undertaken in partnership with academic institutions, industry, the innovation and clean technology sectors and governments. During the transition period to a lower carbon economy, we recommend that government continue to support clean tech through fiscal policies enabling EITE industry to complete clean tech research, development, demonstration and adoption resulting in Canadian EITE competitiveness and innovation for export globally.

MINISTRY OF ENVIRONMENT
BRANCH-ORIGINATED INFORMATION NOTE

August 23, 2016

File: 280-20
CLIFF/tracking #: 303560

Prepared for: Honourable Mary Polak, Minister

What: Canadian Association of Petroleum Producers' *A Partner in Climate Leadership* report

Why: To better understand the oil and gas sector's perspective on key climate policies

Required by: August 30, 2016

Briefing: Not Required

BACKGROUND:

The Canadian Association of Petroleum Producers (CAPP) represents Canada's upstream oil and natural gas industry. Their stated goals are to enable the responsible growth of the sector and advocate for economic competitiveness and safe, environmentally and socially responsible performance.

On August 10th, CAPP wrote to Minister Polak on behalf of its members and provided a copy of its report *A Partner in Climate Leadership.* This report summarized CAPP's perspectives on emission reduction opportunities, innovation opportunities, principles for carbon pricing, and adaptation.

DISCUSSION:

CAPP identifies five main opportunities for reducing emissions in the natural gas sector: electrification of BC natural gas facilities, carbon capture and storage, methane reductions, natural gas as a transition fuel and cogeneration as an electricity source. They note that many of these measures would require fiscal tools, like offsets, or government investment, in order to be economically feasible for industry.

CAPP highlights its sector's investment in innovation—with 1400% increase in research and development investment since 1999. They state that climate policy, when it was outcomes-based, flexible, predictable, fair and administratively simple, could be a driver for innovation and jobs growth. Offsets and sector-level revenue neutrality, when carbon price revenue is invested in sector innovation, are mentioned as effective drivers of innovation. CAPP encourages government funding of innovation to both increase in scale and focus more on pertinent environmental challenges identified by industry.

CAPP states that they support carbon emissions pricing mechanisms in Canada and internationally. In establishing carbon pricing they recommend that the price be set, in consideration of the full compliance cost of climate policy on industry and that it be

coordinated across jurisdictions. They stress the importance of long-term cost certainty, non-duplication of costs, and that carbon price revenue be reinvested in the sector. They highlight the carbon leakage risks that carbon pricing presents and state that the price should be set, therefore, in recognition of the diversity of different sectors' contexts.

CAPP recognizes the importance of effectively managing the effects of climate change. They provide nine recommendations for government involving providing more information about the benefits and costs of adaptation, managing risk and planning for contingencies on key water and transportation infrastructure. They recommend that government collaborates with industry to better understand risks to surface water access during drought and develop research on innovation to reduce these risks. They call on all levels of government to ensure a rapid response to emergencies for extreme weather events.

CONCLUSION:

Several of CAPP's emission reduction proposals are addressed within the Climate Leadership Plan, including electrification of natural gas facilities, methane reduction and carbon capture and storage. The Province also advocates for the global GHG benefits of exporting liquefied natural gas and the local benefits of using natural gas for transportation and remote power generation. Under BC's clean electricity policy, cogeneration could only be an electricity source where renewable energy was not feasible or cost effective.

BC welcomes CAPP's feedback on spurring innovation and jobs creation. Two of the elements they identified—offsets and revenue neutrality—are already core elements of our climate policy although not sector level revenue neutrality. In addition, the Province funds innovation through its ICE fund, Green Infrastructure Royalty Credit program, and its upcoming tech fund for its LNG benchmark.

The Province shares CAPP's belief in the importance of carbon pricing as a tool for addressing emission reductions. The Province may be able to consider the elements highlighted by CAPP as the Pan-Canadian Framework is developed and BC considers further action.

Attachments: Letter from CAPP and *A Partner in Climate Leadership*

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CAPP CANADA'S OIL & NATURAL GAS PRODUCERS

August 10, 2016

Honourable Mary Polak
Minister of Environment
Government of British Columbia
PO BOX 9047 STN PROV GOVT
Parliament Buildings, Room 112
Victoria, BC V8V 1X4
(via e-mail: ENV.Minister@gov.bc.ca)

Dear Minister Polak:

I am writing today on behalf of our members to provide our perspectives on how to best advance the fight against climate change, and promote clean economic growth for all Canadians.

We all feel the effects of climate change – around the world and here at home across Canada. We believe that solutions are found the same way – through both global and local action.

We are committed to action on climate change.

This means leading on efforts to reduce greenhouse gas emissions, creating more and new jobs, and developing Canada's natural resources through continual advances in technology and innovation.

The attached materials are intended to provide you with CAPP's perspective on the four key areas of the *pan-Canadian framework for clean growth and climate change* where we can lead and support in the fight against climate change:

1. Opportunities for emissions reduction;
2. Innovation, technology and job creation generated by action on climate change;
3. Our support for carbon emissions pricing and valuation;
4. Managing for adaptation and resiliency in a changing climate.

As the world continues progress toward a carbon emissions constrained future, we believe Canada's oil and natural gas sector will be a supplier of choice to many markets.

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We look forward to working with you in ensuring this becomes a reality.

Yours in partnership,



Alex Ferguson
Vice-President, Policy and Performance
Canadian Association of Petroleum Producers

/attachment

Cc: Honourable Rich Coleman, Minister of Natural Gas Development
Honourable Bill Bennett, Minister of Energy and Mines

CAPP CANADA'S OIL & NATURAL GAS PRODUCERS

A Partner in Climate Leadership

August 2016

1 Contents

1 Contents 1

2 Introduction - A partner in climate leadership 2

3 Opportunities for emissions reductions 3

3.1 Provincial climate policies 4

3.2 Enabling innovation and technology development 5

3.3 Enabling innovation and technology deployment 5

4 Innovation, technology and job creation generated by action on climate change 11

4.1 Enabling an economically-viable transition to a low-carbon economy 12

4.2 Long-term low carbon technology implementation through improved innovation policy 14

4.3 Directed innovation to forge a deliberate future for Canada's natural resources 15

4.4 Leveraging existing and enabling new collaborative partnerships 16

5 Our support for carbon pricing mechanisms and valuation 18

5.1 Principles for design 18

6 Managing for adaptation and resiliency in a changing climate 22

2 Introduction - A partner in climate leadership

The Government of Canada – in close partnership with the provinces, territories and Indigenous Peoples – is taking leadership on climate action by putting a price on carbon and reducing greenhouse gas emissions.

The Government of Canada has committed to consult with Canadians through an open and online process to find ways to encourage clean economic growth, reduce greenhouse gas emissions and prepare for the impacts of climate change. The letstalkclimateaction.ca web portal is a new and innovative approach to climate consultations that supports the Government of Canada's commitment to transparency, openness and collaboration.

Canada's oil and natural gas industry is also committed to leadership on climate action. We believe that responsible energy development, driven by technology and innovation, plays a crucial role not only for our industry, but for the Canadian economy. To that end, we support effective government policies that recognize the key role of technology in reducing emissions while maintaining a strong economy.

The Canadian economy has recently experienced a period of hard choices, turbulent markets and stark reminders that climate change is a real and present threat. The message for all of us is clear: adapt or fail. Our sector has a long history of adapting through technology and innovation. We expect to leverage and repeat these successes into our future.

As part of this commitment to lead, CAPP offers this submission which provides Canada's oil and natural gas industry perspective and recommendations for the Government of Canada's *Let's Talk Climate* initiative. The submission will address the following priority areas:

- Opportunities for emissions reductions;
- Innovation, technology and job creation generated by action on climate change;
- Our support for carbon pricing and valuation;
- Managing for adaptation and resiliency in a changing climate.

We propose solutions that will reduce greenhouse gas emissions while developing a strong economy that benefits all Canadians.

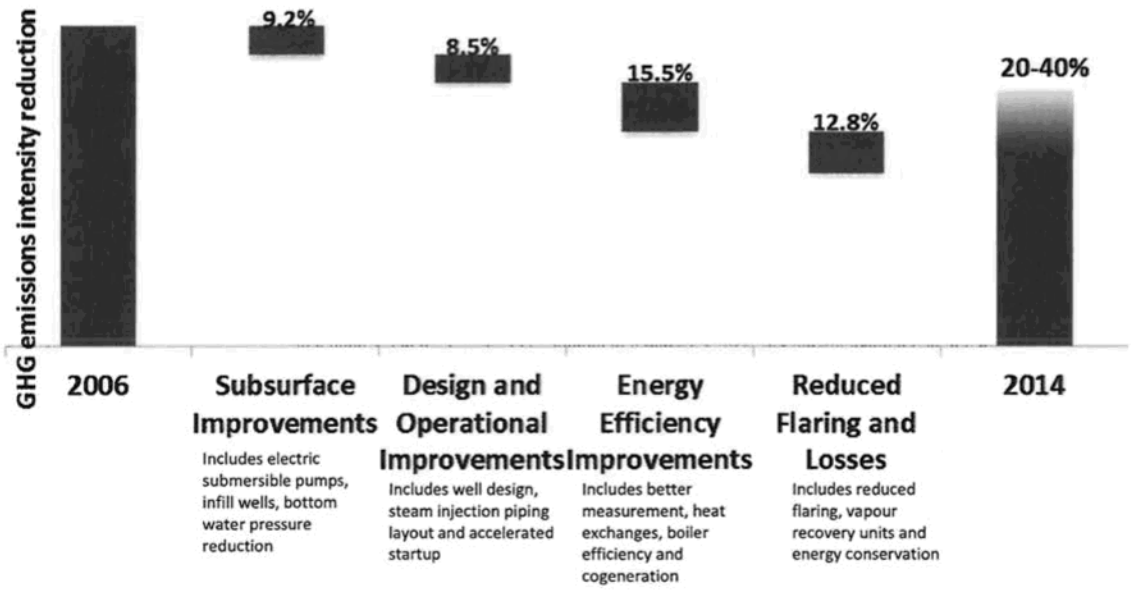
3 Opportunities for emissions reductions

In 2014, Canada's total GHG emissions were 732 megatonnes of carbon dioxide equivalent (CO_2e). Canada's oil and natural gas industry accounted for 26% of these emissions. While the oil and natural gas industry is the largest industrial contributor for emissions across the country, it is also a sector that has done a tremendous amount to reduce emissions.

According to Environment Canada data, the oil sands industry has a successful history of reducing GHG emissions. This achievement has resulted from innovation, technology deployment and policy signals provided by the climate policies and climate-related regulations that have been introduced in Western Canada. Figure 1 illustrates a number of typical examples of emissions intensity improvements made over the eight year period based at a single oil sands in situ facility.

Collectively, the reductions amount to 20-40 per cent of the emissions intensity of the in situ facility that was built in 2006. Though this set of emissions intensity reductions does not include all possible emission reduction opportunities, it is illustrative of the scope, breadth and priority given to emissions intensity reductions measures already and increasingly being deployed by oil and natural gas producers.

Figure 1: Example emissions intensity improvements between 2006 and 2014



Emissions intensity improvements between 2006 and 2014 collectively amount to 20-40%
The list is not exhaustive and not all technologies can be applied at each facility
Reductions are not necessarily additive
Graphic assumes consistent reservoir quality (SOR=3)

Our industry has demonstrated excellence in environmental performance, regulatory compliance and job creation. Canada and the oil and natural gas industry have a significant opportunity to demonstrate that Canada's oil and natural gas is and should be a preferred supplier of petroleum products across the globe.

According to the IEA's World Energy Outlook 2015[1], the demand for oil will remain strong, even under their scenario which charts out what the global community must do to meet the pledge to keep global warming to less than two degrees Celsius. According to the IEA, even in this scenario, there will still be a global demand of 67 million barrels per day in 2040. Canada has a choice to make: help fill this demand or step back and allow countries with lesser rankings on the Environmental Performance Index and Social Progress Index to develop resources and meet energy needs domestically and internationally.

Our industry will work with the Government of Canada, along with its provincial, territorial and Indigenous partners, to ensure that the Canada's oil and natural gas sector becomes the world-leading low-carbon emissions oil and natural gas producing jurisdiction. We offer the following opportunities for consideration to continue to reduce the GHG intensity of oil and natural gas production in Canada.

3.1 Provincial climate policies

British Columbia (B.C.) and Alberta have introduced climate policies that are some of the most rigorous in the world. These policies have already led to significant changes in industry practices. B.C. currently has a carbon tax of $30 per tonne and Alberta was the first North American jurisdiction to introduce a GHG emission pricing policy targeted at large industrial emitters, including all oil sands facilities.

Although these aforementioned policies currently exist, both provinces are committed to further improving their climate policies to achieve further reductions from the industry and their citizens. Alberta's Climate Leadership Plan, announced in November 2015, will target the oil and natural gas industry through three distinct policies: Implementing an ambitious methane reduction target of 45 per cent reduction from 2015 levels by 2025; legislating a 100 megatonne (MT) limit on emissions from the oil sands sector; and through implementation of an output-based performance benchmarking system for large industrial facilities. These policies, combined with the broad-based carbon levy, will invariably lead to further reductions from industry beyond current levels.

The B.C. government has also indicated its intention to release a new Climate Leadership Plan to augment its existing climate change policy, which already includes an economy wide carbon tax. The new Climate Leadership Plan is expected to be released in summer 2016, and will result in further emissions reductions from the oil and natural gas sector.

[1] Retrieved from: http://www.worldenergyoutlook.org/weo2015/

In addition to carbon pricing schemes, all three western provinces have regulatory frameworks that target GHG emissions reductions from flares, vents and fugitive equipment leaks at applicable facilities. Alberta's *Directive 60: Upstream Petroleum Industry Flaring, Incinerating and Venting*, B.C.'s *Flaring and Venting Reduction Guideline*, and Saskatchewan's Directive S10: *Upstream Petroleum Industry Associated Gas Conservation Directive* and *Directive S20: Upstream Flaring and Incineration Requirements*, all have mechanisms that ensure facilities have technologies and business operating practices in place to minimize the amount of methane and CO_2 from these activities.

3.2 Enabling innovation and technology development

CAPP submits that the most efficient means to achieve emissions reductions from the oil and natural gas industry is to enable and invest in GHG reducing innovation and technology development. Supporting and enabling the development and adoption of cost-effective technologies to reduce emissions is the optimal path for the Government of Canada to continue to promote investment, jobs and growth in the oil and natural gas sector – all while continuing to lower GHG emissions.

Substantial emissions reductions have already been achieved as the result of technology investment and adoption across the oil and natural gas sector in Canada. Under the constraints of emission-limiting environmental policy, future growth of Canada's oil and natural gas sector will depend on investment to address the commercial, operational and financial barriers to technological innovation. As such, climate policy should be designed to support technology investment, research and development (R&D), and deployment in order to simultaneously grow the sector and achieve emissions reductions.

3.3 Enabling innovation and technology deployment

In addition to encouraging innovation and clean technology development, further opportunities exist for technology deployment to achieve substantial emissions reductions from the upstream oil and natural gas sector. Government support is vital to the broad adoption of these technologies while minimizing the impact on sector growth and carbon leakage. Support may be offered through direct investment in infrastructure and/or by enabling and promoting fiscal mechanisms through climate or other economic policies (e.g., offsets). Below are five emissions reductions opportunities currently available to Canada and the industry through the implementation of appropriate policy mechanisms (see Subsection 4.1 and Section 5) to enable deployment of currently available technology.

British Columbia upstream electrification

One of the most important mechanisms that industry has to achieve a substantial reduction in upstream greenhouse gas emissions, while allowing for economic growth, is to reinforce the electric transmission grid in northeastern British Columbia and address operational cost gaps between the use of natural gas and electricity. Preliminary estimates suggest that upstream electrification could reduce industry emissions by up to 25 per cent from the wellhead to the LNG tanker or 3 – 4 MT/year of CO_2 by electrifying 6 Bcf/d of new production.

CAPP supports the economically viable expansion and reinforcement of electricity transmission to support load growth for new facilities and positioning electrification on a competitive economic footing relative to gas drive technologies. However, the cost associated with electrifying the industry is significant. Building out access to transmission and promoting a novel pricing scheme for electricity in B.C., coupled with an ability to generate GHG offset credits for electrification will assist in bolstering competitiveness while reducing emissions at the same time.

Carbon capture and storage

Carbon capture and storage (CCS) is a promising option to substantially reduce GHG emissions in the near future, and to help Canada achieve its GHG reduction targets. There are already examples of CAPP member companies who capture CO_2 and store (sequester) it underground or transport it to conventional oil and natural gas wells to help recover more resources from those wells. While CCS has significant potential for emissions reductions, it requires a large amount of investment to build capture facilities and to develop infrastructure to move CO2 from source to storage or use locations. CAPP supports the development of CCS but cautions that market mechanisms alone will likely not be sufficient to incent commercial viability.

Methane emissions

While significant attention has been directed to the role of CO_2 emissions in climate change, emphasis on methane emissions and other short-lived climate forcers is seen as a critical step as part of near-term and meaningful action on climate change. The global warming potential for methane is at least 25 times that of CO_2. Contributing 43 per cent of Canada's national methane emissions, those industries involved in the production, processing and storage of oil and natural gas resources in Canada are expected to make significant performance improvements.

The initiative to collaborate with both the United States and Mexico on a North American priority to reduce methane emissions is welcomed by our members. This effort, which began with the *U.S.-Canada Joint Statement on Energy, Climate and Arctic Leadership*, set the path forward by describing key requirements of an achievable approach to methane emissions reductions by the oil and natural gas sector, namely to:

- Regulate existing sources of methane emissions in the oil and gas sector.
- Work collaboratively on federal measures to reduce methane emissions.

- Improve data collection, transparency, and R&D and share knowledge of cost-effective methane reduction technologies and practices.
- Jointly endorse the World Bank's Zero Routine Flaring by 2030 Initiative.

Since this seminal announcement, we have observed divergence in the regulatory development approach in Canada versus the U.S. While Canada launched consultation on a draft regulatory framework for new and existing equipment in May 2016, the U.S. began its process for regulating existing equipment through an Information Collection Request to better characterize methane emission sources and Voluntary Information Request on emerging technologies to detect, measure and mitigate emissions which is anticipated to be completed by early 2017. Since July 2016, fourteen states have launched lawsuits over the new Environmental Protection Agency (EPA) rule[2] to limit methane emissions at oil and natural gas sites. This action is likely to impede regulatory action to reduce methane emissions in the U.S. while Environment and Climate Change Canada (ECCC) continues to proceed expeditiously to publish an initial phase of national regulations by early 2017.

Given this circumstance and the economic conditions that are tempering activity and moderating methane emissions, we now have time to design a system that allows us to meet the targets in a cost effective and appropriate way. We believe that Canada should use this opportunity to work with the provinces, industry and other engaged partners to develop a hybrid program built upon a performance management program for methane emissions reduction. This is the only practical way of addressing the Canada/U.S. agreement's objective of enhancing evidence-based and cost-effective actions to reduce methane emissions. Using smart regulatory tools to guide leak detection and repair, new performance standards, non-regulatory retrofit programs and practice improvements for existing equipment would yield the same environmental outcome at a significantly lower cost to industry. Regulatory development should be collaborative, while providing for periodic reviews of progress.

While we think that the target of 45% methane emissions reduction by 2025 from a known 2012 baseline is ambitious yet achievable, the current level of methane emissions from the oil and natural gas sector is uncertain in the absence of robust reporting. We recommend the government establish a process to standardize provincial reporting and improve aggregation in national reporting to confirm the scale of the reduction (in megatonnes) opportunity. This effort would enable better analytics on the apportionment of source emissions to prioritize cost-effective, methane emission reduction opportunities and to affirm the achievability of the national target. In absence of this analysis, the proposed regulatory framework under *Canadian Environmental Protection Act* is overly prescriptive and risks diverting limited resources from the most effective action for methane emissions reduction, dampening investment in innovation, and reducing Canada's competitive position as a producer of oil and natural gas.

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[2] Retrieved from: http://thehill.com/policy/energy-environment/290159-thirteen-states-sue-over-epa-methane-rule

It is for this reason that CAPP continues to support a performance management approach to guide cost-effective action under a hybrid model. This model consists of:

1. *Robust performance framework and data analytics.*
   We recognize the value of data-informed analytics. This approach to performance management could help to pinpoint improvements for non-regulatory and regulatory tools to be more effective and to identify new, low-cost opportunities necessary to meet the 45% methane emission reduction target. This analysis can be used to focus near-term action and long-term innovation on methane emissions sources with greatest opportunities for cost effective methane emissions reduction.

2. *Early industry action to improve practices and retrofit existing equipment enabled by fiscal tools.*
   We support an outcomes-based approach that allows industry to identify the most cost-effective actions to achieve methane emissions reductions. Many oil and natural gas companies have corporate programs and rely on industry best practices to reduce methane emissions. More refined analytics would enable the verification of reductions already achieved, many of which we believe are not yet reflected in the National Inventory and should be acknowledged as progress towards the target. Analytics further guide the development of new programs: broad deployment of clean technology, industry mentorship to facilitate knowledge exchange for practice improvement.

   Fiscal mechanisms including technology offset protocols and/or credits should be used to encourage and accelerate technology deployment. Where transition to regulation is contemplated, we encourage the consideration of the timelines for business decisions to support technology deployment at oil and natural gas operations given current cost constraints faced by these operations. Based on the oil and natural gas industry's collective experience, we know that retrofitting existing equipment takes time and money. Industry estimates there are 100,000+ pieces of equipment. In recognition of the magnitude of this undertaking, natural capital stock turnover and capital constraints, incentives for retrofits can enable this work to progress at a faster rate than proposed under regulation.

   We believe that mandatory retrofitting of all equipment would not be cost effective in meeting emissions targets. Companies should be given discretion over determining which equipment to retrofit and when to meet targets. A more measured approach enables the regulations to consider natural capital stock turnover, which will contribute to reductions as older equipment is replaced, over the next decade.

   We believe that progress for existing equipment is best achieved by a non-legislative industry/government/ENGO partnership designed to consider methane emissions sources and reduction opportunities on a priority basis with the breadth of mandate to consider critical enablers to address marginal cost of abatement, safety obligations and technical constraints. Industry is committed to achieving methane reductions from

existing sources but need the enabling policy framework to allow this to occur at the lowest cost.

3. *Assess existing provincial and federal policy and regulatory frameworks to define performance standards for new equipment.*
   The provinces and federal government already have policy and regulatory frameworks to address emissions. To this end, alignment on targets should be enough to satisfy equivalency and to allow provincial governments to build on their existing frameworks to avoid duplicative regulation. The effectiveness of existing programs should be assessed and refined prior to contemplating new policy or regulation. That said, where necessary, the design of the regulatory approach in Canada should take into account the variability of oil and natural gas resources throughout the country, as well as the tailored regulatory regimes designed to guide the responsible development of oil and natural gas resources (both from the vantage point of industry practices as well as environmental and safety performance). As a result, tegulation for new facilities and equipment should focus on the most cost-effective methane emissions reduction opportunities suitable to the particular circumstances of each jurisdiction. As has occurred in the U.S. emission standards for new sources are significantly easier for industry to manage (than existing sources) as it can be built into new facilities at the design stage.

   The different mix of oil and natural gas production across the provinces requires a different focus area for each province to meet the 45% reduction target. The current policy framework in Alberta and British Columbia reflects these differences. For this reason, a collaborative approach, building off the work of the provinces, would yield better results than having duplicative regulatory frameworks across Canada. In this way, a federal approach could leverage the strengths within the provinces, such as such as Alberta's achievement of a 95% solution gas conservation rate since the early 2000s. Competitiveness impacts arising from the implementation of methane regulations should be mitigated through alignment of international policy.

Cogeneration

Cogeneration, the combined generation of electricity and other (primarily heat) energy jointly, represents a significant opportunity for new power generation while reducing the GHG emission intensity of the electricity grid. The projected growth of oil sands facilities with both thermal and power requirements represents an opportunity for additional cogeneration in the country.

The oil and natural gas industry has a current and growing demand for heat (steam) and power. Under the right policy and economic conditions, industry could incorporate cogeneration for both on-site thermal and power demands, with the potential to increase sizing to fully match process steam loads and export surplus electricity to Canada's power market.

Cogeneration benefits both industry and the country with reliable, baseload electricity at industrial load sites. Exported power is typically bid at or near zero dollars per megawatt hour (MWh) into the power pool to ensure thermal demands are satisfied, reducing the average cost of power for all consumers. Cogeneration can also be designed to provide flexibility which can help balance the intermittency of renewables. Combined heat and power synergies at industrial facilities also produce considerably lower GHG emissions per MWh than other forms of fossil fuel electricity generation.

A recent *EDC Associates* report estimates that there is an opportunity for new cogeneration growth of between one and a half to two times EDC's current cogeneration growth forecast and that additional cogeneration would reduce the grid's overall GHG intensity. This reduction would be relative to coal generation and future combined-cycle additions, and could be built at a lower levelized cost than could additional natural gas combined-cycle capacity.[3]

Natural Gas

Natural gas is the cleanest burning fossil fuel. As an energy source, it provides a cost-effective pathway for countries to reduce the carbon intensity of their economies. CAPP recognizes the potential that natural gas has to not only reduce emissions from electricity infrastructure in the near-term, but also to provide further grid stability for the benefit of producers and consumers alike.

As a transition fuel, the development, use, and export of natural gas resources from Canada can support clean energy strategies around the world.

The Government of Canada recognizes the critical role that the provinces play in contributing to not only provincial and national, but global emissions reductions. With world demand for energy forecasted to grow by 32% by 2040, natural gas is a desirable choice to meet this growing demand while helping to curb GHG emissions growth and also achieving local air quality improvements in rapidly developing nations.

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[3] EDC Associates Ltd. February 2015. GHG Emissions Reduction Strategy in the Alberta Electricity Market with Increased Cogen Capacity.

4 Innovation, technology and job creation generated by action on climate change

Canada is an environmental leader. According to Yale University's Environmental Performance Index from 2016[4], Canada ranks 25th out of 178 countries — ahead of countries like USA (26th), Japan (39th), Belgium (41st), and South Korea (80th). While Canadians can be proud of our globally competitive environmental performance, there is a strategic opportunity for government to leverage further environmental improvements, while also stimulating economic growth. By enabling this opportunity, governments can provide confidence to Canadians and the globe that government agencies and industries are working hard to protect Canada's environment.

In fall 2015, Canada joined 185 countries in committing to significantly reducing global GHG emissions. Since that time, our government has made significant and laudable commitments to support innovation and transformative clean technology throughout the economy to achieve these goals.

Canada must enable investments in innovation and technology to achieve deep GHG reductions while ensuring continued economic growth and stable, high quality jobs. To fully understand implications of policy and regulation in this area, our industry believes government policy needs to be crafted with an understanding of our emissions by sector within a globally-competitive commodity market. Building from a position of strength, our government can choose the most appropriate pathways and technology road maps.

Our sector provides a unique and innovation-ready opportunity for government focus, through the emerging "super innovation cluster" which has Canada's Oil Sands Innovation Alliance (COSIA) and the Petroleum Technology Alliance of Canada (PTAC) at its core, along with their various provincial, national and international partners.

Due to our industry's capacity for innovation, we believe the upstream oil and natural gas industry, along with the entire natural resource sector, will play a lead role in achieving Canada's desired low-carbon economy. Canada's natural resource sector offers the country a significant comparative advantage on the global market; by continuing to harness the wealth of these sectors, and using this wealth to make deliberate investments in transformative low-emissions extraction technologies and business processes, our country can become the world-leader in providing the global market with low-carbon natural resources.

Canada's oil and natural gas industry is accelerating innovation. With low commodity prices, a shift in export markets creating a need for pipelines to offshore markets, and a global move to a low-carbon economy, our industry is under significant pressure to find new ways to remain competitive while reducing the environmental impacts of development and production.

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[4] Retrieved from: http://epi.yale.edu/reports/2016-report

This challenge presents a great opportunity to innovate and deploy new technologies and processes to reduce our footprint, and become global leaders in low intensity oil and natural gas production. We also have an opportunity to move Canada's oil and natural gas to supply domestic and global markets for new and traditional non-combustion products and uses[5].

Combining smart climate policy with enabling innovation policy – while leveraging existing and creating new collaborative partnerships with government and industry – is critical for ensuring that Canada becomes a global leader in innovation and clean technology development in the oil and natural gas sector. Successful innovation will create new global market opportunities for Canada's industry and for innovators across the country. We offer the following recommendations for the federal and all provincial governments to consider when developing options for the First Ministers on innovation, technology and job creation.

4.1 Enabling an economically-viable transition to a low-carbon economy

Canada and most provinces have committed to significantly reduce domestic GHG emissions to meet global goals for limiting climate change. There are many tools and programs available to the government to enable reductions by governments, industries, business enterprises and consumers. But not all tools and programs have equal effect. Climate policy can be a critical enabler for innovation and clean technology development, but it can also set up costly barriers and administrative hindrances. It is critical for governments to choose and implement the right mix of tools and programs to maximize innovation and technology adoption and deployment to forge a low-carbon economy in the most efficient and cost-effective manner.

CAPP offers the following recommendations to design carbon policies and enable opportunities for clean technology development and deployment.

Climate policy criteria

Smart climate policy should stimulate investment in the technologies necessary for significant reductions in GHG emissions in Canada and globally.

To ensure long-term investment in innovation and the industry, policies should be outcomes-based, flexible, predictable, fair and administratively simple. Policies that do not meet these criteria create barriers to industry investment and to investment in technology research, development, innovation and deployment. Additionally, governments should ensure that policies align across Canadian provinces to avoid duplication and minimize impacts to industry competitiveness, thereby increasing the likelihood of successful achievement of policy objectives.

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[5] Examples of traditional non-combustion uses for petroleum products available here: http://www.oilandgasinfo.ca/oil-gas-you/products/

Revenue recycling

Carbon pricing mechanisms are becoming an increasingly popular policy tools used by governments to flexibly enable cost-effective GHG reductions across the economy. When a government moves forward with carbon pricing, there are many decisions to be made to ensure the policy is implemented to maximize GHG emissions reductions efficiently and without weakening the economy. One of the decisions governments need to make is what to do with the revenue generated from the carbon pricing mechanism. There are many options available for distribution of this generated revenue; CAPP recommends that to enable innovation, revenue generated by industrial emitters is best recycled back to the industry for technology and innovation.

Ensuring the revenue generated from carbon emissions is recycled back through a technology fund to R&D and technology deployment and adoption is critical to incenting domestic GHG emissions reductions using clean technology. It is also important that the revenue generated is recycled back to technology investments by those who pay into the fund, using transparent and consistent funding criteria. Recycling revenue in this manner creates the incentive to reduce emissions while enabling competiveness for Canadian industry. The investment opportunities available to the government and industry through this technology fund are critical to de-risking technologies at all stages of development, and will enable long term technology advancements that will help to bend the curve and help Canada reach its climate goals.

Offsets

Offsets are another policy tool available to governments for achieving GHG reductions. Offsets can be enabled through many mechanisms, including direct purchase by government or consumer, or through a cap and trade system. Regardless of the enabling policy, offsets can play a critical part in enabling emissions reductions across the broader economy, while incenting industry and businesses to invest in technological advancements over the long-term, specifically:

- Offsets can help to overcome financial barriers. For example, generation of offsets by the oil and natural gas industry at smaller facilities would allow project proponents to partially or wholly overcome financial barriers to the deployment of emission-reducing environmental technologies.
- Offsets allow the regulated industry and the wider economy to choose the lowest cost options. They allow for the discovery and delivery of lowest cost GHG abatement options for emission reductions.
- Offsets enable credible emissions reductions. To encourage participation in offset projects and markets, government can take measures to ensure minimize risk for buyers of offsets using tools like certification, registration, and streamlined but appropriate verification. In doing so, the federal or provincial governments can maintain market credibility by continuing to ensure that offsets are real, additional, permanent, verifiable, quantifiable,

and enforceable, while bolstering market participation and subsequent emission reductions.

CAPP continues to recommend a robust and credible offset system for Canada to achieve low-cost GHG reducing activities and expand the opportunities for innovation and clean technology investment. CAPP also recommends the expansion of the offset across provinces as a means to expand offset opportunities and to promote an interprovincial climate strategy, energy strategy and harmonized carbon regimes.

4.2 Long-term low carbon technology implementation through improved innovation policy

Canada's oil and natural gas industry is an R&D leader. Canada's *Science, Technology and Innovation System's State of the Nation 2014*[6] report recognized that R&D investment by the oil and natural gas extraction industry rose by 1400 percent between 1999 and 2015. While Canada's overall R&D investment fell by $1 billion between 2007 and 2015 – with substantial declines in many key industries – investments by the mining, quarrying, and oil and natural gas extraction industries increased by 74 percent.

CAPP believes there are significant opportunities to enable and accelerate technology implementation within the oil and natural gas sector over the long-term.

There are a number of barriers within Canada's existing innovation policy that hinder the implementation of emissions intensity reduction measures in the oil and natural gas sector. Coordinated, efficient and deliberate innovation policy is critical to help Canadian governments and businesses to overcome these barriers.

A key barrier to the development of transformative technologies in the oil and natural gas sector is scale and lack of deliberate focus. There are many opportunities to offer direct investments into technologies, small and big, across the industry. However, transformative technologies need government and industry to focus and make long-term, deep and deliberate investments in these key innovative ideas that can leverage significant partnerships, knowledge centres and global comparative advantages. It is important for governments to pick specific ideas out of the thousands available to move our country forward to become a global leader in low-carbon natural resource development.

Following successful R&D, viable technologies must be de-risked to ensure ongoing reliability – a critically important step for both project economics as well as safe and efficient operations. The cost of such development programs should not be underestimated – pre-commercial

[6] Retrieved from: http://www.stic-csti.ca/eic/site/stic-csti.nsf/vwapj/STIC_1500_SON_Report_e_proof4.pdf/$file/STIC_1500_SON_Report_e_proof4.pdf

demonstrations alone can cost tens of millions of dollars. Given these factors, even successful technologies take time to develop and deploy industry-wide.

Multiyear commitments must be made and reasonable timelines must be anticipated for a suite of potential technologies to yield successful projects that can be deployed at scale. Any improvements to ensure regulatory certainty around returns on investment will help producers to include more of these technologies in their business planning.

Barriers also come into play at the deployment stage – even when commercial technology exists, financial and operational barriers may remain. Many available emissions reduction technologies add engineering, construction and operational complexity to facilities. Any economic benefit realized can often be diminished through decreased reliability and additional maintenance requirements. This is especially relevant in cost-constrained environments.

4.3 Directed innovation to forge a deliberate future for Canada's natural resources

The majority of the publically funded innovation in the past, regardless of funding source or managing organization, has been administered by general calls for proposals, with financial support going to support good ideas, but good ideas that may not necessarily target key challenges for Canadian industry. As global innovation systems learn and mature, there is evidence that suggests a more directed approach to innovation can result in stronger outcomes than using just more traditional, general, passive calls for ideas.

Directed innovation starts with strategic leaders (e.g. business and government leaders) defining bold, ambitious and desired outcomes or "moon shots" with support and advice from innovation leaders. In this context, the moonshot can be thought of as a single, or a small number of key strategic GHG reduction technology development initiatives.

After definition, the bold outcomes are unpacked or further defined into a series of smaller steps or deliverables that in sum allow attainment of the bolder outcome. Critically, directed innovation defines technically-actionable innovation challenges that can be more easily understood and solved by innovation providers to achieve the targeted outcomes.

With a defined outcome, resolve in senior strategic leaders, and strong governance, the unique strengths of organizations (e.g. capacity, funding, and infrastructure) can be brought to play alone or in partnership to solve the challenges.

The concept of directed innovation can be adopted at different scales. One option is to adopt a series of smaller-scale challenges; another option is to adopt directed innovation at a large, bold scale. Directed innovation can also be used in conjunction with more passive paradigms like calls for proposals.

4.4 Leveraging existing and enabling new collaborative partnerships

Industry is continuing to work collaboratively, leveraging individual company efforts, to advance new technologies and best practices across the sector. Organizations including Canada's Oil Sands Innovation Alliance (COSIA), Alberta Innovates, the Petroleum Technology Alliance of Canada, and the Climate Change Emissions Management Corporation (CCEMC) are working to explore and address technological, operational and financial barriers to innovation. These organizations are able to identify, develop and apply solutions-oriented innovation to the most pressing oil and gas environmental challenges.

Together, these organizations should be considered as a Canadian "super innovation cluster" that leverages Canada's strengths in our oil and natural gas resources.

The oil sands industry has already shared and developed 819 distinct technologies and innovations with a value of almost $1.3 billion through COSIA. COSIA is a collaborative of 13 companies who came together in March 2012 to find innovative solutions in the oil sands to reduce GHGs, minimize impact on land, reduce water use and improve the management of tailings. This type of collaborative body facilitates the channeling of individual company expertise and contributes to solution sets for collective problems, benefitting the entire industry and supporting the government's environmental policy objectives.

CAPP recommends that the federal and provincial governments band together to prioritize and coordinate investment in clean infrastructure, and develop stronger partnerships between the government and the oil and natural gas industry for clean technology research, with the objective of reducing and/or offsetting GHG emissions in the development of Canada's oil and gas natural resources.

CAPP also recommends that governments take advantage of learnings available to the rest of Canada from the unique opportunities made by collaborative partnerships initiated by the oil and natural gas sector, and enable new collaborative partnerships between and within other sectors where Canada has a comparative advantage.

The collaborative partnerships formed by our sector, such as COSIA, have a head start in ambition, priority-setting and technology road mapping, as well as governance and administration. Governments can incent other sectors to replicate (or, where appropriate, coordinate with) these collaborative industry partnerships to focus R&D and innovation towards improved environmental performance. There is tremendous opportunity for government partners to leverage the learnings that are available through our industry sector to move forward strategic innovation across the economy.

Lastly, a complementary approach is to support a stronger partnership between Sustainable Development Technology Canada (SDTC) and COSIA to accelerate advancements in clean technology and GHG mitigation innovations. A stronger partnership between SDTC and

Canadian natural gas technology and innovation development for clean technologies would also be beneficial.

Ensuring that industry continues to work collaboratively on emission reductions is vital to encourage the industry and the country to maximize the emission reduction capability from the oil and natural gas sector. Outcomes of these efforts could result in the achievement of objectives relating to GHG reductions and sequestration, conversion to less carbon intensive machinery and equipment, stimulation of new, clean technology innovation, promotion of wider use of renewable energy technologies, and demonstration of leadership in environmental sustainability.

5 Our support for carbon pricing mechanisms and valuation

CAPP supports carbon emissions pricing mechanisms in Canada and internationally.

Given the important role the oil and natural gas industry will continue to play in our economy, it is critical that climate policy be addressed with balanced and realistic solutions that allow for growth in investment and jobs while continually reducing greenhouse gas (GHG) emissions.

Any pricing mechanism implemented should contribute to a vibrant and competitive oil and natural gas sector while efficiently and effectively facilitating reductions in GHG emissions. This means ensuring that Canada can compete with other jurisdictions for the necessary capital investment needed to support economic growth and the development of Canada's oil and natural gas resources, and ensures efficient access to international markets for our products.

Canada needs to be both a stronger world leader in the fight against climate change and a more competitive place to invest in low emissions oil and natural gas development.

Supporting and enabling the development and adoption of cost-effective technologies to reduce emissions is the optimal path for the Government of Canada to continue to promote investment, jobs, oil and natural gas sector growth while lowering GHG emissions.

5.1 Principles for design

CAPP submits that the following principles are critical considerations for any Canadian government, federal or provincial, when designing carbon pricing mechanisms that affects the oil and gas industry, which is an industry that competes for market share on a global scale and must ensure a globally-competitive production cost profile to remain competitive.

Price

The price paid for carbon by emitters goes beyond the marginal price of carbon set by governments through a taxation or cap and trade regime. When considering carbon pricing mechanisms – or comparing mechanisms across jurisdictions – it is important to consider all of the costs incurred by emitters to comply with relevant policy instruments, including mitigative regulatory requirements and/or renewable portfolio standards. The carbon pricing mechanisms considered by governments should be inclusive of all policy costs, and set at levels that continue to incent environmental change but without damaging the competiveness of Canadian industries, and possibly leading to carbon and investment leakage abroad.

CAPP recommends that any policy initiatives undertaken by the government should seek to not only preserve, but enhance the economic competitiveness of the upstream oil and natural gas

sector, in consideration of carbon price mechanisms that are inclusive of all policy costs and cumulative burden across policies and regulations, corporate tax increases and royalty changes.

As indicated, we also recommend that price considerations include the suite of emissions mitigation mechanisms that are in place across Canada; for example, regulatory and other initiatives undertaken in many provinces that are leading to emissions mitigation.

Cross-jurisdiction Coordination

Many provinces have already taken action to create carbon pricing mechanisms. A national program consisting of a mosaic of provincial approaches will provide regulatory certainty for those already subject to carbon regulations, while also contributing to achievement of the country's overall GHG emissions reduction objectives.

Broad based

A broad based, flexible carbon pricing system, inclusive of all policy costs, is most efficient if it is applied to emitters across the global economy. Meaningful emission reductions can only be achieved if all industrial emitters are subject to some form of environmental pricing. CAPP recommends that government take a full sector view approach when designing a climate policy pricing mechanism.

There is also a strong case to be made that variations across sectors can enhance the effectiveness of a broad-based approach. Canada's economy does not follow a truly homogenous pattern of sectors with respect to their contribution to either emissions or wealth creation. We recommend a pricing policy approach that gives appropriate consideration to this diversity. Elements of diversity include investment patterns, international competitiveness factors (including for foreign investment as well as markets), wealth creation patterns, and technology readiness.

Carbon price certainty

One of the most important aspects of an effective and appropriate climate pricing mechanism is price certainty. Industry's financial decisions are made on long time frames, which require making complex investment decisions. Having a carbon price that is transparent and provides some certainty can help promote sound investment decisions through the long term. CAPP also recommends that any increase in a carbon price is phased in to ensure businesses have time to adjust to changes in cost levels. Any new carbon policy should have pricing review dates or other triggers in order to allow industry to make investment decisions.

Strong data

The development of technically sound emission reduction policies and regulations relies on good quality emissions data in order to identify potential opportunities for emissions

reductions and to determine industry performance and emissions reductions in future years. Any climate policy must have mechanisms for robust, transparent and scientifically valid data at its core.

Avoid duplicative measures

It is important when designing climate policies to ensure that there are limited duplicative measures and no double taxation or cost burden. Regulations or other government interventions on industry should not be used when a corresponding carbon pricing mechanism exists to deal with the emission reductions. Duplicative systems are often costly for both government and industry and do not result in additional incremental emission reductions.

Ensuring that industry is not double priced on the same carbon unit is essential in designing a fair climate policy. The oil and natural gas industry already has a large cost burden and any double taxation would severely impact the competiveness of the industry. CAPP recommends that any federal government climate policy take into full account the provincial climate policies that already exist and ensure they receive equivalency for the emission reductions that industry is doing at the provincial level.

Revenue Recycling

A key consideration under any market-based carbon pricing system – such as carbon tax or a cap and trade regime – is how and where to recycle the revenue. An option available to governments is to recycle some or all of the revenue generated by industry back to achieve further emissions reductions from the emitting sectors. One of the key purposes for carbon pricing mechanisms is to reduce emissions while not weakening industry's competiveness. By recycling revenue, through a technology fund or alternative, governments create the incentive for companies to reduce emissions while helping to protect their competiveness. This opportunity allows companies to further their reduce emissions and develop and deploy long term technology advancements that will help to bend the curve and help Canada reach its climate goals.

Preventing carbon leakage

Carbon leakage occurs if constraints on emissions are placed on activities in Canada but not elsewhere because there is a possibility that industry may choose to leave Canada (or new investment could be discouraged) and go to a jurisdiction where there is little or no carbon price, which will allow companies to produce and potentially release more emissions in a jurisdiction without a climate policy.

If carbon leakage occurs, Canada will lose the economic value from production and there will be no consequential global reduction in emissions. Many jurisdictions around the world such as California, the European Union (E.U.) and Ontario protect emission-intensive, trade-exposed (EITE) sectors to help prevent carbon leakage.

CAPP recommends that government take into account carbon leakage and includes provisions to protect EITE industries.

6 Managing for adaptation and resiliency in a changing climate

Adapting to climate change is an important consideration for the oil and natural gas industry. Our industry's operations and support infrastructure span the nation, from small one-well onshore facilities to large offshore production facilities in Atlantic Canada. This infrastructure includes small gathering pipelines crossing rural lands and large transmission pipelines covering a significant diversity of geographical landscapes.

The impact of a changing climate and risks presented by changing weather patterns presents new and evolving risks to the production, transportation and reliable supply of petroleum products to the end consumer.

Planning and preparation for the impacts of a changing climate on the operating environment is vital. Companies employ risk management and contingency planning approaches, which are common and well-developed practices in the energy sector. Climate change adaptation in the oil and natural gas sector is often discussed and addressed in these terms.

The oil and natural gas industry currently has robust and widely used risk management systems in place. Risk management analyses are employed at all stages of a production facilities lifecycle and beyond operations to infrastructure, through the value chain, and to each operating location (including corporate headquarters). Risks considered by industry that are impacted by climate change include wildfires, floods, droughts, compromised infrastructure, water supply concerns and ambient temperature extremes.

As adaptation becomes an increasingly important management consideration, industry will continue to exercise sound risk management practices and to plan construction, operation and decommissioning stages of projects to address the expected range of weather, water and ecological conditions over the life of each project and operation.

Industry offers the following recommendations to enable broader and higher quality application of risk management strategies by regions, provinces and the industry using consistent, current, relevant and timely information:

1. Undertake assessments of the cost and financial impacts of climate change to provide industry with a common and relevant understanding of the financial risks to industry and stakeholders.
2. Incorporate climate change adaptation and risk management into land-use planning frameworks to better understand planning and adaptive management scenarios on a regional basis. These scenarios would promote a more consistent approach to risk assessment and emergency response across industry.

3. Undertake risk management and contingency planning on a regional basis for common infrastructure, focusing on regional water infrastructure, key transportation hubs (rain, pipeline and road), and land-use planning.
4. Focus federal infrastructure funding on improving and redesigning the robustness of existing critical infrastructure, such as bridges, roads, pipeline culvert and regional networks such as rail and pipeline hubs and water networks.
5. Enable collaboration between government and industry to focus on understanding the risk to surface water access, availability and use in drought conditions. Understanding these risks will further improve contingency planning, risk mitigation strategies and enable further technological innovation into water intensity reductions.
6. Collaborate with industry and focus research and innovation towards reducing the risks to surface water access, availability and use in drought conditions.
7. Support and promote open, common and timely data sources for understanding the challenges that government, industry and stakeholders face due to climate change. Further to this, provide transparent, current and reliable forecasting data to stakeholders to improve long-term projections in risk management and business continuity planning. Continue to support ongoing surface water monitoring through hydrometric networks, and temperature and climate prediction through weather forecasting.
8. Ensure a rapid response to emergencies by municipalities, provincial and federal governments. Review of government responses to extreme weather events, and that emergency response protocols are in place to respond rapidly and efficiently.
9. Ensure government policies and legal frameworks are flexible and responsive to reflect and adapt to the impacts that climate change has on policy objectives and desired outcomes. Policy outcomes enabled through legislation and/or regulation should remain flexible and adaptable over time (e.g., impact of climate change on biodiversity conservation objectives).

MINISTRY OF ENVIRONMENT
MEETING INFORMATION NOTE

September 15, 2016
File: 280-20
CLIFF/tracking #: 304081

PREPARED FOR: Fazil Mihlar, Deputy Minister, Climate Leadership

DATE AND TIME OF MEETING: September 30th, 8:30 am - 1:00 pm

ATTENDEES: Canadian Association of Petroleum Producers (CAPP), Deputy Ministers

ISSUE: A variety of climate-related topics.

BACKGROUND:

The Canadian Association of Petroleum Producers (CAPP) represents Canada's upstream oil and natural gas industry. Their stated goals are to enable the responsible growth of the sector and advocate for economic competitiveness and safe, environmentally and socially responsible performance.

On September 30, Deputy Ministers will meet with CAPP to discuss a wide variety of issues pertaining to the natural gas sector including markets, regulatory issues, the environment (including climate issues), royalties and taxation, First Nations and communities and Site C.

DISCUSSION:

Among the climate issues being discussed, three topics will be led or co-led by the Climate Action Secretariat—an update on the Climate Leadership Plan, the timing of greenhouse gas reporting requirements and "carbon tax as a percentage of commodity value".

On August 19, BC released its Climate Leadership Plan (the Plan). Among the Plan's 21 actions, three focus on the natural gas sector—methane reductions, electrification of the natural gas sector and development of a regulatory framework for carbon capture and storage (CCS).

In addition, the Plan also signalled that future incremental climate policy would be implemented following federal/provincial discussions. The Province is already working collaboratively with the federal government on a federal methane reduction regulation, which will achieve a 45% emission reduction, and ensuring policy is in place for the Province to achieve this level.

CAPP recently published a report, *A Partner in Climate Leadership*, which outlined the Association's views on effective climate policy. The report identified methane reductions, electrification of the sector and CCS as potential emission reduction opportunities. They highlight, though, that fiscal measures like royalty credits, offsets or electricity price adjustments may be necessary for the sector to competitively implement these policies. In its plan, the Province has facilitated methane reductions with the use of the Clean Infrastructure Royalty Credit and offsets. s.17

CAPP also wished to discuss the timing of greenhouse gas reporting deadlines. In response to industry concerns, BC moved its reporting deadlines two months later, to May 31, which is later or within one day of other Canadian deadlines. CAPP has also stated that the verification deadlines require flexibility, since some remote facilities are difficult for verifiers to access at some times of year. CAS has confirmed on its website that verification visits will be allowed in late fall when conditions necessitate it.

CAPP also wished to discuss "carbon tax as a percentage of commodity cost". Likely, CAPP is suggesting that the carbon tax be indexed to the natural gas price to support competitiveness. In its *A Partner in Climate Leadership* document, CAPP stated that there may be advantages to having variations in carbon price between sectors due to their different market and regulatory contexts.

Since 2008, the natural gas sector has faced a carbon tax, which rose to $30/tonne of carbon dioxide equivalent in 2012. During that same time the North American natural gas price (Henry Hub price) has fallen from $8.86 per million British Thermal Units to $2.62 in 2015. These two elements, although important, are only two factors that affect profitability and production of the sector. During that same time, industry has benefitted from lower costs due to BC royalty programs and from higher revenue from natural gas liquids from increased development of the Montney unconventional gas play. Based on market conditions, the sector, since 2008, has increased production by over 50%.

In 2013, BC also froze the size and scope of its carbon tax for five years to maintain the competitiveness of the Province's industries and to allow other sectors to "catch up" to its level of carbon price stringency.

SUGGESTED RESPONSE:

The Province is interested in CAPP's ideas for developing effective climate policy in BC. The Province is conscious of the need to balance economic and environmental considerations in its climate policy. For this reason it has adjusted its regulatory policies for the sector and developed fiscal policies, including freezing the carbon tax, to accommodate industry needs.

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Reviewed by	Initials	Date
DM		
DMO	TC	23-09-16
ADM	SLC	22/09/16
ED	TL	22/09/16
Dir./Mgr.	ND	16Sep16
Author	HP	20Sep16

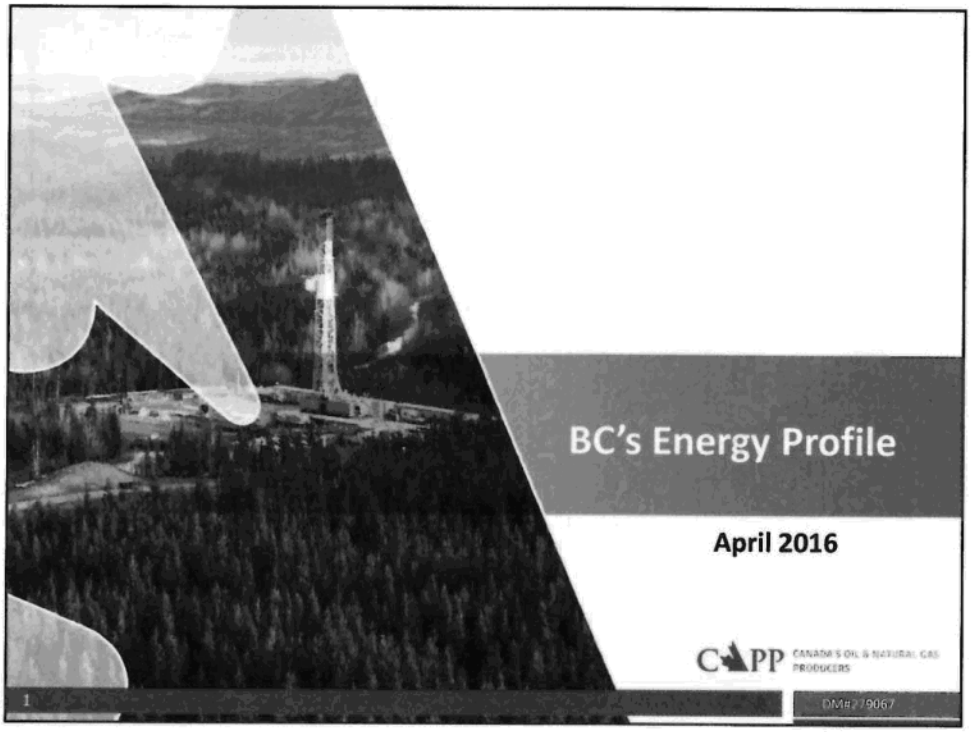
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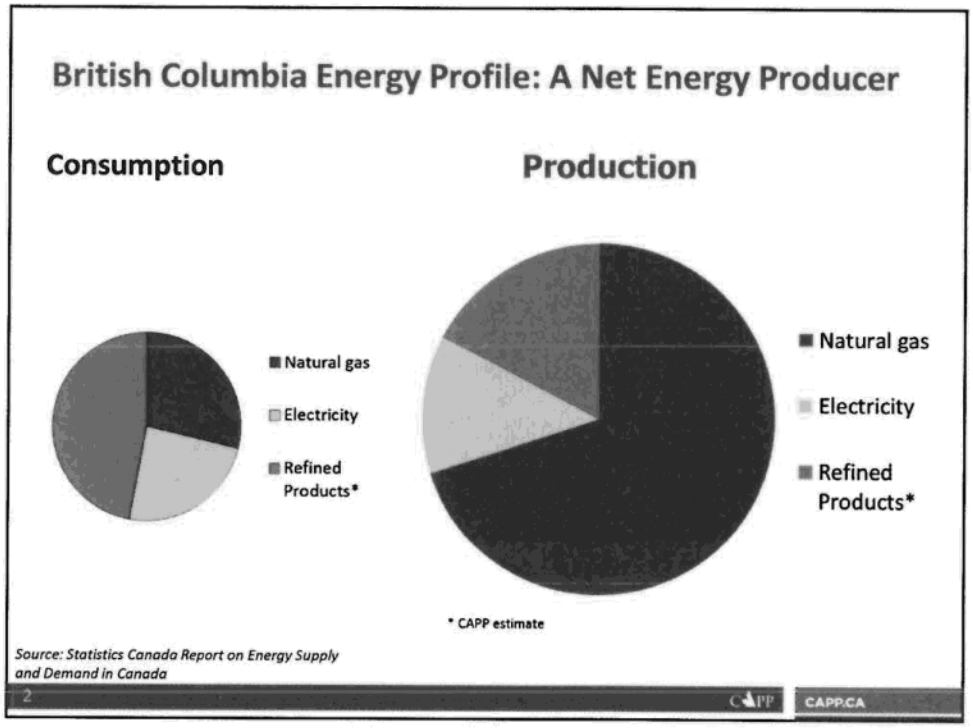
From: Morrison, Geoff <geoff.morrison@capp.ca>
Sent: Friday, April 15, 2016 11:17 AM
To: Mihlar, Fazil ENV:EX
Subject: British Columbias Energy Profile.ppt
Attachments: British Columbias Energy Profile.ppt

As promise – BC's Energy Profile slide in colour.

Geoff

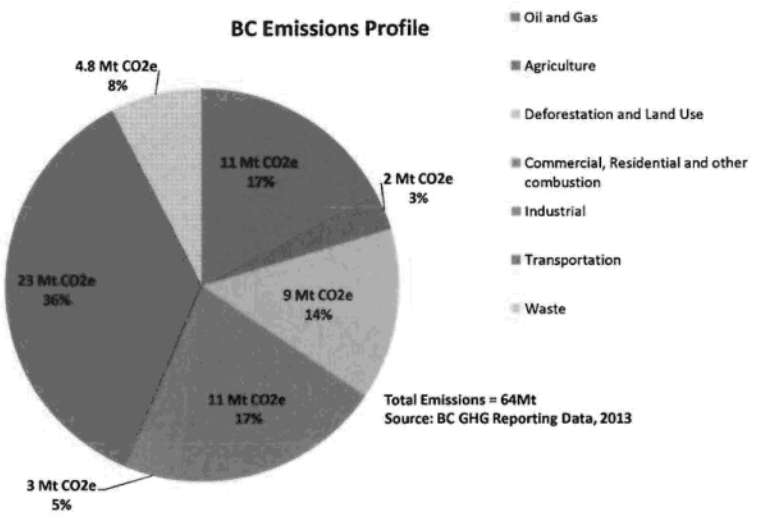
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BC's Energy Profile
April 2016
CAPP
CANADA'S OIL & NATURAL GAS PRODUCERS
1
DM#279067


British Columbia Energy Profile: A Net Energy Producer
Consumption
Production
Natural gas
Electricity
Refined Products*
Natural gas
Electricity
Refined Products*
* CAPP estimate
Source: Statistics Canada Report on Energy Supply and Demand in Canada
2
CAPP
CAPP.CA

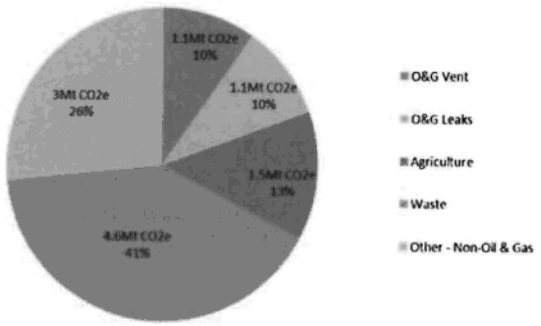
BC's GHG Profile: Context

Climate Policy Solutions: Economy-Wide Approach



Climate Policy Solutions: Province wide Methane

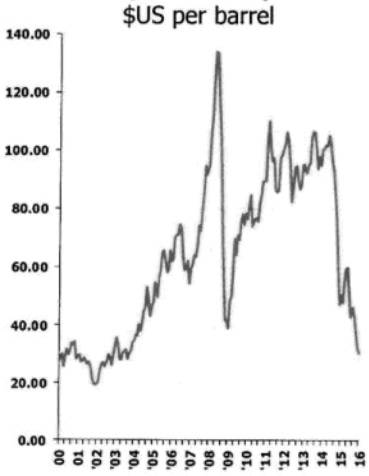
BC Methane Emissions Profile



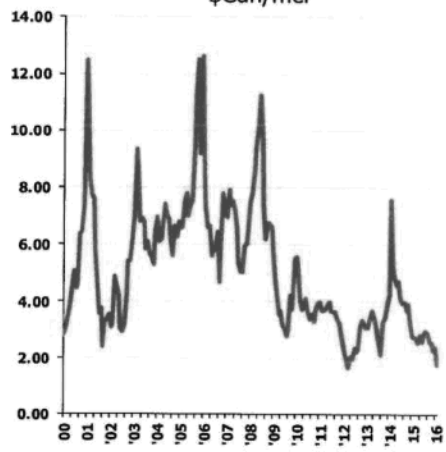
- **Vents and leaks (2.2 Mt) account for ~20% of BC's methane emissions and ~4% of BC's total emissions**

Current Commodity Price Declines Present a Real Challenge for Energy Producers

Crude Oil Prices
(WTI NYMEX)
$US per barrel

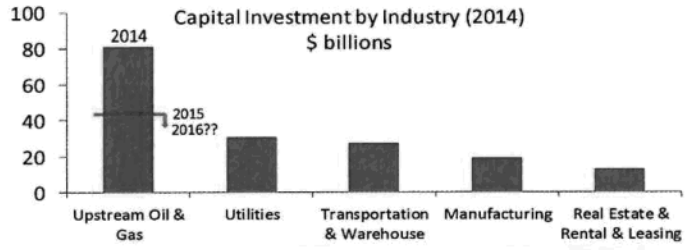


Natural Gas Prices
(AECO Daily Spot Price)
$Cdn/mcf



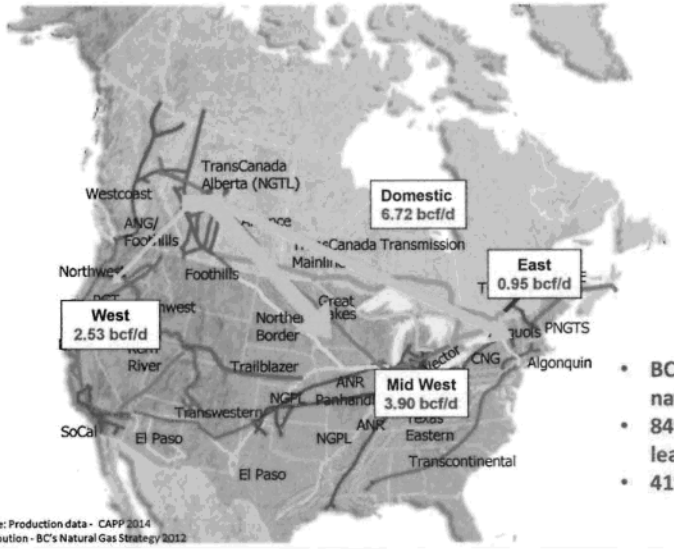
Declining Commodity Prices – Impact on Canadian Capital Investment

- Canadian capital investment down 41% ($33 billion) to $48 billion in 2015
  - Company announcements indicate further significant reduction this year
- Drilling down 49% (5,000 wells) from 2014 to 5,300 wells in 2015
  - Drilling to fall further in 2016 – 4,500 range
- Employment –
  - 450,000 direct & indirect
  - Announced layoffs
    - 44,000 direct, 105,000 direct & indirect



Source:: Statistics Canada

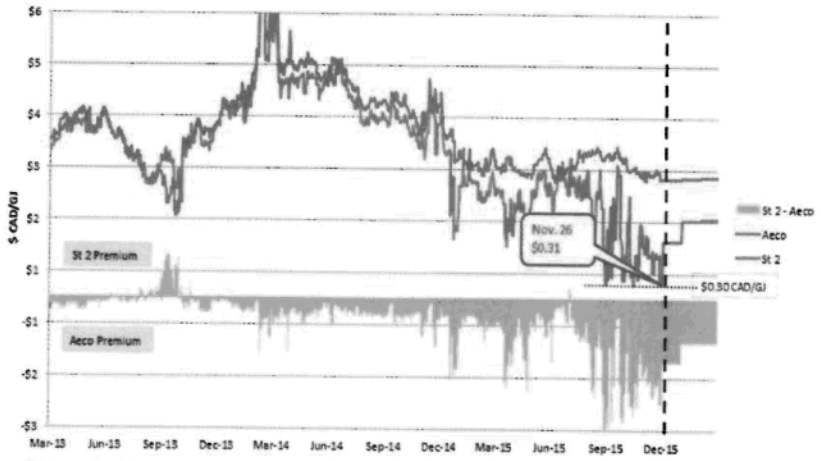
Trade Exposed: 2014 Disposition of Western Gas Production



Source: Production data - CAPP 2014
Distribution - BC's Natural Gas Strategy 2012

- BC produces 4.1 bcf/d of natural gas
- 84% of BC gas production leaves the province
- 41% exported to the USA

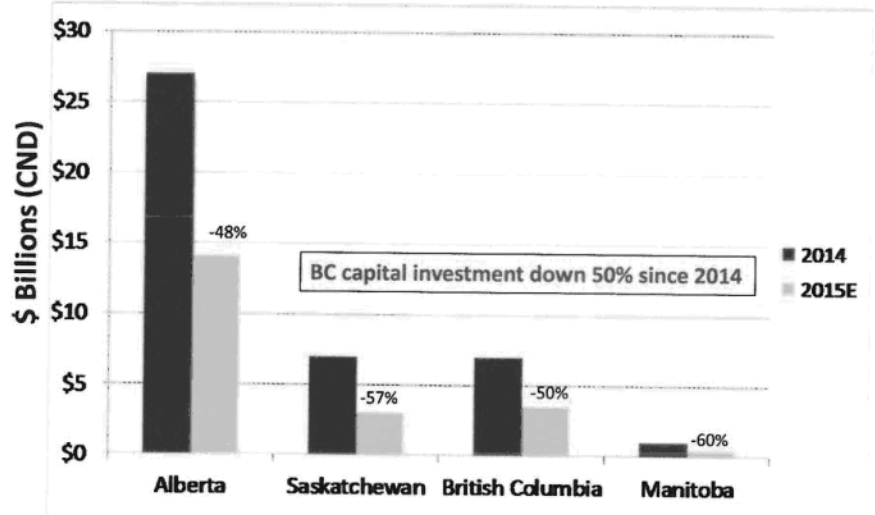
Station 2 Gas Trading at a Discount to AECO



Differential increasing:

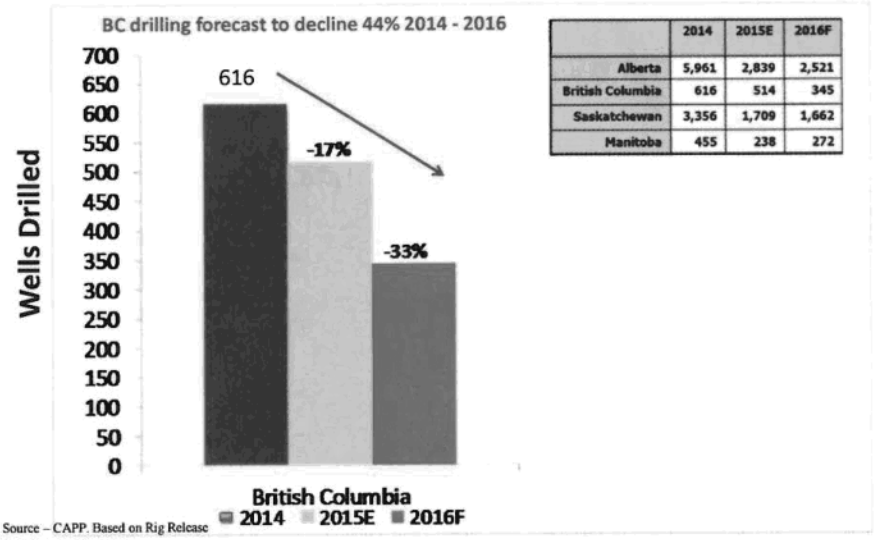
- January 2012 — June 2014 US$0.11 cents
- June 2014 – July 2015 US$0.39 cents
- August 2015 – Present US$1.11

Industry Capital Spending in Western Canada $Billions (Cdn)



Source – CAPP. Excludes spending on mergers and acquisitions
E=estimate; F=forecast

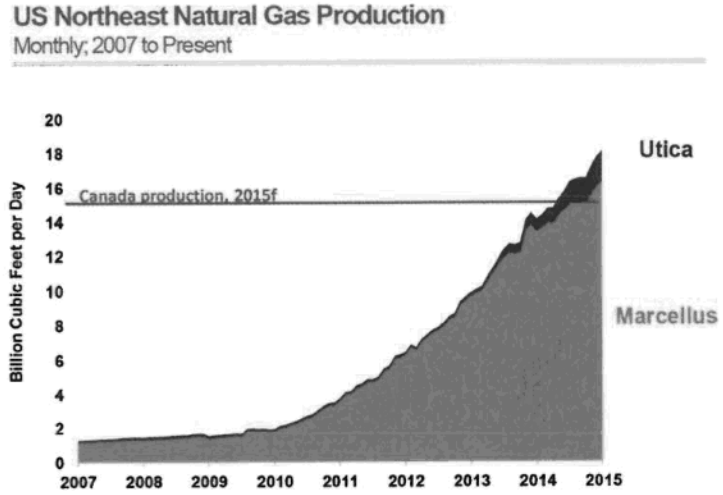
Total wells drilled in Western Canada by Province



	2014	2015E	2016F
Alberta	5,961	2,839	2,521
British Columbia	616	514	345
Saskatchewan	3,356	1,709	1,662
Manitoba	455	238	272

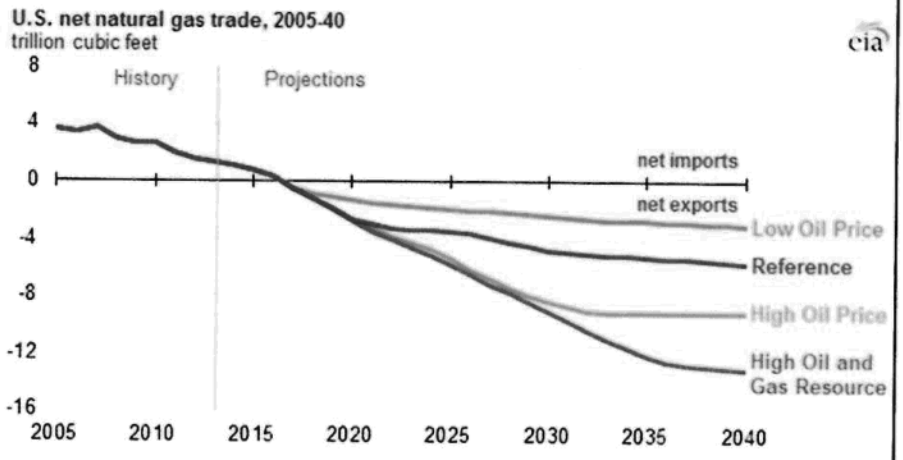
Source – CAPP. Based on Rig Release
E=estimate; F=forecast

US Natural Gas Production has significantly increased: The Marcellus now produces more than all of Canada



Source: EIA, ARC Financial Corp

United States a Net Exporter of Natural Gas by 2017



Source: EIA
http://www.eia.gov/todayinenergy/detail.cfm?id=20992

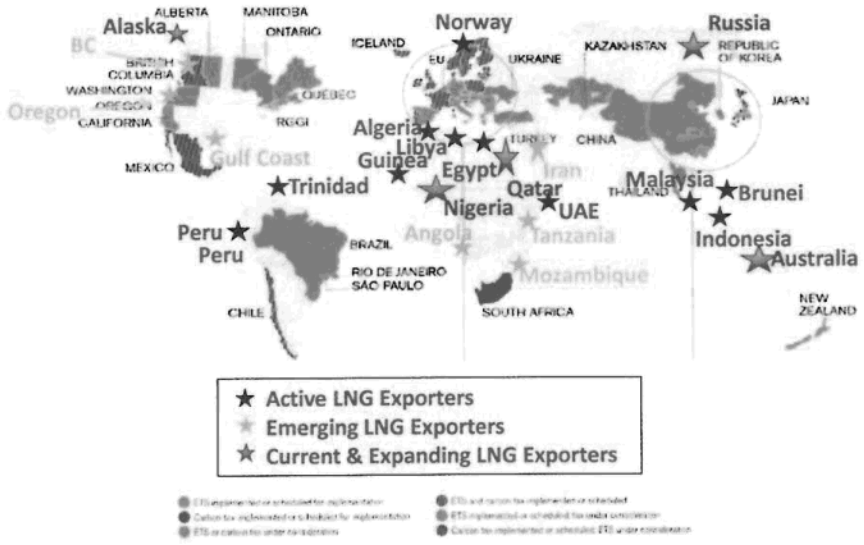
Comparative upstream oil and gas climate policies

BC has highest carbon price of all comparator jurisdictions

World Carbon Prices		
Jurisdiction	System	Price Per Ton
Alberta	End use carbon tax	**$0/tCO2 until 2023** $30/tCO2 post 2023
BC	**End use carbon tax**	**$30/tCO2**
RGGI (NE USA)	Cap and Trade	Auction Clearing Price March 2015 $6.1/tCO2
Texas	**No Carbon Price**	**$0/tCO2**
Pennsylvania	**No Carbon Price**	**$0/tCO2**
Oregon	**No Carbon Price**	**$0/tCO2**
EU	Cap and Trade	US$9/tCO2(Aug 1, 2015)
Australia*	**No Carbon Price**	**$0/tCO2**
California	Cap and Trade	**Full Exemption for Oil & Gas** Auction Clearing Price December 2015 $13/tCO2
Large Emitters Alberta & BC	Large final emitters (LFEs) Facility performance standard Product performance standard LNG performance standard (BC)	$20/tCO2 in 2017 $30/tCO2 performance standard in 2018 on $25/tCO2 (BC)

*Australia repealed its carbon tax in 2013

New Market Access for BC Natural Gas is Essential



Map source: BC Climate leadership Discussion July 2015 paper pg. 6

BC Upstream Natural Gas Summary

- **Challenged trade-market dynamics**
  - Canadian natural gas exports to U.S. down 29% since 2007
  - Canadian production down 13%, U.S. production up 42% since 2005
- **Challenged investment climate since 2014**
  - BC upstream investment down > 50%
  - AECO natural gas prices down 64%
  - AECO-Station 2 differential increased by 185%
- **Challenged carbon price position**
  - BC has highest carbon price of all comparator jurisdictions

Cameron, Tara D ENV:EX

From: Morrison, Geoff <geoff.morrison@capp.ca>
Sent: Monday, April 11, 2016 4:24 PM
To: Mihlar, Fazil ENV:EX
Subject: FW: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers
Attachments: Microsoft Word - CAPP_EDMS-#279029-v18-DRAFT_submission_to_BC_regarding_....pdf

Hi Fazil

FYI....

Geoff Morrison | Manager of British Columbia Operations
Victoria: 778.410.5040 | Cell: 250.634.4010| Calgary: 403.776.1409

From: Morrison, Geoff
Sent: Monday, April 11, 2016 3:26 PM
To: 'ENV.minister@gov.bc.ca'
Cc: Kapac de Frias, Martina E ENV:EX
Subject: May 16, 2016 - Victoria Meeting request - Canadian Association of Petroleum Producers

Dear Minister Polak:

I am writing to request a to review and discuss CAPP's feedback on the *Consultation Guide: Building B.C.'s Climate Leadership Plan* (please see attached document which was submitted April 8th, 2016). In addition to this feedback CAPP has been actively participating with government through the sectoral engagement process led by Deputy Minister Dave Nikolejsin at the Ministry of Natural Gas Development. CAPP would appreciate the opportunity to have a dialogue about our submission and the progress made during the sectoral engagement process. As the BC Government finalizes the development of its updated Climate Leadership Plan, CAPP believes it would be useful to have an opportunity to address any questions about the upstream industry's response. Furthermore, CAPP would like to highlight opportunities to reduce GHG through methane management programs, electrification and the importance of maintaining and enhancing competiveness to attract new investment for upstream development and potential LNG exports; creating jobs and developing BC's resources responsibly.

Attending the meeting from CAPP would be:

- Tim McMillian, CAPP President
- Michael Gatens, CAPP Chairman & CEO, Unconventional Gas Resources Canada
- Brad Herald, Vice President of Western Operations and
- myself, Geoff Morrison Manager of British Columbia Operations.

We are requesting a meeting on Monday May 16 in Victoria if possible. We will also be approaching other members of the *Cabinet Working Group on Climate Leadership* for meetings that same day.

Thank you for your consideration. Please contact me if you have any questions or need further information, my phone number in Victoria is (250) 634-4010.

Regards;

Geoff Morrison

Geoff Morrison | Manager of British Columbia Operations

CAPP CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS
Canada's Oil and Natural Gas Producers
| Cell: 250.634.4010| Calgary: 403.776.1409 | Website: www.capp.ca



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CANADIAN ASSOCIATION
OF PETROLEUM PRODUCERS

Canada's Oil and Natural Gas Producers

April 8, 2016

Honourable Mary Polak
Climate Leadership Consultation
Ministry of Environment Climate Action Secretariat
PO BOX 9486, STN PROV GOVT
Victoria B.C. V8W 9W6

via e-mail: climateleadershipplan@gov.bc.ca

Dear Minister Polak:

Re.: Feedback on BC's Climate Leadership Plan Consultation Guide

The Canadian Association of Petroleum Producers (CAPP) submits the following comments in response to the *Consultation Guide: Building B.C.'s Climate Leadership Plan*. CAPP appreciates the opportunity to provide our industry's perspective on addressing climate change in British Columbia as the province finalizes the development of the new Climate Leadership Plan.

It is clear that both generally and in the context of natural gas producing and LNG exporting jurisdictions that BC is a leader on carbon policy and addressing greenhouse gas (GHG) emissions. BC has a unique opportunity to help tackle global climate change by making LNG available to countries looking to move off of coal-fired power generation. We are firmly of the view that the economic benefits from responsible natural-gas production and export can be achieved while also meeting BC's ambitions to tackle global climate change.

CAPP supports a climate policy framework in British Columbia that creates a vibrant and competitive oil and gas sector while efficiently and effectively managing greenhouse gas emissions. To this end, CAPP provides the following key recommendations, aligned with the relevant sections of the Consultation Guide. These views remain consistent with CAPP's submission made to Government September 2015, in response to the Climate Leadership Plan Discussion Paper, which outlined the importance of competitiveness and supporting further emissions reductions opportunities for oil and gas, such as electrification and methane emissions reductions. [1]

***What We Value:* Protecting BC's Competitiveness & Minimizing Carbon Leakage**

From a competitiveness standpoint, BC's upstream natural gas industry faces significant challenges due to a continued low commodity price environment coupled with the unique challenges associated

[1] https://engage.gov.bc.ca/climateleadership/files/2015/12/179_-Canadian-Association-of-Petroleum-Producers.pdf

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with BC's resource plays. We recommend that the BC government consider how any climate policy initiatives undertaken by the province can not only preserve, but enhance the economic competitiveness of BC's upstream oil and gas sector to attract investment and create jobs. Carbon policy design requires full cost accounting of options when evaluating the cumulative burden across policies and regulations in order to prevent further deterioration of industry competitiveness and to minimize the risk of carbon leakage to competing jurisdictions. We offer the following carbon policy recommendation for how to minimize both carbon and investment leakage from BC.

Carbon Tax

The CLT recommended increases to the current $30/tonne carbon price commencing in 2018. Applying additional increases to our sector would further diminish competitiveness of the natural gas industry and increase the risk of carbon leakage to competing jurisdictions. Economic competitiveness is of paramount importance to ensure the industry is able to thrive, attract new investment, create jobs and generate revenues for government.

Emission-Intensive, Trade-Exposed (EITE)

CAPP strongly supports the efforts of the Government of BC to protect EITE industries. On November 27, 2015, Minister Polak stated that the province would only consider changes to its carbon tax under a regime where EITE industries are "fully protected from any carbon tax increase."

CAPP fully supports the government's position to protect EITE industries, and believes the upstream industry clearly qualifies as an EITE industry.

Given BC's strong leadership on carbon pricing, applying further increases in BC's carbon price to our sector without full protection would further impair the competitiveness of the province's oil and gas sector, especially in the current low price environment when operating margins are already suppressed. An EITE policy applied to carbon price increases would recognize the importance of managing inter-jurisdictional competitiveness, until the carbon policies in key trading jurisdictions are equivalent and/or aligned in level of effort and price. Additional policy principles are provided in the Appendix.

The Way We Work: GHG Emissions Reduction Opportunities

CAPP is looking forward to engaging with the B.C. government in the development of the province's Climate Leadership Plan to meaningfully address GHG emission from upstream oil and natural gas activities while enhancing the overall competiveness of the industry in British Columbia. The following section provides recommendations on key emissions reductions opportunities from our industry.

Electrification

The consultation guide references the Climate Leadership Team's recommendation 14 to supply clean electricity for the electrification of the upstream industry in a competitive and timely manner.

CAPP believes competitive electrification of the upstream will help BC move toward its provincial GHG reduction targets, representing a foremost opportunity for significant GHG mitigation for the oil and gas sector in BC. Based on our sector's experience, there exists two significant risks to competitive electrification: Reliable and timely in-service transmission capacity; and economic considerations related to rates and tariffs. Practical work is required by BC Hydro and government to work with our sector to align business processes and to find equitable means to balance risks.

Methane

In 2013, upstream oil and gas methane emissions accounted for approximately 20 per cent of BC's total methane emissions. CAPP is committed to making reductions to methane emissions and recommends the following, taking care that responses to each of these demonstrate leadership in seeking alignment with Canada, other provincial jurisdictions and, where appropriate, with competing jurisdictions like the US:

- Applying enhanced regulated standards to new facilities and a regulated standard of practice for leak detection and repair (LDAR) of fugitive equipment leaks; building on existing LDAR requirements.
- A market-based approach to achieve a specified reduction target using fiscal measures focused on reductions from legacy methane emissions sources installed at existing facilities.
- A specific reduction target for vented and fugitives sources at existing facilities that is ambitious yet achievable with the appropriate policy and fiscal mechanisms in place to provide industry with a pathway to achieve the specified reductions. In addition, this target should align appropriately with other provincial and federal goals, including Alberta's Climate Leadership Plan.

CAPP believes properly designed and prescribed programs will achieve greater reductions than those that would be achieved through a carbon tax approach, which increases operating costs and could discourage needed investment in BC. Consequently, CAPP does not at this time support recommendations to increase the rate or scope of the BC carbon tax, as applied to our sector, and believes that all uncombusted methane should be exempt from carbon tax to enable reductions using the market-based mechanisms above. For legacy assets, a market-based approach to achieving a specified methane emissions reduction target is critical to mitigate the costs of retro-fitting industry's inventory of existing equipment to lower emitting devices.

Fiscal Measures

To incent methane emissions reductions, and to incent greater uptake in electrification, a viable path forward hinges on the development of fiscal mechanisms to enable investment. Given the current competitiveness pressures on our sector (including the cost burden of the carbon tax), industry and government will need to work together on ways to improve the economic value of emission reduction projects. By doing so will contribute to more reductions being achieved.

The following fiscal measures should be considered further by the BC government for application by the industry to emissions reductions opportunities:

- *Offsets*: Could be achieved via BC government guaranteed/targeted purchase of offsets, to provide certainty around supply and price, and/or enabling linkages to other offset markets, to expand demand for BC offsets.
- *Carbon compliance certification*: Reduction in carbon tax payable based on emission reductions achieved.
- *Clean infrastructure royalty credit program*: Investing in innovation and technology will enable BC to reduce emissions while also creating and maintaining jobs. CAPP recommends that the province create a broad clean royalty infrastructure credit program that would support investments in infrastructure/technology to reduce methane emissions. A royalty credit program would contribute to investment economics supplemented by fiscal support through offsets or compliance certificates.

In conclusion, BC needs to find the balance so that it can be both a strong world leader in the fight against climate change and a more competitive place to invest in oil and gas. Climate policy should be designed to focus on targeted emissions reductions through enhanced technology investment and deployment, enable flexible compliance options and prioritize economic competitiveness in order to simultaneously enhance competiveness, attract new investment, while achieving the emissions performance objectives. Going forward industry and government will need to work together to achieve greater GHG reductions in a way that can support or enhance industry's competitiveness. We believe a significant opportunity does exist and can be supported by BC in its climate action plan by: designating EITE industries, supporting upstream electrification, and providing the fiscal mechanism that will enable methane emission reductions. CAPP is committed to working together to find ways to help achieve BC's emissions reduction targets while continuing to grow the economy.

Sincerely,

Brad Herald

Brad Herald
Vice-President, Western Canada

Cc: Hon. Rich Coleman, Minister of Natural Gas Development
Hon. Michael de Jong, Minister of Finance
Hon. Shirley Bond, Minister of Jobs, Tourism and Skills Training and Responsible for Labour
Hon. Todd Stone, Minister of Transportation and Infrastructure
Hon. Peter Fassbender, Minister of Community, Sport and Cultural Development and Responsible for TransLink

CANADIAN ASSOCIATION
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Canada's Oil and Natural Gas Producers

April 8, 2016

Appendix: Emission-Intensive, Trade-Exposed (EITE) Policy Design Principles

Currently, many different carbon management regimes around the world utilize an emission-intense trade-exposed (EITE) methodology to determine the need to protect industries competiveness and minimize carbon leakage under carbon pricing policies. The EITE designation serves to recognize those segments of the economy that represent a leakage risk, whereby investment could shift jurisdiction with less stringent carbon policies providing no gain in global GHG reductions but shrinking economic benefit for BC through loss of investment, jobs and government revenue.

CAPP has worked with industry associations along the natural gas value-chain in British Columbia to consider other jurisdictions' EITE methodologies and develop policy design principles for EITE. Through this effort, the following principles have been established and should be part of a BC mechanism for EITE determination:

- *Fair and transparent*, creating competitive parity across competing jurisdictions.
- *Science-based*, with a strong analyses and understanding of implications in practice.
- *Clear, predictable and simple to administer*, with clear and established processes for review of EITE protection.
- *Cost-efficient*, offsetting the difference in incremental carbon price that exists between competing jurisdictions.
- *Balanced and efficient*, recognizing the totality of emissions policies on industry.
- *Viable*, with readily available compliance pathways that support open market mechanisms.
- *Consistent with developing a clean LNG industry*, achievable within the context of a growing and transitioning lower carbon economy.
- *Recognizes the risk of carbon leakage*, and that BC is currently a world leader in carbon price and industry emissions regulations.
- *Does not disadvantage BC natural gas producers*, in existing North America markets and in emerging international markets.

Using these principles as a framework for EITE policy design, CAPP looks forward to working further with the BC government to further develop a BC solution to EITE determination and application.

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Page 134 to/à Page 141

Withheld pursuant to/removed as

s.16;s.17

Page 142 to/à Page 144

Withheld pursuant to/removed as

s.17

Cameron, Tara D ENV:EX

From: Dunn, Richard <Richard.Dunn@EnCana.com>
Sent: Sunday, August 7, 2016 11:17 AM
To: Nikolejsin, Dave MNGD:EX
Cc: Mihlar, Fazil ENV:EX; bill.werry@gov.ab.ca; Ferguson, Alex (alex.ferguson@capp.ca)
Subject: s.16

s.16

thx

Richard Dunn
Vice President, Canadian Government Relations t 403.645.6729 c 403.512.6440

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encana.com

-----Original Message-----
From: Nikolejsin, Dave MNGD:EX [mailto:Dave.Nikolejsin@gov.bc.ca]
Sent: Sunday, August 07, 2016 11:48 AM
To: Dunn, Richard <Richard.Dunn@EnCana.com>
Cc: Mihlar, Fazil ENV:EX <Fazil.Mihlar@gov.bc.ca>; bill.werry@gov.ab.ca; Ferguson, Alex (alex.ferguson@capp.ca) <alex.ferguson@capp.ca>
Subject: s.16

Would be better if you sent your comments to ECCC and copied us.

Dave Nikolejsin
Deputy Minister
Natural Gas Development

On Aug 7, 2016, at 9:06 AM, Dunn, Richard <Richard.Dunn@EnCana.com<mailto:Richard.Dunn@EnCana.com>> wrote:

Hi all
s.16

thx, Richard

States, industry groups file lawsuits to overturn US EPA methane rules
314 words
August 3, 2016
Platts Commodity News
English
Copyright 2016. Platts. All Rights Reserved.
At least 15 states and dozens of oil and gas organizations have sued the US Environmental Protection Agency over rules to reduce methane emissions at new oil and natural gas sites.

On Wednesday, the Independent Petroleum Association of America, the American Exploration and Production Council and 17 other trade groups announced they had filed suit against EPA's methane rules, which were finalized in May.
The lawsuit was filed Tuesday in the US Court of Appeals for the District of Columbia, as was a similar lawsuit from West Virginia Attorney General Patrick Morrisey which argued that EPA's methane rules were unnecessary and burdensome.
"The rules are a solution in search of a problem and ignore the industry's success in voluntarily reducing methane emissions from these sources to a 30-year low," Morrisey said in a statement.
The lawsuit was backed by Alabama, Arizona, Kansas, Kentucky, Louisiana, Montana, Ohio, Oklahoma, South Carolina and Wisconsin; Michigan Attorney General Bill Schuette, a Republican; the Kentucky Energy and Environment Cabinet; and the North Caroline Department of Environmental Quality.
The lawsuit follows previous suits filed by Texas and North Dakota seeking to overturn the rules.
In addition, the American Petroleum Institute, GPA Midstream Association, Interstate Natural Gas Association, Texas Oil and Gas Association and Western Energy Alliance have all filed petitions against the EPA rules.
The EPA's rules are primarily aimed at capturing emissions using existing controls and providing incentives for well owners to fix leaks. Under the rules, owners and operators of new hydraulically fractured and refractured oil wells would be required to capture methane emissions through green completions that separate gas and liquid hydrocarbons from flowback that comes from the well.
The regulations are expected to form the basis of the EPA's future efforts to regulate methane emissions from existing wells, which likely will fall to the next administration.

Richard Dunn
Vice President, Canadian Government Relations
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Page 147 to/à Page 159

Withheld pursuant to/removed as

s.16;s.17

Cameron, Tara D ENV:EX

From: Dunn, Richard <Richard.Dunn@EnCana.com>
Sent: Sunday, September 18, 2016 12:15 PM
To: Mihlar, Fazil ENV:EX
Cc: Ferguson, Alex (alex.ferguson@capp.ca)
Subject: Draft summary information as discussed
Attachments: Summary table slides v5.ppt

Hi

As well we are pulling together a timeline as to what reductions would look like over time.....give me a call if you'd like to discuss further.....I let Alex know that I would be sending this your way

thx

Richard Dunn
Vice President, Canadian Government Relations
t 403.645.6729
c 403.512.6440

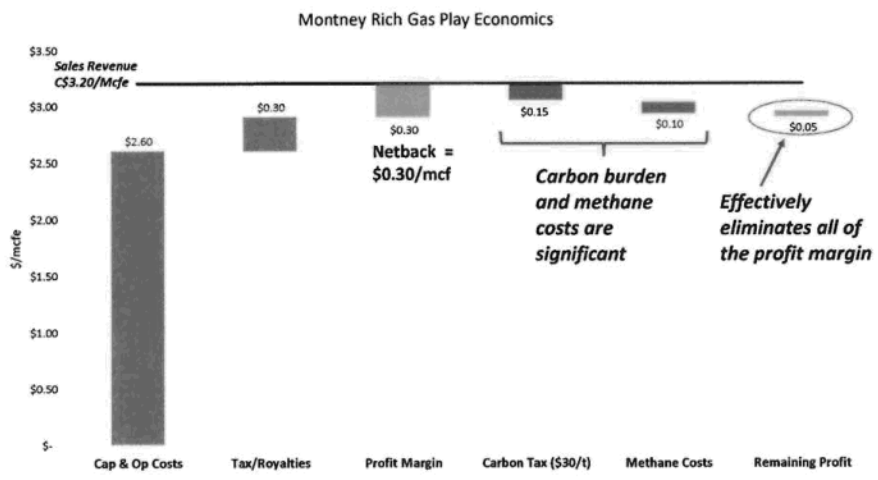
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Page 161

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s.17

Competitiveness
Impact of Carbon & Methane Burdens



Sales revenue basis:
C$2.50/Mcf AECO
C$50/bbl Edmonton

CAPP CAPP.CA

2016 CAPP BC EPG – BC Deputy Ministers Meeting

WITH COMMENTARY FOR MINISTRIES' STAFF IN RED

September 30th, 2016 – 8:30 am to 1:00 pm

Hotel Grand Pacific - Galiano Room - Victoria, BC

Agenda

1. Welcome remarks from MNGD's Deputy and CAPP (MNGD)
2. Introductions/Roundtable (ALL)
3. State of the Industry – CAPP presentation (CAPP)
4. Review of 2015 "Matrix" (Geoff Morrison with government staff's comments as needed)
5. Markets
    a. Eastern Access to Western natural gas (CAPP opens – MNGD leads)
    b. Value added opportunities (CAPP opens – MNGD leads)
6. Regulatory
    a. Induced seismicity (including ground motion regulatory requirements) (CAPP opens – OGC leads)
    b. Liability management (Redwater) (CAPP opens – OGC/MNGD lead)
7. Environmental
    a. Land:
        i. Caribou (ENV provides an update)
        ii. Cumulative effects related initiatives (RSEA, ESI etc.) (FLNRO provides an update an clarifies how they relate)
    b. Climate:
        i. BC Climate Action Plan update (CAS leads)
        ii. Clean Infrastructure Royalty Credit Program (MNGD leads)

iii. Upstream electrification (MEM leads)
iv. Methane management (MNGD/OGC lead)
v. GHG reporting timelines (timing poor in the year and creates burden) (CAS update on timelines_
vi. Carbon tax as a % of commodity value (CAPP frames concern / MNGD-CAS lead)

c. Update on Condition 5, Land Based Spill preparedness and response (PRO) (ENV leads)
d. Water Sustainability Act regulations (ENV leads)
e. Changes to Reviewable Projects Regulation (sweet gas plants) (EAO leads)

8. Taxation and Royalties
   a. BC Commission on Tax competitiveness (FIN update)
   b. Petrinex status update (MNGD/FIN/OGC update – MNGD leads)
   c. Oil Royalty Program Needs (MNGD leads)

9. First Nations and communities
   a. Blueberry River First Nations injunction – status and update on government's strategy (MARR provides update)
   b. General update on FN negotiations in T8 area (MARR provides update)
   c. NEBC communities – managing the economic downturn (CAPP comments/MNGD leads response)

10. Other matters

11. Closing remarks

Page 165 to/à Page 167

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s.17

Cameron, Tara D ENV:EX

From: Piccinino, Ines MNGD:EX
Sent: Wednesday, November 9, 2016 9:02 AM
To: Mihlar, Fazil ENV:EX
Subject: FW: Methane update 2016-11 (002).pptx
Attachments: Methane update 2016-11 (002).pptx

s.16

From: Dunn, Richard [mailto:Richard.Dunn@EnCana.com]
Sent: Wednesday, November 9, 2016 8:38 AM
To: Mihlar, Fazil ENV:EX
Cc: Dunn, Richard; Monaghan, Nadia; Piccinino, Ines MNGD:EX; 'vicki.ballance@capp.ca' (vicki.ballance@capp.ca); XT:Sian, Sherry FLNR:IN
Subject: Methane update 2016-11 (002).pptx

Hi Fazil

As discussed when we got together a week or so ago I'm sharing a revised couple of slides that we pulled together that better show the cost effectiveness of CAPP and ECCC proposals for LDAR and Compressor vent. Note the absolute cost impact would be to industry on a $ mm / yr

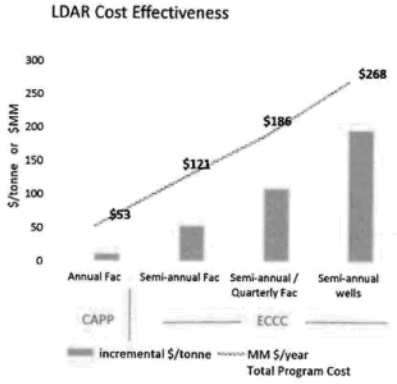
Effectively the same information that has been provided previously, with perhaps a bit better formatting to make a bit more clear (hopefully!)

Let me know if you have any questions or feedback

Thx, Richard

Fugitive Emissions (LDAR): CAPP Proposal

- As proposed by ECCC, LDAR estimated to cost industry ~ $270 mm/year
  - Associated operational and safety impacts (driving)
- CAPP alternative proposal (annual inspections at facilities), would cost ~ $50MM/year, with acceptable environmental outcomes
- Industry is committed to early action / wins delivered through voluntary LDAR,
  - Federal regs signaled for 2020; currently developing voluntary industry approach for early action with associated significant reductions expected
- Performance improvements, emerging technologies, are expected to provide increased emissions reductions over time

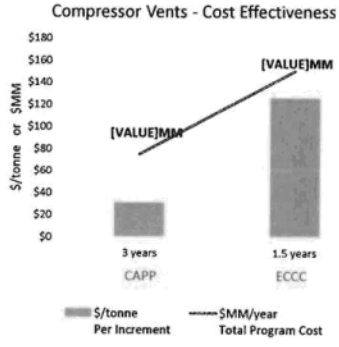


Proposal eliminates components that are inefficient with current technology, including:
- Wells at ~ 180 $/tonne
- Incremental cost of facilities inspections in the range of $50 - $100 + /tonne

1

Compressor Vents: CAPP Proposal

- As proposed, ECCC threshold is expected to require rod packing replacement at 1-2 years, with an associated operating cost of $150 mm/year
  - Associated significant operational impacts - annual measurement, lost production, emissions & safety considerations with replacement procedures
- CAPP alternative proposes set 36 months replacement time, with possibility to extend with optional testing at 3 years
- Benefits:
  - Total cost halved to $75mm/year ($30mm/yr incremental from current practice of 5 year replacement target)
  - Will deliver acceptable emissions reductions for this source (40% vs 60% as ECCC proposed)
  - Aligns with CDN operating practices
  - Consistent with US EPA requirements



Incremental cost of ~ 125 $/tonne moving from 3 year (CAPP) to 1.5 year replacement (ECCC) packing cycle

CAPP proposal maintains acceptable emissions reductions at $30/tonne

Page 170

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Cameron, Tara D ENV:EX

From: Dunn, Richard <Richard.Dunn@EnCana.com>
Sent: Friday, November 11, 2016 10:36 AM
To: Mihlar, Fazil ENV:EX
Cc: Dunn, Richard
Subject: CAPP EITE jurisdictional methodology review
Attachments: CAPP_EDMS-#280660-Final April 15 2016_Submission_to_Dave_Nikolejsin_MGND....pdf

Hi Fazil

When we were chatting a couple of weeks back I said I would send you the CAPP scan of various EITE qualification methodologies. As outlined in the attached letter sent earlier this year to DM Dave Nikolejsin (see Appendix starting on page 13) typically EITE qualification is a test of a sector's emission intensity, carbon burden and trade exposure

CAPP provided the review for the EU, Australia and California. Further CAPP tested the various methodologies and came to the conclusion that the BC NG industry would qualify for emissions intense / trade exposed status in each jurisdiction.

Hope this helps / talk soon

Richard

Richard Dunn
Vice President, Canadian Government Relations
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c 403.512.6440

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CAPP
CANADIAN ASSOCIATION
OF PETROLEUM PRODUCERS
Canada's Oil and Natural Gas Producers

April 15, 2016

Dave Nikolejsin
Deputy Minister
Ministry of Natural Gas Development
PO Box 9319, Stn Prov Govt
Victoria, BC V8W9N3

Dear Mr. Nikolejsin:

Re.: Development of BC's new Climate Leadership Plan

The Canadian Association of Petroleum Producers submits the following summary of discussions reached during sectoral discussions lead by the Ministry of Natural Gas Development December 2015 through March 2016. These discussions initiated from the release of the Climate Leadership Team's Recommendation Report and the Consultation Guide: Building BC's Climate Leadership Plan. CAPP appreciates the opportunity to provide our industry's perspective on addressing climate change in British Columbia as the province finalizes the development of the new Climate Leadership Plan.

It is clear that both generally and in the context of natural gas producing and LNG exporting jurisdictions that BC is a leader on carbon policy and addressing greenhouse gas emissions. CAPP supports a climate policy framework in British Columbia that creates a vibrant and competitive oil and gas sector while efficiently and effectively managing greenhouse gas emissions. To this end, CAPP has developed the following principles to guide climate policy development:

- Balanced "3E" policy should deliver economic growth, environmental protection, and a secure and reliable energy supply.
- Policy should be designed to drive efficient actions to achieve emission objectives.
- Policy should maintain competitiveness of Canadian industry; ensure compatibility with major trading and economic partners (particularly with the U.S., our largest trading partner).
- Policy should stimulate and support investment in the technologies necessary for significant reductions in GHG emissions in Canada.
- Predictable policy built on stable principles should support long term capital investments in the upstream oil and gas sector and create jobs for Canadians.
- Compliance should be achievable within the context of growing production.

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- Policy should be harmonized across jurisdictions within Canada, to an extent that is both reasonable and practical.
- Policy should be simple and minimize the administrative burden on industry to the greatest extent possible.
- Policy should distribute cost burden equitably among sectors and jurisdictions across the economy.

In consideration of these guiding principles, we recommend that the BC government consider how any climate policy initiatives undertaken by the province can not only preserve, but enhance the economic competitiveness of BC's upstream oil and gas sector to attract investment and create jobs. This requires full cost accounting of policy options when evaluating the cumulative burden across policies and regulations.

And while applying these principles, it is beneficial to understand the sources of BC's GHG emissions. In July 2015, the BC government produced a *Climate Leadership Plan* discussion paper in preparation for updating its Climate Leadership Plan in 2016. That discussion paper summarized the provincial emission inventory that consisted of 64 million tonnes of CO_2e in 2013. Energy consumption in the form of fuel for personal and commercial transportation and heating represented some of largest propositions of provincial GHG emissions. The upstream oil and gas industry accounted for 8.6 million tonnes, or 13.4% of the province's total emissions[1]. We must work together to find a ways to help develop climate policy that achieves BC's emissions reduction targets by considering all emissions sources, but protects and grows the economy.

We offer the following input and considerations to your ministry on how our industry can work with your government within the new Climate Leadership Plan. Further details on each section below may be found in the attached appendices. We have also included an appendix detailing on which of the Climate Leadership Team's recommendations we are offering context and input.

1. Protecting Industry Competitiveness & Minimizing Carbon Leakage

From a competitiveness standpoint, BC's upstream natural gas industry faces significant challenges due to a continued low commodity price environment coupled with the unique challenges associated with BC's resource plays. We recommend that the BC government consider how any climate policy initiatives undertaken by the province can not only preserve, but enhance the economic competitiveness of BC's upstream oil and gas sector to attract investment and create jobs. Carbon policy design requires full cost accounting of options when evaluating the cumulative burden across policies and regulations in order to prevent further deterioration of industry competitiveness and to minimize the risk of carbon leakage to competing jurisdictions. We offer the following carbon policy recommendation for how to minimize both carbon and investment leakage from BC.

[1] http://engage.gov.bc.ca/climateleadership/files/2015/07/ClimateLeadershipPlanDiscussionPaper.pdf

Carbon Tax

Additional increases in the current price of $30/tonne as applied to our industry would further diminish our competitiveness and increase the risk of carbon leakage to competing jurisdictions. Economic competitiveness is of paramount importance to ensure the industry is able to thrive, attract new investment, create jobs and generate revenues for government. Thus, in general CAPP could not endorse an increase in the carbon tax applied to our industry until other competing jurisdictions, domestic and international, act to align with BC with regards to climate and carbon policy and there is leveled operating and investment environments.

Emission-Intensive, Trade-Exposed (EITE)

CAPP strongly supports the efforts of the Government of BC to protect EITE industries. On November 27, 2015, Minister Polak stated that the province would only consider changes to its carbon tax under a regime where EITE industries are "fully protected from any carbon tax increase."

CAPP fully supports the government's position to protect EITE industries, and believes the upstream industry clearly qualifies as an EITE industry.

Any further increases in BC's carbon price relative to other jurisdictions would further impair the competitiveness of the province's natural gas sector, especially in the current low price environment when operating margins are already suppressed. An EITE policy applied to carbon price increases would recognize the importance of managing inter-jurisdictional competitiveness, until the carbon policies in key trading jurisdictions are equivalent and/or aligned in level of effort and price. CAPP has included in Appendix A and A1 a fulsome discussion on the competitiveness pressures facing our industry and the importance of implementing a BC EITE policy as a component of the new Climate Leadership Plan. (See separate slide deck on BC Climate Leadership and Upstream Competitiveness – January 2016)

2. Emissions Reductions Opportunities: Methane & Electrification

We believe the province and the upstream natural gas industry have a common interest in developing British Columbia's natural gas resources and to become the LNG supplier of choice for nations looking for economic alternatives to using more GHG-intensive fuels. We believe Canada's natural gas producers have an important contribution to make in helping reduce the carbon intensity of the planet's growing primary energy demand.

CAPP has proactively engaged with the BC government in the development of the province's Climate Leadership Plan to meaningfully address GHG emission from upstream oil and natural gas activities while enhancing the overall competiveness of the industry in British Columbia. We put forward the following opportunities for achieving further reductions in emissions from the upstream natural gas industry, in response to respective recommendations made by the Climate Leadership Team.

2.1. *Electrification*

The consultation guide references the Climate Leadership Team's recommendation 14 to supply clean electricity for the electrification of the upstream industry in a competitive and timely manner. CAPP believes cost competitive electrification of the upstream will help BC move toward its provincial GHG reduction targets, representing a foremost opportunity for significant GHG mitigation for the oil and gas sector in BC. Based on our sector's experience, there are three risk to competitive electrification; reliable and timely in-service transmission capacity; economic considerations related to electricity rates and tariffs and regulatory certainty with regard to those tariffs and regulations. Practical work is required by BC Hydro and government to work with our sector to align business processes and to find equitable means to balance risks.

Appendix B, attached, contains a comprehensive summary of how our industry and the BC government can work together to ensure electrification becomes a leading choice for our industry in powering our facilities into the future. (See attached separate slide deck - BC Climate Action Plan Electrification Support Slide appendix.)

2.2. *Methane*

In 2013, upstream oil and gas methane emissions accounted for approximately 20 per cent of BC's total methane emissions. CAPP believes all sources of methane may be able to find reductions, but agrees with aspects of the CLT's recommendation #15 that there are opportunities to achieve methane emissions reductions from the oil and gas industry.

CAPP is committed to making reductions to methane emissions and recommends the following, taking care that responses to each of these demonstrate leadership in seeking alignment with Canada, other provincial jurisdictions and, where appropriate, with competing jurisdictions like the US:

- Applying regulated standards to new facilities and a regulated standard of practice for leak detection and repair (LDAR) of fugitive equipment leaks
- A market-based approach to achieve a specified reduction target using fiscal measures focused on reductions from legacy methane emissions sources installed at existing facilities.
- A specific reduction target for vented and fugitives sources at existing facilities that is ambitious yet achievable with the appropriate policy and fiscal mechanisms in place to provide industry with a pathway to achieve the large scale reductions. In addition, this target should align on an outcomes basis with other provincial and federal goals, including Alberta's Climate Leadership Plan.

Appendix C, attached, provides more details on CAPP's support for these methane reduction measures within BC's new Climate Leadership Plan.

Additionally, CAPP believes properly designed and prescribed programs will achieve greater reductions than those that would be achieved through a carbon tax approach, which increases operating costs and could discourage needed investment in BC.

Consequently, CAPP does not at this time support recommendations to increase the rate or scope of the BC carbon tax as applied to our industry, and believes that all uncombusted methane should be exempt from carbon tax to enable reductions using the market-based mechanisms above.

2.3. *Fiscal Measures*

To incent methane emissions reductions, and to incent greater uptake in electrification, a viable path forward hinges on the development of fiscal mechanisms to enable investment. Given the existing competitiveness pressures on our sector (including the current cost burden of the carbon tax), industry and government will need to work together on ways to improve the economic value of emission reduction projects. By doing so will contribute to more reductions being achieved.

CAPP advocates for BC to enable methane emissions reductions from the natural gas industry using hybrid approach, as mentioned above. For legacy assets, a market-based approach to achieving a specified methane emissions reduction target is critical to mitigate the costs of retro-fitting industry's inventory of existing equipment to lower emitting devices.

The following fiscal measures should be considered further by the BC government for application by the industry to emissions reductions opportunities:

- *Offsets*: Could be achieved via BC government guaranteed/targeted purchase of offsets from the upstream, to provide certainty around supply and price, to expand the offsets market in BC and/or enabling linkages to other offset markets. More details on CAPP's position on the offsets markets may be found in Appendix D.
- *Carbon compliance certification*: Reduction in carbon tax payable based on emission reductions achieved.
- *Clean infrastructure royalty credit program*: Investing in innovation and technology will enable BC to reduce emissions while also creating and maintaining jobs. CAPP recommends that the province create a broad clean royalty infrastructure credit program that would support investments in infrastructure/technology to reduce methane emissions. A royalty credit program would contribute to investment economics supplemented by fiscal support through offsets or compliance certificates.

In conclusion, BC needs to find the balance so that it can maintain is climate leadership and be a competitive place to attract investment to develop its oil and gas resources to create jobs and wealth for British Columbians. Through developing its vast natural gas resources, BC has an important opportunity to contribute to shifting the global energy supply mix towards and lowering the aggregate carbon intensity of global energy consumption. In BC climate policy should be designed to focus on targeted emissions reductions through enhanced technology investment and deployment, enable flexible compliance options and prioritize economic competitiveness in order to simultaneously enhance competiveness, attract new investment, while achieving the emissions performance objectives. Going forward industry and government will need to work together to achieve greater GHG reductions in a way that can support or enhance industry's competitiveness.

We believe a significant opportunity does exist and can be supported by BC in its climate action plan by: designating EITE industries, supporting upstream electrification, and providing the fiscal mechanism that will enable methane emission reductions. CAPP is committed to working together to find ways to help achieve BC's emissions reduction targets while continuing to grow the economy.

Sincerely,

Brad Herald
Vice-President, Western Canada

/attachments

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Appendix A: Protecting Industry Competitiveness

The Climate Leadership Team's fiscal policy recommendations 5 and 6 relate to further increasing BC's world leading carbon price and expanding the scope of pricing to all GHG emissions sources after five years. The following section and Appendix A offer a recommendation for how to fully protect the industry from further increases in the carbon price to avoid carbon leakage and to minimize investment erosion.

BC's daily production of 4.5 billion cubic feet of natural gas represents approximately 30 per cent of Canadian production, or about 5.3 per cent of total North American natural gas production. Any further increases in BC's carbon price relative to other jurisdictions would further impair the competitiveness of the province's natural gas sector, especially in the current low price environment when operating margins are already suppressed.

Industry Challenges

Protecting the BC natural gas industry is vital to ensuring the economic health of the province and keeping NE BC communities vibrant. The industry directly employs over 12,000 people and generated over $1.3 billion in government revenue in 2013/2014 and it has the potential to directly employ 37,000 people and contribute over $40 billion dollars to the province through provincial taxes by 2035. But due to low prices the industry's economics are challenged. Natural gas is being hit hard by the current carbon tax, and further carbon price increases will further erode the competitiveness of the BC natural gas industry.

The price for natural gas has steadily been decreasing in the last ten years as an abundance of American natural gas is being produced and has decreased the price of gas at the AECO daily spot price. Prices have decreased from a high of $12Cdn/mcf in 2006 to the current price which is below $2Cdn/mcf as shown in figure 1.

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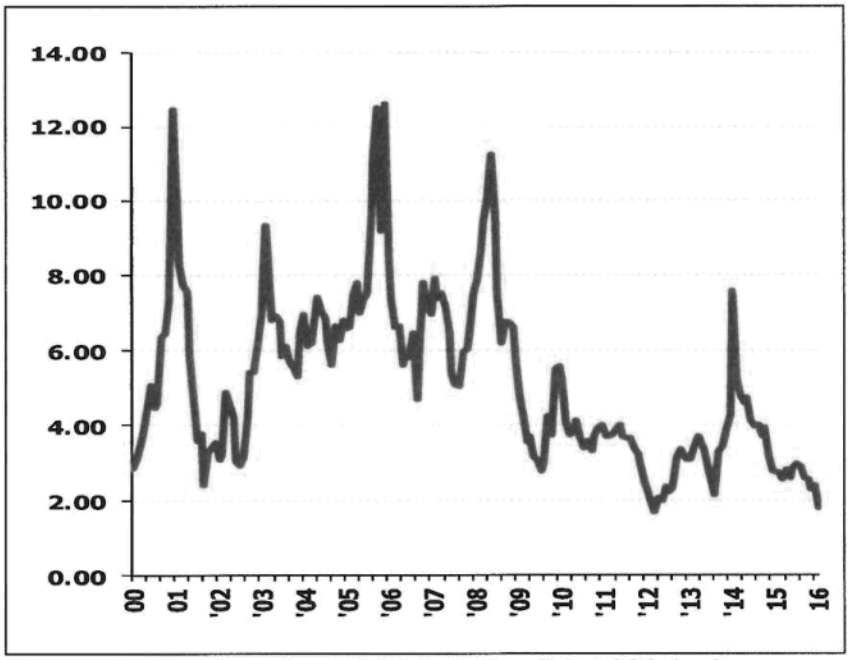


Figure 1 - Natural Gas Prices (AECO Daily Spot Price) $Cdn/mcf

The economics are even more challenged when examining the current price BC natural gas producers get when selling their product at Station 2. Due to lack of infrastructure and new American production filling Eastern Canadian demand for natural gas; station 2 is currently trading at a large discount to AECO daily spot price. As figure 2 shows, the differential has become worst in recent years and in August 2015, the difference was US$ 1.11, meaning that BC producers were receiving substantially less than the AECO daily spot.

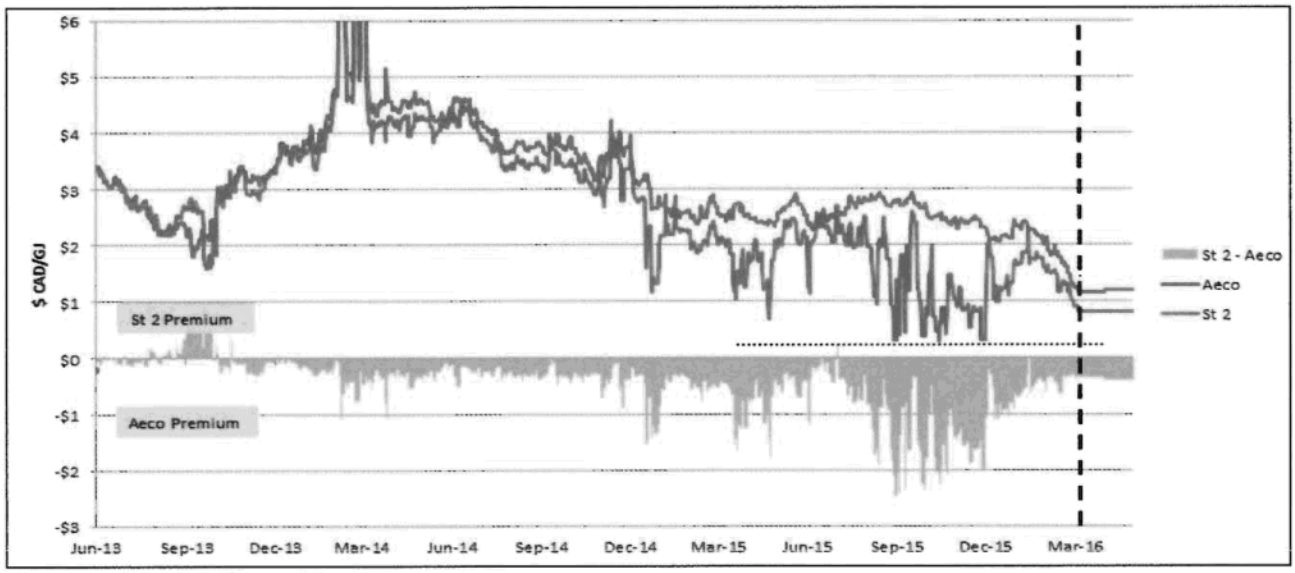


Figure 2 - AECO Differential

For further context, the $30/tonne carbon tax translates to a charge of ~$1.61/million cubic feet (mcf) of natural gas burned. In 2008 when the carbon tax was implemented, natural gas had a value of approximately $8/mcf and the carbon tax represented ~ 20% of the product value. Today that same natural gas has a value range of $0.80-$1.30/mcf, thus the $30/carbon tax is much higher in value than the product value, as shown in figure 3. By contrast the carbon tax on fuel and oil products is currently a small portion of the product value.

Because of the challenged economics of BC natural gas, upstream investment has decreased in recent times, Canadian natural gas exports to US are down 29% since 2007 and Canadian production is down 13% since 2007 as US production has risen by 42% since 2005. Wells drilled in the province has gone from 616 in 2014 to 514 in 2015 and it is forecasted to drop to 345 in 2016, overall investment in the BC upstream sector has decreased by over 50% since 2014.

Due to the economic challenges currently facing the industry, any new incremental costs will only further decrease the economic viability for the industry and may lead to companies moving investment in natural gas development outside the province. Thus for our industry, CAPP does not support an increase the carbon tax this time and does not support an expansion of the carbon tax to other GHG emissions. CAPP also believes that the application of the carbon tax on uncombusted gas methane from pneumatics be specifically exempted to align with other jurisdictions and promote economically viable approaches to reducing methane outlined elsewhere in this submission.

BC is Already a Climate Leader

BC is already a world leader in pricing carbon for all sectors of the economy. Additional increases in the current price of $30/tonne without a mechanism to protect our industry would further diminish competitiveness of the natural gas industry. At the current $30/tonne, BC's carbon tax accounts for at least one-third of the total industry government cost burden (based on a typical Montney producer) and in the Horn River, the ratio is closer to two-thirds of the total burden, as shown in Figure 3.

Any incremental increase to the carbon tax will have a large impact on the economics for natural gas in the province. Should the government decide to raise the carbon price; there must be provisions to help protect the economic competiveness of the natural gas industry in BC. Otherwise government may be faced with lower royalty revenues, while enabling greater global emissions due to carbon leakage.

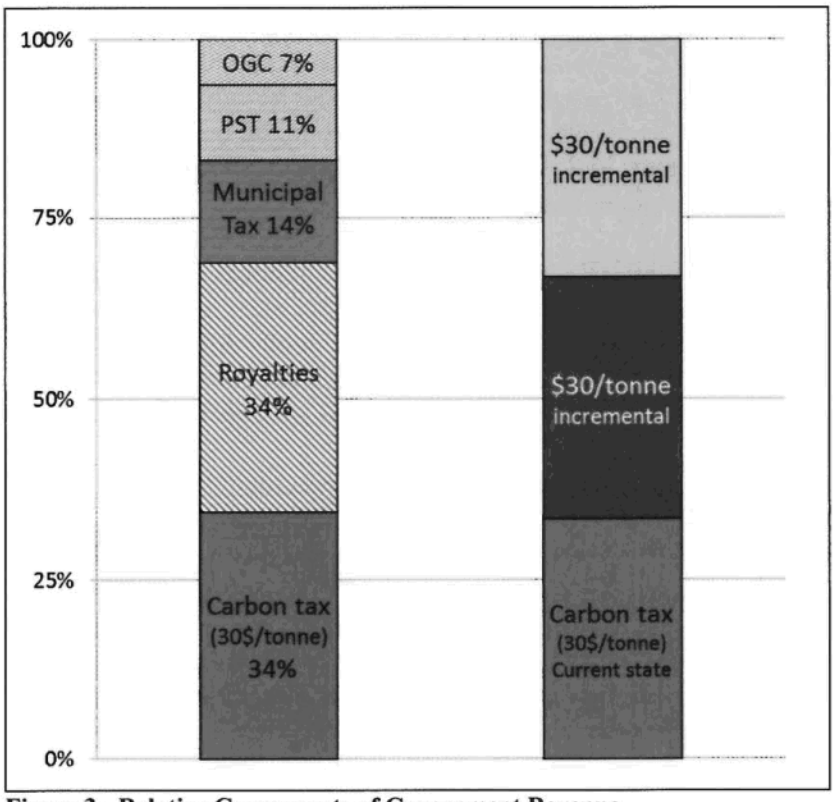


Figure 3 - Relative Components of Government Revenue

Preventing Carbon Leakage

Carbon leakage occurs if constraints on emissions are placed on activities in BC but not elsewhere because there is a possibility that industry may choose to leave BC (or new investment could be discouraged) and go to a jurisdiction where there is little or no carbon price, which will allow companies to produce and potentially release more emissions in a jurisdiction without climate policy. If carbon leakage occurs, BC not only loses the economic value from production but there will be no consequential global reduction in emissions.

Emissions-Intense Trade-Exposed Protection

Fortunately the CLT recognized the competitiveness pressures on the industry and the risk additional increases in the carbon tax would have on carbon leakage to competing jurisdictions. Economic competitiveness is of paramount importance to ensure the industry is able to thrive, attract new investment, create jobs and generate revenues for government to provide valuable public services and infrastructure. The Climate Leadership Team recommended that the province establish a mechanism to mitigate the competitiveness risks to emission-intensive, trade-exposed (EITE) sectors resulting from further increases in the carbon price; a recommendation that CAPP firmly supports.

Additionally, CAPP strongly supports the efforts of the Government of BC to protect EITE industries. On November 27, 2015, Minister Polak stated that the province would only consider

changes to its carbon tax under a regime where EITE industries are "fully protected from any carbon tax increase." By doing so, the province is not only protecting EITE industries' competitiveness but also protecting against further carbon leakage, where EITE industries chose to relocate to regions without similar carbon reduction pricing policies or mechanisms, thereby increasing global GHG emissions.

An EITE policy applied to carbon price increases would recognize the importance of managing inter-jurisdictional competitiveness, until the carbon policies in key trading jurisdictions are equivalent and/or aligned in level of effort and price.

Currently, many different carbon management regimes around the world utilize an emission-intense trade-exposed (EITE) methodology to determine the need to protect industries competiveness under carbon pricing. The EITE designation serves to discourage EITE industries from being perceived as an investment risk and leaving BC. In this situation BC fails to protect the EITE industry without any environmental benefits, and loses investment, jobs and government revenue. Many other competing jurisdictions including California and the EU use an EITE methodology to protect domestic industry and to prevent carbon leakage risk.

EITE Policy Principles

CAPP has worked with industry associations along the natural gas value-chain in British Columbia to develop principles and draft EITE methodologies. Through this effort, the following principles have been established and should be part of a BC policy for EITE determination:

- *Fair and transparent*, creating competitive parity across competing jurisdictions.
- *Science-based*, with a strong analyses and understanding of implications in practice.
- *Clear, predictable and simple to administer*, with clear and established processes for review and withdrawal.
- *Cost-efficient*, fully offsetting the difference in carbon price that exists between jurisdictions.
- *Balanced and efficient*, recognizing the totality of emissions policies on industry.
- *Viable*, with readily available compliance pathways that support open market mechanisms.
- *Consistent with developing a clean LNG industry*, achievable within the context of a growing and transitioning lower carbon economy.
- *Recognizes the risk of carbon leakage*, and that BC is currently a world leader in carbon price and industry emissions regulations.
- *Does not disadvantage BC natural gas producers*, in existing north America Markets and in emerging international markets (LNG)

Many jurisdictions around the world such a California and the EU utilize an emission-intensive, trade-exposed (EITE) methodology to help prevent carbon leakage and help protect EITE industries. CAPP is supportive of the Climate Leadership Team and their recommendation that the province establish a mechanism to mitigate the competitiveness risks to EITE sectors resulting from further increases in the carbon price.

Determining EITE Industries

Currently, many different jurisdictions around the world use an EITE methodology to manage their carbon regimes and help protect EITE's competiveness. California, the EU and Australia all have introduced legislation that included detailed methodologies on how to determine EITE, although CAPP does not recommend a preferred option in this paper, the example set by the three jurisdictions offers a strong opportunity to show that under these jurisdictions rules, the BC natural gas industry is EITE. To determine if a sector is EITE governments must:

1. Establish metrics to quantify emissions intensity and exposure to international trade,
2. Set a threshold for each metric to identify emissions intensive and trade exposed sectors, respectively, and
3. Make a determination whether or not a sector is exposed to leakage using the combination of emissions intensity and trade exposure identified in steps 1) and 2).

Appendix A1 attached provides a jurisdictional scan of EITE frameworks and methodologies in place for the European Union Emissions Trading Scheme, the California Cap-and-Trade system, and the now repealed Australian Carbon Regime. Included in our scan are each jurisdiction's combined threshold tests for evaluating if an industry is EITE. Using best available data on BC but applied within each jurisdiction's EITE formula, we determined that the upstream petroleum industry affirmatively applies as EITE.

The approach to an EITE methodology, including a definition of EITE to determine qualification, should be consistent with international standards adopted in climate policy throughout various jurisdictions around the world. At the same time, BC's approach with respect to its EITE parameters (including the exact formula/thresholds for qualification) should be uniquely designed for the context in BC. Using the principles above as a framework for EITE policy design, CAPP looks forward to working further with the BC government to further develop a solution to EITE determination and application.

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Appendix A1 - EITE Methodologies: International Jurisdictional Scan

California, the EU and Australia all have introduced legislation that included detailed methodologies on how to determine EITE, although we do not recommend a preferred option in this note, the example set by the three jurisdictions offers a strong opportunity to evaluate if the BC natural gas industry is EITE.

EITE Methodology

- To determine if a sector is EITE governments must :
  - 1) establish metrics to quantify emissions intensity and exposure to international trade,
  - 2) set a threshold for each metric to identify emissions intensive and trade exposed sectors, respectively, and
  - 3) make a determination whether or not a sector is exposed to leakage using the combination of emissions intensity and trade exposure identified in steps 1) and 2).
- **Assess Emissions Intensity and Trade Exposure:** Below is a table that includes the methodology for calculating the emission intensity and trade exposure from a number of different jurisdictions around the world.
- **Set Threshold for each metric:** Also included in the table below are the threshold levels set by each jurisdiction on how to classify EITE.

	Formulas	Stand-alone test	Combined tests
EU ETS	**Carbon costs** $\frac{(\text{Direct emissions } tCO_2 + \text{Indirect emissions } tCO_2) \cdot €30/tCO_2}{\text{Gross value added}}$ **Trade intensity** $\frac{(\text{Imports} + \text{Exports})}{(\text{Turnover} + \text{Imports})}$	• Carbon costs over 30% • Trade intensity over 30%	• Carbon costs above 5% • Trade intensity above 10%
Australia CPR	**Emissions intensity** $\frac{\text{Tonnes } CO_2e}{\text{Million AUD revenue}}$ **or** $\frac{\text{Tonnes } CO_2e}{\text{Million AUD value added}}$ **Trade intensity** $\frac{(\text{Annual value of imports} + \text{annual value of exports})}{\text{Annual value of production}}$		• Emissions intensity : Highly emissions-intensive: At least 2,000 tCO_2e emissions per million AUD revenue, or 6,000 tCO_2e per million AUD value added : Moderately emissions-intensive: 1,000 tCO_2e emissions per million AUD revenue, or 3,000 tCO_2e per million AUD value added • Trade intensity above 10%
California Cap-and-Trade	**Emissions intensity** $\frac{\text{Tonnes } CO_2e}{\text{Million USD value added}}$ **Trade intensity** $\frac{(\text{Imports} + \text{Exports})}{(\text{Shipments} + \text{Imports})}$		• Emissions intensity : High: > 5,000 : Medium: 1,000-4,999 : Low: 100-999 : Very low: less than 100, **and** • Trade intensity : High: > 19% : Medium: 10-19% : Low: less than 10%

Much of the above needed data is available to the public: emissions, imports, exports, value added, and annual value of production can be located.

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- In addition to the above jurisdictions, Alberta (BC's nearest competitor) has essentially implemented a basic approach to EITE protection, by providing full protection to its conventional upstream oil and gas sector through a full exemption from the broad based carbon tax until 2023.

Definitions

- Gross value added: Equivalent to gross domestic product (GDP) less taxes on products plus subsidies on products.[2]
- Turnover, annual value of production, or shipments: All are equivalent to revenue from production. In this case, that means the sum of all sales of natural gas produced in BC sold domestically or abroad.
- Imports and exports: Imports are foreign goods sold into BC while exports are good produced in BC and sold to foreigners.
- Value added: Economists generally use GDP for value added calculations.

Data Assumptions

- Data was provided for the 2012 year since that is the latest data available via Statistics Canada for nominal GDP in the oil and natural gas extraction industry. Real GDP is available for later years (up to 2014 currently, and likely 2015 in spring 2016), however, real exports, imports, and revenues are not available using the same methodology.
- Natural gas GDP is not separable from liquids GDP, though it is assumed the majority of GDP is attributable to natural gas production.
- Revenue is solely revenue from natural gas sales by producers.
- Exports and imports are of an international nature only, and do not reflect interprovincial trading.
- Canada does not release data on gross value added, GDP/ Value Added was used a substitute.

Data	Year 2012	Source
BC Natural Gas Imports	**$CAD 22,077,000**	**Industry Canada**
BC Natural Gas Exports	**$CAD 1,301,782,000**	**Industry Canada**
Value Added/GDP	**$CAD 2,781,400,000**	**Statistics Canada**
BC Natural Gas Total CO2e	**10,631,000**	**BC Government**
Annual Value of Production/Value of Produced Sales	**$CAD 3,109,792,000**	**CAPP**

[2] http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Gross_value_added_at_market_prices

Australia CPRS Methodology

Australia CPR	Emissions intensity $\frac{Tonnes\ CO_2e}{Million\ AUD\ revenue}$ or $\frac{Tonnes\ CO_2e}{Million\ AUD\ value\ added}$ Trade intensity $\frac{(Annual\ value\ of\ imports + annual\ value\ of\ exports)}{Annual\ value\ of\ production}$		• Emissions intensity ○ Highly emissions-intensive: At least 2,000 tCO_2e emissions per million AUD revenue, or 6,000 tCO_2e per million AUD value added ○ Moderately emissions-intensive: 1,000 tCO_2e emissions per million AUD revenue, or 3,000 tCO_2e per million AUD value added • Trade intensity above 10%

Emission Intense

- 10,631,000 tCO2e/($CAD 2,781,400,000/1,000,000) = 3822 CO_2e/$M

Trade Intense

- ($CAD 22,077,000+ $CAD 1,301,782,000)/ $CAD 3,109,792,000= 0.42 or 42%

The threshold for the Australian CPRS is:

- Emission intensity is > 6,000 CO2e/$M value added for high leakage and 3,000 CO_2e/$M value added for medium leakage and trade intensity is set at anything greater than 10%.
- Under the Australian methodology, the BC natural gas industry would be considered moderately emission-intensive and with a high trade intensity Due to a decrease in natural gas price in recent years, it is likely that the BC natural gas industry would now be considered highly emission intense under the Australian system.

EU ETS

	Formulas	Stand-alone test	Combined tests
EU ETS	Carbon costs $\frac{(Direct\ emissions\ tCO_2 + Indirect\ emissions\ tCO_2) * €30/tCO_2}{Gross\ value\ added}$ Trade intensity $\frac{(Imports + Exports)}{(Turnover + Imports)}$	• Carbon costs over 30% • Trade intensity over 30%	• Carbon costs above 5% • Trade intensity above 10%

- **Carbon Cost**
  - 10,631,000 tCO_2e* CAD$30/ ($CAD 2,781,400,000) = 0.11 or 11%
- **Trade Intense**
  - ($CAD22,077,000+ $CAD1,301,782,000)/($CAD 3,109,792,000+ $CAD22,077,000)= 0.42 or 42%
- **The threshold for the EU ETS is:**
  - Carbon Cost is above 5% and trade intensity is set at anything greater than 10%.
- Under the EU ETS, the natural gas Industry would be classified as highly trade intense and emission intense.

California Cap and Trade

California Cap-and-Trade	Emissions intensity $\frac{Tonnes\ CO_2e}{Million\ USD\ value\ added}$ Trade intensity $\frac{(Imports + Exports)}{(Shipments + Imports)}$		• Emissions intensity : High: > 5,000 : Medium: 1,000-4,999 : Low: 100-999 : Very low: less than 100, and • Trade intensity : High: > 19% : Medium: 10-19% : Low: less than 10%

- **Emission Intense**
  - 10,631,000 tCO2e/($CAD 2,781,400,000/1,000,000) = 3822
- **Trade Intense**
  - ($22,077,000+ $1,301,782,000)/ ($ CAD 2,781,400,000+ 22,077,000) = 0.47 or 47%
- **The threshold for the California Cap and Trade is**:
  - Emission intensity for high is > 5,000; Medium is 1,000-4,999, low is 100-999 and very low is <100. Trade Intensity for highly trade exposed industries is > 19%; medium is 10-19% and low is <10%. California created the table below to classify industries as EITE.

Leakage Risk	Emissions Intensity	Trade Exposure
High	High	High Medium Low
	Medium	High
Medium	Medium	Medium Low
	Low	High Medium
Low	Low	Low
	Very Low	High Medium Low

Source: California Air Resource Board (2012).

  - Under the California system, the BC natural gas industry would be classified as having high leakage and therefore deserving of freely allocated credits

Classify sectors by risk of emissions leakage

- The final step is to evaluate which sectors are energy intensive and trade exposed by creating classifications that combine the emission intensity and trade exposure and use this to determine who deserves to be economically protected.
  - EU ETS: Anything with Emissions Intensity > 5% and Trade Share > 10% or emissions intensity > 30% or trade share> 30% is considered to be EITE. BC natural gas would qualify as EITE.
  - Australia: Emission intensity is > 6,000 CO2e/$M value added for high leakage and 3,000 CO2e/$M value added for moderate leakage and trade share is >10%. BC natural gas would qualify as EITE.

  - California: Emission intensity for high is > 5,000; Medium is 1,000-4,999, low is 100-999 and very low is <100. Trade Intensity for highly trade exposed is > 19%; medium is 10-19% and low is <10%. California further created a metric to determine what thresholds qualified as EITE

- Setting thresholds allows government to choose which industries they consider to be EITE and can craft a policy solution that helps protect industries in need while still encouraging strong overall emission reduction across the province.

Ontario Cap and Trade

The Ontario government recently proposed a new cap and trade regulation that contains provision to help protect emission intense and trade exposed industries. Although final recommendations are still occurring, in a recommendation paper, Ontario says that they are looking to create an allocation method similar to that of California, which means under the newly proposed cap and trade program in Ontario, the BC natural gas industry would likely be considered EITE.

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Appendix B – Electrification of Natural Gas Production

Overview

The consultation guide references recommendation#14 to supply clean electricity for the electrification of the upstream industry in a competitive and timely manner.

CAPP supports this objective. Promoting competitive electrification of the upstream helps BC move toward its provincial GHG reduction targets. CAPP believes that upstream electrification remains the foremost opportunity for significant GHG mitigation in BC. Electrification of the upstream also directionally supports BC "cleanest LNG facilities" aspiration and new federal CEAA rules that will consider upstream GHG emissions as a part of downstream facility approvals

The business-as-usual approach for designing and constructing oil and gas facilities is to choose natural gas-driven equipment. Natural gas facilities have predictable construction timelines, reliable in-service operations and are very cost effective, particularly in low natural gas price environments. Upstream electrification, while providing some benefits, also presents new and additional risks to the upstream industry. These risks include economic considerations of using electricity versus natural gas; timely availability of reliable transmission capacity; and regulatory risks regarding potential rate and tariff changes. To this end, CAPP wishes to work with BC Hydro and Government to find practical means to manage these risks by streamlining and aligning business processes with the utility, and exploring equitable means to address commodity price differentials while ensuring BC Hydro rate payers are protected. CAPP believes that doing so will enable industry and Government to prudently employ BC's existing hydroelectric resources to help jointly strive towards provincial emissions reductions. This summary is supported by the attached presentation entitled "BC Climate Action Plan – Electrification".

Since before 2010, electrification of oil and gas facilities in northeast BC has been contemplated as a means of reducing GHG's and incurring greater public acceptance of upstream facilities. While some operators in NE BC have chosen to electrify by way of recently completed transmission reinforcements, such as the Dawson Creek and Chetwynd Area Transmission (DCAT) project, electrification remains a corporate business decision made on a project by project basis.

It is estimated that 3 – 4 MT CO_2/yr of emissions may be mitigated by electrifying 6 Bcf/d of upstream production; this is equivalent to removing ~700,000 cars off the road each year. Electrification of the upstream can also help BC Hydro to gain new industrial load, thereby sustaining revenues and growing demand for clean electricity in the province. However, CAPP believes that outstanding electrification risks must be managed and mitigated to capture this significant climate opportunity.

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Recommendations to address these risks have are summarized as follows:

1. **Economics:** Develop a fiscal support framework to reduce economic risk and incent operators to electrify in the low natural gas price environment.
2. **Timing of Utility Supply:** Process / de-risking measures should be established to ensure power supply timing aligns with customer needs thereby enhancing certainty and enabling upstream commitments.
3. **Regulatory Certainty:** Provide certainty against regulatory changes that may impact rates and tariffs for large industrial customers through the BC Hydro Rate Design Application (RDA).

Economic Support Solutions

As a result of the economic risk associated with high electricity prices relative to natural gas, CAPP encourages the BC Government to develop fiscal support programs that can address this price differential, and thus de-risk the choice to electrify. At current natural gas prices, it is estimated that a ~$15/MWh electricity rate reduction (or $30/T GHG offset) is required to make a typical electrification project economic relative to a gas-drive facility.

The following is a summary of potential solution categories developed by the CAPP for consideration:

- **Federal Infrastructure Funding**
  - With flow-through to customers to help reduce electricity pricing
- **Novel Electricity Rate Design**
  - Electricity rate indexed to NG price to address price differential
  - At low NG prices, electricity rate floor set at Mid-C price (excess BCH power sold at discount – currently <$40/MWh)
  - At high NG prices, support amounts recovered through higher rates
- **Market-Based Solutions**
  - Carbon Tax "Certificates": applied against carbon tax obligation
  - GHG Offsets: current market constraints reduce value of offsets
- **Other Solutions**
  - Remove PST from industrial power bills: While removal of the PST alone would not provide sufficient support for electrification economics, CAPP supports this recommendation from the CLT report.

While CAPP has reviewed the preceding options as potential solution categories, CAPP recognizes that support will likely consist of a multi-pronged approach that includes a combination of the above options.

Further, CAPP believes that the solution selected should consider the following design considerations:

Eligibility

CAPP believes that both new and existing projects should be eligible for economic support under this program to ensure fairness and promote / de-risk upstream electrification in support of capturing GHG mitigation opportunities.

New projects are those which will be interconnected to future transmission reinforcements and extensions (e.g. PRES / NMPS). CAPP believes that economic support for these types of projects will help to encourage new interconnections of electric-drive facilities that might not otherwise be captured due to economic impairments. CAPP further believes that this front-end support will be balanced by long-term supply contracts as electrified facilities will continue operating well beyond the term of support.

CAPP also believes that existing projects, such as those which are interconnected to existing BC Hydro transmission infrastructure (including DCAT), should also be eligible under the support program. CAPP believes that inclusion of these facilities will provide equitable treatment and help to enhance competitiveness of existing facilities. In this way, the support program will minimize economic disparity between 'new' and 'old' projects and not penalize early-adopters of electrification.

Term

With respect to the term of the program, CAPP believes that the support program should provide sufficient certainty to support electrification while natural gas price outlook remains low relative to electricity rates (~7-10 years). During this time, forward natural gas prices are not expected to increase significantly while electricity rates will likely continue increasing. This time period also approximately coincides with the period when the utility is expected to have excess supply.

Pricing

CAPP believes that prudent design of a support program can both reduce economic risk for operators while also benefiting other stakeholders. Thus, CAPP believes that the following should be achieved:

- BC Hydro electricity rate payers should be protected;
- BC Hydro (and provincial treasury) should receive new load / income that might not otherwise be received; and
- Oil and gas customers should benefit from competitive economics for their electric-drive facilities.

Novel electricity rate design: At current NG prices, electricity rate support of at least $15/MWh is required. This electricity rate reduction approximately coincides with the current pricing for electricity sold at the Mid-C market (where excess BC electricity is sold at a discount). Per the 2016

BC budget, Mid-C prices are forecasted at $33-36/MWh (2016 – 2018, CAD). Accordingly, CAPP suggests adopting a sliding-scale structure whereby floor electricity pricing set at Mid-C price, and as natural gas prices increase, support amounts are recovered through higher electricity rates.

Market-based options: Other options to create incentives for electrification include market-based solutions such as those being proposed to support the methane reduction initiative. CAPP would also support a market-based fiscal solution and believes that consideration should be given to align fiscal solutions across the electrification and methane reduction initiatives, where possible. At current natural gas prices, it is estimated that an offset price of at least $30/T CO_2 is required.

Timing of Firm Utility Supply

In addition to the economic support referenced above, timing of firm utility supply must align with customer on-stream timing. Timing risks to facility on-stream dates are not present when designing natural-gas facilities, and retrofit of constructed gas-drive facilities to become electric is not economic. Accordingly, CAPP supports BC Hydro's request to exempt PRES / NMPS from the CPCN process, and believes that such an exemption would help: accelerate timelines and maximize electrification capture; reduce the need for costly/inefficient 'load bridging' measures by BCH; and better align availability of power with pace of industry development.

To better achieve timing outcomes, CAPP and BC Hydro have established a commitment for ongoing engagement regarding future load interconnections. This process may include alignment of business practices between the upstream industry and the utility or development of de-risking measures.

Regulatory Certainty – Rate and Tariff Design

Finally, CAPP believes that certainty regarding future electricity policy is required to facilitate upstream support of electrification and new projects like PRES. CAPP notes that changes to existing Transmission Extension policy or rate design may fundamentally change the economics of electrification, and that the potential for the BC Hydro RDA process to become protracted results in continued lack of certainty for operators. Thus, CAPP seeks regulatory certainty from changes that may negatively impact rates / tariffs for industrial customers. Regulatory certainty is fundamental to enable natural gas producers to commit to upstream electrification particularly given the long term planning horizons that are involved.

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Appendix C – Methane Emissions Reductions

Since the release of British Columbia's Climate Leadership Discussion paper in July 2015 and the subsequent recommendations made by the Climate Leadership Team in November 2015, CAPP has been actively engaged with the Government of British Columbia to ensure that the development of renewed climate policy commitments related to methane emissions reflect the best-in-class standards of Canadian oil and gas operators. This appendix is intended to confirm the understanding of policies under discussion and to reaffirm CAPP's commitment to strong environmental policy as it pertains to the upstream oil and gas industry.

British Columbia's longstanding and robust provincial regulatory regime for the management of methane emissions has positioned the province as a leader when compared to other oil and gas producing jurisdictions. Existing provincial standards have a focus on outcome-based requirements that foster innovative solutions that achieve real operational efficiencies and emission reductions while minimizing costs to industry. If appropriate well-designed policies are put in place, CAPP believes that significant opportunities exist to enable further meaningful reductions in methane emissions from the upstream oil and gas sector in the near term, while maintaining the industry's competitiveness.

Over the course of the last four months, CAPP and representatives of the Ministry of Natural Gas Development and the Climate Action Secretariat and have made significant progress in developing a program that meets the province's desired outcomes with minimized costs to industry. With a strong policy framework in place, premised on market-based treatment, CAPP is prepared to support a reasonable target and target assessment process that aligns, on an outcomes basis, with other provincial and federal aspirational goals while retaining BC as a climate policy leader. CAPP is confident that appropriate consultation with the sector will ensure that targets can be met in a way that protects industrial competitiveness as the sector grows.

Target for Existing Methane Emission Sources

In order to demonstrate industry's commitment to the Government of British Columbia's continued climate policy leadership, CAPP supports a non-legislated emission reduction target, assessed on an industry-wide basis, that could represents up to a 45% reduction of upstream oil and gas vented and fugitive methane emissions from a 2014 baseline to be realized by 2025. Aligned with the recommendations made by the Climate Leadership Team, this target will apply to emissions from legacy oil and gas facilities built in 2014 or earlier. Set in 2016, this ambitious target would be reassessed in 2020 to ensure that continued action towards its achievement is cost-effective, operationally feasible, and not harmful to competitiveness.

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It is recognized by both government and industry that a key challenge to methane policy development and subsequent progress assessment is emission data quality, and an efficient and credible method to track results. Industry is committed to improving data quality – should emission assumptions about the 2014 baseline change as a result, adjustment provisions can and should be made. For example, a reduction in the 2014 baseline as a result of data improvement efforts will be counted as successful reductions from the target. These data improvements will be critical to ensuring the timely and credible recognition of industry action on methane emissions in both provincial and federal inventories. In order to signal a commitment to a level of effort to an absolute emission reduction, an increase in baseline emissions would be paired with an equivalent increase in the resulting absolute emissions target for 2025.

A five year non-regulated program that enables a market-based approach for legacy emissions could be staged as follows:

- Until 2020, industry and government will work cooperatively to ensure that targets and baseline assumptions are improved and validated. In addition, early adopters will begin or continue to implement methane emission reduction projects that are supported by fiscal mechanisms;
- In 2020, a critical assessment of progress and continued achievability will occur to account for effort made to date, improved data and assumptions, and competitiveness considerations. As a result, a joint industry and government recommendation will be made with respect to progress to date and next steps. This full legacy emission reduction program review will determine the best path forward to ensure targets are met, which could lead to the continuation of the initiative.
- From 2020 to 2024, continued progress made under the program will be reported to the public on an annual basis; and
- In 2025, a joint industry and government announcement as to the attainment of the target will be made. Based on the confidence of our membership in the achievability and efficacy of the policy framework proposed here, a regulatory backstop will not be required to meet the desired outcomes.

Enhanced Leak Detection and Repair

Though an incremental effort and cost allocation will be required, CAPP is also prepared to support the development of an enhanced results-based approach to leak detection and repair for new and existing facilities. In order to ensure that efforts are best placed, however, provisions should be made to ensure smart program design that is flexible, as follows:

- Reduced survey requirements for facilities or sites with minimal leaking components or minimal leak volumes during consecutive survey periods, allowing facilities demonstrating strong performance to reduce their compliance burden;
- Scaling efforts to facility size and design to best allocate resources and efforts to the majority of potential leaking components;
- Flexible repair time provisions that account for leak severity, off-lease impacts, shut down considerations, health and safety concerns, and personnel and part availability; and

- Minimizing the burden associated with leak quantification, in that focusing more resources than those required for detection to quantify leaks is an involved process that diverts time and resources away from addressing the problem, aligning with requirements for reporting and verification.

This program will build upon the foundation of and learnings from CAPP's *Best Management Practice for Fugitive Emissions Management* developed in 2007 and updated in 2014, as well as long standing current, risk-based regulated requirements. A renewed approach to the standardization of leak detection and repair practices will serve to reassure the public as well as provincial regulators of the responsible maintenance practices of CAPP members and will result in fugitive methane emission reductions across the sector.

Go-Forward Standards for New Equipment

Recognizing that the Climate Leadership Team recommendations target existing emission sources, CAPP is also prepared to support the formal standardization of new build criteria for methane emission sources, aligned with actions proposed in other Canadian jurisdictions. Developed in partnership with industry and with consideration to economic competitiveness issues, the development of these standards for new facilities will begin immediately with a targeted enactment date of 2018. These criteria will ensure that industry's high standard of methane emission management is upheld as development of the sector continues beyond 2025. This process recognizes the need for enforceable climate action as well as the substantive progress made by industry in voluntarily eliminating the need for methane emission-intensive equipment to date.

Fiscal Measures

The cost effectiveness and overall achievability of further methane emission reductions from the upstream oil and gas sector, and as a result the success of the framework and potential policy solutions proposed here, is highly contingent upon appropriate policy and regulatory design. This includes the resolution of a number of outstanding fiscal issues.

The proposed approach will rely strongly on the ability of oil and gas producers to generate carbon offsets for actions taken to recognize emission reduction opportunities at existing facilities and sites, installed to the point of new regulations taking effect. A critical component of realizing these offsets will be to explore ways to expand the use of offsets beyond the Carbon Neutral Government Program to specific industrial sectors, linking offset markets with other jurisdictions, or using offsets generated by the oil and gas sector as a larger part of the offset portfolio used to help meet provincial carbon reduction targets. CAPP is encouraged that the Government of British Columbia has expressed a willingness to explore offset price and purchase guarantees to allow for certainty in business planning and looks forward to further engagement on these matters.

Complementary programs to incent the rapid uptake of lower-emission equipment, such as the proposed *Clean Infrastructure Royalty Credit Program* (CIRCP), should be implemented as soon as possible to enable near-term project uptake and associated emission reductions. Programs such as the CIRCP have the potential to enable historic investments into modern low emission oil and gas

infrastructure – a government commitment of $20 million can lead to up to $40 million worth of leveraged methane emission reduction projects. In order to ensure sustained project investment for both existing and new methane emission sources, this program should last for a minimum of three years and work in combination with offsets or other fiscal measures to enable the methane reductions discussed.

In light of the low capital availability, an increasing operational cost burden, and competitiveness concerns within the sector, CAPP also encourages the Government of British Columbia to explore carbon compliance certification mechanisms – that is, a way in which an emission avoided as the result of a GHG emission abatement action taken by an operator could result in an equivalent tonne reduction in the total carbon tax payable by a company.

Taxation

It is recognized that the carbon tax in an important tool for BC to show climate policy leadership and to act as an incentive to achieve emissions reduction in the wider economy. However, the application of a carbon tax on non-combusted methane emissions is a sub-optimal approach to maximize methane emissions reductions from the upstream industry. The methane reduction program proposed here will achieve better outcomes than an expansion of a carbon tax while minimizing harm to the competitiveness of the upstream oil and gas industry. Thus, CAPP does not support an increase in the rate or scope of the carbon tax which will increase cost burden, reduce competitiveness and result in fewer reductions.

In addition, CAPP holds that the application of carbon tax to uncombusted methane exceeds the intended legislative scope of the *Carbon Tax Act*. The application of the tax to these emission sources has the potential to discourage further investment and significantly undermine the outcomes of the proposed policy approach. Should the Ministry of Finance continue to interpret the *Act* in such a way, CAPP would recommend the creation of a specific exemption for these emission sources in order to support the policy architecture and contingent economics proposed here.

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Appendix D – Offsets Market in BC

For the BC government to achieve success in meeting reduction targets while still growing its economy and engaging a healthy LNG export market, it will be critical for BC to have in place a robust, balanced and competitive offset system. Offsets promote investment in typically cost-prohibitive emissions reductions technologies by offering financial credit in proportion to the emissions reduced from the technology investment. Given the cost pressures facing our industry, BC must enable the ability for the upstream oil and gas industry to sell offsets at competitive prices through such an offset market.

The Climate Investment Branch manages BC's portfolio of offsets and purchases carbon offsets to meet the government's carbon neutral commitment. The market is currently oversaturated with offsets supply, which will further increase with implementation of the aforementioned methane reductions and the electrification of upstream facilities. It is important for BC to consider ways of increasing demand for these offsets in the short and long-term, which will be the first steps to creating a viable offsets market.

Options are available to the BC government for creating demand for methane and electrification (CO_2) offsets. All of these options require strong government leadership and action within the province and/or outside the province. We believe some of the options available to the BC government in the near-term are:

Provincially

- The upstream petroleum industry represents only 17% of the provinces total methane emissions. A significant proportion of the remaining methane emissions in the province of BC are not being targeted for reductions under the Climate Leadership Plan, nor are these sources priced under the carbon tax or a focus of existing or future regulations. Agriculture, mining and waste are key sources that could be targeted for reductions with the option of purchasing offsets until cost-effective reductions are available.
- Future development of LNG facilities with natural gas-driven power may also open up further demand for offsets.

National and/or Internationally

- Linking the BC offset market to offset markets outside the province's borders in other provinces or other countries will improve the competitiveness of the BC market while also promoting BC as a hub for clean investments and innovation technology in the upstream oil and gas industry. Access to other offset markets will also build cross-provincial and international climate action partnerships.

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Page 198 to/à Page 227

Withheld pursuant to/removed as

s.16

Ireland, Shannon L ENV:EX

Subject: MMP Meeting w/ Geoff Morrison, CAPP
Location: Room 112

Start: Mon 05-16-2016 9:00 AM
End: Mon 05-16-2016 9:30 AM

Recurrence: (none)

Meeting Status: Accepted

Organizer: Mihlar, Fazil ENV:EX
Required Attendees: Laaksonen-Craig, Susanna ENV:EX

Categories: DM/MO

Meeting Purpose	Meeting with MMP for feedback on the *Consultation Guide: Building B.C.'s Climate Leadership Plan*
Staff Attendees Y/N/Who	yes
Request BN?	yes
Date/Location	May 16, 9:00-9:30am
Meeting Duration	30 min
Cliff Log #	298188

Ireland, Shannon L ENV:EX

Subject:	Methane Policy Discussion (Calgary)
Location:	Harry Hays Building, 220 4th Ave SE, Airdrie/Beiseker rooms in the Conference Centre (1st floor)
Start:	Mon 09-19-2016 12:00 PM
End:	Mon 09-19-2016 2:00 PM
Show Time As:	Out of Office
Recurrence:	(none)
Meeting Status:	Accepted
Organizer:	Beale, Mike (EC)
Categories:	Out of Victoria

Location: Harry Hays Building, 220 4th Ave SE, Airdrie/Beiseker rooms in the Conference Centre (1st floor)
Time: 1:00pm - 3:00pm (MDT)

Hi everyone,

As we have all agreed, it is an opportune time to get together to discuss methane oil and gas policy, given all the related activities and discussions underway. Below please find a proposed agenda for the meeting. Let me know if you have any suggested changes or additions.

Draft Agenda

1:00-1:10 Introductions
1:10-1:40 Overview of jurisdictional approaches to methane in the oil and gas sector
1:40-2:20 Industry and ENGO perspectives on proposed methane approaches
2:20-2:45 Identifying opportunities to work together (e.g., methane emissions quantification)
2:45-2:55 Other items
2:55-3:00 Closing remarks

Please note, I have been informed that the room has limited capacity, so a confirmation of the attendance of any additional delegates with Krista Aris (krista.aris@canada.ca) in my office would be appreciated. Kindly note for this meeting, we will have someone to escort you to the meeting room upon arrival, in order to gain entry.

I look forward to seeing you in-person in Calgary.

Mike Beale
ADM, Environmental Protection Branch
Environment and Climate Change Canada

Ireland, Shannon L ENV:EX

Subject:	CAPP & Canada's Energy Citizens at a UBCM Delegate Reception (RSVP'd)
Location:	Bard and Banker
Start:	Tue 09-27-2016 8:00 PM
End:	Tue 09-27-2016 10:00 PM
Show Time As:	Out of Office
Recurrence:	(none)
Organizer:	Laaksonen-Craig, Susanna ENV:EX
Categories:	OOO within Victoria

Ireland, Shannon L ENV:EX

Subject:	FW: DM Meeting w/CAPP BC EPG
Location:	Hotel Grande Pacific - Galiano Room 233
Start:	Fri 09-30-2016 8:30 AM
End:	Fri 09-30-2016 1:00 PM
Show Time As:	Out of Office
Recurrence:	(none)
Meeting Status:	Accepted
Organizer:	Nikolejsin, Dave MNGD:EX
Categories:	DM/MO

-----Original Appointment-----
From: Nikolejsin, Dave MNGD:EX
Sent: Tuesday, July 12, 2016 10:42 AM
To: Nikolejsin, Dave MNGD:EX; Piccinino, Ines MNGD:EX; Caul, Doug D ABR:EX; McKnight, Elaine L MEM:EX; Sheldan, Tim FLNR:EX; Shoemaker, Wes ENV:EX; Sturko, Derek AGRI:EX; Mihlar, Fazil ENV:EX; Jeakins, Paul OGC:IN; Mentzelopoulos, Athana FIN:EX; Geoff Morrison - CAPP (geoff.morrison@capp.ca); Jardine, Kevin EAO:EX; Nash, Laurel ABR:EX
Cc: Zacharias, Mark ENV:EX; Kriese, Kevin FLNR:EX; Manwaring, Richard G FLNR:EX
Subject: DM Meeting w/CAPP BC EPG
When: Friday, September 30, 2016 8:30 AM-1:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Hotel Grande Pacific - Galiano Room 233

Ireland, Shannon L ENV:EX

Subject:	Methane Policy Discussion - 1:00pm – 2:30pm (MDT)
Location:	McDougall Centre, 455-6th Street S, Calgary (Rosebud Room, 4th floor)
Start:	Fri 10-14-2016 12:00 PM
End:	Fri 10-14-2016 1:30 PM
Recurrence:	(none)
Meeting Status:	Accepted
Organizer:	Beale, Mike (EC)
Categories:	Out of Victoria

As we have all agreed, it would be beneficial to continue our discussion on methane oil and gas policy. Please find a proposed agenda below; let me know if you have any suggested changes or additions.

Draft Agenda:

1:00-1:15 Introductions and Opening Remarks

1:15- 1:55 Regulatory Design – Key issues, considerations and options

- ECCC presentation
- Discussion

1:55-2:05 Industry Perspectives

2:05-2:15 Pembina Perspectives

2:15-2:30 Other Items and Closing remarks

Please RSVP to Krista Aris in my office (krista.aris@canada.ca) **by October 7, 2016, to confirm participant names**, which are required by the security desk at the McDougall Centre.

I look forward to seeing you all again in Calgary.

Mike Beale
ADM, Environmental Protection Branch
Environment and Climate Change Canada

Laaksonen-Craig, Susanna ENV:EX

From: Morrison, Geoff <geoff.morrison@capp.ca>
Sent: Friday, April 8, 2016 2:29 PM
To: Shoemaker, Wes ENV:EX; Mihlar, Fazil AVED:EX; Laaksonen-Craig, Susanna ENV:EX; Lesiuk, Tim ENV:EX
Subject: Fw: For Review: CAPP Feedback on BC's Climate Leadership Plan Consultation Guide
Attachments: Microsoft Word - CAPP_EDMS-#279029-v18-DRAFT_submission_to_BC_regarding_Climate_Leadership_Plan_-_March_2016.DOC.pdf

Wes, Fazil, Susanna, and Tim

Please find CAPP's feedback on the climate leadership consultation process.

Geoff

Sent from my BlackBerry 10 smartphone on the TELUS network.

From: Tate, Shirley <shirley.tate@capp.ca>
Sent: Friday, April 8, 2016 2:19 PM
To: climateleadershipplan@gov.bc.ca
Cc: JTST.Minister@gov.bc.ca; mngh.minister@gov.bc.ca; FIN.Minister@gov.bc.ca; CSCD.minister@gov.bc.ca; Minister.Transportation@gov.bc.ca
Subject: For Review: CAPP Feedback on BC's Climate Leadership Plan Consultation Guide

To: Honourable Mary Polak
Climate Leadership Consultation
Ministry of Environment Climate Action Secretariat

Cc: Hon. Rich Coleman, Minister of Natural Gas Development
Hon. Michael de Jong, Minister of Finance
Hon. Shirley Bond, Minister of Jobs, Tourism and Skills Training and Responsible for Labour
Hon. Todd Stone, Minister of Transportation and Infrastructure
Hon. Peter Fassbender, Minister of Community, Sport and Cultural Development and Responsible for TransLink

Please find attached the Canadian Association of Petroleum Producers (CAPP) feedback on BC's Climate Leadership Plan Consultation Guide.

Sincerely,
Shirley Tate on behalf of

Brad Herald | VP, Western Canada

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April 8, 2016

Honourable Mary Polak
Climate Leadership Consultation
Ministry of Environment Climate Action Secretariat
PO BOX 9486, STN PROV GOVT
Victoria B.C. V8W 9W6

via e-mail: climateleadershipplan@gov.bc.ca

Dear Minister Polak:

Re.: Feedback on BC's Climate Leadership Plan Consultation Guide

The Canadian Association of Petroleum Producers (CAPP) submits the following comments in response to the *Consultation Guide: Building B.C.'s Climate Leadership Plan*. CAPP appreciates the opportunity to provide our industry's perspective on addressing climate change in British Columbia as the province finalizes the development of the new Climate Leadership Plan.

It is clear that both generally and in the context of natural gas producing and LNG exporting jurisdictions that BC is a leader on carbon policy and addressing greenhouse gas (GHG) emissions. BC has a unique opportunity to help tackle global climate change by making LNG available to countries looking to move off of coal-fired power generation. We are firmly of the view that the economic benefits from responsible natural-gas production and export can be achieved while also meeting BC's ambitions to tackle global climate change.

CAPP supports a climate policy framework in British Columbia that creates a vibrant and competitive oil and gas sector while efficiently and effectively managing greenhouse gas emissions. To this end, CAPP provides the following key recommendations, aligned with the relevant sections of the Consultation Guide. These views remain consistent with CAPP's submission made to Government September 2015, in response to the Climate Leadership Plan Discussion Paper, which outlined the importance of competitiveness and supporting further emissions reductions opportunities for oil and gas, such as electrification and methane emissions reductions. [1]

***What We Value:* Protecting BC's Competitiveness & Minimizing Carbon Leakage**

From a competitiveness standpoint, BC's upstream natural gas industry faces significant challenges due to a continued low commodity price environment coupled with the unique challenges associated

[1] https://engage.gov.bc.ca/climateleadership/files/2015/12/179_-Canadian-Association-of-Petroleum-Producers.pdf

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with BC's resource plays. We recommend that the BC government consider how any climate policy initiatives undertaken by the province can not only preserve, but enhance the economic competitiveness of BC's upstream oil and gas sector to attract investment and create jobs. Carbon policy design requires full cost accounting of options when evaluating the cumulative burden across policies and regulations in order to prevent further deterioration of industry competitiveness and to minimize the risk of carbon leakage to competing jurisdictions. We offer the following carbon policy recommendation for how to minimize both carbon and investment leakage from BC.

Carbon Tax

The CLT recommended increases to the current $30/tonne carbon price commencing in 2018. Applying additional increases to our sector would further diminish competitiveness of the natural gas industry and increase the risk of carbon leakage to competing jurisdictions. Economic competitiveness is of paramount importance to ensure the industry is able to thrive, attract new investment, create jobs and generate revenues for government.

Emission-Intensive, Trade-Exposed (EITE)

CAPP strongly supports the efforts of the Government of BC to protect EITE industries. On November 27, 2015, Minister Polak stated that the province would only consider changes to its carbon tax under a regime where EITE industries are "fully protected from any carbon tax increase."

CAPP fully supports the government's position to protect EITE industries, and believes the upstream industry clearly qualifies as an EITE industry.

Given BC's strong leadership on carbon pricing, applying further increases in BC's carbon price to our sector without full protection would further impair the competitiveness of the province's oil and gas sector, especially in the current low price environment when operating margins are already suppressed. An EITE policy applied to carbon price increases would recognize the importance of managing inter-jurisdictional competitiveness, until the carbon policies in key trading jurisdictions are equivalent and/or aligned in level of effort and price. Additional policy principles are provided in the Appendix.

***The Way We Work:* GHG Emissions Reduction Opportunities**

CAPP is looking forward to engaging with the B.C. government in the development of the province's Climate Leadership Plan to meaningfully address GHG emission from upstream oil and natural gas activities while enhancing the overall competiveness of the industry in British Columbia. The following section provides recommendations on key emissions reductions opportunities from our industry.

Electrification

The consultation guide references the Climate Leadership Team's recommendation 14 to supply clean electricity for the electrification of the upstream industry in a competitive and timely manner.

CAPP believes competitive electrification of the upstream will help BC move toward its provincial GHG reduction targets, representing a foremost opportunity for significant GHG mitigation for the oil and gas sector in BC. Based on our sector's experience, there exists two significant risks to competitive electrification: Reliable and timely in-service transmission capacity; and economic considerations related to rates and tariffs. Practical work is required by BC Hydro and government to work with our sector to align business processes and to find equitable means to balance risks.

Methane

In 2013, upstream oil and gas methane emissions accounted for approximately 20 per cent of BC's total methane emissions. CAPP is committed to making reductions to methane emissions and recommends the following, taking care that responses to each of these demonstrate leadership in seeking alignment with Canada, other provincial jurisdictions and, where appropriate, with competing jurisdictions like the US:

- Applying enhanced regulated standards to new facilities and a regulated standard of practice for leak detection and repair (LDAR) of fugitive equipment leaks; building on existing LDAR requirements.
- A market-based approach to achieve a specified reduction target using fiscal measures focused on reductions from legacy methane emissions sources installed at existing facilities.
- A specific reduction target for vented and fugitives sources at existing facilities that is ambitious yet achievable with the appropriate policy and fiscal mechanisms in place to provide industry with a pathway to achieve the specified reductions. In addition, this target should align appropriately with other provincial and federal goals, including Alberta's Climate Leadership Plan.

CAPP believes properly designed and prescribed programs will achieve greater reductions than those that would be achieved through a carbon tax approach, which increases operating costs and could discourage needed investment in BC. Consequently, CAPP does not at this time support recommendations to increase the rate or scope of the BC carbon tax, as applied to our sector, and believes that all uncombusted methane should be exempt from carbon tax to enable reductions using the market-based mechanisms above. For legacy assets, a market-based approach to achieving a specified methane emissions reduction target is critical to mitigate the costs of retro-fitting industry's inventory of existing equipment to lower emitting devices.

Fiscal Measures

To incent methane emissions reductions, and to incent greater uptake in electrification, a viable path forward hinges on the development of fiscal mechanisms to enable investment. Given the current competitiveness pressures on our sector (including the cost burden of the carbon tax), industry and government will need to work together on ways to improve the economic value of emission reduction projects. By doing so will contribute to more reductions being achieved.

The following fiscal measures should be considered further by the BC government for application by the industry to emissions reductions opportunities:

- *Offsets*: Could be achieved via BC government guaranteed/targeted purchase of offsets, to provide certainty around supply and price, and/or enabling linkages to other offset markets, to expand demand for BC offsets.
- *Carbon compliance certification*: Reduction in carbon tax payable based on emission reductions achieved.
- *Clean infrastructure royalty credit program*: Investing in innovation and technology will enable BC to reduce emissions while also creating and maintaining jobs. CAPP recommends that the province create a broad clean royalty infrastructure credit program that would support investments in infrastructure/technology to reduce methane emissions. A royalty credit program would contribute to investment economics supplemented by fiscal support through offsets or compliance certificates.

In conclusion, BC needs to find the balance so that it can be both a strong world leader in the fight against climate change and a more competitive place to invest in oil and gas. Climate policy should be designed to focus on targeted emissions reductions through enhanced technology investment and deployment, enable flexible compliance options and prioritize economic competitiveness in order to simultaneously enhance competiveness, attract new investment, while achieving the emissions performance objectives. Going forward industry and government will need to work together to achieve greater GHG reductions in a way that can support or enhance industry's competitiveness. We believe a significant opportunity does exist and can be supported by BC in its climate action plan by: designating EITE industries, supporting upstream electrification, and providing the fiscal mechanism that will enable methane emission reductions. CAPP is committed to working together to find ways to help achieve BC's emissions reduction targets while continuing to grow the economy.

Sincerely,

Brad Herald

Brad Herald
Vice-President, Western Canada

Cc: Hon. Rich Coleman, Minister of Natural Gas Development
Hon. Michael de Jong, Minister of Finance
Hon. Shirley Bond, Minister of Jobs, Tourism and Skills Training and Responsible for Labour
Hon. Todd Stone, Minister of Transportation and Infrastructure
Hon. Peter Fassbender, Minister of Community, Sport and Cultural Development and Responsible for TransLink

CAPP

CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS

Canada's Oil and Natural Gas Producers

April 8, 2016

Appendix: Emission-Intensive, Trade-Exposed (EITE) Policy Design Principles

Currently, many different carbon management regimes around the world utilize an emission-intense trade-exposed (EITE) methodology to determine the need to protect industries competiveness and minimize carbon leakage under carbon pricing policies. The EITE designation serves to recognize those segments of the economy that represent a leakage risk, whereby investment could shift jurisdiction with less stringent carbon policies providing no gain in global GHG reductions but shrinking economic benefit for BC through loss of investment, jobs and government revenue.

CAPP has worked with industry associations along the natural gas value-chain in British Columbia to consider other jurisdictions' EITE methodologies and develop policy design principles for EITE. Through this effort, the following principles have been established and should be part of a BC mechanism for EITE determination:

- *Fair and transparent*, creating competitive parity across competing jurisdictions.
- *Science-based*, with a strong analyses and understanding of implications in practice.
- *Clear, predictable and simple to administer*, with clear and established processes for review of EITE protection.
- *Cost-efficient*, offsetting the difference in incremental carbon price that exists between competing jurisdictions.
- *Balanced and efficient*, recognizing the totality of emissions policies on industry.
- *Viable*, with readily available compliance pathways that support open market mechanisms.
- *Consistent with developing a clean LNG industry*, achievable within the context of a growing and transitioning lower carbon economy.
- *Recognizes the risk of carbon leakage*, and that BC is currently a world leader in carbon price and industry emissions regulations.
- *Does not disadvantage BC natural gas producers*, in existing North America markets and in emerging international markets.

Using these principles as a framework for EITE policy design, CAPP looks forward to working further with the BC government to further develop a BC solution to EITE determination and application.

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From:	Piccinino, Ines MNGD:EX
To:	Schwabe, Michelle MNGD:EX; XT:Sian, Sherry FLNR:IN; Brad Herald (herald@capp.ca); Geoff Morrison (geoff.morrison@capp.ca); Lesiuk, Tim ENV:EX; Fradley, Adria N ENV:EX; Paulson, Ken OGC:IN; Parsonage, Kevin D OGC:IN
Cc:	Phillips, Krista
Subject:	BC Methane Table May 6th meeting - Draft agenda
Date:	Friday, April 29, 2016 4:12:53 PM
Attachments:	Methane Reduction Strategy for Oil and Gas Industry - Tech 3.docx

Please find attached draft agenda for May 6th meeting in Victoria. Let me know if you have any edits please. Also, please read the action items (second page) as some of them MIGHT involve you and I don't want you to be too surprised!

Have a great weekend and see you on Friday!

Ines

BC Methane Table

May 6, 2016 – 8:00 am – 10:30 am Pacific Time

Boardroom 8036 - 1810 Blanshard, 8th floor, Victoria

Conference Call: 1-877-356-9184 / Passcode: 2327400

1. Welcome (MNGD)
2. Roundtable (all)
3. Purpose of meeting (MNGD)
4. Developments in other jurisdictions: Federal – Alberta – Saskatchewan (all)
5. Joint technical group developments (CAS)
6. NRCan funding for oil and gas projects (CAPP/OGC)
7. The role of CSA and other organizations in standards development (all)
8. CIRCP & Offsets interactions (MNGD/CAS)
9. Next steps and timelines

Action items from last meeting:

1. **CAS (Tim)** will put everybody in the technical group in touch so they start meeting – their first task: clean up the 2014 inventory to use as base for target.
    - Industry: Marie Johnson from Progress
    - CAPP: Troy Jones
    - CAS: Hurrian Peyman
    - OGC: Tony Wakelin
    - MNGD: Don D'Souza

2. **CAPP (Brad?)** to look into projects that NRCAN might be proposing in the oil and gas space (Brad indicated CAPP might already have the list)

3. **OGC (Ken Paulson)** to follow up with NRCAN about funding and applicability of funds to writing standards

4. **CAPP (Mikaela)** to add a column to the LDAR scan analysis and send back to the group - DONE

5. **MNGD (Michelle) and CAS (Tim?)** will work on a draft concept on how the CIRCP and offsets can play together to incent methane emission reductions. They will also explore how to validate the approach and ensure it's successful (potential for industry "focus group"?)

6. **MNGD (Ines)** to set up next meeting – May 6th in Victoria

From:	Lesiuk, Tim ENV:EX
To:	Laaksonen-Craig, Susanna ENV:EX
Cc:	Hop Wo, Hilary ENV:EX; Dobson, Neil ENV:EX; Fradley, Adria N ENV:EX
Subject:	Fwd: CAPP Assessment of Federal Draft Regulatory Model for Methane Emissions Reduction-Slide Deck
Date:	Wednesday, September 21, 2016 11:11:12 PM
Attachments:	CAPP_EDMS-#288898-v11-MTG_Combined_Slides_Deck_MASTER.pdf ATT00001.htm

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Fyi

Tim Lesiuk
Executive Director, Business Development and Chief Negotiator
Climate Action Secretariat
Province of British Columbia
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Email: tim.lesiuk@gov.bc.ca

Begin forwarded message:

From: "Loh, Salima" <Salima.Loh@capp.ca>
To: "'Cauchi, Mark'" <mark.cauchi@canada.ca>, "'Diamond, James'" <james.diamond@canada.ca>, "Piccinino, Ines MNGD:EX" <Ines.Piccinino@gov.bc.ca>, "Paulson, Ken OGC:IN" <Ken.Paulson@bcogc.ca>, "Wakelin, Tony" <Tony.Wakelin@bcogc.ca>, "Curry, Sean" <Sean.Curry@BCOGC.ca>, "Parsonage, Kevin D OGC:IN" <Kevin.Parsonage@bcogc.ca>, "Lesiuk, Tim ENV:EX" <Tim.Lesiuk@gov.bc.ca>, "'Stephen Wills'" <Stephen.Wills@gov.ab.ca>, "'Sharla Rauschning'" <Sharla.Rauschning@gov.ab.ca>, "'Mark Taylor'" <Mark.Taylor@aer.ca>, "'Heather Carmichael'" <Heather.Carmichael@gov.ab.ca>, "'Joel Rogers'" <joel.rogers@gov.ab.ca>, "'! Gerald Palanca'" <Gerald.Palanca@aer.ca>, "'Rhonda King'" <Rhonda.King@aer.ca>, "Schwabe, Michelle MNGD:EX" <Michelle.Schwabe@gov.bc.ca>, "'Cailee Ellis'" <Cailee.Ellis@aer.ca>, "'Maria Lavelle'" <Maria.Lavelle@aer.ca>, "'Nauman Saeed Anwar'" <NaumanSaeed.Anwar@aer.ca>, "'Kate Rich'" <kathleen.rich@gov.ab.ca>, "'Wist, Floyd ECON'" <Floyd.Wist@gov.sk.ca>, "'hal.sanders@gov.sk.ca'" <hal.sanders@gov.sk.ca>, "'Loseth, Howard'" <Howard.Loseth@gov.sk.ca>, "'Lowdon, Keith'" <Keith.Lowdon@gov.mb.ca>, "'Fraser, Landon (MMR'" <Landon.Fraser@gov.mb.ca>, "'Kerr2, Jennifer'" <jennifer.kerr2@canada.ca>, "D'Souza, Don MNGD:EX" <Don.DSouza@gov.bc.ca>, "'Devlin, Joe'" <joe.devlin@canada.ca>, "'Corbett, Laura'" <laura.corbett@canada.ca>, "'jim.kuper@canada.ca'" <jim.kuper@canada.ca>, "'Ganapathy, Roopa'" <roopa.ganapathy@canada.ca>, "'Stevado, Amanda (EC'" <amanda.stevado@canada.ca>, "'Abdul, Mohamed (EC'" <mohamed.abdul@canada.ca>, "'justin.domareski@canada.ca'" <justin.domareski@canada.ca>, "Hubbard, Terence (NRCan/RNCan)" <terence.hubbard@canada.ca>, "Heath, Douglas (NRCan/RNCan)" <douglas.heath@canada.ca>, "Monastesse, Lyne (NRCAN/RNCAN)" <lyne.monastesse@canada.ca>, "'Dione McGuinness'" <Dione.McGuinness@aer.ca>, "'Leslie Allen'" <Leslie.Allen@aer.ca>, "'Foran2,

John (NRCan/RNCan)'" <john.foran2@canada.ca>, "'Westerman, Debby ECON'" <Debby.Westerman@gov.sk.ca>, "Robert Savage (ESRD)" <Robert.Savage@gov.ab.ca>

Subject: CAPP Assessment of Federal Draft Regulatory Model for Methane Emissions Reduction-Slide Deck

Good Evening,

Thank you again to those of you who were able to attend today's meeting. As requested during the session please find attached a PDF copy of today's presentation.

We look forward to further our collaboration with each of you on the methane file in the near future.

Kind regards,

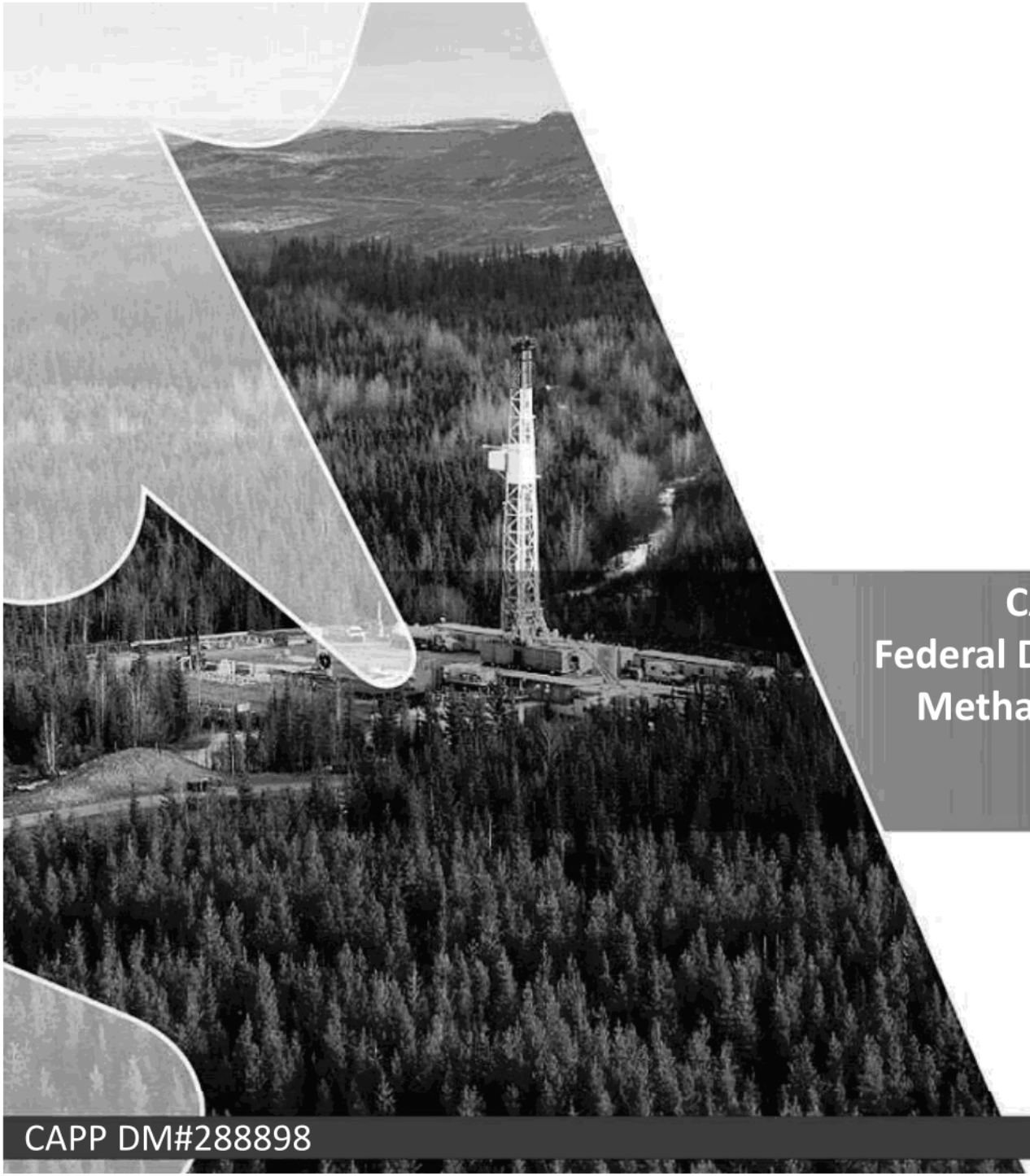
Salima Loh | Air Issues Advisor

D: 403.776.1406 | C: 403.671.0482 | Email: Salima.Loh@capp.ca | Website: www.capp.ca

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Agenda September 21, 2016

11:00	Introductions/Welcome
11:15 – 12:15	CAPP High Level Overview
12:15 – 12:45	Lunch and Discussion
1:00 – 2:30	CAPP Technical Review – Emission Source Categories Each Presentation 20 min + 10 min Q&A
2:30 – 2:45	Coffee Break
2:45 – 3:45	CAPP Technical Review –Emission Source Categories Each Presentation 20 min + 10 min Q&A
3:45 –5:00	All Attendees Additional Discussion and Next steps



CAPP Assessment of Federal Draft Regulatory Model for Methane Emissions Reduction

September 21, 2016

CAPP CANADA'S OIL & NATURAL GAS PRODUCERS

CAPP DM#288898

Outline

- **Summary of Key Messages**
  - Political commitments
- **Context**
  - Engagement summary
  - Current state of the industry
- **The CAPP Commitment**
  - CAPP Commitment
  - Progress to date
- **Methane Emissions Summary**
  - Baseline 2012
  - Provincial breakdown
- **CAPP Analysis of ECCC Model and proposed regulations**
- **CAPP Example of a Cost-Effective Alternative**
- **Key Messages and Next Steps**

Summary of Key Messages

Key Messages

Industry is committed to the methane reduction target of 40-45% by 2025

- **Ensure close collaboration and consultation amongst industry, provincial and federal gov'ts**
- **Enable provincial equivalency with flexible provisions and manageable timelines**

CAPP supports an approach that:

1. Provides regulated standards for:
   - New developments, based on economically-achievable thresholds
   - Smart LDAR program to align inspection frequency with emission reduction potential – baseline survey frequency no more than annually, flexibility to adjust survey frequency as appropriate

2. Addresses existing facilities by:
   - Allowing for early action using fiscal incentives (e.g. credits, offsets) to drive clean technology deployment
   - Setting a performance-based regulatory backstop prior to 2025

3. Enables funding for clean technology and innovation development and deployment

4. Develops an enhanced performance management system to track emission reductions

The Political Commitment

U.S.-Canada Joint Statement (March 10, 2016) + Mexico (June 29, 2016)

Target: Reduce methane emissions by 40-45% below 2012 levels by 2025 from the oil and gas sector

Four Commitments

- **Regulate methane emissions from new and existing oil and gas sources**
- **Work collaboratively on programs, policies and strategies, and share experiences**
- **Improve data collection, transparency, and R&D and share knowledge of cost-effective methane reduction technologies and practices**
- **Jointly endorse World Bank's "Zero Routine Flaring by 2030" initiative**

Context

Methane Emissions – Existing Requirements

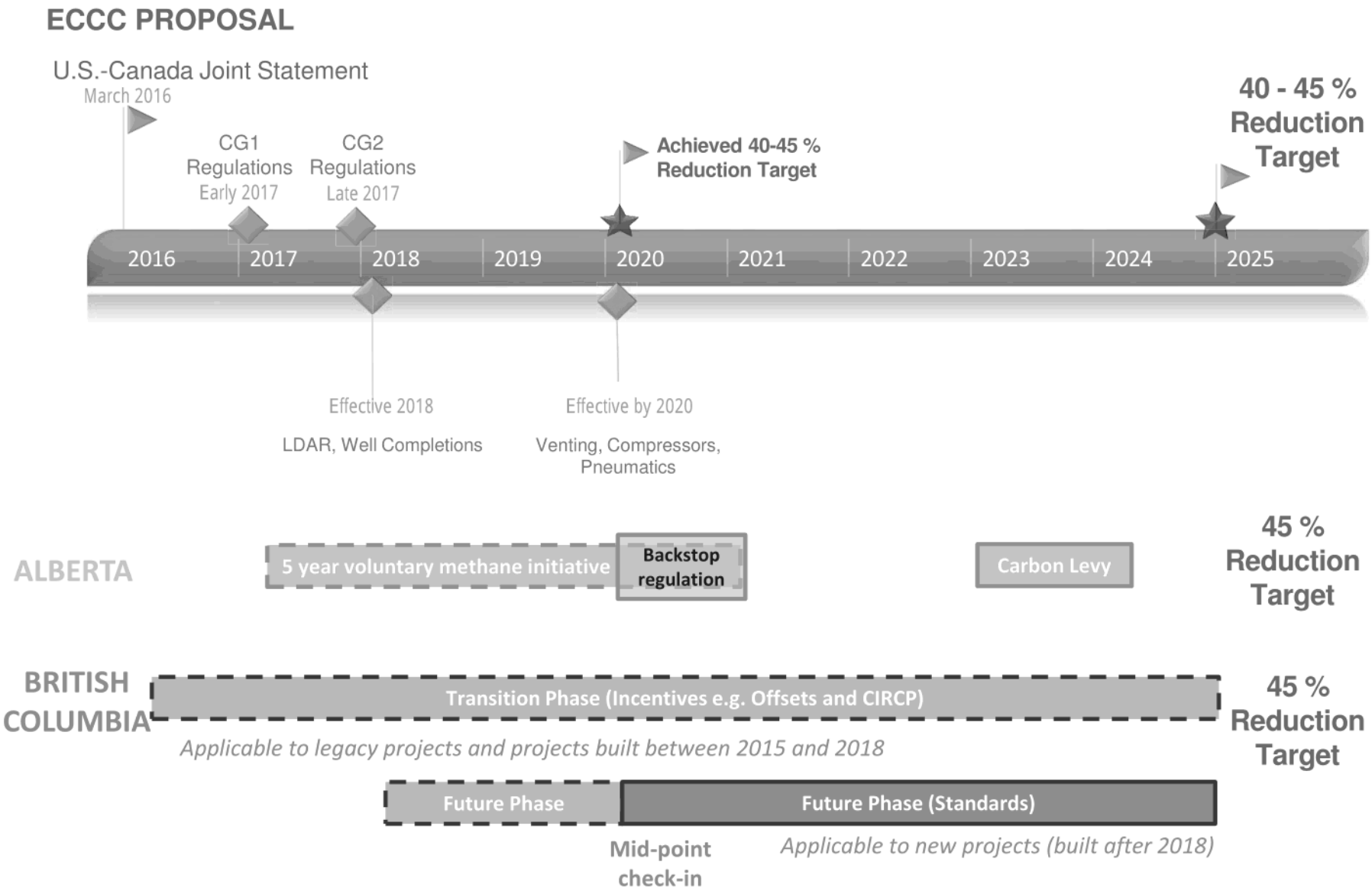
- **Legislation in place for petroleum and natural gas activities, resource conservation**
  - provincial governments
  - Federal Government (NEB, Offshore Petroleum Boards for NL and NS)
- **Flaring and Venting requirements**
  - AB Directive 060, ID 2003-01
  - BC Flaring and Venting Reduction Guideline
  - SK Directives S-10, S-20
- **Measurement and Reporting requirements**
  - e.g. AB Directive 017 >>> Petrinex

ECCC Methane Regulations Development Process

Canadian Environmental Protection Act, 1999

- **ECCC modelling and drafting requirements: spring/summer 2016**
- **ECCC drafting regulation, RIAS/CBA: fall 2016**
- **Canada Gazette 1 (proposed regulations): by early 2017**
  - 60 day comment period
- **Canada Gazette 2 (final regulations): by end 2017**
  - Coming into force as early as 2018: leak detection and repair, well completions
  - Coming into force by 2020: venting, compressors, pneumatics
- **Equivalency Agreements per CEPA, section 10**
  - with interested provinces: ~ two year process

Roadmaps to Methane Emissions Reduction Target



Engagement Process

- ECCC general information webinars **(May 17, 2016)**
- ECCC presentation to CAPP **(May 2016)**
- ECCC presentations to CAPP on emissions and costs modelling and proposed regulations **(June 8 – 9, 2016)**
- CAPP Methane Task Group (MTG) – sub-group interaction on ECCC modeling for proposed regulations (Venting, LDAR, Pneumatics, Compressors, Well Completions) **(June – August, 2016)**
- CAPP presentation to ECCC **(September 21, 2016)**

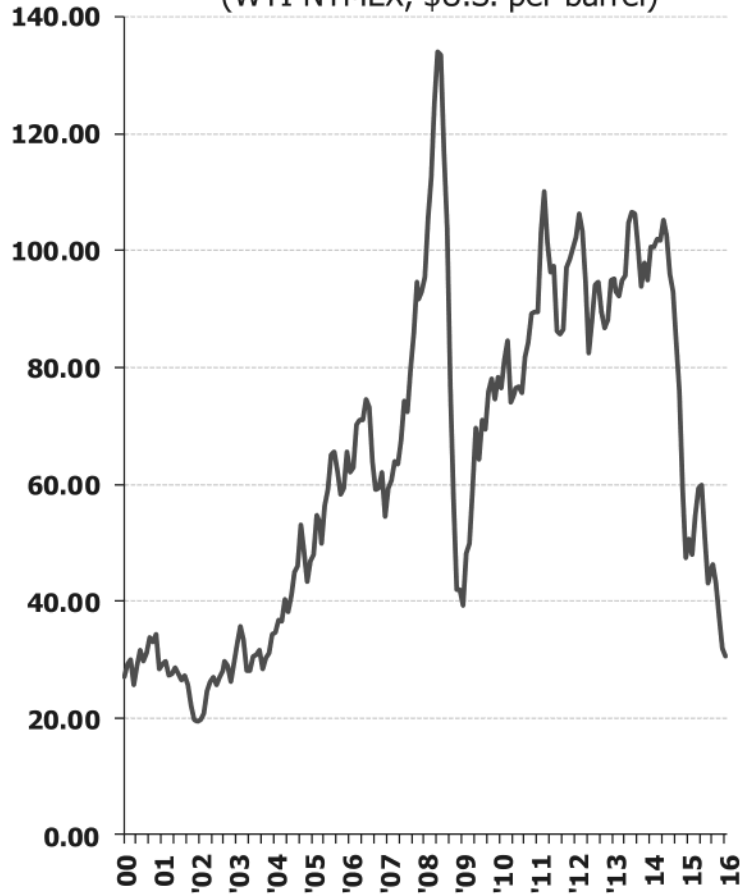
Only 2 months to view and assess ECCC modeling and analyze impacts of proposed regulation

Current State of the Industry

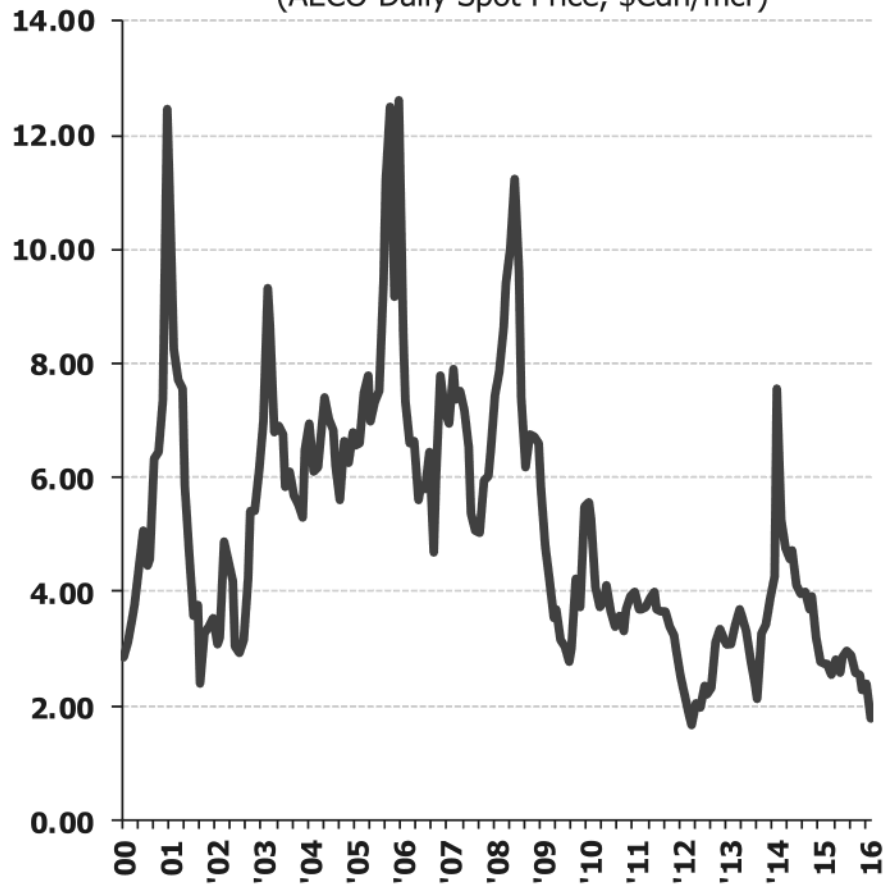
Upstream Oil and Gas Competitiveness

Commodity Price Declines a Real Challenge for Producers
On-going Cost Reductions are Critical to the Health of Industry

Crude Oil Prices
(WTI NYMEX, $U.S. per barrel)

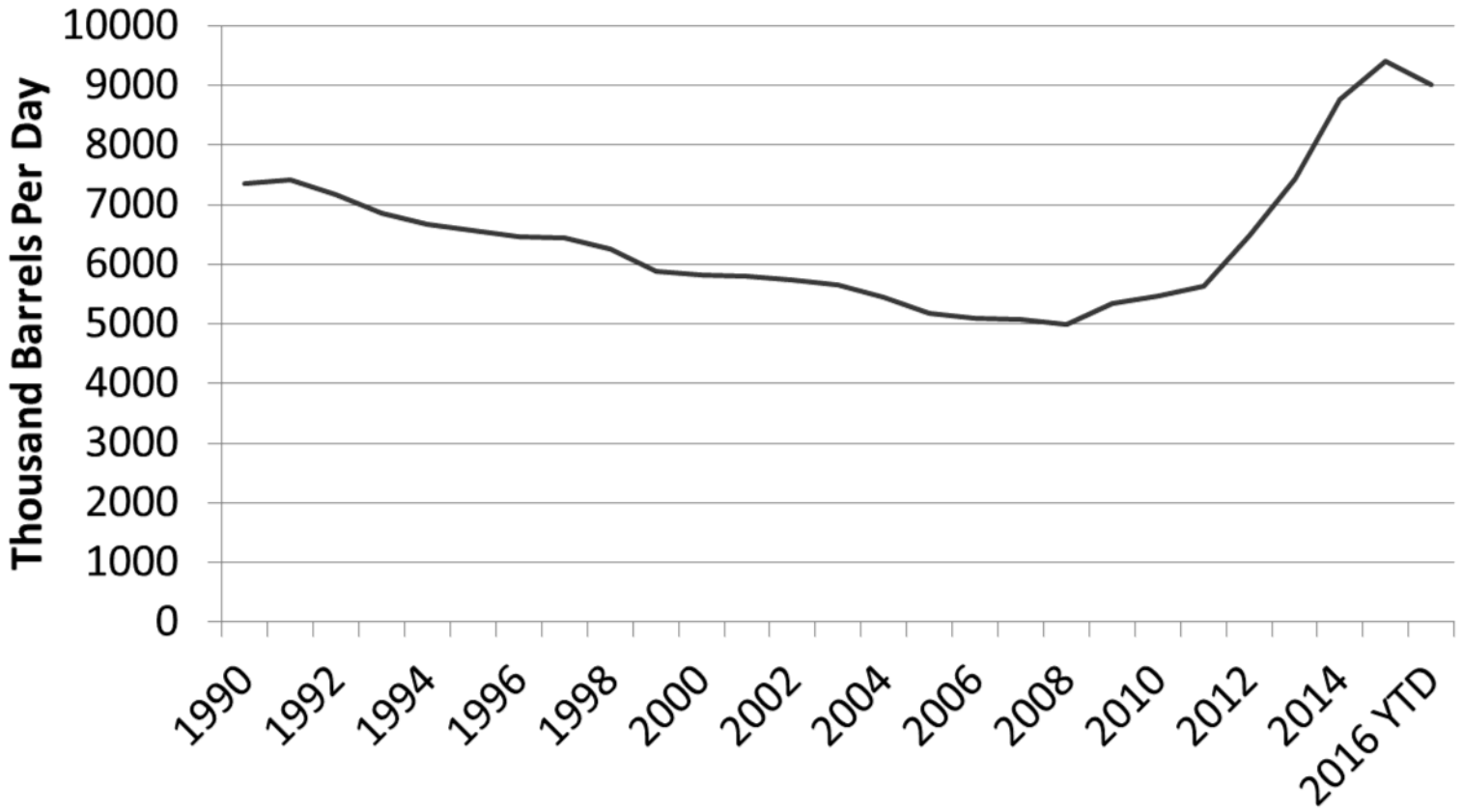


Natural Gas Prices
(AECO Daily Spot Price, $Cdn/mcf)



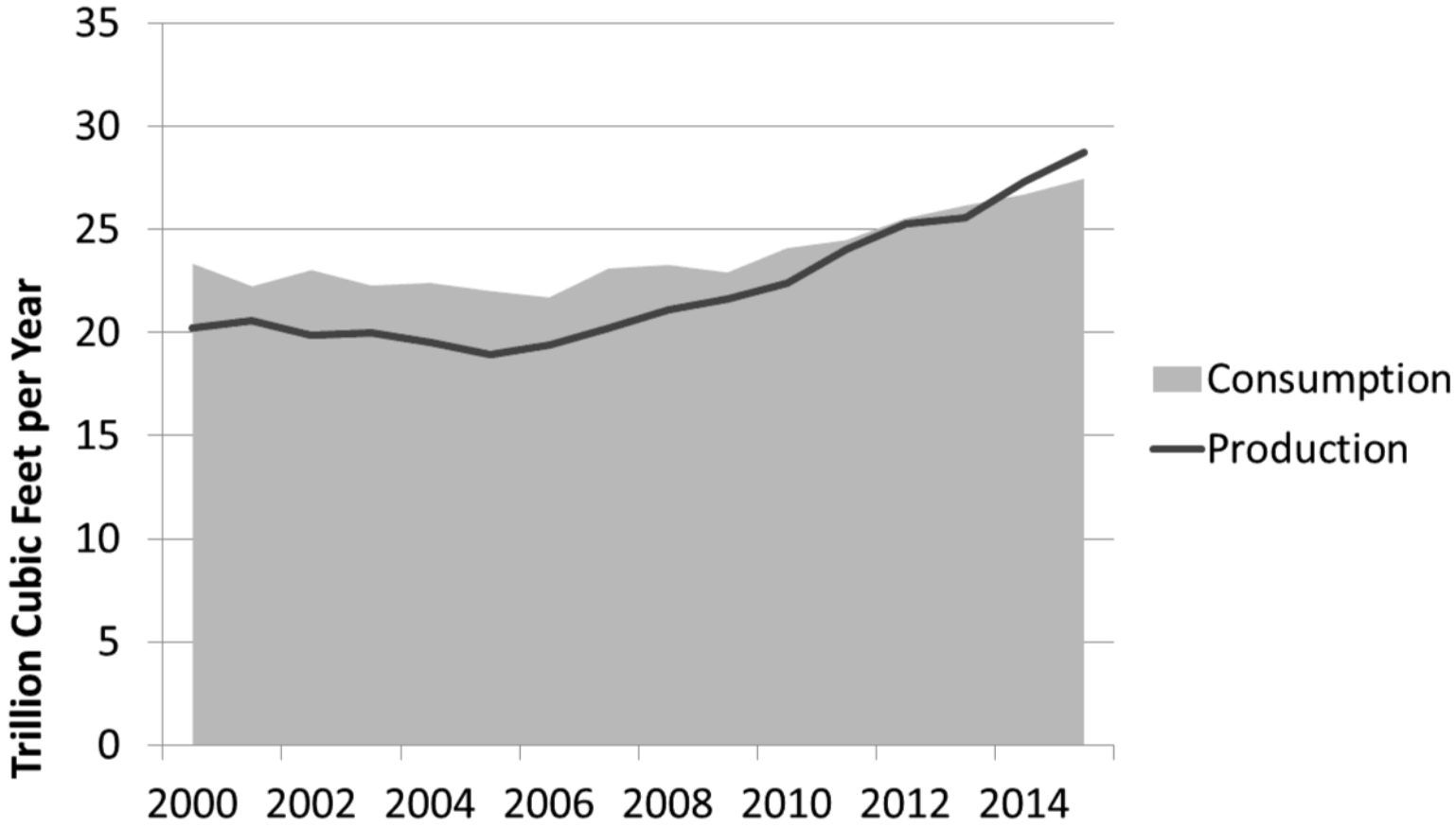
Source: CAPP Statistical Handbook

U.S. Production of Crude Oil



Source: CAPP Statistical Handbook

U.S. Natural Gas Production vs Consumption

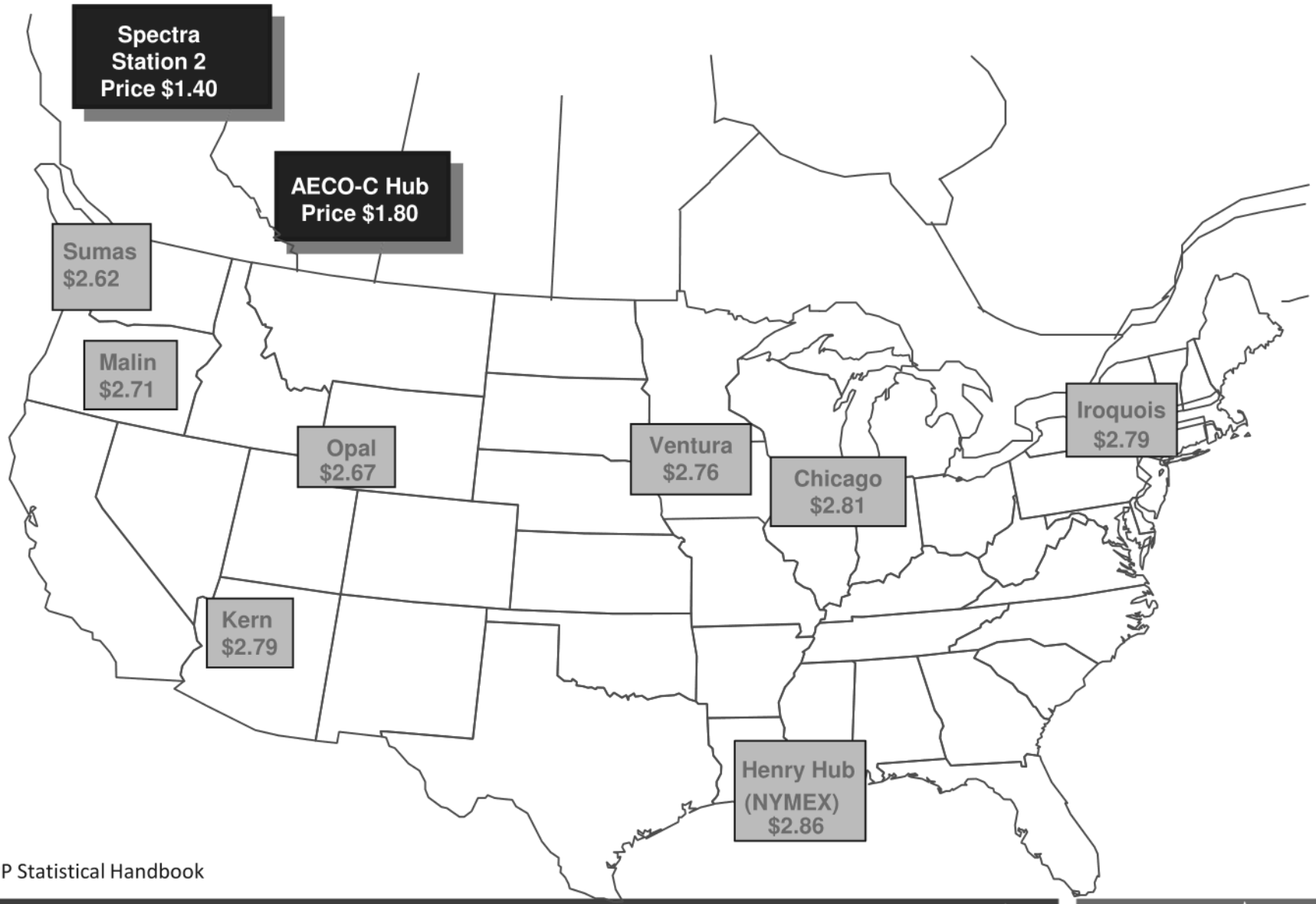


Source: CAPP Statistical Handbook

Canada's Geographic Disadvantage

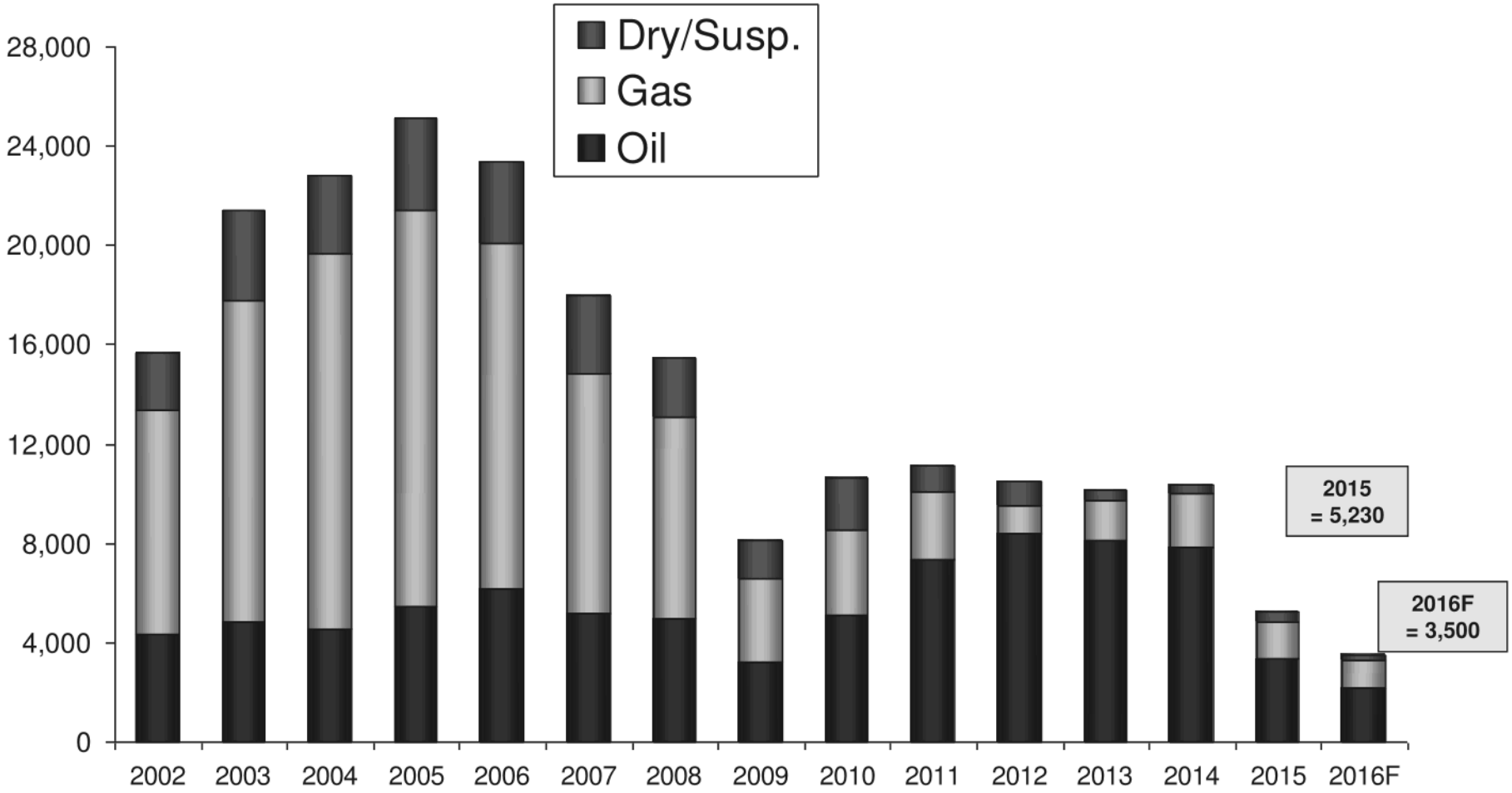
Firm 30-Day Natural Gas Prices

August 2016 (U.S.$ per MMBtu)



Source: CAPP Statistical Handbook

Total Wells Drilled in Western Canada



Source: CAPP Statistical Handbook

Oil and Gas Production (2015) by Province

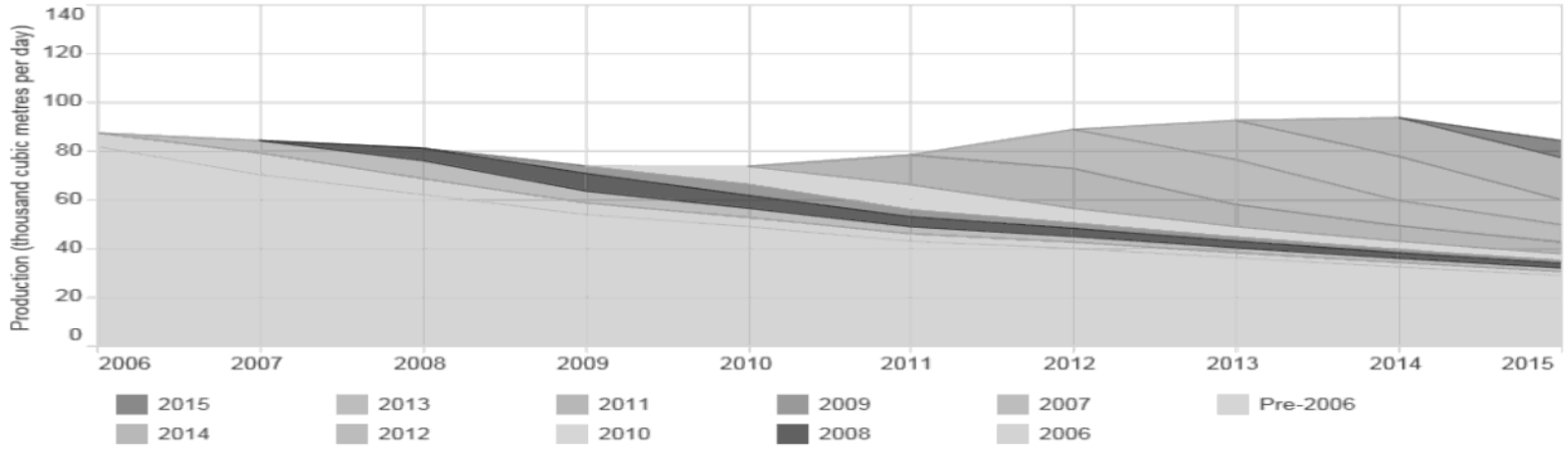
Jurisdiction	Conventional Light Crude Oil (m^3/d)	Upgraded Bitumen (m^3/d)	Non-upgraded Bitumen & Heavy Oil (m^3/d)	C_5+ / Condensate (m^3/d)	Marketable Natural Gas ($10^3m^3/d$)
BC	3,280	-	-	5,363	118,738
AB	62,594	155,205	245,121	29,345	286,941
SK	33,289	-	50,381	144	12,238
MB	7,283	-	-	-	-
NWT & Yukon	1,587	-	-	-	231
ON	157	-	-	-	307
NS	-	-	-	438	5,468
NF	27,373	-	-	-	-

Source: National Energy Board www.neb-one.gc.ca/nrg/sttstc/

IRC Page 23 of 128 MOE-2017-70711

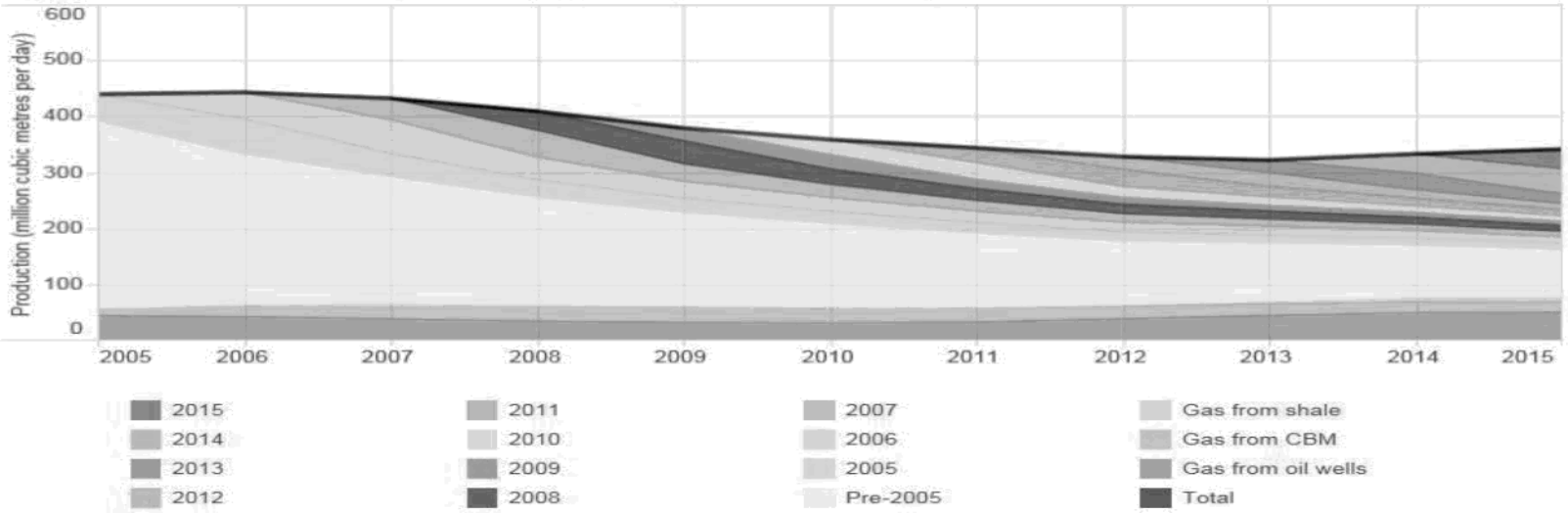
Alberta Crude Oil and Natural Gas Production Trends

Figure S4.8 Alberta conventional crude oil average daily production* by on-production year



* Production includes oil production from gas wells.

Figure S5.3 Alberta raw gas average daily production by on-production year



Source – AER ST98

Capital Investment in Canada's Oil and Natural Gas Industry



Source: Statistics Canada

- Overall capital spending is forecast to decrease by 35% from last year to $31 billion this year or 62% from $81 billion in 2014
  - Conventional oil & gas spending down 45% from 2015 to $14 billion in 2016
  - Oil sands decrease by 25% from $23 billion to $17 billion in 2016
- Annual government revenues on average of $17 billion/year in 2015
- Total drilling down 33% from 2015 to 3,500 wells in 2016
- Employs approx. 440,000 in Canada (direct & indirect)
- Impacts: Announced layoffs – 44,000 jobs. Direct & indirect – 110,000 jobs

Context - Summary

- **Industry activity is at lowest levels seen in last 15-20 years**
- **Industry overall financially challenged**
- **Fundamentals of markets have changed quickly, with U.S. production increases**
- **Canadian production is already at a risk of being displaced by U.S. competition**
- **Not a good time to impose additional costs on industry**
- **Opportunity to find ways to be more cost-effective and meet emission reduction objectives**
  - e.g. standards for new developments, for when activity levels increase

The CAPP Commitment

CAPP's Commitment to Action on Methane

Industry is committed to the methane reduction target of 40-45% by 2025

- **Ensure close collaboration and consultation amongst industry, provincial and federal gov'ts**
- **Enable provincial equivalency with flexible provisions and manageable timelines**

CAPP supports an approach that:

1. Provides regulated standards for:
   - New developments, based on economically-achievable thresholds
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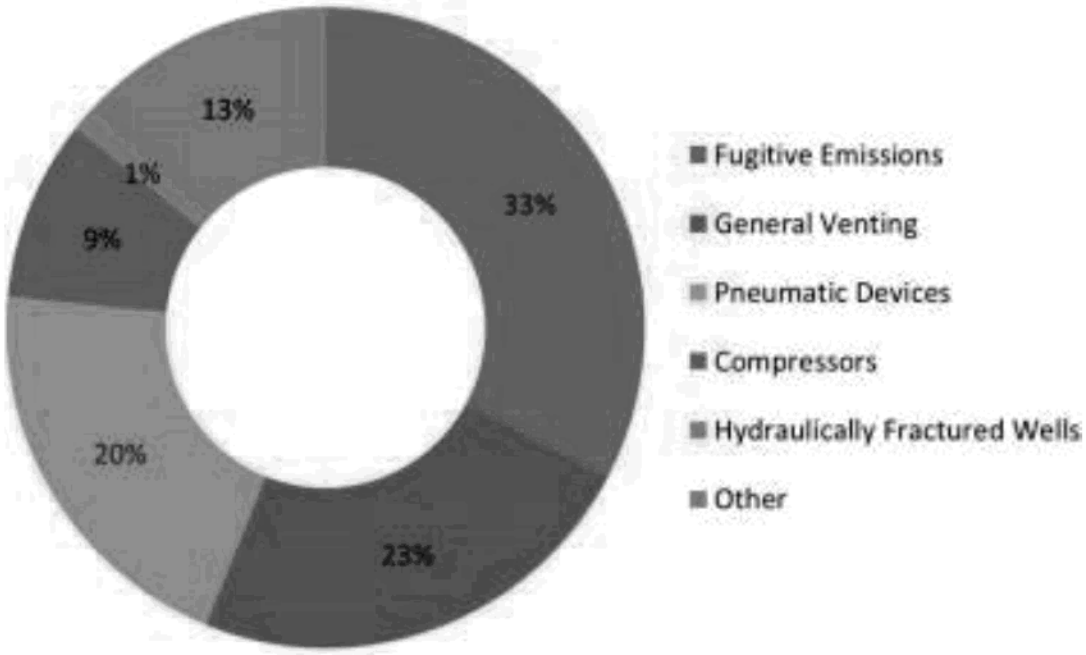
4. Develops an enhanced performance management system to track emission reductions

Methane Emission Actions by Industry

- **Example of Industry reduction since 2012:**
  - Retrofit/Conversion technologies: **0.575Mt CO_2e**
    - Vent gas capture, instrument air, low bleed controllers, solar pumps
  - Solution gas conservation/combustion (heavy oil): **1.73 Mt CO_2e**
- **Oilsands SAGD no routine venting**
- **Regulated LDAR Programs since 2010**
- **CCEMC funded projects**
  - Compressor packing vent collection systems, pneumatic retrofits
- **Ambient methane monitoring**
  - Vehicles (e.g. St. FX Flux Lab), UAVs, satellites
- **Data improvements**
  - Industry participation in AER field surveys
  - PTAC LDAR project in progress
- **PTAC**
  - Technology review for CHOPS venting
  - Technology development and field demonstrations

Baseline Methane Emissions

The Starting Point… ECCC's Methane Emissions Profile



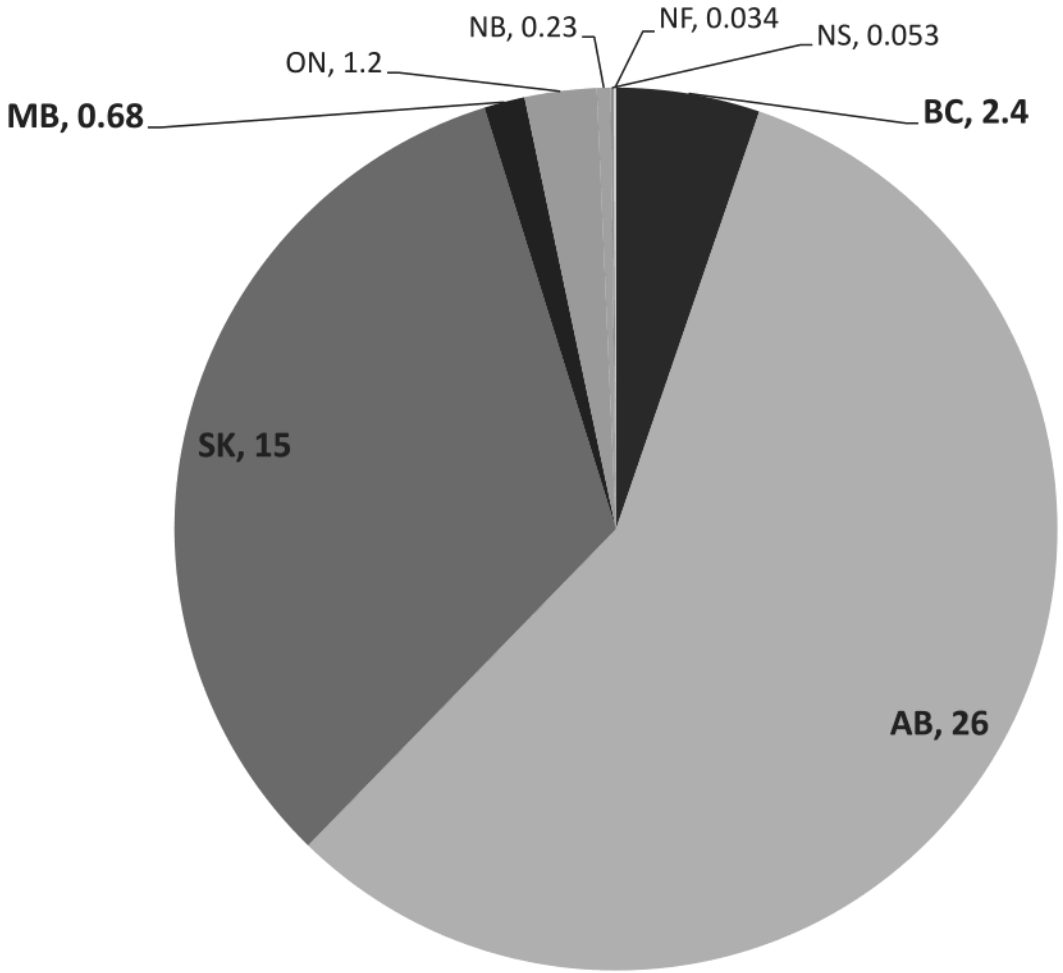
Source: Environment and Climate Change Canada

Methane Emissions from Canadian Oil and Natural Gas (2012)

45 Mt CO_2e

Source:
ECCC National Inventory Report, 1990 - 2012
Table A12-3

2012 Methane Emissions by Province (MT CO_2e)



Source: ECCC – National Inventory Report, 1990-2012 – Part 3 Methane Emissions from Oil and Natural Gas, 2012

CAPP Analysis of the ECCC Model and Draft Proposed Regulation

ECCC Modelling Approach

- **Bottom up approach -similar to Clearstone (2014), ICF (2015)**
- **No industry vetting of results, at site-level by operators**
- **Baseline emissions**
  - No current, complete Canadian industry inventories
    - reciprocating and centrifugal compressors
      - ECCC compressor counts derived from a partial engine inventory
    - natural gas supplied high bleed pneumatic controllers
    - leak detection data
  - Limited data on Canadian compressor vent rates
- **Gas composition**
  - Variable across industry
    - Shallow gas, CBM > 95% methane
    - Other produced gas higher and lower than ECCC model inputs

ECCC Modelling Approach

- **Value of gas (vented vs conserved)**
- **Emission factors**
- **Equipment Utilization**
  - e.g. seasonal use of pneumatic pumps
- **Consideration of alternative technologies in place?**
- **Consideration of emissions controls in place?**
  - Assumption that all centrifugal compressors in UOG have wet seals
- **Costs to implement emission reductions**
- **Production Forecasts**
- **Effectiveness of proposed requirements (emission reductions)**

ECCC Modelling Approach

Characterization of production types and facilities

- "Tight" vs "Shale" ?
- Validation of emission sources to facility code or facility type

Example 1: Natural Gas Processing Plant

- One Facility Licence
- A number of codes may be associated with facility
  - ABGP (Gas Plant)
  - ABBT (Gas Battery)
  - ABGS (Gas Gathering System)

Example 2: Multi Well Oil Battery

- One code e.g. ABBT, SKBT
- May include numerous facility licences for central battery facility, production satellites, multi well pads

ECCC Draft Proposed Regulation

- **Overly prescriptive**
- **Aggressive timelines**
- **Implementation costs will be greater than modelled**
- **Administrative burden Examples**
  - Annual reporting for pneumatic controllers not retrofit
  - Annual reporting for all pneumatic pumps, # days in operation

Page 038

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CAPP Conclusions – Analysis of ECCC model

- **Competitiveness**
  - Fiscal impact of proposed federal regulations are > 3.1 times higher than ECCC model. Range of $4 Bn over 8 yrs (2017-2025); Incremental operating costs continues beyond 2025
  - Significant impact on profitability and viability of Canadian production
  - Canadian gas production is at risk of being displaced by U.S. competitors, in supplying Eastern Canadian gas markets
- **We must find ways to be smarter, more cost effective, and still meet emissions reduction targets**

An Example of an Alternative Approach

CAPP Cost Effective Alternative

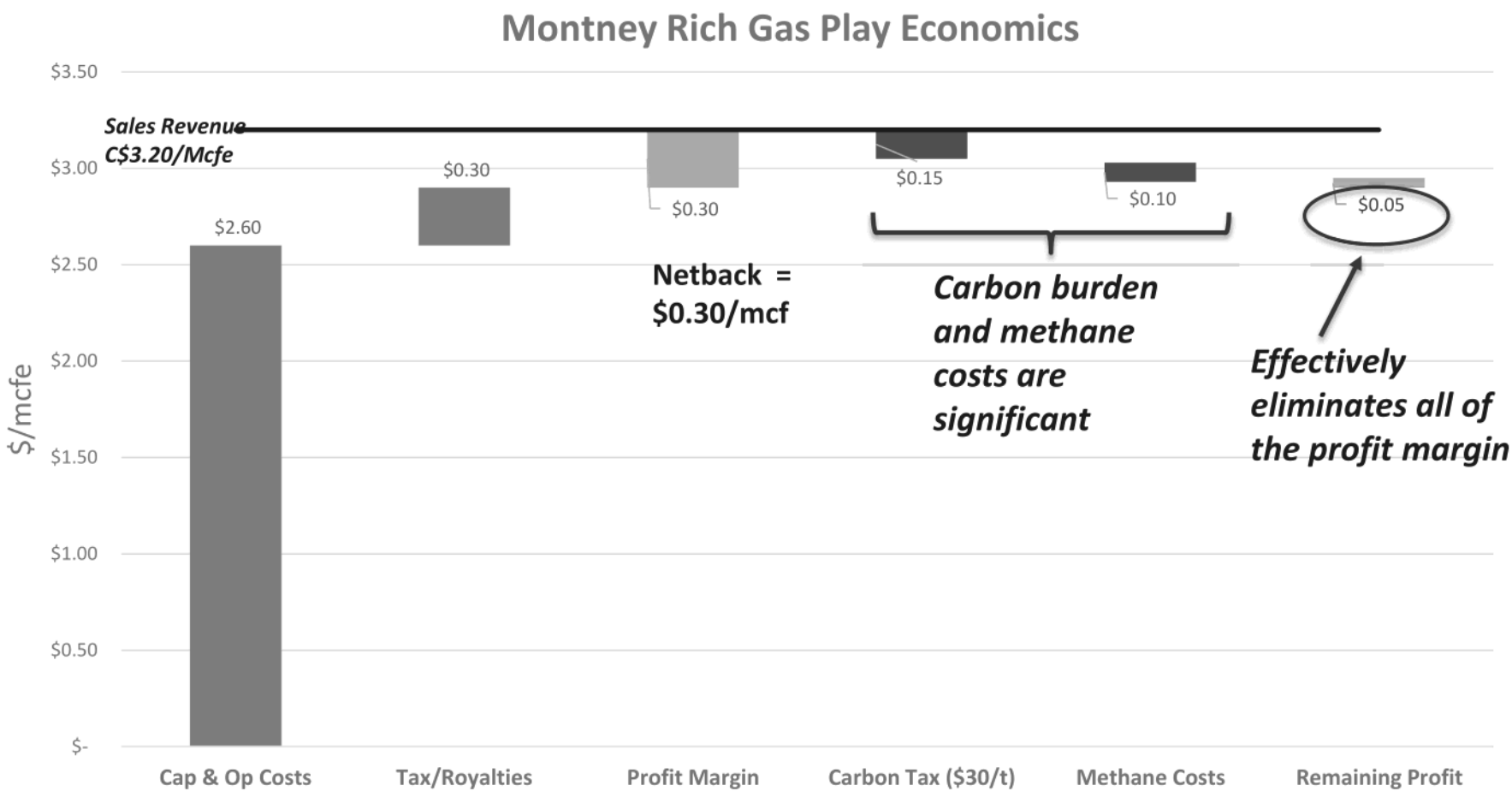
- Alternative requirements for LDAR and compressor vents can reduce the incremental operating cost burden by 2/3rd
  - Early wins achievable via implementation of cost-effective LDAR
- Early wins achievable with standards for new developments
- Extend timeframe for the regulatory approach for existing equipment to reduce the incremental cost burden by 2/3rd
  - Longer period for fiscal mechanisms, time to learn / adopt cost effective technologies
- Provides environmental outcomes in line with the stated emissions reduction target

Page 042

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Example
Competitiveness Impact of Carbon & Methane Burdens



Sales revenue basis:
C$2.50/Mcf AECO
C$50/bbl Edmonton

Key Messages and Next Steps

CAPP Key Messages

Industry is committed to the methane reduction target of 40-45% by 2025

- **Ensure close collaboration and consultation amongst industry, provincial and federal gov'ts**
- **Enable provincial equivalency with flexible provisions and manageable timelines**

CAPP supports an approach that:

1. Provides regulated standards for:
   - New developments, based on economically-achievable thresholds
   - Smart LDAR program to align inspection frequency with emission reduction potential – baseline survey frequency no more than annually, flexibility to adjust survey frequency as appropriate

2. Addresses existing facilities by:
   - Allowing for early action using fiscal incentives (e.g. credits, offsets) to drive clean technology deployment
   - Setting a performance-based regulatory backstop prior to 2025

3. Enables funding for clean technology and innovation development and deployment

4. Develops an enhanced performance management system to track emission reductions

Next Steps - Supporting Solutions

- **Detailed review/testing of alternative solutions for each source category**
  - Where required identify additional data collection & analysis, or piloting work, that could support a smarter approach
- **On-going consultation between industry and governments to develop consistent measurement and reporting requirements**
- **Collaboration between industry, technology providers, and government to support development of innovative technological solutions … towards improved gas conservation**

Recommendations

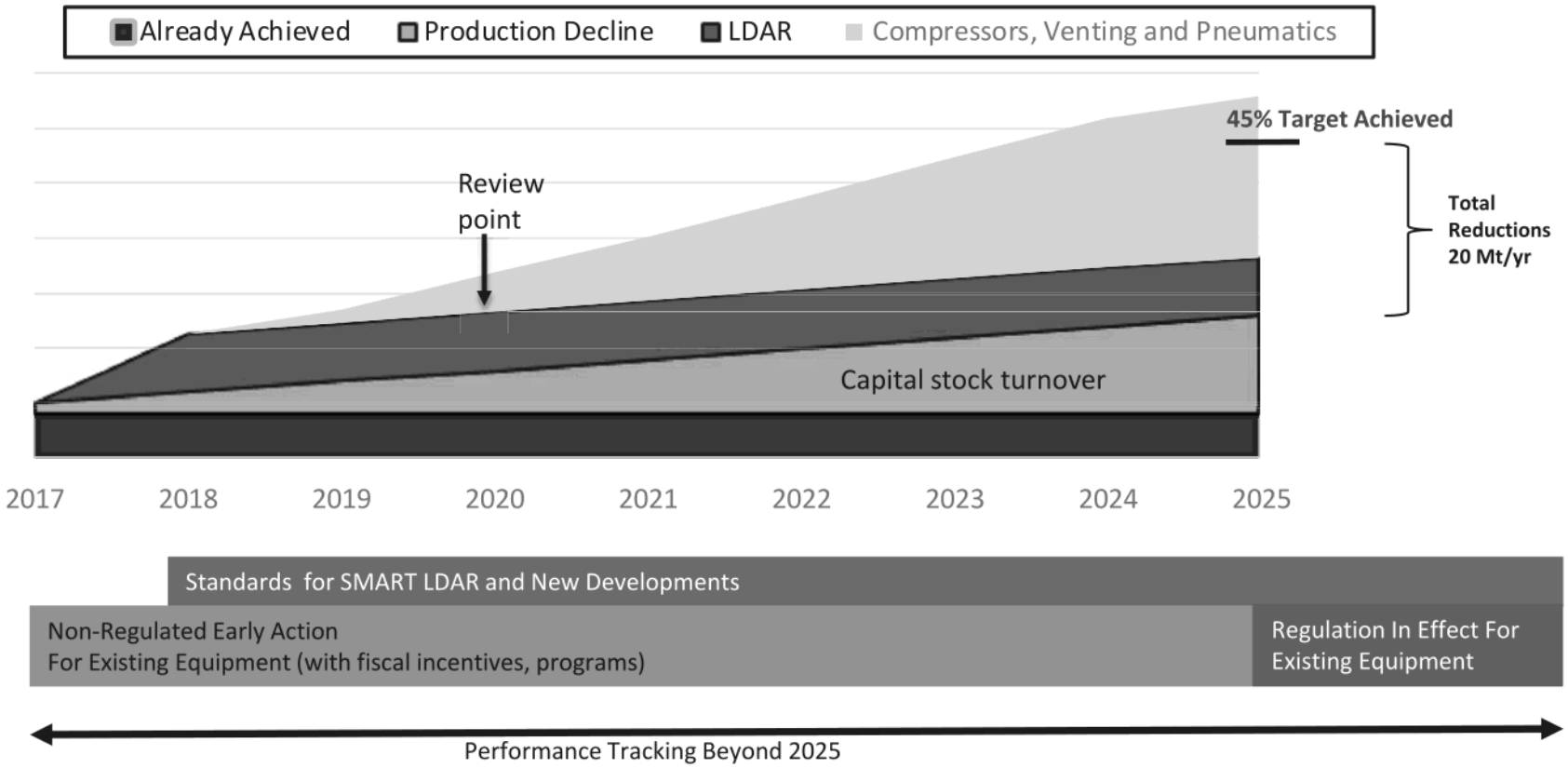
Based on the impact analysis, CAPP recommends:

1) **A smarter design of regulations that can deliver acceptable emissions while minimizing impact on industry competitiveness**
   - Fully consider the alternative solutions prior to issuance of draft regulations (CG1)
   - Build flexibility into regulations to incorporate ongoing learnings and data improvements

2) **Delaying the timing of regulatory implementation for existing equipment beyond the currently proposed 2020**
   - Enables stronger environmental and competiveness outcomes
   - Enhances the likelihood of successfully meeting the 2025 emission target

CAPP Alternative Proposal

Emission Reductions Achieved



Achieves 45% target in advance of 2025, with reduced cost impact

Technical Presentations

Fugitives

Fugitives Overview

- **Emissions Profile**

- **Background**
  - Source description, current industry practices & requirements, trends

- **Federal Proposal**
  - Summary of regulatory requirements / Comparison with U.S. EPA
  - ECCC Modeling – inputs / outputs

- **CAPP Impact Analysis**
  - Cost-Benefit - ECCC Proposal & Alternative Solution
    - Methodology
    - Results
  - Operational Impacts
  - Technology/Innovation Impacts
  - Alternative Solution Development

- **CAPP Positions / Recommendations**

Fugitives Summary

- **Recommendations**
  - Initial baseline that delivers early wins based on what is currently achievable and cost effective
    - Baseline of annual surveys at non-well facilities, with flexible survey frequency based on performance
    - Eliminate comprehensive well surveys
    - Potential future application of innovative technologies for multi-wellsite leak detection
  - Flexibility in regulations to adjust frequencies as learnings suggest
  - An informed & collaborative approach to support smarter LDAR design – data analysis, research, piloting
    - Support for: extended frequencies over time, low emissions at well sites
    - Multi-stakeholder working group to coordinate the work, check in on progress and learnings, make recommendations
  - Repair times - work with industry to develop a reasonable guideline

Fugitives Summary

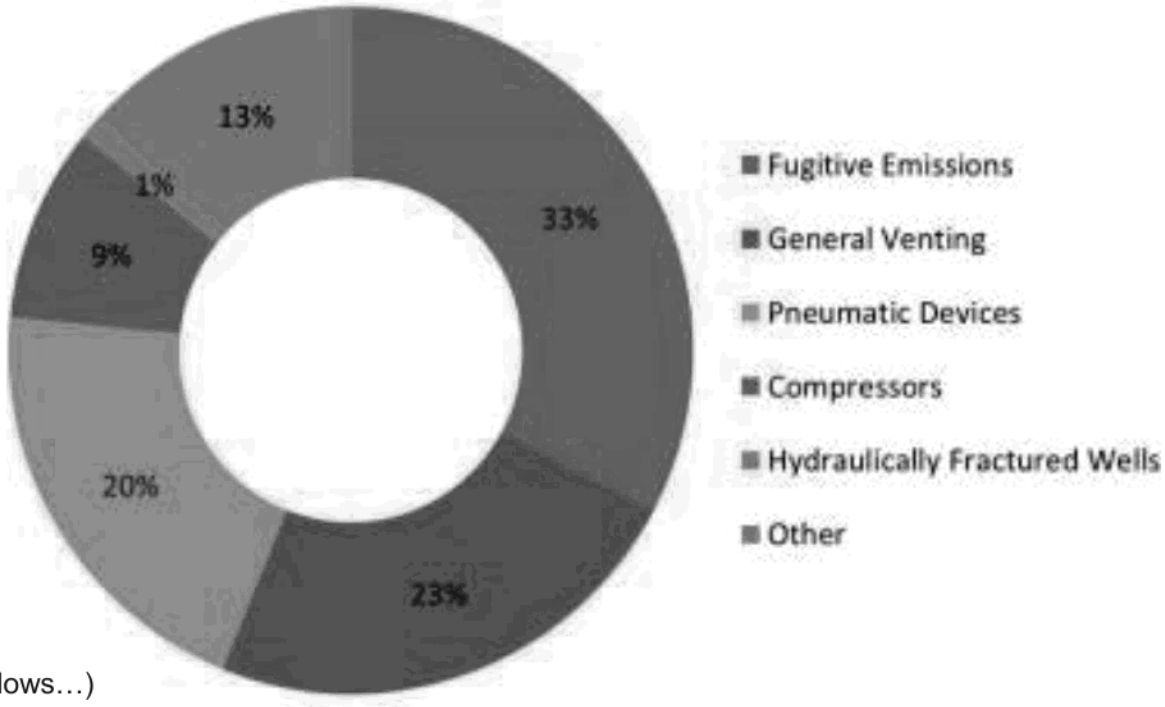
- **Benefits of Proposal**
  - Provides an early win
  - Emissions reductions that are in line with target
  - An incremental cost of ~$60MM/year to industry, is 1/3rd of the ECCC proposal, and still achieves ~70% of the reductions (5 Mt vs 7 Mt)
    - Eliminates inefficient efforts in the range of $40/t to $150/t CO2e
    - Significantly improves the industry standard versus current practice
  - Focus on innovative technologies provides potential to increase future reductions
  - A collaborative and informed approach, leading to the development of smarter LDAR requirements in Canada

Fugitives Emission Profile

2012 Baseline:

Oil & gas = 45Mt CO_2e

Fugitives = 15Mt CO_2e*



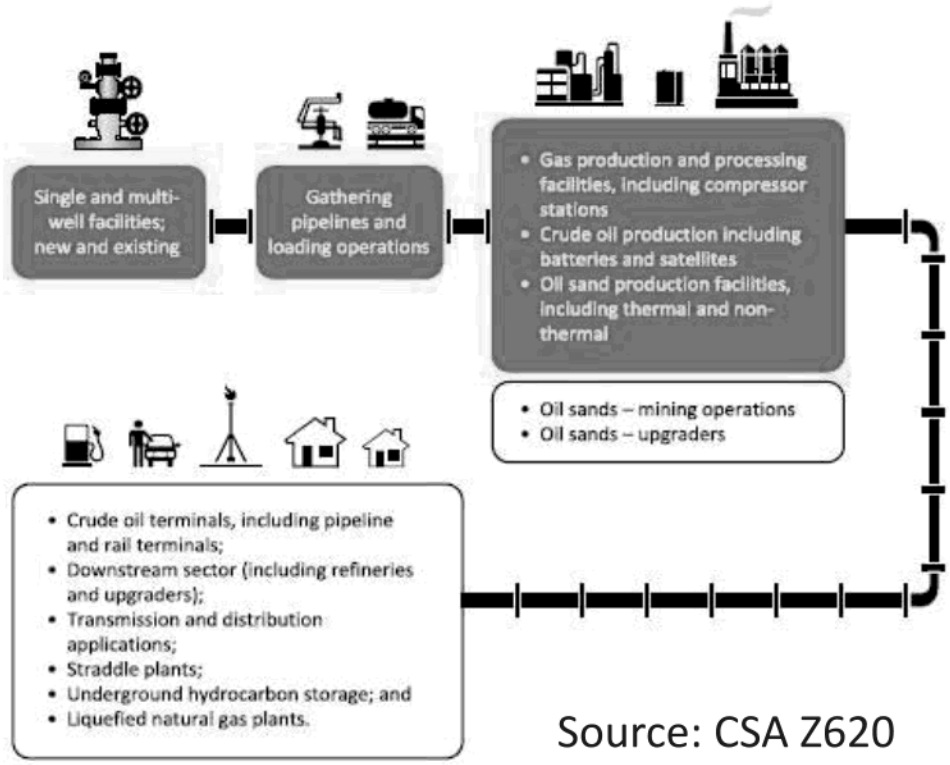
*Assumed for analysis:
15 Mt represents only equipment leaks,
and not other sources (i.e surface casing vent flows…)

Source: Environment and Climate Change Canada

Fugitives Background – Source Description

- **Fugitive equipment leaks: Unintentional leaks from oil and gas operations, does not include equipment designed to vent as part of normal operations.**

  - Common sources include: connectors/flanges, threaded connections and compressions fittings, pump seals, valves, open-ended lines, hatches, meters.
  - Occurs throughout production, gathering, processing, and transmission.
  - Typical causes are new equipment installations, maintenance activities, vibration, wear of mechanical parts over time, corrosion or malfunctioning devices.
  - Note - pipeline leaks dealt with by pipeline integrity management programs



Source: CSA Z620

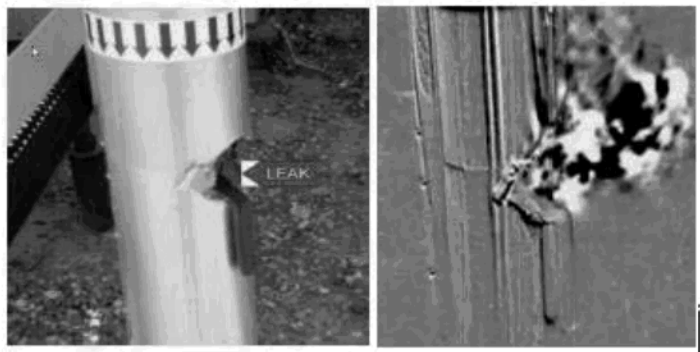
Fugitives Background -Practices / Trends

- **Leak Detection and Repair (LDAR): Practice for locating and repairing leaks, carried out with periodic surveys to identify leaks, with or without quantification, followed by repair.**
  - Comprehensive techniques include: optical leak imaging, handheld leak detector….
  - Quantification: only as a basis for decision for when to repair

- **Current Industry Standard / Requirements**
  - Canadian industry has been implementing LDAR for > 10 years
    - AB EPEA Approvals (e.g. SAGD), AB Dir 060 since 2010, BC Flaring/Venting Guideline
    - Industry compliance documented through Best Management Practices
  - Current baseline inspections – typically 3 – 5 years, some large facilities annually
  - Other Canadian industry standard operational / worker safety practices e.g. fixed continuous monitoring (LEL,H_2S), personal gas monitors

- **Trends**
  - Decrease in fugitives since 2006
  - Clearstone emission factors update (<75%)
  - Technology innovation – piloting new technologies for leak detection and quantification

Example of leak detection:



Fugitives ECCC Proposed Federal Regulations

- **CAPP understanding of the current ECCC proposal:**

Criteria	Federal Proposal	U.S. EPA Comparison
Facility threshold	Applies to all facilities with >60,000 m^3/yr (produced + receipts)	Applies only to new and modified sources **existing to be developed*
Baseline inspection frequency	• Semi annual, where no compression • Quarterly, where compression • Exemption - for single wellheads only	• Semi annual • Quarterly, where compression • Exemption - for single/multi wellhead
Methodology	• Optical gas imaging instrument • Method 21 (500ppm limit) • Leak detected by any other method Approval required for alternative methods	• Optical gas imaging instrument **EPA call for information on technologies*
Repair	Within 15 days; or if unfeasible/unsafe, tag & repair within 90 days Confirmed with Method 21 instrument	Within 30 days
Implementation	In effect 2018	

Note - Requirements for U.S. are currently for new/modified only, Development of rules for existing sources underway in 2016

Fugitives ECCC Modeling Summary

- **Key inputs**

Input	ECCC Model	CAPP Comments
Inventory	Facility total count ~210,000 Facility impacted* ~50,000	- In line with inventory assessment (based on IHS): 68,000 facilities impacted
Costs	Inspection costs: $500/wellsite, $1500/battery, $2000/facility Gas value: $4/GJ Repair costs: omitted	- Inspections – industry & 3rd party estimates: $750/well, $1750/battery, $3000/facility. - Costs can be much higher for larger facilities types (in-situ) - Gas value considered at $2/GJ - Incremental repairs would impact cost
Emissions	12 Mt Baseline / 6 Mt covered by regulation U.S. EPA Reductions - 40%, 60%, 80% for annual, semi-annual, and quarterly	- Reductions adapted for Canadian setting (Pembina/EDF)

- **Outputs**
  - Overall abatement cost: < 5 $/tonne (-20 to +30 $/tonne, based on facility type)
  - Total annual cost: not calculated by ECCC, estimated at $20 MM/yr (based on inputs)

Fugitives CAPP Analysis: Assumptions

- **Assumptions – Costs**
  - IHS well/facility counts used for AB, BC – oil & gas, all active
    - Wells – assumed all single well locations are exempt
    - AB/BC inventory represents majority of costs, setting up to assess MB/SK inventory
  - Costs per survey (third party)
    - Based on industry input for third party costs, includes admin (reports…) & travel
    - Does not account for: seasonality issues, repair or record keeping / admin costs

- **Assumptions - Emissions**
  - Baseline emissions from NIR, with Clearstone facility breakdown (2011)
    - Wells: 10%
    - Non-wells: 90%
  - Reduction for Canadian baseline per EDF/Pembina
    - Annual: 40%
    - Semi: 50%
    - Quarterly: 60%

- **Uncertainty on technical basis for % reductions, and applicability over multiple years of surveys**

Fugitives CAPP Analysis: Results

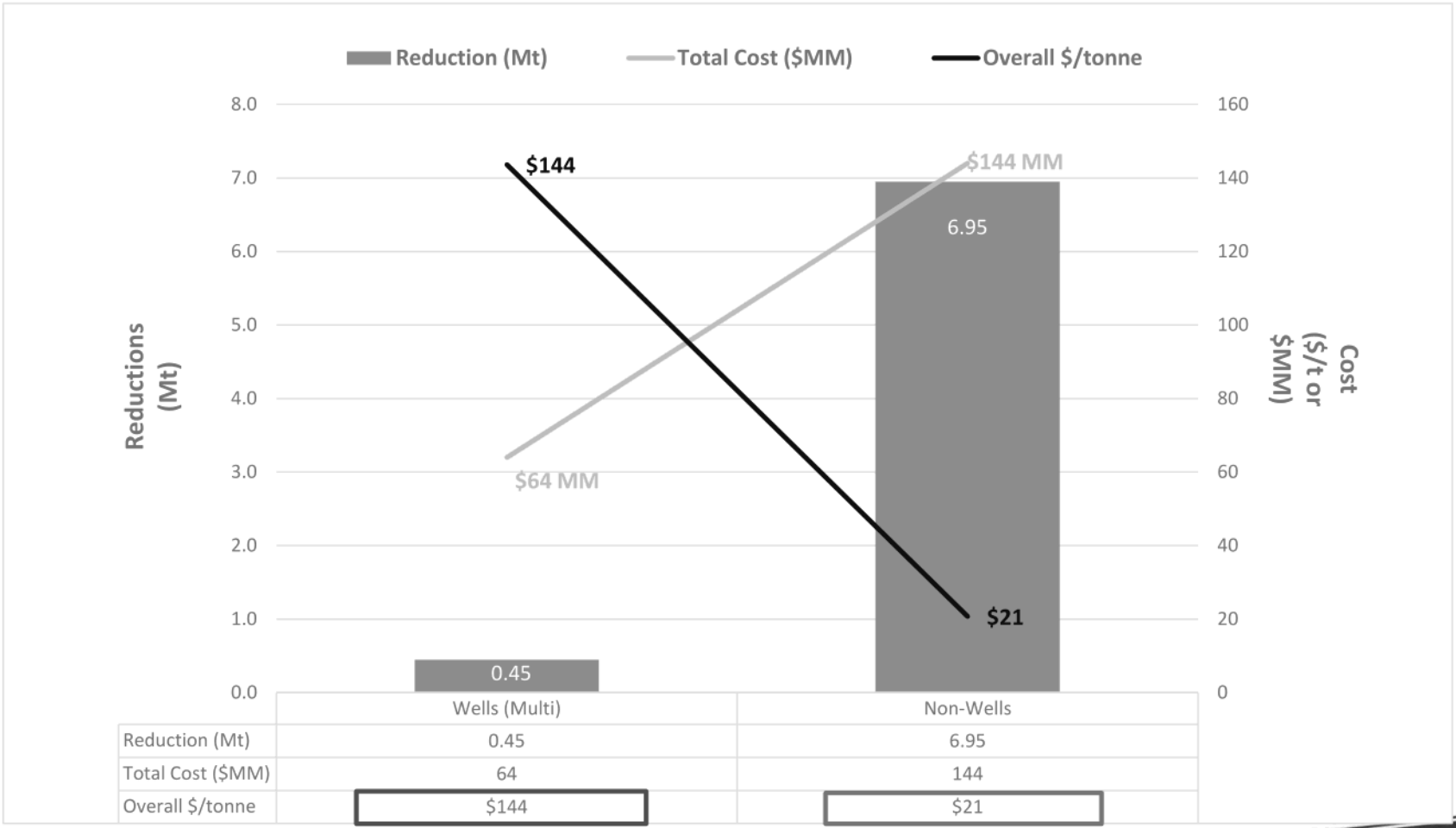
- **Impact of ECCC Proposal**
  - $200MM/yr of on-going incremental cost to industry
  - Non-exempt wells account for 30% of the cost, $60MM/yr
    - >100,000 wellsite inspections / year – doubles the number of inspections
  - 50% reduction in fugitives, or ~7Mt reduction potential
    - 47% from non-wells / 3 % from wells
- **Impact of Alternative Proposal: Annual inspections at non-wells**
  - $60MM/yr of incremental cost to industry
  - Achieves ~70% of the benefit, providing 35% in early reductions or ~ 5Mt

Fugitives: Cost Effectiveness, by facility type

Inspections at wells are not cost effective at > $140/tonne

Wells contribute only 3% emissions reduction, at 30% of the overall cost

Anticipate emerging technologies will supplement current practices to identify leaks, including well sites

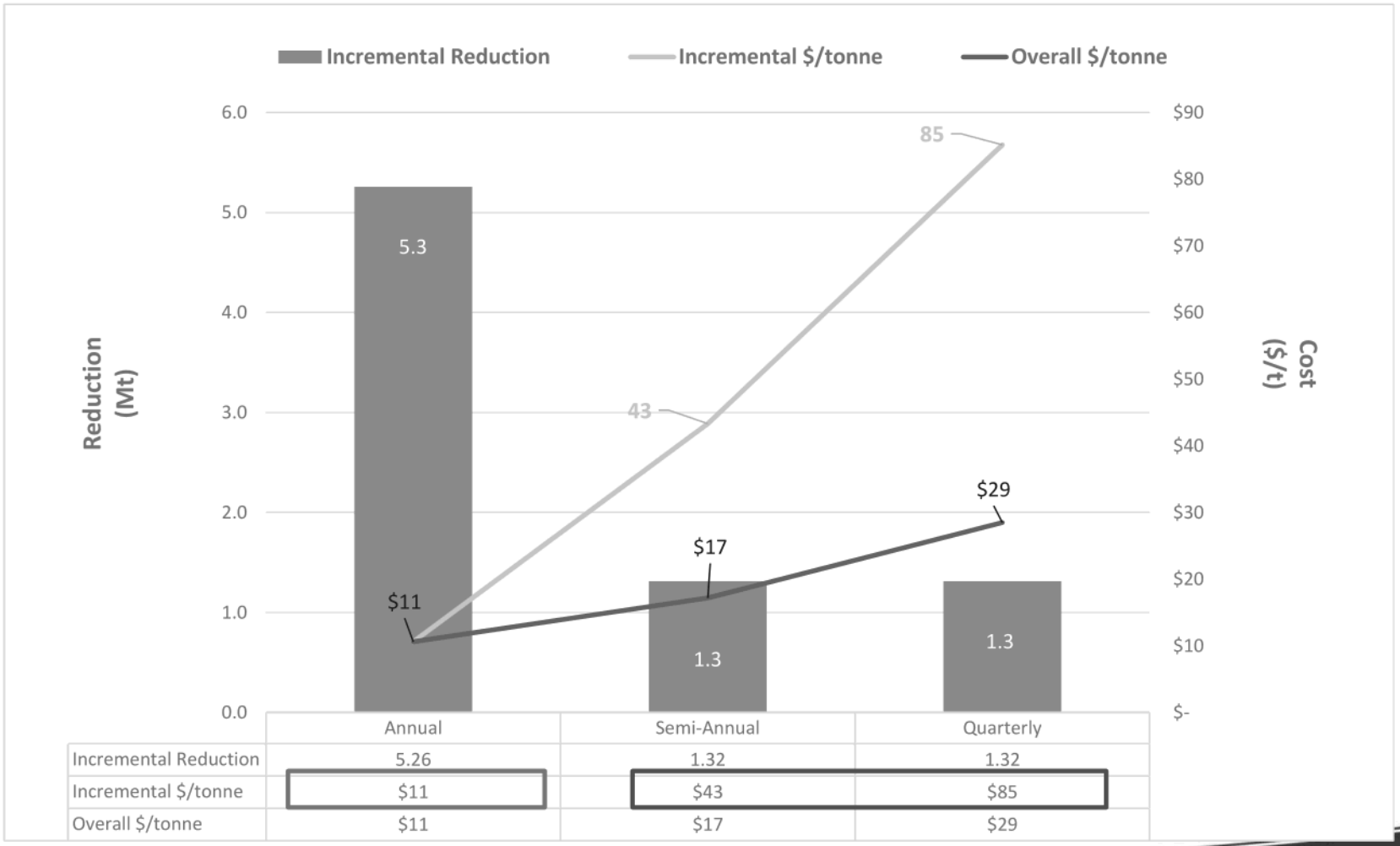


	Wells (Multi)	Non-Wells
Reduction (Mt)	0.45	6.95
Total Cost ($MM)	64	144
Overall $/tonne	$144	$21

Fugitives: Cost effectiveness, by frequency (non well)

Inspections beyond annual frequency is not cost justified

Annual inspection maintains cost below $30/tonne



	Annual	Semi-Annual	Quarterly
Incremental Reduction	5.26	1.32	1.32
Incremental $/tonne	$11	$43	$85
Overall $/tonne	$11	$17	$29

CAPP Analysis & Alternative Summary

		ECCC Model	ECCC - CAPP Inputs	CAPP Alternative
Survey Frequency		as proposed	as proposed	annual, facilities
Facility inventory		50,000	68,000	68,000
Costs				
Survey Cost	Wells	$500	$750	$750
	Batteries	$1,500	$1,750	$1,750
	Compressor Stations	$1,500	$3,000	$3,000
	Gas Gathering Systems	$2,000	$3,000	$3,000
	Gas Plants	$2,000	$3,000	$3,000
Repair Cost		$ -	$-	+30% of survey
Gas Value ($/GJ)		$4	$ 2	$2
Incremental Cost Impact ($MM/yr)		**$20**	**$200**	**$60**

Fugitives: Operational Impacts

- **In addition to the cost effectiveness, increasing inspections beyond annual frequency also leads to operational considerations:**
  - Seasonality and access constraints
  - Resourcing - significant ramp up in manpower for surveys/admin
  - Driving time - Concerns regarding safety issues

- **Operational conditions will influence the ability to comply with the regulations and the overall impact cost**

- **Canadian context is important to smarter LDAR – should consider integration with existing operating practices / requirements**
  - ex: regular monitoring that occurs with fixed continuous monitors and operator site visits

Fugitives: Repair Times

- **Industry experience suggests proposed repair requirements could prove challenging to implement and in certain cases could impose significant economics /emissions impact**
  - Current repair time proposed by ECCC is 15 days, will allow 90 days in certain cases
  - Longer than 15 days on average needed to account for lag between leak discovery and reasonable time for completion of repair:
    - Administrative turnaround time, equipment orders
    - Need to shut down for safe operations
    - Scheduled with other maintenance activities
    - Access to site and/or leak
  - Requirements for verification with Method 21 - need to consider impact / burden

- **Recommendation: Review with industry to develop reasonable guidelines. Consideration for a baseline of 30 days with potential to extend to 90 days or next shutdown, where warranted.**
  - *Note: Anticipate that most repairs do occur well before 30 days, if not immediately. With the proposed repair timeline only a small number of exemptions would be required.*

Fugitives: Technology & Innovation

- **Requirements should reflect what is currently achievable with the best available technology**
  - Baseline annual survey frequency for facilities based on cost effectiveness, and operational practicality

- **Recommend flexibility in regulations to build on learnings and adjust future inspection frequencies**

- **Focusing on innovative technology/methods may enable greater reductions (40-45%), rather than increasing baseline inspections**
  - Targeted sensing methods for efficient identification of super-emitters

- **Initiatives underway – with results beginning in 2017, can influence future reduction potential**
  - Research underway – PTAC LDAR data review, alternative sensing techniques
  - Piloting initiative proposed - Industry in collaboration with technology providers, proposed piloting to begin late 2016 - early 2017 (PTAC NRCAN proposal)

Fugitives: Informed Approach to Smarter LDAR

- **Data mining and analytics are key to informing smart LDAR design – leading to cost effective, increased emissions reductions**
  - Risk-based - Focus on addressing super emitters
  - Cost effective reductions – Appropriate baseline frequencies now, and over time

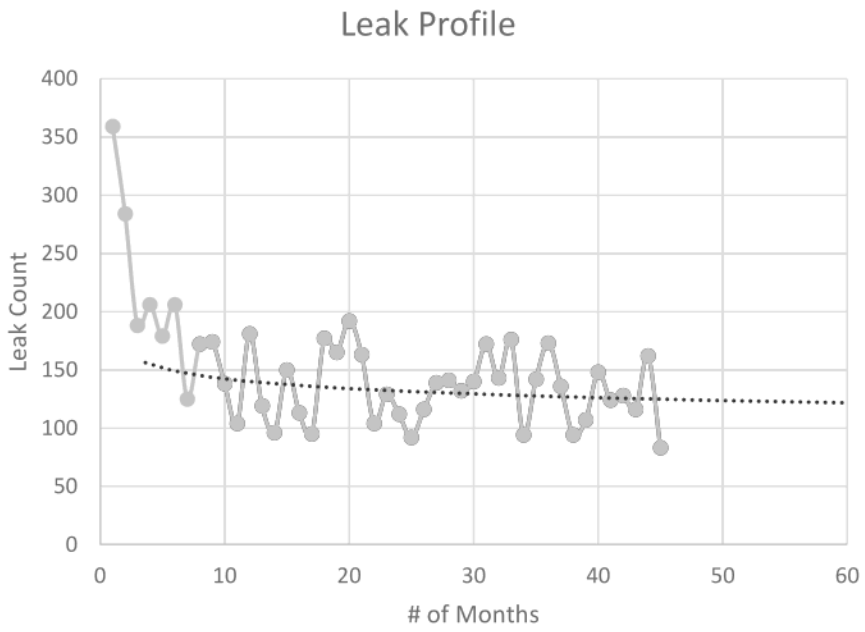
- **How can this be achieved?**
  - Taking the time now to analyse wealth of data, develop appropriate regulations
    - Understanding the leak sources – how to target super emitters
    - Understand leak recovery – appropriate frequency vs time
  - Regulatory framework designed with requirements to incorporate these

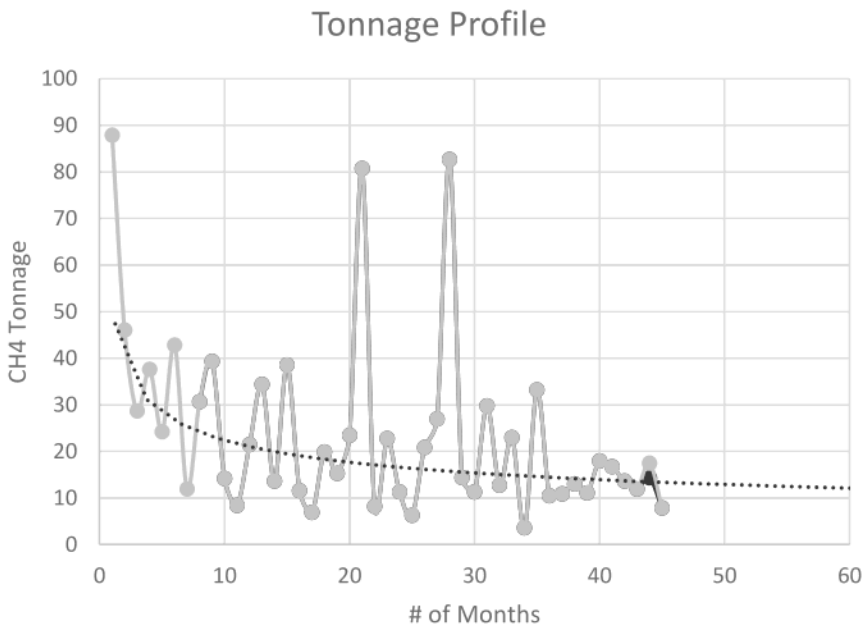
- **Work proposed:**
  - Comprehensive LDAR data analysis / piloting to determine appropriate frequencies
    - Support for exclusion of wellsites – Greenpath field surveys, PTAC study underway
    - Reductions / Leak recovery profiles over time – to support initial and on-going frequencies

Fugitives: Informed Approach to Smarter LDAR

U.S. Case Study Findings (70 facilities inspected monthly, 140 wellsite inspected annually)

- High initial reduction, level off over time - decreasing cost effectiveness
- Early reduction opportunities - systemic issues found and dealt with
- Small number of super emitters – would be detected with regular operational screening





- **Supports recommendations for further data analysis to inform inspection frequencies over time, and how to address super emitters**

PTAC Greenpath Study

- **Overview: Analysis of large Canadian LDAR dataset, to analyse trends and support recommendations for smart cost effective design. To be complete Dec 2016.**
  - Data set - 11 producers, representing 40% of gas production
  - Over 700 facilities (>9,000 data points); mainly facilities, some wells

- **Study Objectives**
  - Leak rates at different facility types and wells
  - Trends over time in leak reductions
  - Distribution of leaks / understanding of super emitters
  - Qualitative comparison of FEMP plans

- **Preliminary results – analysis to date directionally shows:**
  - Leak contributions by facility type - small number of leaks found at wells
    - Compressor facilities > non-compressor facilities > wells
  - Super emitters: analysis likely to yield greater understanding around occurrences and how to target these leaks
    - very small number of occurrences that exceeded the EPA threshold

Fugitives Summary

- **Recommendations**
  - Initial baseline that delivers early wins based on what is currently achievable and cost effective
    - Annual surveys at non-well facilities
    - Eliminate comprehensive well surveys
    - Potential future application of innovative technologies for multi-wellsite leak detection
  - Flexibility to adjust survey frequencies as learnings suggest
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    - Support for: extended frequencies over time, low emissions at well sites
    - Multi-stakeholder working group to coordinate the work, check in on progress and learnings, make recommendations
  - Repair times - work with industry to develop a reasonable guideline

Fugitives Summary

- **Benefits of Proposal**
  - Provides an early win
  - Emissions reductions that are in line with target
  - An incremental cost of ~$60MM/year to industry, is 1/3rd of the ECCC proposal, and still achieves ~70% of the reductions (5 Mt vs 7 Mt)
    - Eliminates inefficient efforts in the range of $40/t to $150/t CO2e
    - Significantly improves the industry standard versus current practice
  - Focus on innovative technologies provides potential to increase future reductions
  - A collaborative and informed approach, leading to the development of smarter LDAR requirements in Canada

Compressors

Compression Overview

- **Background**
- **Emissions Profile**
- **Federal Proposal**
  - Summary of regulatory requirements / Comparison with U.S. EPA
  - ECCC Modeling – summary of inputs/outputs, CAPP comments
- **CAPP Impact Analysis**
  - Costs / Emissions Reductions
    - Methodology
    - Results
  - Operational Impacts
  - Technology/Innovation Impacts
- **Alternative Solution Development**
- **CAPP Positions / Recommendations**

Compression – Summary

- **CAPP Recommendation**
  - In alignment with US EPA NSPS, 36 months replacement *or* test at 36 months, with potential to extend replacement until threshold is exceeded
  - Additional work determine appropriate per unit and per throw thresholds

- **Impact Summary**
  - ECCC Proposal: Replacement 1-2 years (vs 5 year baseline), results in **$100MM/yr incr cost and ~60% emissions reduction (1.8 Mt)**
    - Significant operational impacts - annual measurement, lost production & emissions impact to bleed unit down
  - CAPP Proposal: Replacement at 3 years (vs 5 year), reduces cost to **$30MM/yr and still provides ~40% emission reductions (1.2Mt)**
    - Alignment with operating procedure and with U.S.
    - Threshold provides flexibility to support innovation / technology

CAPP Recommendation Rationale

- **Benefits of Proposal:**
  - Cost effectiveness
    - Still represents $30 MM/year of incremental cost to industry, but reduces the overall cost impact
    - Avoids $125/tonne associated with the incremental reductions
  - Acceptable emissions reductions achieved at 40%
  - Consistent with neighboring jurisdiction – aligns with U.S. EPA
  - Operability – Better alignment with operating procedures, avoids issues with annual measurement of individual throws
  - Flexibility to extend beyond three years based on measurement results enables innovation to drive improved packing performance

Compression - Baseline

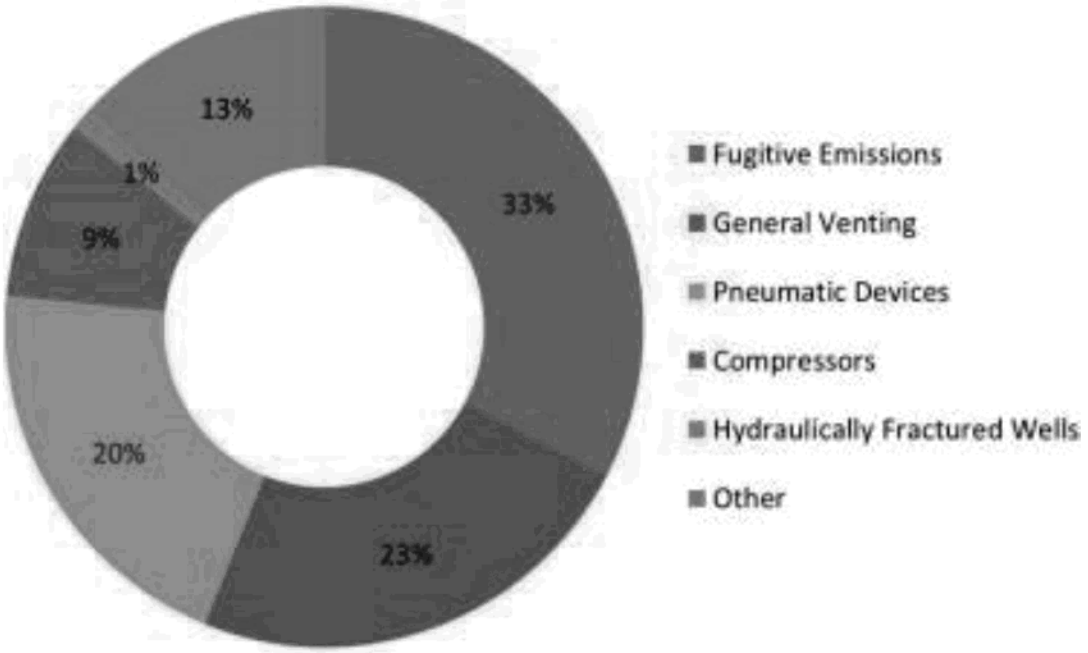
2012 NIR Baseline:

- Total methane = 45Mt
- Compressor vents = 4Mt

Compressor breakdown*:

- Recips @ 7% = 3.15Mt
- Centrifug @ 2% = 0.9Mt

*Clearstone Upstream Oil and Gas Inventory:
Upstream only: 95% recip / 5% centrifugal
With transmission: 78% recip / 22% centrifugal



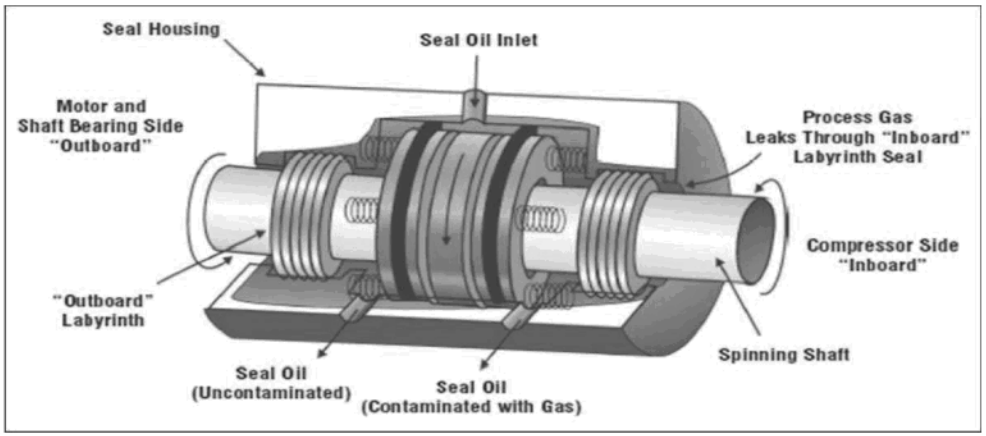
Source: Environment and Climate Change Canada

Background – Centrifugal Compressors

Centrifugal Compressors

Compress the gas by centrifugal force.

Typically used in gas pipelines and very large gas plants/refineries. Majority are in transmission.



Wet seals systems (shown in schematic) are the focus as vent flows are larger than from dry seals.

Measurement is typical for vent flows.

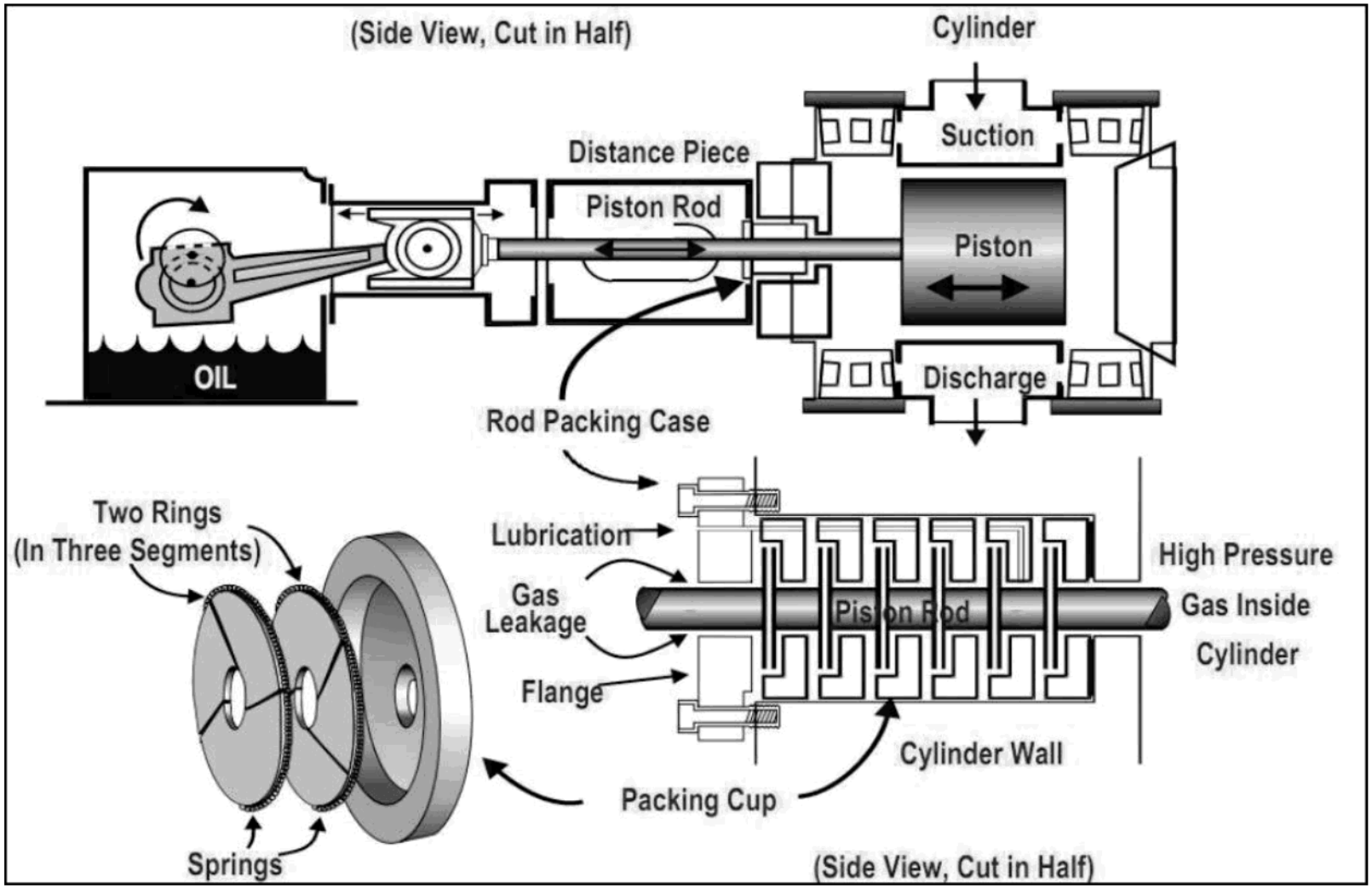
Emissions

The shaft seals are the only gas emission source on centrifugal compressors.

Gas vented from these seals may be routed to an atmospheric vent, to flare or both, depending on the compressor and/or seal design.

The seal gas used may be methane, air or an inert gas – again depending on the design.

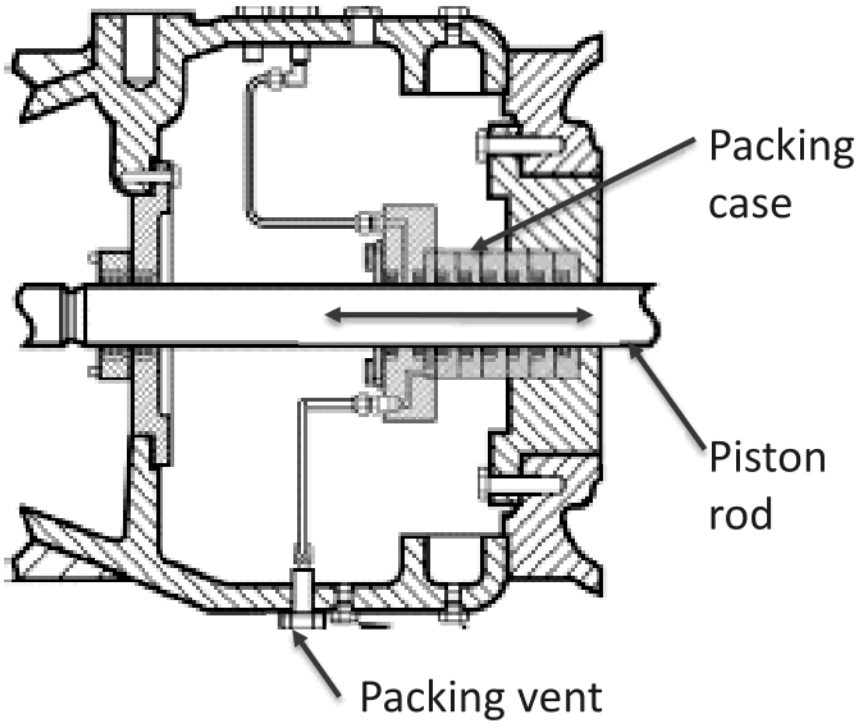
Background - Reciprocating Compressors



Source: US EPA. 2006a. *Lessons Learned: Reducing Methane Emissions from Compressor Rod Packing Systems*

Background - Reciprocating Compressors

Reciprocating Compressors - Compress the gas by positive displacement. Typical in gas gathering systems and gas processing plants across oil and gas production in all jurisdictions.



Emissions

Packing vents - Typically a function of wear over time and pressure

Compressor packing vents are connected within the compressor building to common vent headers and then routed to a common atmospheric vent if gas is sweet

In the case of a sour gas compressor, and some sweet gas compressors, these vents are routed to a local flare stack and burned

In some cases vent gas is captured and conserved and/or re-used as fuel gas

Reciprocating compressors account for majority of upstream inventory and emissions. CAPP analysis and presentation therefore focuses only on reciprocating compressors.

Background – Current Industry Practice

- **Current replacement of rod packing: occurs across industry 3 - 5 years. Average for baseline assumed at 5 years.**
  - Time for replacement depends on wear and scheduled maintenance / compressor overhaul.
  - Operational considerations – shutdown / production loss, health/safety & emissions (depressurization of equipment)
  - Preventative maintenance measures used to detect wear. Examples:
    - Temperature sensing
      - Thermocouple, RTD – automated/continuous, alarm limits
      - Infrared gun or manual – during routine operator rounds
    - Qualitative
      - Auditory/visual/olfactory (AVO), gas monitors, IR camera (as part of LDAR)
    - Quantitative
      - Hi Flow® Sampler (as part of LDAR), in-line flow meter (rare)

Background - Current Requirements

- **Current Regulatory requirements**
  - General venting & air quality requirements are applicable (ex: AER Directive 060, Ambient Air Quality objectives)

- **CSA Z620.1-16 - newly developed Canadian standard**

  - **The operator shall perform one of the following:**
    - Follow a packing maintenance, monitoring, and replacement (PMMR) program;
    - Replace every 3 years (recording of operating hours not required);
    - Replace every 26,000 runtime hours (operating hours shall be recorded); or
    - Route packing vent gas to a process.

  - **Consider other GHG emission reduction techniques/practices**

Compression – Proposed Federal Regulations

CAPP understanding of the current ECCC proposal:

Criteria	Federal Proposal	U.S. EPA Comparison
Facility threshold	Applies to all new and existing facilities producing >0.16e3m3/day	Applicable to only new and modified to date (existing in development)
Baseline inspection frequency	**Reciprocating:** if vent rate > 35scfh requires action within 30 days. **Centrifugal:** if vent rate > 88scfh requires action within 30 days	Change the **recip rod packing** on or before 26,000 hours of operation OR every 36 months in lieu of monitoring compressor operating hours 95 percent reduction of methane and VOC emissions from compressors with **wet seal systems** - through flaring or capture
Measurement	Annual measurement requirement	Monitor the duration (in hours) that the compressor is operated

Current CAN proposal more stringent than U.S. EPA

ECCC Modeling Overview

- **Key inputs**
  - Inventory: 5,628 reciprocating (5,499 upstream, 129 transmission), 3.3 cylinders/compressor
  - Costs: Replacement cost $2,000/rod packing replacement, Gas savings at 4 $/GJ
  - Time to 35 scfh threshold: 2 year replacement interval
  - Limited Canadian compressor data available to support baseline emissions estimates, emission reduction calculations
  - Uncertain how existing emission controls are considered
- **Outputs**
  - Total cost to industry = $20 MM / Incremental cost = $12MM
  - Reduction achieved = 46% of baseline
- **Key comments**
  - Inventory low: an accurate consolidated inventory is lacking; however the estimated range is 5,600 – 11,000 (various estimation methods, e.g., Clearstone (2014))
  - Costs:
    - Low replacement cost per packing, does not account for labor or lost production
    - Does not account for annual measurement cost
  - Shorter replacement cycle expected at proposed threshold

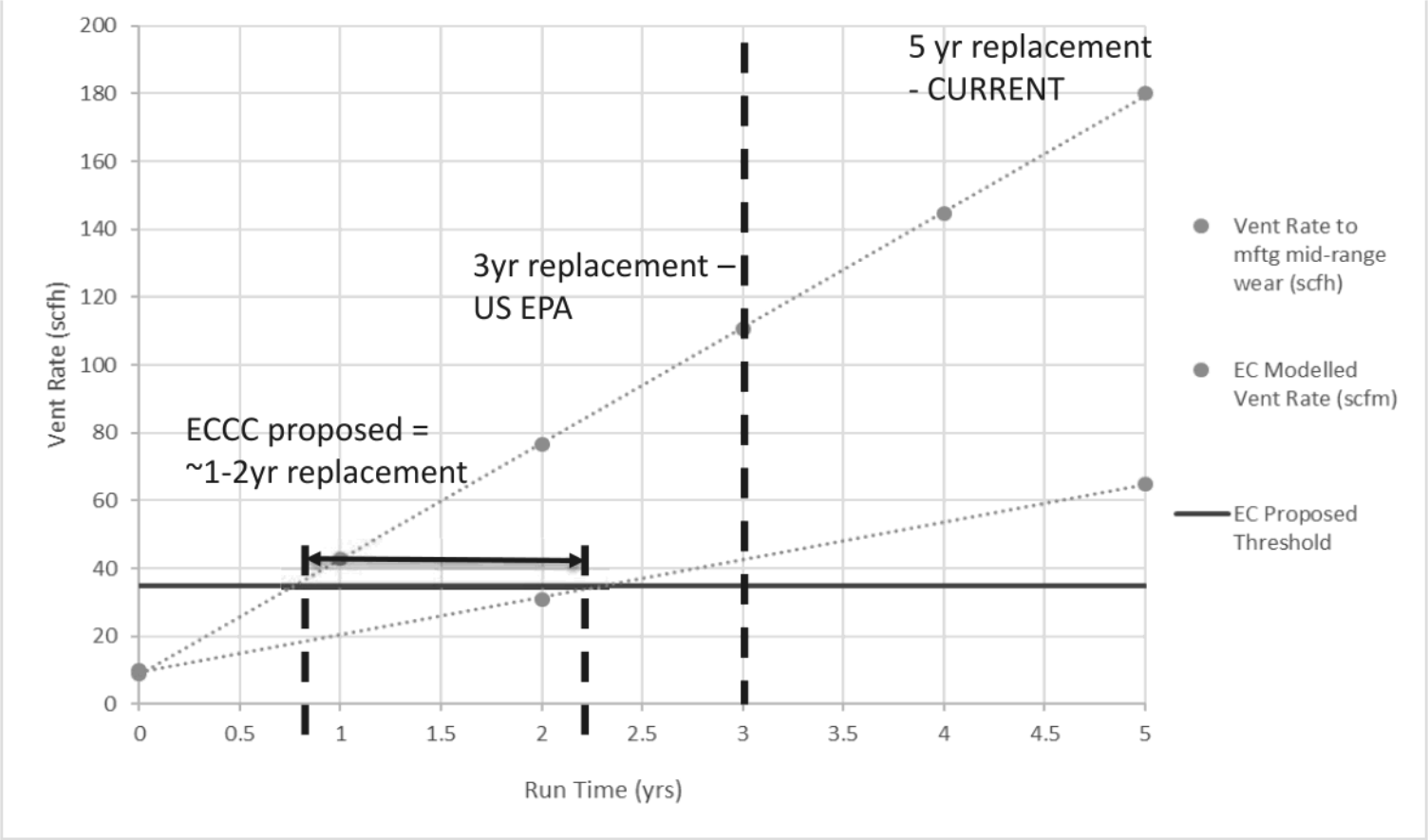
CAPP Analysis: Emissions Methodology

- **Inventory of compressors - assessed with several approaches, supported mid range estimate**
- **Vent rate per throw - expect time function for leakage, operational experience points to relationship with wear & operating conditions**
  - Approach taken: reviewed historical test data & studies, field data collection, consulted rotating equipment specialists and industry experts
  - Identified need for additional testing data - to support better understanding of wear over time and pressure correlation
- **Based on review, expect vent increase as packings wears to manufacture wear rate range of *120 – 240 scfh***

Instantaneous Vent Rate (per throw) vs Time

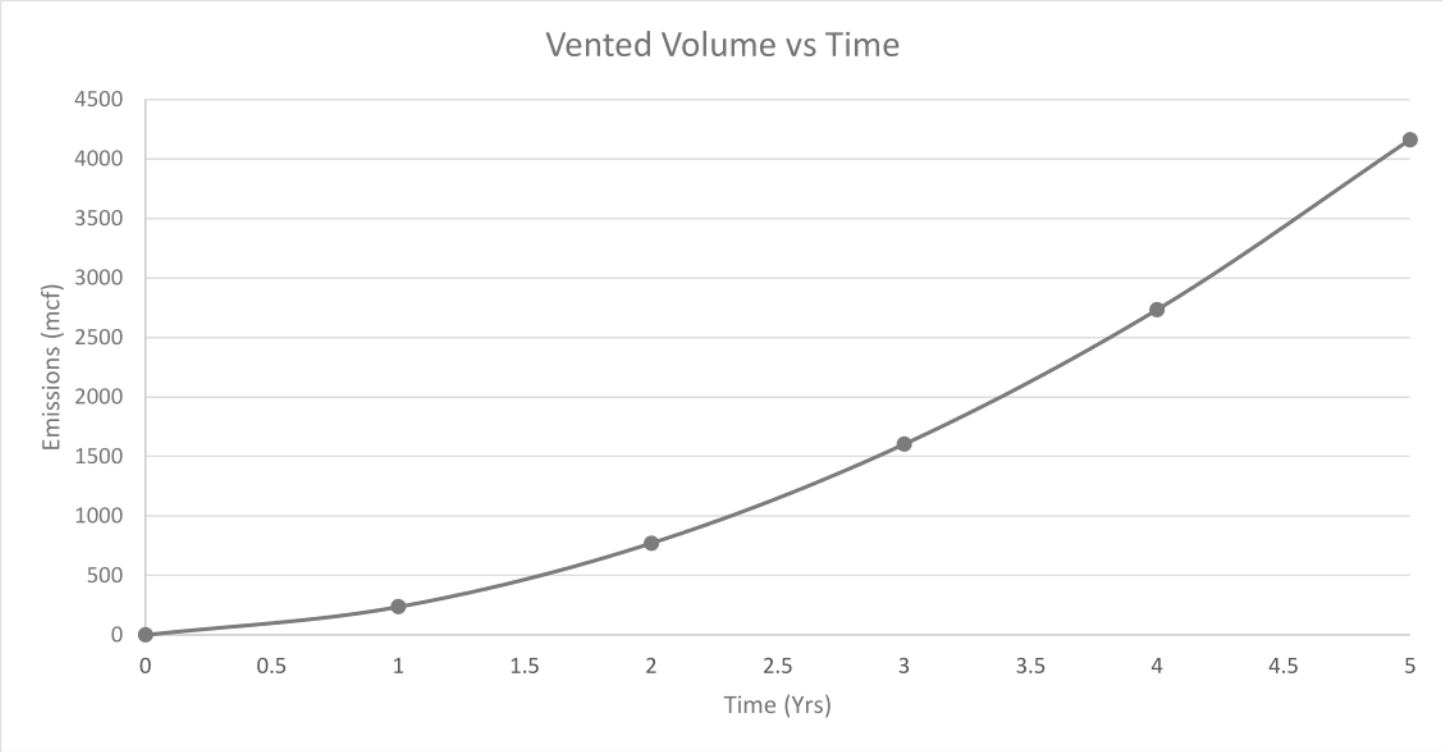
Blue line = vent rate to mid-point of manufacture wear; likely for throw under high pressure

Orange line = ECCC modeled emissions using EDF/ICF Sawtooth



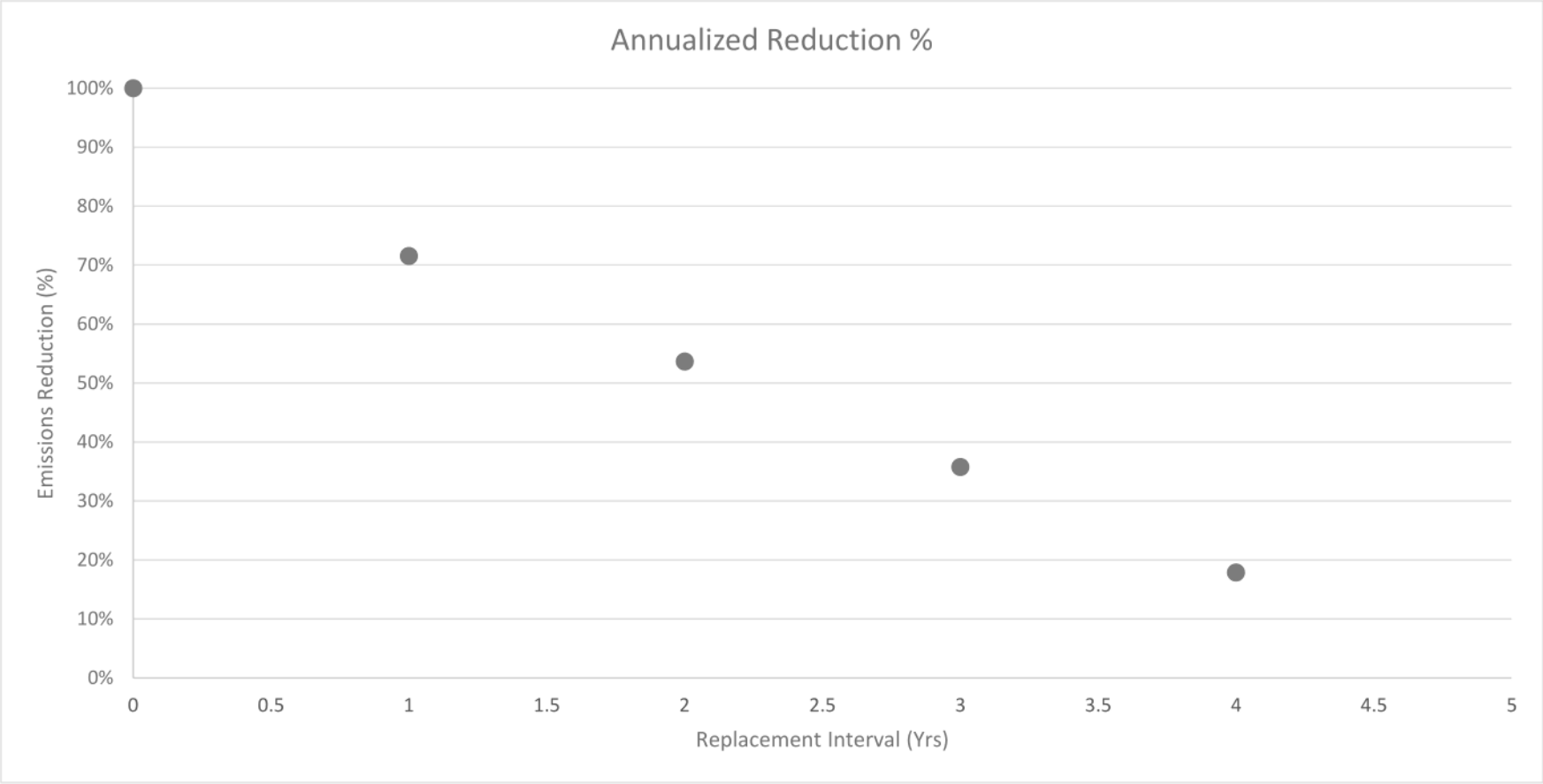
Based on the two models, proposed threshold results in replacement every 1-2 years

Cumulative Emissions vs Time



- **If non-linear wear occurs, cumulative emissions would be even higher over time (emissions at earliest time are minimal)**
  - Require more data to validate wear over time

Annualized Emissions Reductions Vs Replacement Time



- **1-2 yr replacement = 56%** - exceeds target
- **3 yr replacement = 38% -** near target

CAPP Analysis: Replacement Cost Impact

	ECCC Model – proposed threshold		CAPP Inputs – proposed threshold	CAPP Inputs – 3 Years
Replacement Time	2 years		1 – 2 years	3 years
Inventory, # Recip Compressors	5,628		7,500	7,500
Avg. # throws	3.3		4	4
Cost per rod packing replacement	$ 2,120		$ 5,000	$ 5,000
Lost production per unit	-		$ 4,000	$ 4,000
Labour per unit	-		$ 6,000	$ 6,000
Annual measurement cost per unit	-		$ 2,000	-
Annual Cost (MM$/yr)	**$ 20**		**$ 150**	**$ 75**
5 Year Baseline (MM$/yr)	**$ 8**		**$ 45**	**$ 45**
Incremental Cost ($MM/yr)	**$ 12**		**$ 105**	**$ 30**

Moving from proposed threshold (1-2 year replacement) to 3 yr replacement time significantly reduces incremental cost impact, 2/3rd cost reduction

Alternative Solution Development
Measurement & Threshold Considerations

- **CAPP recommends a set time for replacement at 3 years**
- **Further, we recommend jointly developing an appropriate threshold that allows extended replacement time with measurement results**
  - **Recommend a per unit vent rate**
    - Compressor packing vents connect into a common header and routed outside of the building where it is safer to measure
      - Current package design does not have provisions for measuring individual throws safely
      - Accounts for variation in packing performance by throw
  - Further data collection could be incorporated into a future review of the threshold.
- **Technology & innovation - Enabling extension may drive solution development such as longer life low emissions packing**
  - Industry experience on low vent rate packings - not proven up yet
    - CVE has had better results from standard packing, ECA have had some failures
    - not common application for other operators
  - High vent rates still possible under certain operating conditions

Compression CAPP Proposal

	Current	ECCC Proposed	CAPP Recommendation
Replacement	5yr	1-2yrs	3yrs
Testing	None	Annually	@ 3yrs, optional
Industry Total Cost (per year)	$45MM	$150MM	**$75MM**
Industry Incremental Cost	-	$105MM	**$30MM**
% Reduction	-	60%	**40%**
Emission Reduction	-	1.8Mt CO_2e/yr	**1.2Mt CO_2e/yr**
Abatement Cost	-	**$60/tonne**	**$25/tonne**
		Cost of incremental reductions = $125/tonne	

- **Alternative achieves reasonable emissions reductions and reduced incremental annual cost to industry by 2/3rd**
- **Incremental 0.6 Mt of reductions at a cost of $125/tonne**

Compression – Summary

- **CAPP Recommendation**
  - In alignment with U.S. EPA NSPS, 36 months replacement *or* test at 36 months, with potential to extend replacement until threshold is exceeded
  - Additional work determine appropriate per unit and per throw thresholds
  - Complete a Canada-wide inventory of compressors
    - Energy regulators – Notice to All Operators?
- **Impact Summary**
  - ECCC Proposal: Replacement 1-2 years (vs 5 year baseline), results in **$100MM/yr incr cost and 60% emissions reduction (1.8 Mt)**
    - Significant operational impacts - annual measurement, lost production & emissions impact to bleed unit down
  - CAPP Proposal: Replacement at 3 years (vs 5 year), reduces cost to **$30MM/yr and still provides 40% emission reductions (1.2Mt)**
    - Alignment with operating procedure and with U.S.
    - Threshold provides flexibility to support innovation / technology

Venting

Outline - General Venting

- **Emission Source Description**
- **Summary of Industry Practices**
- **ECCC Proposed Regulatory Approach**
- **ECCC Model and CAPP Analysis of ECCC Model**
- **CAPP Recommendation**

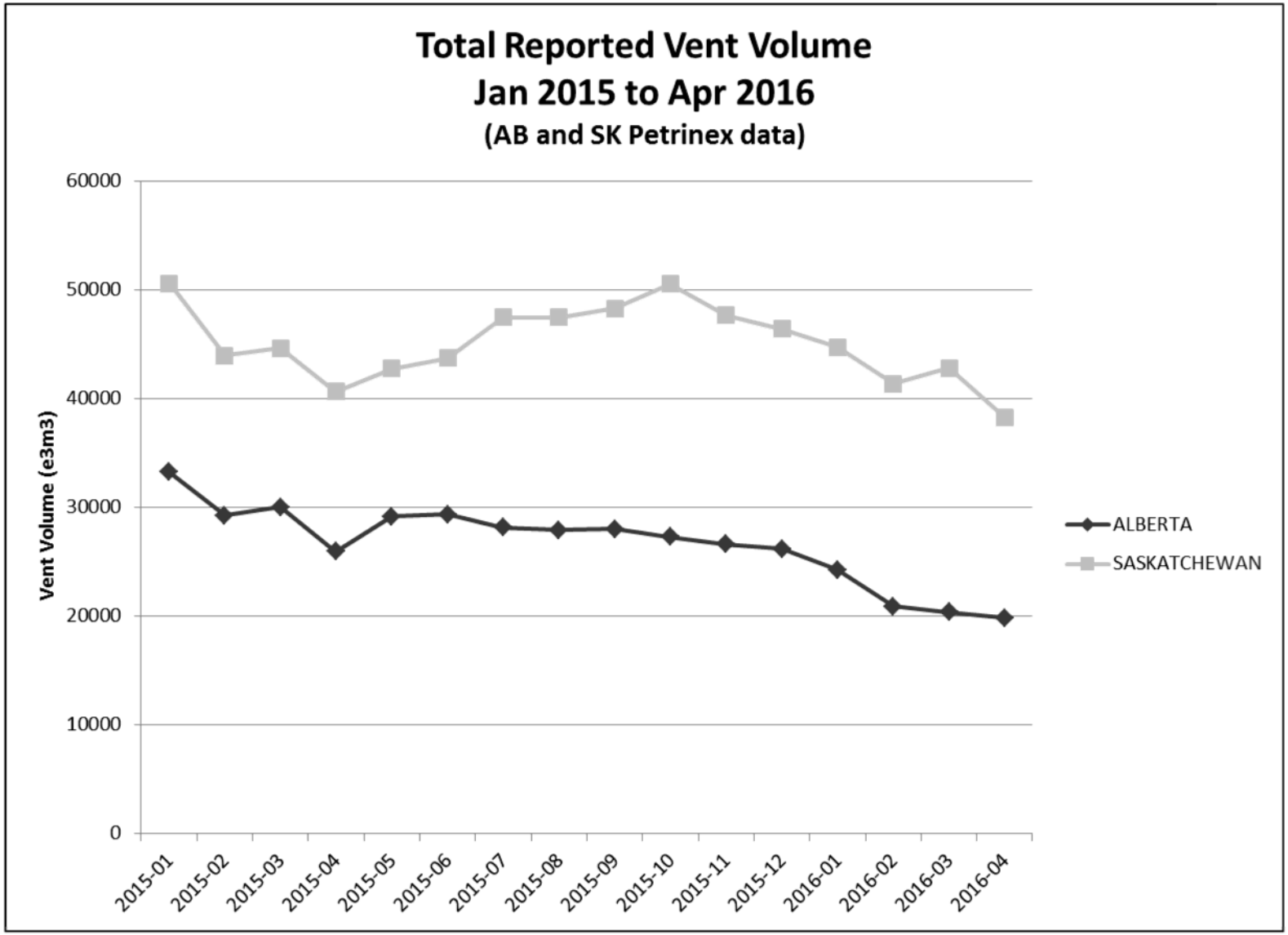
Emission Source Description – General Venting

- **Sources of venting include:**
  - Solution gas venting from casing and tank venting at Heavy Oil sites
  - Tank venting at Conventional Oil sites
  - Non-routine venting from all production types (e.g. in situ, gas processing facilities)
- **This category does not include:**
  - Venting from pneumatic devices
  - Venting from compressor seals/rod packing
- **Majority of reported venting occurs in Alberta and Saskatchewan**
  - BC energy development is mainly natural gas - non-routine venting only
  - MB conventional oil activity – limited solution gas reporting requirements
- **National Inventory Report 2012**
  - Total methane from oil and gas sector = 45 Mt CO_2e
  - General venting from oil and gas sector = 10.35 Mt CO_2e

Summary of Industry Practices – General Venting

- **Venting is regulated by:**
  - AB Directive 60, BC Flaring and Venting Reduction Guideline, SK Directives S-10 and S-20
    - Decision Tree Analysis
    - Economic test triggered for sites venting > 900 m^3/day (consecutive 3 month average)
    - If NPV $\geq$ -$50,000 (SK) and -$55,000 (AB), must conserve gas
    - Must combust if gas can sustain stable combustion
  - MB Drilling and Production Regulation
    - Apply to the Director to flare or vent
- **AB solution gas conservation rate 95.6% in 2014**
- **SK associated gas conservation rate 61.6% in 2015**
- **Industry is continuing to test new technologies to manage solution gas such as incineration or enclosed combustion**
  - Currently at pilot project stage
- **Venting intensity on a per bbl production basis is continuing to decline**

Summary of Industry Practices – General Venting



ECCC Proposed Regulatory Approach – General Venting

Criteria	ECCC Proposal	U.S. EPA	Alberta Directive 60	Saskatchewan Directive S10 and S20
Facility threshold	Applies to all facilities with emissions controls already in place AND PTE* >60,000 m^3/yr AND vented emissions > 3000 m^3/yr Applies to all facilities with no emissions controls in place AND vented emissions > 40,000 m^3/yr	Applies only to new and modified emission sources. Issued Information Collection Request to oil and gas operators to gather data to inform development of regulations for existing sources.	Decision tree analysis 900 m^3/day triggers economic test	Decision tree analysis 900 m^3/day triggers economic test
Emission Limit Requirement	Must reduce emissions to 5% or less of potential to emit (produced + receipt)	Storage vessel > 6 ton/month must have 95% emission controls	Must combust if can sustain stable combustion. (500 m^3/day) Must conserve if economic test results ≥ -$55,000 NPV	Must combust if can sustain stable combustion. Must conserve if economic test results ≥ -$50,000 NPV
Measurement/ Reporting	Measure vent rate > 500 m^3/day		Measure vent rate > 2000m^3/day Engineering estimate for volumes < 2000 m^3/day Report vent volumes monthly	
Implementation	In effect 2020	In effect for new and modified sources in ????	Implemented in 1999	Implemented in 2012 (new facilities) Implemented in 2015 (existing facilities)

*PTE = produced gas + received gas

Current CAN proposal more stringent that U.S. EPA

ECCC Model Inputs – General Venting

- **Proposed venting limits:**
  - Must reduce vented emissions to < 5% of Potential To Emit (PTE):
    - **Category 1:** Facility does have current emission controls AND PTE >60,000 m^3/yr AND vented emissions >3,000 m^3/yr
    - **Category 2:** Facility does NOT have current emission controls AND vented emissions >40,000 m^3/yr
- **Capital Costs:**
  - Conventional – conservation: $150,000
  - Heavy Oil – conservation: $200,000
  - Conventional or Heavy Oil – flare: $150,000
  - Assumed decreasing capital cost adjustment to account for facilities that are already conserving and will need to conserve more (Category 1)

ECCC Model Inputs – General Venting

	ECCC Inputs	CAPP Inputs
Capital Cost adjustment	Assumed decreasing capital cost adjustment to account for facilities that are already conserving and will need to conserve more. (Category 1)	If a Heavy Oil facility is currently venting and has gas deliveries, the additional capital cost to conserve the remaining vented volumes is substantial. • The remaining vented volumes are likely due to tank venting not being captured. • Installation of a VRU and potential need to upgrade/replace existing tanks
Technology choice to meet venting limit	Assumed that in order to meet the venting limits, a facility will choose conservation if gas production >1500 m^3/day OR already conserving >30 m^3/day, otherwise will choose to flare	• If a Heavy Oil facility is currently venting > 900 m^3/day, assume it will choose conservation to meet venting limit. • If a Heavy Oil facility is currently venting < 900 m^3/day, assume it will choose combustion to meet venting limit. • Conventional Oil facility choose combustion to meet venting limit.
Project Life	10 year project life	8 year project life for Heavy Oil wells 20 year project life for Conventional wells

ECCC Model Inputs – General Venting

	ECCC Inputs	CAPP Inputs
Metering costs	Did not include additional metering costs	Additional cost at heavy oil wells to install meters capable of measuring vent rate to 500 m^3/day (currently required to measure 2,000 m^3/day) • $10,000 per heavy oil site
Facility count and volumes	IHS 2013 facility count, production and fuel/flare/vent volumes for AB and SK, scaled to determine BC and MB	Petrinex 2016 production and fuel/flare/vent volumes for AB and SK
Potential To Emit	PTE calculated as greater of: (1) the highest rolling 12-month actual sum total (m^3/year) of gas produced (Qe) and gas received (Qr) during the last five years; or (2) the forecasted Qe + Qr for the following 12-month period.	PTE calculated as 3 month average February to April 2016.

CAPP Comments on ECCC model – General Venting

Capital Costs, Category 1: Emission Controls already in place

- Assumed that remaining vent volume at Heavy Oil is from tanks
- Assumed that vent volume at Conventional Oil is from tanks

	Emission Controls already in place (i.e. reporting vent and reporting flare or gas sales)				
		Conservation (applied to rates > 900 m^3/day)		Combustion (applied to rates < 900 m^3/day)	
	Type	Capital Cost	Comments	Capital Cost	Comments
Heavy Oil	SWB	$250,000	Cost associated with collecting and conserving tank gas volume	$250,000	cost associated with collecting and combusting tank gas volume
	MWB	$500,000	Cost associated with collecting and conserving tank gas volume	$500,000	cost associated with collecting and combusting tank gas volume
Conventional (Light/ Medium) Oil		Combustion			
	SWB	$100,000	cost associated with collecting and combusting tank gas volume with low pressure flare		
	MWB	$500,000	cost associated with collecting and combusting tank gas volume with VRU, low pressure flare		

CAPP Comments on ECCC model – General Venting

Capital Costs, Category 2: No Emission Controls already in place

- Assumed that Heavy Oil sites will conserve or combust casing gas only
- Assumed that Conventional Oil sites have tank venting only

	No Emission Controls already in place (i.e. reporting vent and not reporting flare or gas sales)				
		Conservation (applied to rates > 900 m^3/day)		Combustion (applied to rates < 900 m^3/day)	
	Type	Capital Cost	Comments	Capital Cost	Comments
Heavy Oil	SWB	$200,000	Cost associated with conserving solution gas from casing only.	$75,000	Cost associated with combusting solution gas from casing only.
	MWB	$200,000	Cost associated with conserving solution gas from casing only.	$75,000	Cost associated with combusting solution gas from casing only.
Conventional (Light/ Medium) Oil		Combustion			
	SWB	$100,000	cost associated with collecting and combusting tank gas volume with low pressure flare		
	MWB	$1,000,000	cost associated with collecting and combusting tank gas volume with VRU, low pressure flare and high pressure flare		

CAPP Comments on ECCC model – General Venting

- **Cost Considerations**
  - Many factors impact economic viability of combustion and conservation projects, including:
    - Distance to existing pipeline/infrastructure
    - On-site fuel demand
    - Vent rates
    - Gas composition
    - Liquids content
    - Value of conserved gas
    - Availability of used equipment
  - Tank upgrades/replacement may be required to facilitate operation of VRU
  - Additional operating costs, maintenance and reliability considerations with new combustion or conservation equipment
- **Other Considerations**
  - Flare spacing requirements
  - Landowner concerns

CAPP Comments on ECCC Model Outputs

- **Impacted facilities are those that meet the thresholds in either category 1 or category 2 and are currently venting > 5% of PTE**
- **Emissions reductions calculated as reduction required to ensure vented emissions are <5% of PTE**

ECCC Outputs	CAPP Outputs* using ECCC proposal
$510 MM capital costs	$658 MM capital costs
9.6 Mt CO_2e reduction by 2020	6.2 Mt CO_2e reduction by 2020
5,000 impacted facilities	4,270 impacted heavy oil and conventional oil facilities
93% reduction of vented emissions	60% reduction of vented emissions
$5/tonne	Category 1 average $60/tonne Category 2 average $8/tonne

* AB and SK only

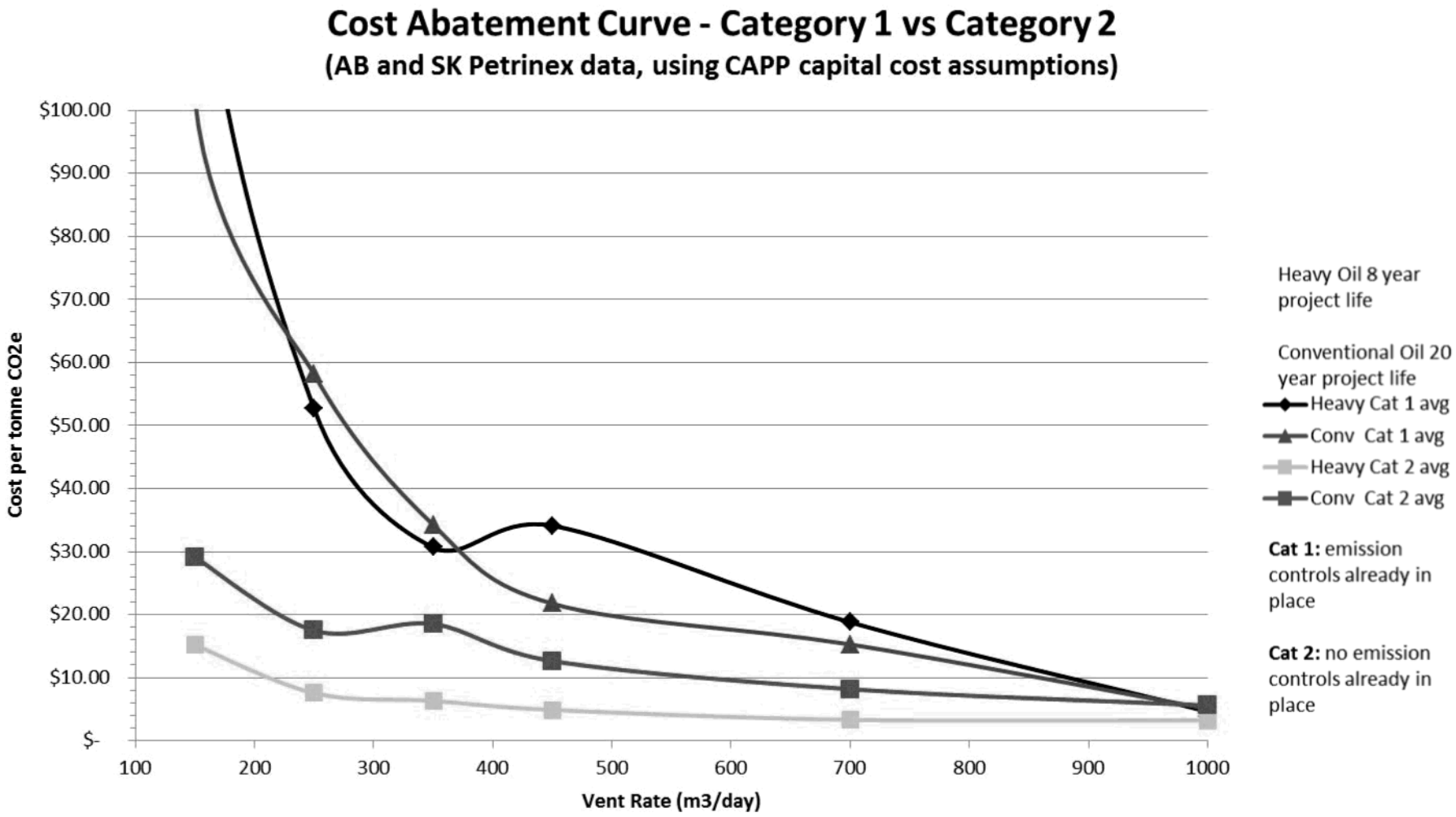
CAPP Comments on ECCC model

Current Vent Rate:		0 – 109 m^3/d	109 – 200 m^3/d	200 – 300 m^3/d	300 – 400 m^3/d	400 – 500 m^3/d	500 – 900 m^3/d	➢ 900 m^3/d
Category 1	CO_2e reduction (Mt CO_2e)	0.016	0.025	0.035	0.016	0.040	0.104	0.550
	Capital Cost ($ MM)	$ 52.81	$ 26.60	$ 20.20	$ 11.64	$ 10.35	$ 17.37	$ 25.96
	Average Cost per tonne CO_2e	**$ 236.82**	**$ 90.13**	**$ 40.89**	**$ 23.93**	**$ 21.47**	**$ 12.85**	**$ 3.81**
Category 2	CO2e reduction (Mt CO_2e)		0.661	0.798	0.711	0.723	1.741	2.432
	Capital Cost ($ MM)		$ 128.73	$ 86.48	$ 71.15	$ 52.43	$ 84.05	$ 70.70
	Average Cost per tonne CO_2e		**$ 15.69**	**$ 9.39**	**$ 8.55**	**$ 6.08**	**$ 4.00**	**$ 3.29**

2.37 Mt CO_2e

3.85 Mt CO_2e

CAPP Comments on ECCC model



CAPP Recommendation – General Venting

- **Venting limit of 500 m^3/day**
  - 3.85 Mt CO_2e reduction (37% from 2012 baseline general venting category)
  - $198 MM capital cost
  - Aligns with forthcoming Alberta requirements
  - Industry has already achieved >1.53 Mt reduction between 2012 and end of 2015
  - 5.38 Mt CO_2e reduction (52% from 2012 baseline general venting category) achieved by 2025.
- **Mid-point check-in 2020 to determine progress towards target**
  - Adjust venting limit for new facilities if required
- **Remove 60,000 m^3/day PTE threshold**
  - Minimizes administrative burden
  - Allows operators to focus on meeting a single vent limit
- **Maintain engineering estimate for vent rate < 2000 m^3/day at Heavy Oil facilities**
  - Continue to meter vent rate above 2000 m^3/day

CAPP Recommendation Summary

	CAPP Analysis of ECCC Proposal	CAPP Proposal
Capital Costs	$658 MM	$198 MM
CO_2e reduction	6.2 Mt CO_2e	3.85 Mt CO_2e + 1.53 Mt CO_2e already achieved
Impacted Facilities	4270	1115
Reduction from 2012 baseline vented emissions	60%	52%
Average Cost per tonne	$34/t	$8/t

Pneumatics

Pneumatics – Outline

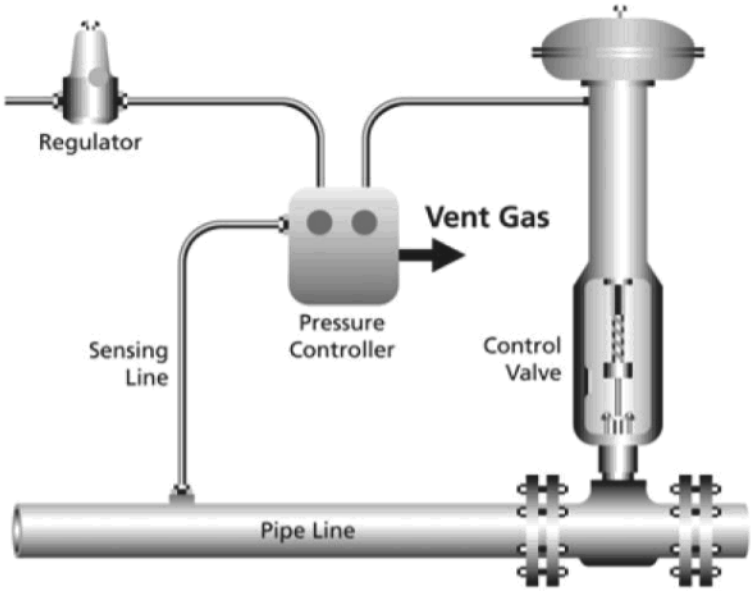
- **Emission Source Description**
- **Summary of Industry Practices**
- **Comparison of ECCC and U.S. EPA**
- **ECCC Model and CAPP comments/analysis**
- **CAPP Recommendation**

Pneumatics – Emission Source Description

- **What are pneumatic devices?**
  - Controllers and pumps that use fuel gas to power process control (Gas Driven Instruments)

- **Why do we need them?**
  - Remote oil and gas sites are not typically connected to grid electricity
  - Pressurized fuel gas is readily available

- **What do they do?**
  - Pressure regulation
  - Liquid-levels regulation
  - Temperature regulation
  - Safety-relief valve operation
  - Pumping corrosion inhibitor, glycol and methanol



Summary of Current Industry Practices

- **New developments:**
  - Use of low bleed and electronic instruments at new facilities widespread
  - Solar electric-drive pumps are utilized where practical but not suitable for all applications e.g. high pressure wells; dense forest; northern latitudes
  - New technologies being piloted to ensure robust solutions suited to Canadian climate
    - Industry focused on technologies ready for deployment in next 1 to 3 years



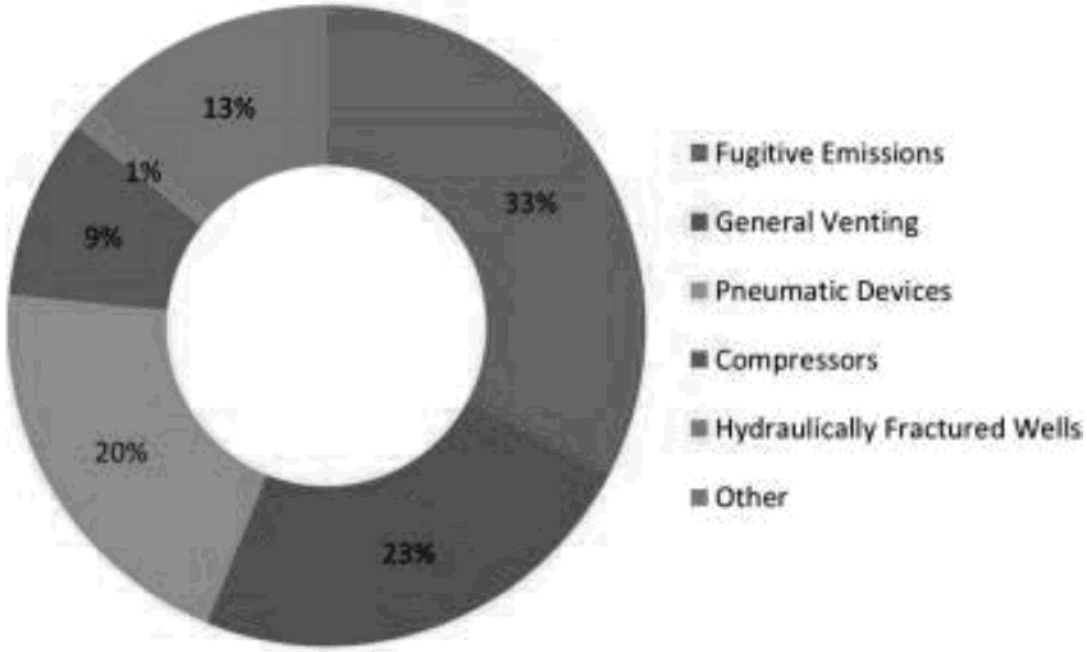
- **Existing equipment:**
  - Large number of controllers in industry; accurate inventories do not exist
  - Compressed air installed at SAGD facilities and well pad facilities, sour gas plants, sweet gas plants, compressor stations and multi-well oil batteries
  - Some voluntary replacement of high bleed devices has occurred

Pneumatics – Emission Profile

2012 Baseline:

Oil & gas methane = 45Mt

Pneumatics* = ~9Mt



Source: Environment and Climate Change Canada

Uncertainties:

- *Number of pneumatic instruments and pumps*
- *Proportion of existing equipment that is already low-bleed or zero emission (e.g. instrument air)*
- *Emission rates by type of equipment*

Comparison of ECCC and U.S. EPA

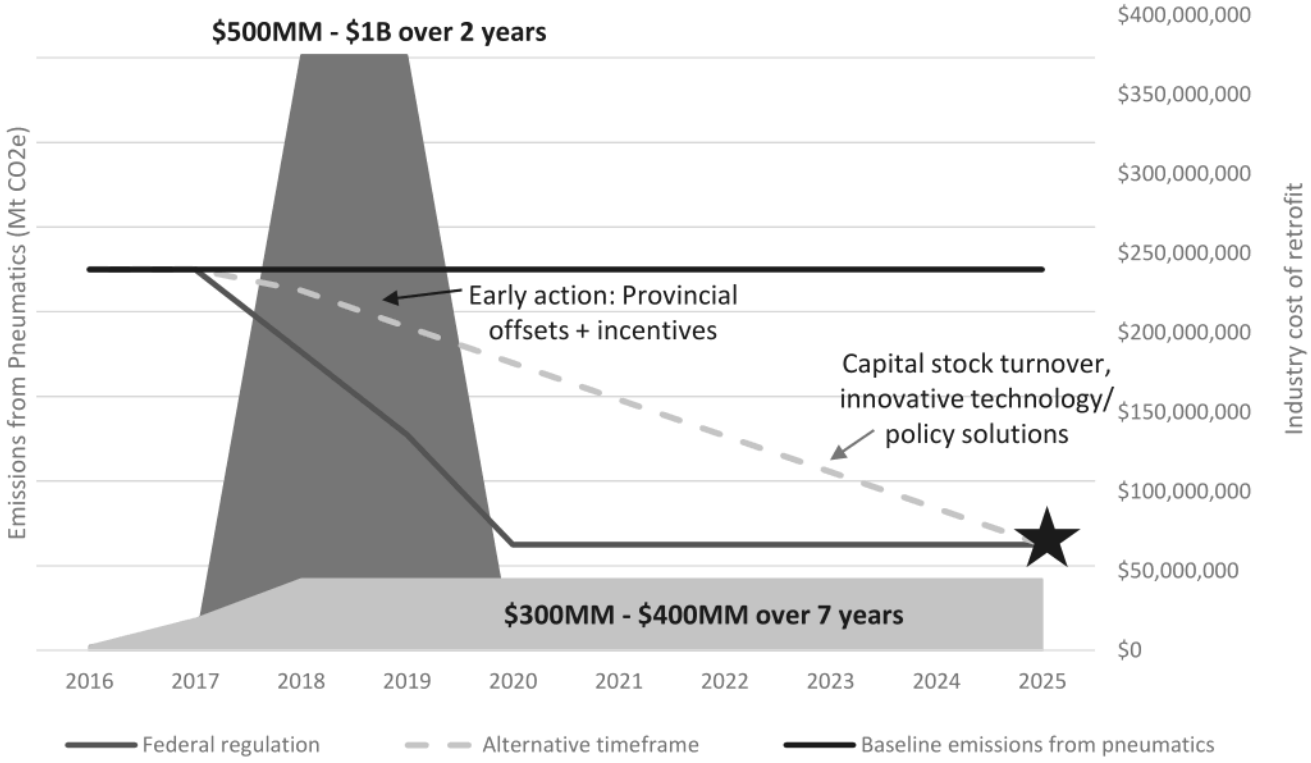
Criteria	Federal Proposal	U.S. EPA Comparison
Facility threshold	Applies to all facilities with >60,000 m^3/yr (produced + received) Pumps: Methanol Injection rate >30L/day Controllers: Facilities with compression >250hp	Applies only to new and modified sources, including replacements
Emission Limit Requirement	Pumps: • Emissions from pneumatic pumps must be conserved or combusted • Methanol injection rate threshold 30L/day Controllers: • At facilities with compression must use non-emitting devices • Compression threshold 250hp • All other facilities must use low bleed devices (according to manufacturer specs)	Pumps: • Diaphragm pumps at well sites: use existing controls that are available on site. • Pumps used <90 days/yr are exempt • Solar-, electric-, air-driven pumps also exempt • Diaphragm pumps at gas processing plants: zero emissions. Same exemptions as for well sites. Controllers: • Zero bleed at gas plants • Continuous bleed: low bleed only at wellhead to gas plant • Intermittent bleed exempt • Exceptions for functional needs e.g. positive actuation, response time, safety
Implementation	In effect 2020	In effect ???

Current CANADA proposal more stringent than U.S. EPA

CAPP comments on ECCC analysis

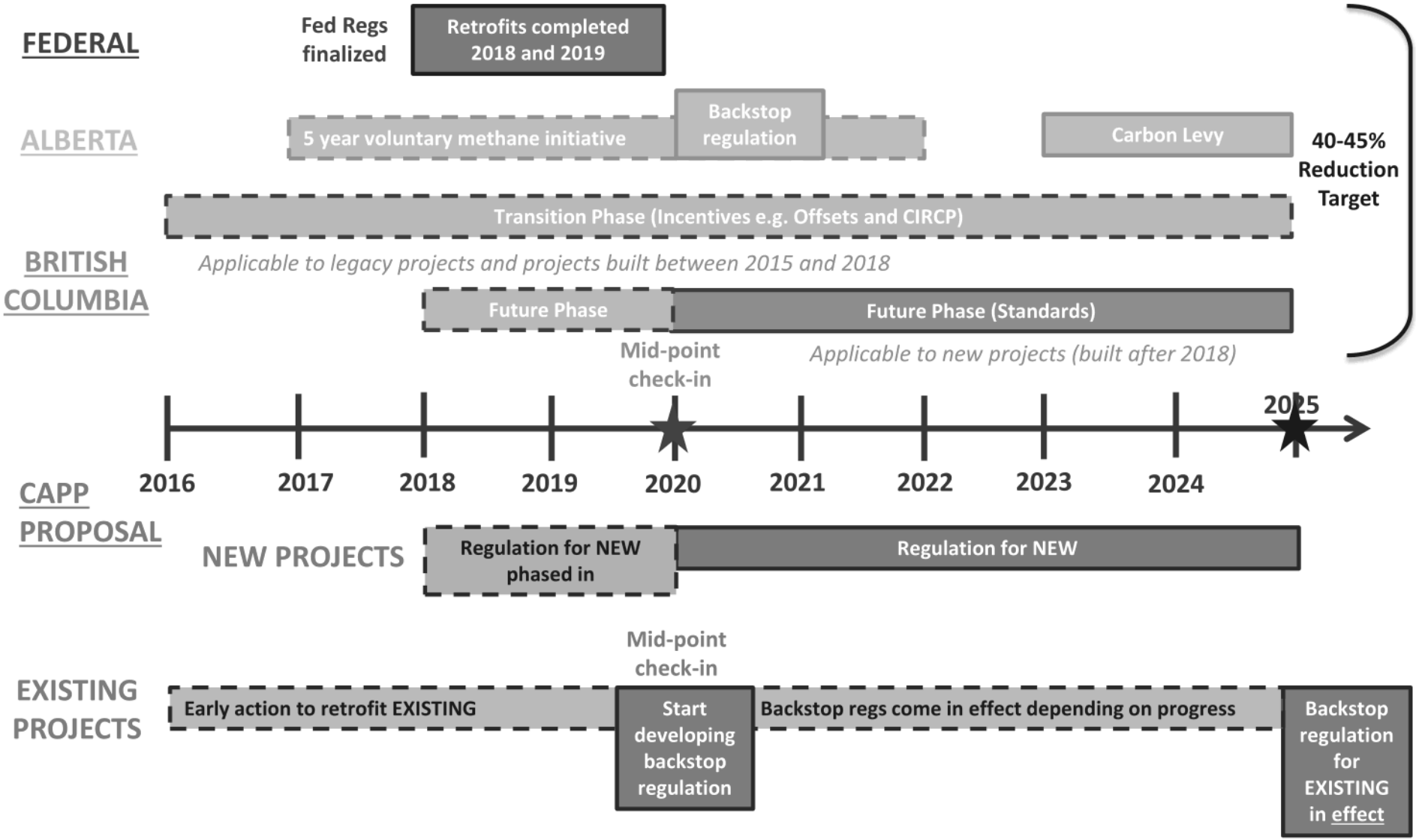
	ECCC Inputs/Assumptions	CAPP comments
Equipment/ Facilities impacted	Controllers 100,000 Pumps 18,800	• Number of equipment by facility type
Emission reductions	4.6Mt reduction - controllers 1.2Mt reduction - pumps	• BAU emissions do not account for widespread usage of low-bleed controllers and instrument air • Emission reductions potentially overestimated • Some emission factors overstated
Capex	$370MM capex - controllers $120MM capex - pumps	• Capex per instrument/pump about right • Doesn't include cost of time and travel • Underestimating the cost of zero-emissions solutions • Not taking account of innovative technology solutions
Summary	**Total capex $550MM ~6Mt reduction Average cost of $3-10/tonne**	**Total capex $500MM to $1B 5-10Mt reduction Average cost of ~$10-20/tonne**

Pneumatic controllers – CAPP analysis



- Compressing the timeframe into 2 years will drastically increase costs faced by industry
- Allowing more time to meet the reduction target will enable smart, cost-effective solutions to be found and still meeting the same emission reduction target by 2025

Pneumatics – Timing considerations



Summary

- **Industry agrees that pneumatic devices are a significant methane emission reduction opportunity for the oil and gas sector, and will work to address by 2025.**

- **Recommendation: Differentiate requirements for new and existing equipment, with later phase in of requirements for existing equipment**
  - NEW equipment regulatory requirements take effect 2018
  - EXISTING equipment requirements take effect post-2020 to align with provincial programs

- **Benefits of Proposal:**
  - Still achieve 2025 reduction target
    - allow the time that is needed to address the scale of the task for existing equipment
  - Significantly reduce the cost to industry – **by up to 50%**
  - Takes account of:
    - Technology development – lowers costs, improves emissions reductions
    - Competitiveness and alignment with the U.S.
    - Provincial offset & other fiscal programs
    - Complexity and scale of existing equipment inventories / large body of work required to undertake large scale retrofit program
    - Natural capital stock turnover

Well Completions

Well Completions – Overview

- **Emission Source Description**
- **Summary of Industry Practices**
- **ECCC Model and CAPP Comments**
- **CAPP Recommendation**

Well Completions – Emission Source Description

- **Methane associated with well completion fracing**
  - Well cleanup involves removing frac fluid (gas & liquids) and sand; Required to ensure safe and compliant production
  - Post fracing there is typically methane produced with the well cleanup
  - Normally during cleanup any produced methane is flared until fluid flow composition stabilizes to pipeline spec at which point it is then conserved
  - In some cases, (i.e. unstable flow, low GOR, energized fracs) flaring is not feasible so methane will be vented as part of cleanup

Well Completions – Summary of Industry Practices

- **Background**
  - "Green" or "reduced emission completions" (REC) are part of the regulatory framework in Alberta and British Columbia for all facilities, new and existing
  - Other jurisdictions (MB & SK) have regulations in place governing well completions. Not seen as a focus area due to lower activity levels and play type.
- **Considerations**
  - Decision tree based emission abatement logic
  - Clear distinction between completion flowback and production operations
  - Exceptions where exploration, safety, and feasibility justify non-standard practices

Well Completions – ECCC Model and CAPP Comments

- **Inputs / Assumptions:**
  - Quantity of wells drilled and completed
    - Primary - NEB production activity forecast
    - Secondary - CAPP's statistical handbook & Provincial data
  - Volumes
    - EPA's NSPS - gas well 9 mmscf/d, oil Well 1 mmscf/d with applied factors
  - Industry publications/practices
  - Recommendations inline with U.S. EPA proposal
- **Mitigations applied**
  - Conservation
  - Flaring
  - Venting

	Gas	Oil
	kt CO_2e	
Emissions if Vented	4.59	0.46
Emissions Abated with REC	4.54	0.45
Emissions Abated with Flare	4.01	0.39

Table: ECCC model summary - what the emission reduction looks like for a single fractured well completion0

Well Completions – ECCC Model and CAPP Comments

- **Activity level forecast not aligned**
  - NEB forecast is more optimistic than industry
  - Industry outlook shows flatter trend, with more modest growth
    - Reference: PSAC & CAPP
- **Modelling is not giving credit for current industry best practices**
  - Factors did not give considerations for different well completion designs (e.g. shale vs conventional)
  - EPA estimated numbers used with no consideration for AB (ST-60B) or BC reported actuals
  - Variety of completion designs and reservoir properties which would yield different emission profiles

Well Completions – ECCC Model and CAPP Comments

- **The proposed Federal regulatory framework reflects what is currently enacted by AB & BC provinces**
  - As such, there would be minimal impact to current industry best practices for methane in those jurisdictions
  - Certain completion practices in SK may not meet the proposed exception cases resulting in a cost impact in that jurisdiction
  - All methane must be conserved or flared by exception:
    - Whether a separator can be operated - GOR based (53 m^3 gas:1 m^3 oil); Heavy oil not feasible but medium to light would be
    - "suitable pipeline" – < 3km to nearest pipeline
    - Gas pressure below pipeline pressure
    - Gas composition (e.g. N_2 & CO_2 fracs)
  - Regulation states no allowances for venting but venting emissions were included in ECCC model (exception criteria details not provided)

Well Completions – CAPP Recommendation

- The existing Alberta and British Columbia reduced emission completion standards should serve as a model for any potential Federal standards in Canada
- Standardizing language in regulations
  - As an example, but not limited to, the NSPS OOOO 40 CFR Part 60 (June 2016) definition of completion and production stage differentiation
  - Common emission abatement logic (i.e. decision tree)
  - Exceptions for exploration activities
- ECCC model does not reflect industry current regulations and overestimates reduction potential
- Further reduction opportunities beyond AB & BC standards come at increased process safety risk and cost burden
- If regulation is meant to be equivalent with existing provincial requirements, then conduct equivalency test prior to implementation

End

Questions…?

Next Steps…

IRC Page 128 of 128 MOE-2017-70711



The Proposed Federal Regulatory Model for Methane

CAPP CANADA'S OIL & NATURAL GAS PRODUCERS

May 17, 2016

EA Page 1 of 69 MOE-2017-70711

CAPP Understands Federal Action on Methane

- **CAPP appreciates early engagement with:**
  - Data-informed approach to regulation that reflects pragmatic, smart design
  - Defined objectives that allow flexibility is selection of solutions
  - Commitment to harmonize with the provinces
  - Flexibility to recognize alternative baseline years
  - Commitment to rely mainly on provincial reporting
  - Intent to minimize administrative burden
  - Staged approach to implementation with ambitious yet realistic timelines

CAPP's Principles on Climate Change

- **CAPP supports an approach that maintains a vibrant and competitive oil and natural gas sector while efficiently and effectively manages GHG emissions.**
- **The following principles should guide climate policy development:**
  - Balanced "3E" policy should deliver economic growth, environmental protection, and a secure and reliable energy supply.
  - Policy should stimulate and support investment in the technologies and innovations necessary to reduce GHG emissions in Canada.
  - Policy should be designed to drive efficient actions required to achieve technology and innovation objectives.
  - Predictable policy built on stable principles required for long-term capital investments in the upstream and create jobs for Canadians.
  - Policy should maintain competitiveness of Canadian industry, ensure compatibility with major trading and economic partners, and compliance should be achievable within the context of growing production.

Consultation Timelines and Process

Assessment	Recommendations
• The consultation timelines for federal and provincial consultation overlap. • Without sufficient understanding of the federal scheme and the potential interface with provincial regulation, the oil and gas sector will struggle to provide meaningful feedback regarding operational implications to ensure seamless, non-duplicative and aligned regulation.	• As much as feasible, work to align federal and provincial consultation timelines. • Make outcome based requirements in federal regulation; allow the provinces the flexibility to determine how best to achieve the required reductions.

Proposed Regulatory Implementation Timelines

Assessment	Recommendations
• The timeline specified in the proposed approach to regulation does not reflect the time needed for implementation of the proposed regulation. • The timeline to phase in federal regulations appears to be more aggressive than is required to meet the 2025 reduction targets and appears to be ahead of the US requirements for existing equipment; potentially creating a disadvantage within Canada • The timeline to phase-in federal regulations does not appear to align with public commitments by the Provinces: Alberta & British Columbia.	• Ensure the timing of the Canadian implementation does not precede the US requirements and coordinates with the provinces, specifically: • Provincial frameworks to enable action by mid- to late- 2017. • Alberta has a 5-year non-regulated initiative to allow industry to address methane emissions and to generate offsets while recognizing that this takes time and effort to: • understand the inventory • pilot control technologies • set internal systems to track/report/keep records • British Columbia has a similar aim.

Proposed Regulatory Implementation Timelines

Assessment	Recommendations
• Recognizing that the federal government does not intend to enable offsets, this has been enabled under the provincial approaches (i.e., British Columbia, Alberta). • Provincial scope of allowing offsets to support the early adoption of methane reduction technology is an important element of provincial plans.	• Ensure that timing of federal requirements does not impact the provinces' ability to allow offsets. • Realize the benefits of incentivized, quick-wins by the provinces: • New equipment installation could be phased in ahead of requirements for existing while enabling transition from BAU. • LDAR could be an early implementation opportunity in 2018 while taking time to create appropriate regulations. • A 5-year window for incentive-based program and early phase in of LDAR and new equipment positions Canada to achieve reduction of 40-45% by 2025.

Outcomes versus Prescription

Assessment	Recommendations
• Focus on outcomes based regulations and allow the provinces to set the details of how to achieve the reduction targets. • A smart, pragmatic approach would deliver the greatest emissions reductions while minimizing the overall cost impact on industry.	• Regulations should define success through emission reduction objectives while maximizing commercial and technical flexibility to achieve those objectives. • Flexibility is required to ensure technical solutions can be adapted to each situation. As well, flexibility is required to foster innovation and allow the implementation of new solutions. • Enable flexibility to take into account capital stock turnover (i.e., wells abandonment or facility decommissioning before 2025).

Outcomes versus Prescription

Assessment	Recommendations
• Regulations should set expectations about the required elements of a system to manage methane.	• Explore tools under CEPA to regulate critical elements of management system (i.e., s. 54 and 55) while leaving achievement of regulatory outcomes to the provinces through guidance for methane emissions management at upstream facilities and equipment.

Outcomes versus Prescription

Assessment	Recommendations
• LDAR – Different equipment has different probability of leaks. The baseline frequency for inspections (quarterly inspections at compressors) appears high, and the requirements appear prescriptive.	• Set a minimum requirement, but allow flexibility to either increase or decrease survey frequency based on performance.
• Venting Restrictions – Confirm the control at 60 e3m3/yr as this appears extremely low. Concerns with reference to combustion efficiency. • Current requirements (AER, OGC) are based on 900 m3/d. • Combustion efficiency may not be a significant opportunity.	• Continue to emphasize the need for combustion, not only conservation.

Outcomes versus Prescription

Assessment	Recommendations
• Pneumatics – Non emitting equipment required at all compressors.	• Consider enabling flexibility where this requirement is not technically nor economically feasible.
• Well completions – The elimination of all venting during operations may not be feasible.	• Consider allowing flexibility for where a requirement is not technically feasible or economically unattractive.

Questions of Clarification

- How are the following terms defined?
  - Low bleed
  - High bleed
  - Leak detection unit
- What is the justification for the inspection frequency?
- Will the approach be risk-based to identify high leaks first?
- Will LDAR be required for multi-well pads? (i.e. What is the definition of well versus facility?)
- What are suitable criteria for technical exemptions – LDAR, venting, etc.?
- What should the status of retrofits be by 2020-completed/started?
- Could an interim check-in to assess progress towards the 45% reduction be imposed prior to regulation?
- How will the 45% reduction be assessed?

Questions of Clarification

- How will the alignment to the US EPA enable equivalency agreements with the provinces on the basis of outcomes?
- How will equivalency agreements support provincial offsets?
- What is the scope of the Cost Benefit Analysis?

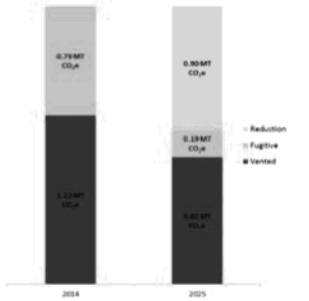
Next Steps

- **Follow up on points of clarification and technical justification/rationale, including:**
  - cut-off numbers
  - thresholds
- **Prioritize standards for earlier implementation opportunities, with sufficient time/consultation to ensure pragmatic outcome based requirements can be designed.**
- **Convene a joint process to accomplish the following tasks:**
  - Technical review to support the development of LDAR requirements
  - Industry input into the Cost Benefit Analysis
  - Definition of challenging but realistic implementation timelines for a phased approach to realize early-win opportunities

2014 British Columbia Reporting Regulation Emissions Report Summary Table: Linear Facilities Operation Summary				
Company	Facility	Venting CH4	Fugitive CH4	Total CH4
Aitken Creek Gas Storage ULC	Aitken BC Linear Facilities Operation (LFO)	1,984.50	558.15	3,579.48
AltaGas Ltd.	AltaGas BC Linear Facilities Operation (LFO)	7,415.58	5,314.00	14,281.35
Apache Canada Ltd.	Apache BC Linear Facilities Operation (LFO)	4,985.55	390.48	5,870.15
ARC Resources	ARC BC Linear Facilities Operation (LFO)	41,930.65	14,938.73	69,704.10
Artek Exploration Ltd.	Artek BC Linear Facilities Operation (LFO)	-	-	2,745.75
Aux Sable Canada L.P.	Aux Sable BC Linear Facilities Operation (LFO)	758.20	278.18	4,115.23
Black Swan Energy	Black Swan BC Linear Facilities Operation (LFO)	2,402.78	5,735.40	10,560.43
Bonavista Energy Corporation	Bonavista BC Linear Facilities Operation (LFO)	8,440.45	9,177.95	19,297.36
Canadian Natural Resources Limited	CNRL BC Linear Facilities Operation (LFO)	250,101.00	147,575.00	406,214.15
Canbriam Energy Inc.	Canbriam BC Linear Facilities Operation (LFO)	1,750.13	5,808.68	11,013.88
Cequence Energy Ltd.	Cequence BC Linear Facilities Operation (LFO)	4,987.53	1,562.83	6,983.26
Chinook Energy Inc.	Chinook BC Linear Facilities Operation (LFO)	21,927.96	20,270.93	45,733.20
ConocoPhillips Canada Resources Corp.	ConocoPhillips BC Linear Facilities Operation (LFO)	121,538.85	89,559.73	226,518.95
Crew Energy Inc.	Crew BC Linear Facilities Operation (LFO)	5,526.88	6,168.50	14,340.08
Devon Canada Corporation	Devon BC Linear Facilities Operation (LFO)	61.04	594.46	955.55
Direct Energy Marketing Ltd.	Direct Energy BC Linear Facilities Operation (LFO)	9,165.51	14,625.50	26,129.32
Encana Corporation	Encana BC Linear Facilities Operation (LFO)	249,317.43	35,578.15	319,488.08
Endurance Energy Ltd.	Endurance BC Linear Facilities Operation (LFO)	225,086.27	129,166.43	368,065.07
Enerplus Corporation	Enerplus BC Linear Facilities Operation (LFO)	748.45	4,545.43	8,031.08
EOG Resources Canada Inc.	EOG BC Linear Facilities Operation (LFO)	11,327.03	1,922.20	14,546.68
Harvest Operations Corp.	HARVEST BC Linear Facilities Operation (LFO)	5,390.06	8,468.65	14,897.57
Husky Oil Operations Limited	Husky BC Linear Facilities Operation (LFO)	17,446.03	23,524.71	43,185.02
Imperial Oil Resources Ltd.	Imperial BC Linear Facilities Operation (LFO)	-	-	552.83
Keyera Corporation	Keyera BC Linear Facilities Operation (LFO)	2,274.05	1,871.55	5,094.85
Lightstream Resources Ltd.	Lightstream BC Linear Facilities Operation (LFO)	3,466.06	2,218.16	5,850.48
Lone Pine Resources Canada Ltd.	Lone Pine BC Linear Facilities Operation (LFO)	2,257.20	5,431.90	8,032.58
Murphy Oil Company Ltd.	Murphy BC Linear Facilities Operation (LFO)	4,340.73	1,276.84	9,296.49
Nexen Inc.	Nexen BC Linear Facilities Operation (LFO)	866.75	388.00	8,241.98
Pengrowth Energy Corporation	Pengrowth BC Linear Facilities Operation (LFO)	7,462.35	6,661.25	16,904.08
Penn West Petroleum Ltd.	Penn BC Linear Facilities Operation (LFO)	29,903.50	12,645.08	51,702.00
Polar Star Canadian Oil and Gas Inc.	Polar Star BC Linear Facilities Operation (LFO)	1,534.75	5,942.50	8,282.43
Progress Energy Canada Ltd.	Progress BC Linear Facilities Operation (LFO)	48,367.95	63,391.57	163,069.87
Quicksilver Resources Canada Inc.	Quicksilver BC Linear Facilities Operation (LFO)	-	15,697.50	19,201.78
Ramshorn Canada	Ramshorn BC Linear Facilities Operation (LFO)	707.28	9,279.88	10,264.33
Shell Canada Limited	Shell BC Linear Facilities Operation (LFO)	26,656.73	25,974.00	75,086.73
Spectra Energy Midstream Corporation	Spectra BC Linear Facilities Operation (LFO)	4,142.75	159.56	30,298.54
Spectra Energy Transmission	Spectra BC Linear Facilities Operation (LFO)	76,776.48	81,542.47	199,218.08
Suncor Energy Inc.	Suncor BC Linear Facilities Operation (LFO)	661.78	2,400.11	3,673.88
Taqa North Ltd.	Taqa BC Linear Facilities Operation (LFO)	4,544.93	4,607.54	10,664.93
Terra Energy Corporation	Terra BC Linear Facilities Operation (LFO)	3,477.63	6,429.36	11,719.32
Tourmaline Oil Corp.	Tourmaline BC Linear Facilities Operation (LFO)	11,275.92	15,264.95	37,579.67
Veresen Energy Infrastructure Inc.	Veresen BC Linear Facilities Operation (LFO)	340.18	91.23	914.95
Whitecap Resources Inc.	Whitecap BC Linear Facilities Operation (LFO)	1,664.20	526.29	2,812.90
TOTAL		1,223,013	787,564	2,463,660
TOTAL VENTING + FUGITIVES			2,010,577	
45% Reduction (Proportional - Demonstrative Only)		550,355.87	354,403.70	
Resulting 2025 Emissions			1,105,817.25	

Proposed Target for Reductions from Existing Sources

- **A 45% reduction in vented and fugitive methane emissions from existing facilities in the upstream oil and gas sector from a 2.01 MT CO_2e baseline in 2014 will require a reduction of 0.90 MT CO_2e by 2025.**
  - Emissions associated with flaring and stationary combustion are excluded.
  - This breakdown serves as a representative example only – vented and fugitive emission reductions may not be as shown or proportional.



*Based on 2014 Consolidated B.C. Emissions Report data.

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Page 15 to/à Page 37

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Rationale for Comprehensive Recognition of Early Action for All Potential Sources in Support of Achieving the Methane Emission Reduction Target

CAPP has reviewed ECCC's document describing equivalency and recognition of early action. While this document provides additional clarity, CAPP believes that a different approach could be taken to recognize early action towards the 45% methane reduction target.

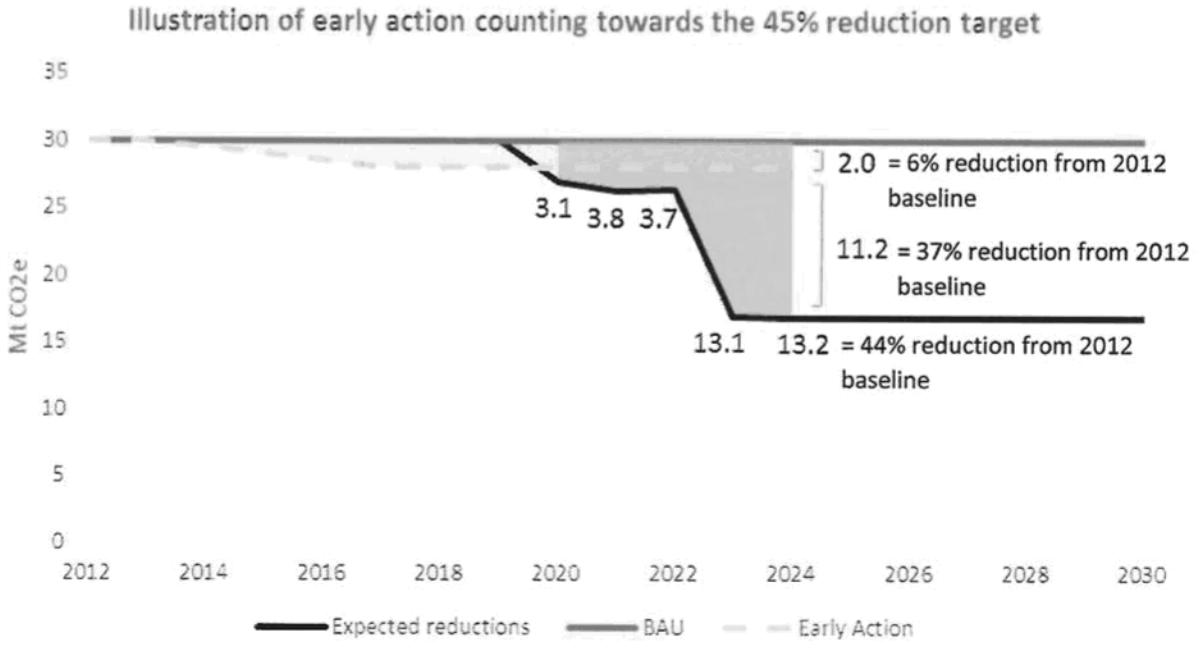
CAPP's main concerns are:

1. **Early action to reduce methane emissions that has occurred since 2012 will be included in the Business As Usual, and the 45% reduction target is then calculated from that BAU. If this is the case, significant investments made to date will not count towards meeting methane targets.**
2. **Industry has a shared desire to meet the 45% reduction and early action efforts help us to attain the desired reduction goal. The proposed regulations should be designed to achieve "the rest" of the reductions, not the full 20.4 Mt (as shown in Table 1 of the ECCC document).**

To illustrate, we offer the following illustrative example to show how the intention outlined in ECCC's presentation in November 2016 could bridge to Alberta's emission reduction requirements. We believe this approach is relevant and applicable for other jurisdictions.

The following assumptions were used:

- 30 Mt flat BAU methane emissions (2012 Alberta baseline)
- Early action between 2014 and 2017, peaks at 2 Mt/year and is considered ongoing emission reductions
- Expected reduction for Alberta taken from ECCC slide deck (dated November 29, 2016)



In this example, the early action emission reductions are directly deducted off the 5-year equivalency reductions required by regulation. Therefore, the cumulative reduction between 2020-2024 is equal to 36.9 Mt. In the ECCC example provided in December 2016, the early action reductions were illustrated as being additional to the 36.9 Mt, leading to a greater than 45% reduction.

CAPP is concerned that ECCC is suggesting by way of their example that emission reductions made since 2012 may not be included in the calculation of the 40-45% emission reduction. If the 2 Mt is not credited as progress towards the target, Alberta will achieve a 51% reduction in methane emissions with real consequences to industry.

Industry has a shared desire to meet the 45% reduction and are confident that early action efforts help us to attain the desired reduction goal. The proposed regulations should be designed to achieve "the rest" of the reductions to meet the 45% target.

Not providing this recognition, only serves to create disincentives to early action. Given the longer terms aspirations of both the federal and provincial governments to demonstrate continued leadership on climate action, we do not believe that there was an intention to send this policy signal.

The ECCC document was explicit in stating that early actions that count towards an equivalency agreement must be covered by ECCC's regulations. In the event that a province seeks an outcome based equivalency agreement, CAPP would like to confirm that provinces are free to include federally unregulated sources that would be included towards meeting the reduction target.

<u>Examples of early action underway within industry:</u>

- Pneumatic device retrofits:
  - ✓ Reductions are on-going (emissions that would have occurred are not occurring as long as that facility continues to operate)
  - ✓ Covered by federal regulations
- New pneumatic devices installed are solar/low to no-bleed:
  - ✓ Reductions are on-going (emissions that would have occurred had previous equipment standard been used are not occurring as long as that facility continues to operate)
  - ✓ Covered by federal regulations
- Improved conservation at heavy oil:
  - ✓ Reductions are on-going (not venting what would have been vented)
  - ✓ Covered by federal regulation
- Improve Stock Tank Vapour calculation
  - ✓ Reductions are on-going (calculated vented emissions from tanks lower than what was calculated in 2012)
  - ✓ Covered by federal regulation
- Compressor packing tied into flare:
  - ✓ Reductions are on-going (combusting gas volumes that would have been vented)
  - ✓ Covered by federal regulation

Alternative Leak Detection Technologies

CAPP has reviewed ECCC's document describing alternative proposal for leak detection and we are supportive of it. However, any proposal to allow for alternative technologies should focus on absolute emissions reductions (outcomes based) versus looking for technologies of equivalent performance. The objective of the alternative technologies will be to find the large leaks more quickly. The key will be a cost effective approach, likely with lower resolution than OGI that can be used on a more frequent basis.

CAPP is concerned that the current language does not reflect this goal and look forward to working together to ensure the regulation text achieves this goal.

Potential to Emit

Due to the variability in venting and production rates, CAPP proposes that the calculation of PTE is based on a 3-month rolling average rather than the past 5 years or forecast 12 months. This is consistent with Directive 60 requirements.

CAPP looks forward to reviewing specific language about the exemption from the emission control measures for LDAR and pneumatic devices during the period of time when venting is permitted.

It would be helpful for CAPP to review a definition of single well exemption for LDAR. Well site components are typically not subject to vibration, high use, or temperature cycles so completing 3 leak surveys per year at wells with PTE > 60,000 m3 per year is not likely to identify meaningful fugitive emissions. Instead, survey frequencies based on facility type (e.g., Table 2 in CSA Z620) with record keeping to identify leak patterns and subsequent DI&M surveys (unique to each company or operating area) is a more effective approach.

From:	Fradley, Adria N ENV:EX
To:	Peyman, Hurrian ENV:EX; Leitch, Andrew J ENV:EX; Zahariev, Konstantin ENV:EX
Subject:	FW: AB/BC/SK/MB Meeting on Methane
Date:	Wednesday, May 18, 2016 8:22:15 AM

Fed Presentation to CAPP and CAPP Feedback

From: Piccinino, Ines MNGD:EX
Sent: Tuesday, May 17, 2016 2:04 PM
To: Fradley, Adria N ENV:EX; Cailee Ellis; D'Souza, Don MNGD:EX; Floyd.Wist@gov.sk.ca; Gerald.Palanca@aer.ca; hal.sanders@gov.sk.ca; Heather.Carmichael@gov.ab.ca; Howard.Loseth@gov.sk.ca; joel.rogers@gov.ab.ca; kathleen.rich@gov.ab.ca; Keith.Lowdon@gov.mb.ca; Paulson, Ken OGC:IN; Parsonage, Kevin D OGC:IN; Landon.Fraser@gov.mb.ca; Maria Lavelle; Mark.Taylor@aer.ca; Schwabe, Michelle MNGD:EX; Nauman Anwar; Rhonda.King@aer.ca; Curry, Sean; Sharla.Rauschning@gov.ab.ca; Stephen.Wills@gov.ab.ca; Lesiuk, Tim ENV:EX; Wakelin, Tony
Subject: AB/BC/SK/MB Meeting on Methane

Organizer: Piccinino, Ines MNGD:EX
When: 11:00 - 14:00 May 17, 2016
Subject: AB/BC/SK/MB Meeting on Methane
Location: OGC - 398 Harbour Road, Victoria BC / Please check in at 3rd Floor Reception OR CONF CALL (info below)

From:	D"Souza, Don MNGD:EX
To:	"Marie Johnson"; Lesiuk, Tim ENV:EX; Wakelin, Tony; Jones, Troy (troy.jones@capp.ca); Peyman, Hurrian ENV:EX
Subject:	Methane baseline for BC
Date:	Monday, May 9, 2016 5:12:57 PM
Attachments:	image001.jpg

Hi all,
Attached is a spreadsheet with a high-level assessment of methane emissions by source category as well as potential reduction activities and their applicability for BC.
The overview of reported 2014 methane emissions is the same as has been shared previously by Mikeala and Marie (using the reporting reg data for the 211113 NAICS code and limited to venting and fugitive CH4 emissions). I've distributed the emissions into source categories based on a 2013 breakdown of emissions developed by CAS (previously publicly available but no longer online).
I've also looked at various sources to determine control and/or reduction efficiencies for different proposed activities (eg. pump to solar, or high bleed to low bleed) and assumed certain applicability factors to estimate what reductions might look like for BC.
The 'applicability' values are most uncertain as the US ones (when available) may not be entirely appropriate and I've had to make some conservative assumptions in some cases. The 'applicability' tab has some notes from different sources, but any thoughts on how these could be improved would be appreciated. If we have access to disaggregated equipment counts for the various source categories, these numbers could be refined further.
Please let me know if there are any questions or comments.
Cheers,
-Don

From: Marie Johnson [mailto:mjohnson@progressenergy.com]
Sent: Friday, May 6, 2016 6:50 AM
To: Lesiuk, Tim ENV:EX
Cc: Peyman, Hurrian ENV:EX; Jones, Troy (troy.jones@capp.ca); Wakelin, Tony; D'Souza, Don MNGD:EX; Jones, Troy (troy.jones@capp.ca)
Subject: Federal GHG Report Action Item
Hi Tim,
Thank you for taking the time to meet with us yesterday and review and recap the progress to date on the methane file.
I took a look at the figures that were sketched out at our earlier meetings and you are right about the slope of the line being the same. I apologize for the confusion.
There were some action items that came out of the meeting. One of them was for me to take a look at the 2015 federal report that was submitted for our b-88-I facility to see if the methodologies are provided within it. They are but not in great detail. I was also asked for an electronic copy of the spreadsheet that I had yesterday. It is attached. The target values within it were generated to see what an industry target of a 45% reduction might look like, and also if Progress was to set its own target to match industry, what that might look like. The source data is taken from the CAS website.
If there is anything else you need from me please let me know.
http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=47B640C5-1&offset=6&toc=show

4.4 Estimation Methods

The reporting facility must identify and report the type of estimation method or

methods used to determine the quantities of emissions reported. Such methods include monitoring or direct measurement, mass balance, emission factors and engineering estimates. These are defined below.

Monitoring or Direct Measurement:

This type of method may involve continuous emission monitoring systems (i.e., emissions recorded over an extended and uninterrupted period), predictive emission monitoring (correlations developed between measured emission rates and process parameters) or source testing (e.g., stack sampling).

Mass Balance:

This type of method involves the application of the law of conservation of mass to a facility, process or piece of equipment. Emissions are determined from the difference in the input and output of a unit operation where the accumulation and depletion of a substance are included in the calculations.

Emission Factors:

This method uses emission factors (EF) to estimate the rate at which a pollutant is released into the atmosphere (or captured) as a result of some process activity or unit throughput. The EFs used may be average or general EFs, or technology-specific EFs.

Engineering Estimates:

This type of method may involve estimating emissions based on engineering principles and judgment, using knowledge of the chemical and physical processes involved, the design features of the source, and an understanding of the applicable physical and chemical laws.

Reporters are reminded of the legal requirement to keep copies of the information submitted, together with any calculations, measurements and other data on which the information is based, for a minimum period of three years from the date the information must be submitted.

Currently, there are no specific protocols to define how reporters must calculate their GHG emissions. However, reporters must use methods that are consistent with the methodologies approved by the UNFCCC and developed by the IPCC. Refer to sections 3.1–3.3 for background information and a more complete description of the flexibility allotted to reporters in their estimation procedures. Facilities can also refer to Annexes 3 and 6 of Part 2 of the National Inventory Report to obtain detailed explanations of estimation methodologies and emission factors used by Environment Canada in the development of the estimates.

For further details on the IPCC methodologies, reporters should refer to Table 3, which presents specific references to the relevant sections of the 2006 IPCC Guidelines for the emission sources subject to reporting.

Regards,

Marie Johnson

Regulatory Advisor
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Company	Facility	BCFacilityID	Primary NAICS Code
Aitken Creek Gas Storage ULC	Aitken BC Linear Facilities Operation (LFO)	12111130001	211113 (Conventional Oil and Gas Extraction)
AltaGas Ltd.	AltaGas BC Linear Facilities Operation (LFO)	12111130036	211113 (Conventional Oil and Gas Extraction)
Apache Canada Ltd.	Apache BC Linear Facilities Operation (LFO)	12111130008	211113 (Conventional Oil and Gas Extraction)
ARC Resources	ARC BC Linear Facilities Operation (LFO)	12111130017	211113 (Conventional Oil and Gas Extraction)
Artek Exploration Ltd.	Artek BC Linear Facilities Operation (LFO)	12111130040	211113 (Conventional Oil and Gas Extraction)
Aux Sable Canada L.P.	Aux Sable BC Linear Facilities Operation (LFO)	12111130021	211113 (Conventional Oil and Gas Extraction)
Black Swan Energy	Black Swan BC Linear Facilities Operation (LFO)	12111131001	211113 (Conventional Oil and Gas Extraction)
Bonavista Energy Corporation	Bonavista BC Linear Facilities Operation (LFO)	12111130012	211113 (Conventional Oil and Gas Extraction)
Canadian Natural Resources Limited	CNRL BC Linear Facilities Operation (LFO)	12111130029	211113 (Conventional Oil and Gas Extraction)
Canbriam Energy Inc.	Canbriam BC Linear Facilities Operation (LFO)	12111131002	211113 (Conventional Oil and Gas Extraction)
Cequence Energy Ltd.	Cequence BC Linear Facilities Operation (LFO)	12111130170	211113 (Conventional Oil and Gas Extraction)
Chinook Energy Inc.	Chinook BC Linear Facilities Operation (LFO)	12111130024	211113 (Conventional Oil and Gas Extraction)
ConocoPhillips Canada Resources Corp.	ConocoPhillips BC Linear Facilities Operation (LFO)	12111130018	211113 (Conventional Oil and Gas Extraction)
Crew Energy Inc.	Crew BC Linear Facilities Operation (LFO)	12111130016	211113 (Conventional Oil and Gas Extraction)
Devon Canada Corporation	Devon BC Linear Facilities Operation (LFO)	12111130006	211113 (Conventional Oil and Gas Extraction)
Direct Energy Marketing Ltd.	Direct Energy BC Linear Facilities Operation (LFO)	12111130183	211113 (Conventional Oil and Gas Extraction)
Encana Corporation	Encana BC Linear Facilities Operation (LFO)	12111130010	211113 (Conventional Oil and Gas Extraction)
Endurance Energy Ltd.	Endurance BC Linear Facilities Operation (LFO)	12111130802	211113 (Conventional Oil and Gas Extraction)
Enerplus Corporation	Enerplus BC Linear Facilities Operation (LFO)	12111130022	211113 (Conventional Oil and Gas Extraction)
EOG Resources Canada Inc.	EOG BC Linear Facilities Operation (LFO)	12111130031	211113 (Conventional Oil and Gas Extraction)
Harvest Operations Corp.	HARVEST BC Linear Facilities Operation (LFO)	12111130027	211113 (Conventional Oil and Gas Extraction)
Husky Oil Operations Limited	Husky BC Linear Facilities Operation (LFO)	12111130013	211113 (Conventional Oil and Gas Extraction)
Imperial Oil Resources Ltd.	Imperial BC Linear Facilities Operation (LFO)	12111130005	211113 (Conventional Oil and Gas Extraction)
Keyera Corporation	Keyera BC Linear Facilities Operation (LFO)	12111130035	211113 (Conventional Oil and Gas Extraction)
Lightstream Resources Ltd.	Lightstream BC Linear Facilities Operation (LFO)	12111131003	211113 (Conventional Oil and Gas Extraction)
Lone Pine Resources Canada Ltd.	Lone Pine BC Linear Facilities Operation (LFO)	12111130020	211113 (Conventional Oil and Gas Extraction)
Murphy Oil Company Ltd.	Murphy BC Linear Facilities Operation (LFO)	12111130034	211113 (Conventional Oil and Gas Extraction)
Nexen Inc.	Nexen BC Linear Facilities Operation (LFO)	12111130002	211113 (Conventional Oil and Gas Extraction)
Pengrowth Energy Corporation	Pengrowth BC Linear Facilities Operation (LFO)	12111130028	211113 (Conventional Oil and Gas Extraction)
Penn West Petroleum Ltd.	Penn BC Linear Facilities Operation (LFO)	12111130009	211113 (Conventional Oil and Gas Extraction)
Polar Star Canadian Oil and Gas Inc.	Polar Star BC Linear Facilities Operation (LFO)	12111130041	211113 (Conventional Oil and Gas Extraction)
Progress Energy Canada Ltd.	Progress BC Linear Facilities Operation (LFO)	12111130039	211113 (Conventional Oil and Gas Extraction)
Quicksilver Resources Canada Inc.	Quicksilver BC Linear Facilities Operation (LFO)	12111130037	211113 (Conventional Oil and Gas Extraction)
Ramshorn Canada	Ramshorn BC Linear Facilities Operation (LFO)	12111130038	211113 (Conventional Oil and Gas Extraction)
Shell Canada Limited	Shell BC Linear Facilities Operation (LFO)	12111130007	211113 (Conventional Oil and Gas Extraction)
Spectra Energy Midstream Corporation	Spectra BC Linear Facilities Operation (LFO)	12111130003	211113 (Conventional Oil and Gas Extraction)
Spectra Energy Transmission	Spectra BC Linear Facilities Operation (LFO)	12111130004	211113 (Conventional Oil and Gas Extraction)
Suncor Energy Inc.	Suncor BC Linear Facilities Operation (LFO)	12111130015	211113 (Conventional Oil and Gas Extraction)
Taqa North Ltd.	Taqa BC Linear Facilities Operation (LFO)	12111130014	211113 (Conventional Oil and Gas Extraction)
Terra Energy Corporation	Terra BC Linear Facilities Operation (LFO)	12111130025	211113 (Conventional Oil and Gas Extraction)
Tourmaline Oil Corp.	Tourmaline BC Linear Facilities Operation (LFO)	12111130033	211113 (Conventional Oil and Gas Extraction)
Veresen Energy Infrastructure Inc.	Veresen BC Linear Facilities Operation (LFO)	12111130042	211113 (Conventional Oil and Gas Extraction)
Whitecap Resources Inc.	Whitecap BC Linear Facilities Operation (LFO)	12111131004	211113 (Conventional Oil and Gas Extraction)

Facility Type	Stationary Fuel Combustion CH4	Flaring CH4	Venting CH4	Fugitive CH4	On-site transportation CH4	Waste CH4	Wastewate	Total CO2 f	Total CH4
LFO	20	1,017	1,985	558	-	-	-	-	3,579
LFO	23	1,529	7,416	5,314	-	-	-	-	14,281
LFO	334	160	4,986	390	-	-	-	-	5,870
LFO	10,742	2,092	41,931	14,939	-	-	-	-	69,704
LFO	2,746	-	-	-	-	0	-	-	2,746
LFO	2,895	183	758	278	-	-	-	-	4,115
LFO	813	1,609	2,403	5,735	-	-	-	-	10,560
LFO	941	738	8,440	9,178	-	-	-	-	19,297
LFO	329	8,209	250,101	147,575	-	-	-	-	406,214
LFO	3,016	439	1,750	5,809	-	-	-	-	11,014
LFO	419	14	4,988	1,563	-	-	-	-	6,983
LFO	2,897	637	21,928	20,271	-	-	-	-	45,733
LFO	14,662	759	121,539	89,560	-	-	-	-	226,519
LFO	1,406	1,239	5,527	6,169	-	-	-	-	14,340
LFO	225	75	61	594	-	-	-	-	956
LFO	1,735	604	9,166	14,625	-	-	-	-	26,129
LFO	31,396	3,196	249,317	35,578	-	-	-	-	319,488
LFO	12,605	1,208	225,086	129,166	-	-	-	-	368,065
LFO	2,434	303	748	4,545	-	-	-	-	8,031
LFO	1,240	58	11,327	1,922	-	-	-	-	14,547
LFO	126	913	5,390	8,469	-	-	-	-	14,898
LFO	1,425	789	17,446	23,525	-	-	-	-	43,185
LFO	439	114	-	-	-	-	-	-	553
LFO	18	932	2,274	1,872	-	-	-	-	5,095
LFO	119	47	3,466	2,218	-	0	-	-	5,850
LFO	292	51	2,257	5,432	-	-	-	-	8,033
LFO	3,267	412	4,341	1,277	-	-	-	-	9,296
LFO	6,192	796	867	388	-	-	-	-	8,242
LFO	2,523	257	7,462	6,661	-	-	-	-	16,904
LFO	8,892	262	29,904	12,645	-	-	-	-	51,702
LFO	727	78	1,535	5,943	-	-	-	-	8,282
LFO	27,404	23,906	48,368	63,392	-	-	-	-	163,070
LFO	3,504	-	-	15,698	-	-	-	-	19,202
LFO	8	269	707	9,280	-	-	-	-	10,264
LFO	20,999	1,457	26,657	25,974	-	-	-	-	75,087
LFO	23,605	2,392	4,143	160	-	-	-	-	30,299
LFO	15,374	25,525	76,776	81,542	-	-	-	-	199,218
LFO	281	330	662	2,400	-	-	-	-	3,674
LFO	837	675	4,545	4,608	-	0	-	5	10,665
LFO	1,411	363	3,478	6,429	-	39	-	-	11,719
LFO	10,234	805	11,276	15,265	-	-	-	-	37,580
LFO	20	464	340	91	-	-	-	-	915
LFO	144	478	1,664	526	-	-	-	-	2,813

GRAND TOTAL in CO2e
52,127
72,442
40,655
243,665
68,483
41,095
40,302
66,482
1,161,830
61,709
12,334
90,014
415,634
49,802
11,675
110,335
753,881
558,929
42,334
31,789
29,996
120,319
21,280
48,782
11,406
16,544
157,324
136,472
51,107
197,155
17,949
882,638
64,380
29,363
350,943
249,150
4,135,555
24,543
55,273
32,378
185,433
92,472
13,805

Company	Facility	BCFacilityID	Primary NAICS Code	Facility Type	Stationary Fuel Combustion CH4	Flaring CH4	Venting CH4
Aitken Creek Gas Storage ULC	Aitken BC Linear Facilities Operation (LFO)	12111130001	211113 (Conventional Oil and Gas Extraction)	LFO	20	1,017	1,985
AltaGas Ltd.	AltaGas BC Linear Facilities Operation (LFO)	12111130036	211113 (Conventional Oil and Gas Extraction)	LFO	23	1,529	7,416
Apache Canada Ltd.	Apache BC Linear Facilities Operation (LFO)	12111130008	211113 (Conventional Oil and Gas Extraction)	LFO	334	160	4,986
ARC Resources	ARC BC Linear Facilities Operation (LFO)	12111130017	211113 (Conventional Oil and Gas Extraction)	LFO	10,742	2,092	41,931
Artek Exploration Ltd.	Artek BC Linear Facilities Operation (LFO)	12111130040	211113 (Conventional Oil and Gas Extraction)	LFO	2,746	-	-
Aux Sable Canada L.P.	Aux Sable BC Linear Facilities Operation (LFO)	12111130021	211113 (Conventional Oil and Gas Extraction)	LFO	2,895	183	758
Black Swan Energy	Black Swan BC Linear Facilities Operation (LFO)	12111131001	211113 (Conventional Oil and Gas Extraction)	LFO	813	1,609	2,403
Bonavista Energy Corporation	Bonavista BC Linear Facilities Operation (LFO)	12111130012	211113 (Conventional Oil and Gas Extraction)	LFO	941	738	8,440
Canadian Natural Resources Limited	CNRL BC Linear Facilities Operation (LFO)	12111130029	211113 (Conventional Oil and Gas Extraction)	LFO	329	8,209	250,101
Canbriam Energy Inc.	Canbriam BC Linear Facilities Operation (LFO)	12111131002	211113 (Conventional Oil and Gas Extraction)	LFO	3,016	439	1,750
Cequence Energy Ltd.	Cequence BC Linear Facilities Operation (LFO)	12111130170	211113 (Conventional Oil and Gas Extraction)	LFO	419	14	4,988
Chinook Energy Inc.	Chinook BC Linear Facilities Operation (LFO)	12111130024	211113 (Conventional Oil and Gas Extraction)	LFO	2,897	637	21,928
ConocoPhillips Canada Resources Corp.	ConocoPhillips BC Linear Facilities Operation (LFO)	12111130018	211113 (Conventional Oil and Gas Extraction)	LFO	14,662	759	121,539
Crew Energy Inc.	Crew BC Linear Facilities Operation (LFO)	12111130016	211113 (Conventional Oil and Gas Extraction)	LFO	1,406	1,239	5,527
Devon Canada Corporation	Devon BC Linear Facilities Operation (LFO)	12111130006	211113 (Conventional Oil and Gas Extraction)	LFO	225	75	61
Direct Energy Marketing Ltd.	Direct Energy BC Linear Facilities Operation (LFO)	12111130183	211113 (Conventional Oil and Gas Extraction)	LFO	1,735	604	9,166
Encana Corporation	Encana BC Linear Facilities Operation (LFO)	12111130010	211113 (Conventional Oil and Gas Extraction)	LFO	31,396	3,196	249,317
Endurance Energy Ltd.	Endurance BC Linear Facilities Operation (LFO)	12111130802	211113 (Conventional Oil and Gas Extraction)	LFO	12,605	1,208	225,086
Enerplus Corporation	Enerplus BC Linear Facilities Operation (LFO)	12111130022	211113 (Conventional Oil and Gas Extraction)	LFO	2,434	303	748
EOG Resources Canada Inc.	EOG BC Linear Facilities Operation (LFO)	12111130031	211113 (Conventional Oil and Gas Extraction)	LFO	1,240	58	11,327
Harvest Operations Corp.	HARVEST BC Linear Facilities Operation (LFO)	12111130027	211113 (Conventional Oil and Gas Extraction)	LFO	126	913	5,390
Husky Oil Operations Limited	Husky BC Linear Facilities Operation (LFO)	12111130013	211113 (Conventional Oil and Gas Extraction)	LFO	1,425	789	17,446
Imperial Oil Resources Ltd.	Imperial BC Linear Facilities Operation (LFO)	12111130005	211113 (Conventional Oil and Gas Extraction)	LFO	439	114	-
Keyera Corporation	Keyera BC Linear Facilities Operation (LFO)	12111130035	211113 (Conventional Oil and Gas Extraction)	LFO	18	932	2,274
Lightstream Resources Ltd.	Lightstream BC Linear Facilities Operation (LFO)	12111131003	211113 (Conventional Oil and Gas Extraction)	LFO	119	47	3,466
Lone Pine Resources Canada Ltd.	Lone Pine BC Linear Facilities Operation (LFO)	12111130020	211113 (Conventional Oil and Gas Extraction)	LFO	292	51	2,257
Murphy Oil Company Ltd.	Murphy BC Linear Facilities Operation (LFO)	12111130034	211113 (Conventional Oil and Gas Extraction)	LFO	3,267	412	4,341
Nexen Inc.	Nexen BC Linear Facilities Operation (LFO)	12111130002	211113 (Conventional Oil and Gas Extraction)	LFO	6,192	796	867
Pengrowth Energy Corporation	Pengrowth BC Linear Facilities Operation (LFO)	12111130028	211113 (Conventional Oil and Gas Extraction)	LFO	2,523	257	7,462
Penn West Petroleum Ltd.	Penn BC Linear Facilities Operation (LFO)	12111130009	211113 (Conventional Oil and Gas Extraction)	LFO	8,892	262	29,904
Polar Star Canadian Oil and Gas Inc.	Polar Star BC Linear Facilities Operation (LFO)	12111130041	211113 (Conventional Oil and Gas Extraction)	LFO	727	78	1,535
Progress Energy Canada Ltd.	Progress BC Linear Facilities Operation (LFO)	12111130039	211113 (Conventional Oil and Gas Extraction)	LFO	27,404	23,906	48,368
Quicksilver Resources Canada Inc.	Quicksilver BC Linear Facilities Operation (LFO)	12111130037	211113 (Conventional Oil and Gas Extraction)	LFO	3,504	-	-
Ramshorn Canada	Ramshorn BC Linear Facilities Operation (LFO)	12111130038	211113 (Conventional Oil and Gas Extraction)	LFO	8	269	707
Shell Canada Limited	Shell BC Linear Facilities Operation (LFO)	12111130007	211113 (Conventional Oil and Gas Extraction)	LFO	20,999	1,457	26,657
Spectra Energy Midstream Corporation	Spectra BC Linear Facilities Operation (LFO)	12111130003	211113 (Conventional Oil and Gas Extraction)	LFO	23,605	2,392	4,143
Spectra Energy Transmission	Spectra BC Linear Facilities Operation (LFO)	12111130004	211113 (Conventional Oil and Gas Extraction)	LFO	15,374	25,525	76,776
Suncor Energy Inc.	Suncor BC Linear Facilities Operation (LFO)	12111130015	211113 (Conventional Oil and Gas Extraction)	LFO	281	330	662
Taqa North Ltd.	Taqa BC Linear Facilities Operation (LFO)	12111130014	211113 (Conventional Oil and Gas Extraction)	LFO	837	675	4,545
Terra Energy Corporation	Terra BC Linear Facilities Operation (LFO)	12111130025	211113 (Conventional Oil and Gas Extraction)	LFO	1,411	363	3,478
Tourmaline Oil Corp.	Tourmaline BC Linear Facilities Operation (LFO)	12111130033	211113 (Conventional Oil and Gas Extraction)	LFO	10,234	805	11,276
Veresen Energy Infrastructure Inc.	Veresen BC Linear Facilities Operation (LFO)	12111130042	211113 (Conventional Oil and Gas Extraction)	LFO	20	464	340
Whitecap Resources Inc.	Whitecap BC Linear Facilities Operation (LFO)	12111131004	211113 (Conventional Oil and Gas Extraction)	LFO	144	478	1,664
				TOTAL	218719	85384	1223015

	Industry	Progress
Just venting and fugitives	2,010,579	111,760
Methane to be reduced to 45%	904,761	50,292
2025 Target	1,105,818	61,468

Fugitive CH4	On-site transportation CH4	Waste CH4	Wastewater CH4	Total CO2 from included biomass	Total CH4	GRAND TOTAL in CO2e
558	-	-	-	-	3,579	52,127
5,314	-	-	-	-	14,281	72,442
390	-	-	-	-	5,870	40,655
14,939	-	-	-	-	69,704	243,665
-	-	0	-	-	2,746	68,483
278	-	-	-	-	4,115	41,095
5,735	-	-	-	-	10,560	40,302
9,178	-	-	-	-	19,297	66,482
147,575	-	-	-	-	406,214	1,161,830
5,809	-	-	-	-	11,014	61,709
1,563	-	-	-	-	6,983	12,334
20,271	-	-	-	-	45,733	90,014
89,560	-	-	-	-	226,519	415,634
6,169	-	-	-	-	14,340	49,802
594	-	-	-	-	956	11,675
14,625	-	-	-	-	26,129	110,335
35,578	-	-	-	-	319,488	753,881
129,166	-	-	-	-	368,065	558,929
4,545	-	-	-	-	8,031	42,334
1,922	-	-	-	-	14,547	31,789
8,469	-	-	-	-	14,898	29,996
23,525	-	-	-	-	43,185	120,319
-	-	-	-	-	553	21,280
1,872	-	-	-	-	5,095	48,782
2,218	-	0	-	-	5,850	11,406
5,432	-	-	-	-	8,033	16,544
1,277	-	-	-	-	9,296	157,324
388	-	-	-	-	8,242	136,472
6,661	-	-	-	-	16,904	51,107
12,645	-	-	-	-	51,702	197,155
5,943	-	-	-	-	8,282	17,949
63,392	-	-	-	-	163,070	882,638
15,698	-	-	-	-	19,202	64,380
9,280	-	-	-	-	10,264	29,363
25,974	-	-	-	-	75,087	350,943
160	-	-	-	-	30,299	249,150
81,542	-	-	-	-	199,218	4,135,555
2,400	-	-	-	-	3,674	24,543
4,608	-	0	-	5	10,665	55,273
6,429	-	39	-	-	11,719	32,378
15,265	-	-	-	-	37,580	185,433
91	-	-	-	-	915	92,472
526	-	-	-	-	2,813	13,805
787564		39			2314717	10849784

Total 2014 CH4 from upstream fugitive and venting sources

Emission Source	Category	% based on 2013 breakdown	Methane emissions (estimated)	Potential applicability	Potential reductions	Total emissions (CO2e)	Notes
Continuous High-Bleed Device Vents	Venting	11.9	239,137	60%	85%	117,779	Assume 60% applicability, 85% reduction in emissions
Pneumatic Pump Vents	Venting	16.6	333,768	50%	100%	166,884	Assume 50% applicability conversion to solar (or electric)
Continuous Low-Bleed and Intermittent Device Vents	Venting	3.5	71,102	0%	0%	71,102	Assume no actions to reduce low bleed and intermittmer
Dehydrator Vents	Venting	3.3	66,242	40%	100%	39,745	Assume vent capture and reuse at 40% of sites (or dehy c
Well Venting for Liquids Unloading	Venting	0.2	4,476	0%	0%	4,476	Assume no new requirements for liquids unloading
Well Venting, with or without Hydraulic Fracturing	Venting	0.2	3,325	0%	0%	3,325	Assume no new requirements misc. well venting
Blowdown Vent Stacks	Venting	6.5	130,438	40%	95%	80,872	Assume new requirements for planned blowdown activit
Well Testing Venting	Venting	0.0	0	-	-	-	
Associated Gas Venting	Venting	0.1	1,061	0%	0%	1,061	Assume no changes to associated gas venting
Centrifugal Compressor Vents	Venting	4.0	80,053	50%	87%	45,061	Assume dry seal use or vent capture
Reciprocating Compressor Vents	Venting	6.3	126,474	50%	0.34	105,161	Assume more frequent replacement of rods
EOR Injection Pump Blowdowns	Venting	0.0	0	-	-	-	
Other Venting Sources	Venting	4.8	96,550	40%	100%	57,930	Assume vent capture and reuse at 40% of sites
Storage Tanks	Fugitive	3.1	61,511	100%	50%	30,755	Assume semiannual LDAR surveys
Gathering Pipeline Equipment Leaks	Fugitive	6.9	139,390	100%	50%	69,695	Assume semiannual LDAR surveys
Equipment Leaks from Valves, Connectors, etc.	Fugitive	28.0	563,953	100%	50%	281,976	Assume semiannual LDAR surveys
Above-Ground Meters/Regulators at Gate Stations	Fugitive	0.4	8,056	100%	50%	4,028	Assume semiannual LDAR surveys
Below-Ground Meters/Regulators/Valves	Fugitive	3.8	75,577	100%	50%	37,789	Assume semiannual LDAR surveys
Third-Party Line Hits	Fugitive	0.0	1	100%	50%	1	Assume semiannual LDAR surveys
Other Fugitive Sources	Fugitive	0.5	9,463	100%	50%	4,732	Assume semiannual LDAR surveys
TOTAL		100.0	2,010,577				

Tonnes CO2e

2,010,577

Fugitive emissions

787,564

Vented emissions

1,223,013

Venting	1,152,625	57%
Fugitives	857,952	43%
Total	2,010,577	100%

Target (after 45%) 1,105,817

	693,395	62%
	428,976	38%
	1,122,371	100%

Difference - 16,554

Actual reduction 44%

, 100% reduction
ıt devices
ɔptimization]

ies (mobile compressor unit or some other type of capture]

2014 British Columbia Reporting Regulation Emissions Report Summary Table: Linear Facilities Operation Su

Company	Facility	BCFacilityID	Primary NAICS Code	Stationary Fuel Combustion CO2 (fossil fuel)
Aitken Creek Gas Storage ULC	Aitken BC Linear Facilities Operation (LFO)	12111130001	211113 (Conventional Oil and Gas Extraction)	41,861
AltaGas Ltd.	AltaGas BC Linear Facilities Operation (LFO)	12111130036	211113 (Conventional Oil and Gas Extraction)	48,842
Apache Canada Ltd.	Apache BC Linear Facilities Operation (LFO)	12111130008	211113 (Conventional Oil and Gas Extraction)	32,489
ARC Resources	ARC BC Linear Facilities Operation (LFO)	12111130017	211113 (Conventional Oil and Gas Extraction)	154,649
Artek Exploration Ltd.	Artek BC Linear Facilities Operation (LFO)	12111130040	211113 (Conventional Oil and Gas Extraction)	50,548
Aux Sable Canada L.P.	Aux Sable BC Linear Facilities Operation (LFO)	12111130021	211113 (Conventional Oil and Gas Extraction)	35,183
Black Swan Energy	Black Swan BC Linear Facilities Operation (LFO)	12111131001	211113 (Conventional Oil and Gas Extraction)	16,606
Bonavista Energy Corporation	Bonavista BC Linear Facilities Operation (LFO)	12111130012	211113 (Conventional Oil and Gas Extraction)	41,080
Canadian Natural Resources Limited	CNRL BC Linear Facilities Operation (LFO)	12111130029	211113 (Conventional Oil and Gas Extraction)	688,849
Canbriam Energy Inc.	Canbriam BC Linear Facilities Operation (LFO)	12111131002	211113 (Conventional Oil and Gas Extraction)	46,232
Cequence Energy Ltd.	Cequence BC Linear Facilities Operation (LFO)	12111130170	211113 (Conventional Oil and Gas Extraction)	5,181
Chinook Energy Inc.	Chinook BC Linear Facilities Operation (LFO)	12111130024	211113 (Conventional Oil and Gas Extraction)	37,071
ConocoPhillips Canada Resources Corp.	ConocoPhillips BC Linear Facilities Operation (LFO)	12111130018	211113 (Conventional Oil and Gas Extraction)	181,137
Crew Energy Inc.	Crew BC Linear Facilities Operation (LFO)	12111130016	211113 (Conventional Oil and Gas Extraction)	24,716
Devon Canada Corporation	Devon BC Linear Facilities Operation (LFO)	12111130006	211113 (Conventional Oil and Gas Extraction)	10,181
Direct Energy Marketing Ltd.	Direct Energy BC Linear Facilities Operation (LFO)	12111130183	211113 (Conventional Oil and Gas Extraction)	78,994
Encana Corporation	Encana BC Linear Facilities Operation (LFO)	12111130010	211113 (Conventional Oil and Gas Extraction)	404,641
Endurance Energy Ltd.	Endurance BC Linear Facilities Operation (LFO)	12111130802	211113 (Conventional Oil and Gas Extraction)	155,647
Enerplus Corporation	Enerplus BC Linear Facilities Operation (LFO)	12111130022	211113 (Conventional Oil and Gas Extraction)	31,562
EOG Resources Canada Inc.	EOG BC Linear Facilities Operation (LFO)	12111130031	211113 (Conventional Oil and Gas Extraction)	16,702
Harvest Operations Corp.	HARVEST BC Linear Facilities Operation (LFO)	12111130027	211113 (Conventional Oil and Gas Extraction)	7,585
Husky Oil Operations Limited	Husky BC Linear Facilities Operation (LFO)	12111130013	211113 (Conventional Oil and Gas Extraction)	71,219
Imperial Oil Resources Ltd.	Imperial BC Linear Facilities Operation (LFO)	12111130005	211113 (Conventional Oil and Gas Extraction)	19,887
Keyera Corporation	Keyera BC Linear Facilities Operation (LFO)	12111130035	211113 (Conventional Oil and Gas Extraction)	37,202
Lightstream Resources Ltd.	Lightstream BC Linear Facilities Operation (LFO)	12111131003	211113 (Conventional Oil and Gas Extraction)	5,108
Lone Pine Resources Canada Ltd.	Lone Pine BC Linear Facilities Operation (LFO)	12111130020	211113 (Conventional Oil and Gas Extraction)	7,965
Murphy Oil Company Ltd.	Murphy BC Linear Facilities Operation (LFO)	12111130034	211113 (Conventional Oil and Gas Extraction)	142,172
Nexen Inc.	Nexen BC Linear Facilities Operation (LFO)	12111130002	211113 (Conventional Oil and Gas Extraction)	120,832
Pengrowth Energy Corporation	Pengrowth BC Linear Facilities Operation (LFO)	12111130028	211113 (Conventional Oil and Gas Extraction)	31,902
Penn West Petroleum Ltd.	Penn BC Linear Facilities Operation (LFO)	12111130009	211113 (Conventional Oil and Gas Extraction)	107,893
Polar Star Canadian Oil and Gas Inc.	Polar Star BC Linear Facilities Operation (LFO)	12111130041	211113 (Conventional Oil and Gas Extraction)	8,938
Progress Energy Canada Ltd.	Progress BC Linear Facilities Operation (LFO)	12111130039	211113 (Conventional Oil and Gas Extraction)	544,213
Quicksilver Resources Canada Inc.	Quicksilver BC Linear Facilities Operation (LFO)	12111130037	211113 (Conventional Oil and Gas Extraction)	44,516
Ramshorn Canada	Ramshorn BC Linear Facilities Operation (LFO)	12111130038	211113 (Conventional Oil and Gas Extraction)	17,153
Shell Canada Limited	Shell BC Linear Facilities Operation (LFO)	12111130007	211113 (Conventional Oil and Gas Extraction)	262,213
Spectra Energy Midstream Corporation	Spectra BC Linear Facilities Operation (LFO)	12111130003	211113 (Conventional Oil and Gas Extraction)	192,224
Spectra Energy Transmission	Spectra BC Linear Facilities Operation (LFO)	12111130004	211113 (Conventional Oil and Gas Extraction)	1,838,351
Suncor Energy Inc.	Suncor BC Linear Facilities Operation (LFO)	12111130015	211113 (Conventional Oil and Gas Extraction)	18,417
Taqa North Ltd.	Taqa BC Linear Facilities Operation (LFO)	12111130014	211113 (Conventional Oil and Gas Extraction)	35,665
Terra Energy Corporation	Terra BC Linear Facilities Operation (LFO)	12111130025	211113 (Conventional Oil and Gas Extraction)	17,434
Tourmaline Oil Corp.	Tourmaline BC Linear Facilities Operation (LFO)	12111130033	211113 (Conventional Oil and Gas Extraction)	138,272
Veresen Energy Infrastructure Inc.	Veresen BC Linear Facilities Operation (LFO)	12111130042	211113 (Conventional Oil and Gas Extraction)	41,167
Whitecap Resources Inc.	Whitecap BC Linear Facilities Operation (LFO)	12111131004	211113 (Conventional Oil and Gas Extraction)	6,065
Total				6,082,367

Stationary Fuel Combustion CO2 (included biomass)	Stationary Fuel Combustion CH4	Flaring CH4	Venting CH4	Fugitive CH4	Total CH4
-	20	1,017	1,985	558	3,579
-	23	1,529	7,416	5,314	14,281
-	334	160	4,986	390	5,870
-	10,742	2,092	41,931	14,939	69,704
-	2,746	-	-	-	2,746
-	2,895	183	758	278	4,115
-	813	1,609	2,403	5,735	10,560
-	941	738	8,440	9,178	19,297
-	329	8,209	250,101	147,575	406,214
-	3,016	439	1,750	5,809	11,014
-	419	14	4,988	1,563	6,983
-	2,897	637	21,928	20,271	45,733
-	14,662	759	121,539	89,560	226,519
-	1,406	1,239	5,527	6,169	14,340
-	225	75	61	594	956
-	1,735	604	9,166	14,625	26,129
-	31,396	3,196	249,317	35,578	319,488
-	12,605	1,208	225,086	129,166	368,065
-	2,434	303	748	4,545	8,031
-	1,240	58	11,327	1,922	14,547
-	126	913	5,390	8,469	14,898
-	1,425	789	17,446	23,525	43,185
-	439	114	-	-	553
-	18	932	2,274	1,872	5,095
-	119	47	3,466	2,218	5,850
-	292	51	2,257	5,432	8,033
-	3,267	412	4,341	1,277	9,296
-	6,192	796	867	388	8,242
-	2,523	257	7,462	6,661	16,904
-	8,892	262	29,904	12,645	51,702
-	727	78	1,535	5,943	8,282
-	27,404	23,906	48,368	63,392	163,070
-	3,504	-	-	15,698	19,202
-	8	269	707	9,280	10,264
-	20,999	1,457	26,657	25,974	75,087
-	23,605	2,392	4,143	160	30,299
-	15,374	25,525	76,776	81,542	199,218
-	281	330	662	2,400	3,674
-	837	675	4,545	4,608	10,665
-	1,411	363	3,478	6,429	11,719
-	10,234	805	11,276	15,265	37,580
-	20	464	340	91	915
-	144	478	1,664	526	2,813
-	**218,718**	**85,384**	**1,223,013**	**787,564**	**2,314,718**

Total CH4	2,314,718
Fugitive and venting CH4	2,010,577
45% emissions reductions	904,760
Emissions after reduction	1,105,817

2013 GHG breakdown for BC oil and gas sector

Emission Source	Category	Total (tCO2e)	Percentage	Total (CH4 basis)	Percentage
Stationary Combustion: Natural Gas	Stationary Combustion	5,389,000	53		
Stationary Combustion: Other Fuels	Stationary Combustion	296,000	2.9		
Electricity Generation	Electricity generation	271,000	2.7		
Well Testing Flares	Flaring	141,000	1.4		
Associated Gas Flares	Flaring	17,300	0.2		
Flare Stacks	Flaring	391,000	3.8		
Continuous High-Bleed Device Vents	Venting	187,000	1.8	187,000	11.9
Pneumatic Pump Vents	Venting	261,000	2.6	261,000	16.6
Continuous Low-Bleed and Intermittent Device Vents	Venting	55,600	0.6	55,600	3.5
Acid Gas Removal	Venting	2,088,000	20.5		
Dehydrator Vents	Venting	51,800	0.5	51,800	3.3
Well Venting for Liquids Unloading	Venting	3,500	0	3,500	0.2
Well Venting, with or without Hydraulic Fracturing	Venting	2,600	0	2,600	0.2
Blowdown Vent Stacks	Venting	102,000	1	102,000	6.5
Well Testing Venting	Venting	-	-	-	
Associated Gas Venting	Venting	830	0	830	0.1
Centrifugal Compressor Vents	Venting	62,600	0.6	62,600	4.0
Reciprocating Compressor Vents	Venting	98,900	1	98,900	6.3
EOR Injection Pump Blowdowns	Venting	-	-	-	
Other Venting Sources	Venting	75,500	0.7	75,500	4.8
Storage Tanks	Fugitive	48,100	0.5	48,100	3.1
Gathering Pipeline Equipment Leaks	Fugitive	109,000	1.1	109,000	6.9
Equipment Leaks from Valves, Connectors, etc.	Fugitive	441,000	4.3	441,000	28.0
Above-Ground Meters/Regulators at Gate Stations	Fugitive	6,300	0.1	6,300	0.4
Below-Ground Meters/Regulators/Valves	Fugitive	59,100	0.6	59,100	3.8
Third-Party Line Hits	Fugitive	1	0	1	0.0
Other Fugitive Sources	Fugitive	7,400	0.1	7400	0.5
Wastewater Processing	Wastewater	140	0		
TOTAL		10,165,200	100	1,572,231	100.0

Venting emissions

	CH4	Total
	891,568	891,568

Fugitive emissions

	CH4	Total
	609,099	609,099

1,500,667

Potential applicability of emissions reduction strategies		Estimated applicability		
Emission type	**Mitigation**	**US EPA**	**Proposed federal requirements**	**EDF/ICF study**
General fugitives	LDAR programs	Assumes 100% applicability All new facilities would require LDAR programs, except: - low production wells (with less than 15 boe/day of production) - well sites that contain only wellheads (known as 'Christmas trees')	Assumes 100% applicability All new facilities would require LDAR programs, except: - single well heads	Assumes 100% applicability
High bleed pneumatics	High to low bleed conversions	Not estimated. EPA rules are for new builds.	Assumes near 100% applicability - "Must use non-emitting equipment at facilities with gas compressors. At other facilities, must use low-bleed pneumatic controllers".	Assumes different applicability for different areas: - 60% of the inventory of high bleed controllers in transmission, storage, and LNG, - 80% in processing - 90% in other segments The study also assumes that 30% of gathering, 50% of processing, and 30% of transmission high bleed devices can be converted to instrument air
Pumps	Convert to solar or electric (or capture and destroy)	Assumes 80% applicability for chemical injection pumps.	Assumes 100% applicability - "Emissions from pneumatic pumps must be conserved or destroyed".	Assumes 60% applicability for chemical injection pumps. Not given for kimray pumps
General venting	vent capture and re-use/destruction		Assumes most facilities will be covered - "facility-wide venting limit to restrict venting of natural gas from facilities producing oil and gas – uncontrolled emissions reduced by 95% with conservation or destruction. Exemptions for facilites whose vented emissions remain below 3,350 m3 per month for 12 consecutive months"	
Compressor stations	rod packing replacement	Assumes 100% applicability.	Assumes 100% applicability. Includes annual measurement of all compressor vents with portable flowmeters: - for reciprocating compressor rod packing vents, an emission rate exceeding 0.017 m3/min requires action, within 30 days	Assumes different applicability for different areas: - 25% for processing - 70% for transmission, storage and LNG.
Compressor stations	wet to dry seal replacement	Assumes 100% applicability.	Assumes 100% applicability. Includes annual measurement of all compressor vents with portable flowmeters: - for centrifugal compressor vents, an emission rate exceeding 0.42 m3/min requires action, within 90 days	Assumes different applicability for different areas: - between 75% and 90%

LDAR

Source 1:
US EPA, Regulatory Impact Analysis for Oil and Natural Gas Proposed NSPS
https://www3.epa.gov/airquality/oilandgas/pdfs/og_prop_ria_081815.pdf

Activity	Potential reductions
Annual surveys	40%
Semiannual surveys	60%
Quarterly surveys	80%

Source 2:
REGULATORY ANALYSIS for Proposed Revisions to Colorado Air Quality Control Commission Regulation Numbers 3, 6 and 7
https://www3.epa.gov/airquality/oilandgas/2014papers/Attachment_GG_EDF.pdf

Activity	Potential reductions
Annual surveys	40%
Quarterly surveys	60%
Monthly	80%

Source 3: (based on previous EPA)
Pembina Institute/EDF/ICF International, Economic Analysis of Methane Emission Reduction Opportunities in the Canadian Oil and Natural Gas Industries
https://www.pembina.org/reports/edf-icf-methane-opportunities.pdf

Activity	Potential reductions
Quarterly surveys	60%

Source 4:
Carbon Limits, Quantifying Cost-effectiveness of Systematic Leak Detection and Repair Program Using Infrared Cameras
http://www.catf.us/resources/publications/view/198

Assumes baseline of annual surveys (from Canadian data)

Activity	Potential reductions
Semiannual	50%
Quarterly surveys	68%

Compressor Stations

Source 1:
US EPA, Control Techniques Guidelines for the Oiland Natural Gas Industry(Draft)
https://www3.epa.gov/airquality/oilandgas/pdfs/og_ctg_draft_081815.pdf
Section 5.3
Reciprocating compressors
- replacing rod packing on a three year schedule (or 26,000 hours)
Gathering and boosting stations

Variable	Value	Unit
Emissions_old	25.9	scf/h-cylinder (CH4)
Emissions_new	11.5	scf/h-cylinder (CH4)

Percent reduction: 0.18

Gathering and boosting
Emission rate: 11.5 (Start) / 25.9 (End)
Operating year: 1
5yr schedule: 11.5
1
3yr schedule: 11.5

Processing stations

Variable	Value	Unit
Emissions_old	57	scf/h-cylinder (CH4)
Emissions_new	11.5	scf/h-cylinder (CH4)

Percent reduction: 0.34

Processing
Emission rate: 11.5 (Start) / 57 (End)
Year: 1
5yr schedule: 11.5
1
3yr schedule: 11.5

- Gas recovery

Activity	**Percent reduction**
Route to VRU	95-100%
Route to flare	95%

Section 5.4
Centrifugal compressors

Variable	Value	Unit
Emissions_old	47.7	scf/min (CH4)
Emissions_new	6	scf/min (CH4)

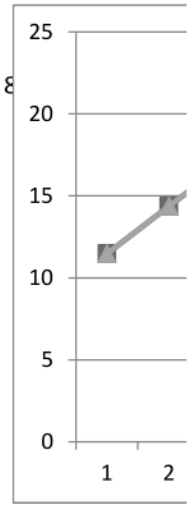
Percent reduction: 87%

- Gas recovery

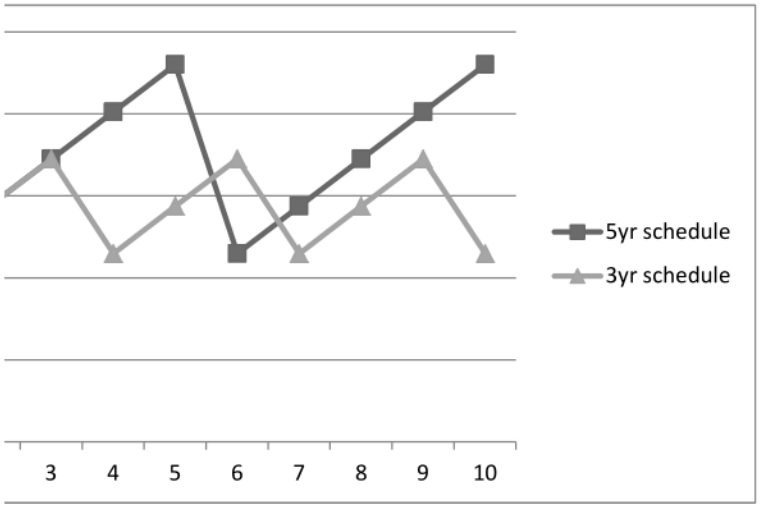
Activity	**Percent reduction**
Route to VRU	95-100%
Route to flare	95%

Source 2:
Carbon Limits, Quantifying Cost-effectiveness of Systematic Leak Detection and Repair Programs Using InfraredCameras
http://www.carbonlimits.no/wp-content/uploads/2015/06/Carbon_Limits_LDAR.pdf

operating hours



2	3	4	5	1	2	3	4	5	151,197.60	0.18
14.38	17.26	20.14	23.02	11.5	14.38	17.26	20.14	23.02	123,445.92	
2	3	1	2	3	1	2	3	1		
14.38	17.26	11.5	14.38	17.26	11.5	14.38	17.26	11.5		
2	3	4	5	1	2	3	4	5	260,172.00	0.34
20.6	29.7	38.8	47.9	11.5	20.6	29.7	38.8	47.9	172,484.40	
2	3	1	2	3	1	2	3	1		
20.6	29.7	11.5	20.6	29.7	11.5	20.6	29.7	11.5		


5yr schedule
3yr schedule
3
4
5
6
7
8
9
10

Pumps

Source 1:
US EPA, Control Techniques Guidelines for the Oiland Natural Gas Industry(Draft)
https://www3.epa.gov/airquality/oilandgas/pdfs/og_ctg_draft_081815.pdf
Section 7.3

Pump replacement

Activity	Percent reduction
to solar	100%
to electric	100%
to instrument air	100%

- Gas recovery

Activity	Percent reduction
Route to VRU	95-100%
Route to flare	95%

Pneumatic devices

Source: The Prasino Group, Final ReportFor Determining Bleed Ratesfor Pneumatic Devices in British Columbia
http://www2.gov.bc.ca/assets/gov/environment/climate-change/stakeholder-support/reporting-regulation/pneumatic-devices/prasino_pneumatic_ghg_e

Common replacement for pressure controllers

Variable	Value	Unit
Emissions_Fisher 4150	0.4209	m3/hr (CH4)
Emissions_C1	0.0649	m3/hr (CH4)

Percent reduction
85%

Level controllers

Activity
no control

Transducer

Activity
Fisher i2p

:f_final_report.pdf

Reduced emissions completions

Source 1:
US EPA, Reduced Emissions Completions forHydraulically Fractured Natural Gas Wells
https://www3.epa.gov/gasstar/documents/reduced_emissions_completions.pdf

Activity	Percent reduction
Use REC	95-100%

Source 1: (based on previous EPA)
Pembina Institute/EDF/ICF International, Economic Analysis of Methane Emission Reduction Opportunities in the Canadian Oil and Natural Gas Ind
https://www.pembina.org/reports/edf-icf-methane-opportunities.pdf

Activity	Potential reductions
Blowdown capture	95%

ustries

From:	Jones, Troy
To:	D"Souza, Don MNGD:EX; "Marie Johnson"; Lesiuk, Tim ENV:EX; Wakelin, Tony; Peyman, Hurrian ENV:EX
Cc:	XT:Sian, Sherry FLNR:IN
Subject:	RE: Methane baseline for BC
Date:	Wednesday, May 18, 2016 3:06:21 PM
Attachments:	image002.jpg image003.png image004.png image005.png image006.jpg image007.png image008.jpg

Hi Don,

Thank you for your document and I apologize for the delay in responding. I have included a few comments and questions below.

Comments / questions:

- I believe that this work assumes that the entire linear facility of all producers will be included. Enviro Can has indicated that there will be thresholds for inclusion. Can you please confirm whether or not BC intends to include production thresholds in the regulations. If BC intends to define its own thresholds or adopt those proposed by Enviro Can than the impacts referenced in your spreadsheet will be reduced. Would it be possible for CAS to send us a document which describes the production in terms of gas and oil (+ associated gas) for every "facility" in BC in order to assess the impact of thresholds (federal or provincial).
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- Reduced emission completions tab. I cannot locate reference to the 95-100% reduction in the reference. Would you mind providing a page number?

Thank you Don, very valuable work.

Troy Jones PhD BScPT, Performance Management Consultant, Western Canada Operations

cid:image003.jpg@01D0001A.505A76C0

D: 403.776.1414 | Email: Troy.Jones@capp.ca | Website: www.capp.ca

From: D'Souza, Don MNGD:EX [mailto:Don.DSouza@gov.bc.ca]
Sent: Monday, May 09, 2016 6:13 PM
To: 'Marie Johnson'; Lesiuk, Tim ENV:EX; Wakelin, Tony; Jones, Troy; Peyman, Hurrian ENV:EX
Subject: Methane baseline for BC [WARNING: SPF validation unavailable]

Hi all,

Attached is a spreadsheet with a high-level assessment of methane emissions by source category as well as potential reduction activities and their applicability for BC.

The overview of reported 2014 methane emissions is the same as has been shared previously by Mikeala and Marie (using the reporting reg data for the 211113 NAICS code and limited to venting

and fugitive CH4 emissions). I've distributed the emissions into source categories based on a 2013 breakdown of emissions developed by CAS (previously publicly available but no longer online).
I've also looked at various sources to determine control and/or reduction efficiencies for different proposed activities (eg. pump to solar, or high bleed to low bleed) and assumed certain applicability factors to estimate what reductions might look like for BC.
The 'applicability' values are most uncertain as the US ones (when available) may not be entirely appropriate and I've had to make some conservative assumptions in some cases. The 'applicability' tab has some notes from different sources, but any thoughts on how these could be improved would be appreciated. If we have access to disaggregated equipment counts for the various source categories, these numbers could be refined further.
Please let me know if there are any questions or comments.
Cheers,
-Don

From: Marie Johnson [mailto:mjohnson@progressenergy.com]
Sent: Friday, May 6, 2016 6:50 AM
To: Lesiuk, Tim ENV:EX
Cc: Peyman, Hurrian ENV:EX; Jones, Troy (troy.jones@capp.ca); Wakelin, Tony; D'Souza, Don MNGD:EX; Jones, Troy (troy.jones@capp.ca)
Subject: Federal GHG Report Action Item
Hi Tim,
Thank you for taking the time to meet with us yesterday and review and recap the progress to date on the methane file.
I took a look at the figures that were sketched out at our earlier meetings and you are right about the slope of the line being the same. I apologize for the confusion.
There were some action items that came out of the meeting. One of them was for me to take a look at the 2015 federal report that was submitted for our b-88-I facility to see if the methodologies are provided within it. They are but not in great detail. I was also asked for an electronic copy of the spreadsheet that I had yesterday. It is attached. The target values within it were generated to see what an industry target of a 45% reduction might look like, and also if Progress was to set its own target to match industry, what that might look like. The source data is taken from the CAS website.
If there is anything else you need from me please let me know.
http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=47B640C5-1&offset=6&toc=show

4.4 Estimation Methods

The reporting facility must identify and report the type of estimation method or methods used to determine the quantities of emissions reported. Such methods include monitoring or direct measurement, mass balance, emission factors and engineering estimates. These are defined below.

Monitoring or Direct Measurement:

This type of method may involve continuous emission monitoring systems (i.e., emissions recorded over an extended and uninterrupted period), predictive emission monitoring (correlations developed between measured emission rates and process parameters) or source testing (e.g., stack sampling).

Mass Balance:

This type of method involves the application of the law of conservation of mass to a facility, process or piece of equipment. Emissions are determined from the difference in the input and output of a unit operation where the accumulation and depletion of a substance are included in the calculations.

Emission Factors:

This method uses emission factors (EF) to estimate the rate at which a pollutant is released into the atmosphere (or captured) as a result of some process activity or unit throughput. The EFs used may be average or general EFs, or technology-specific EFs.

Engineering Estimates:

This type of method may involve estimating emissions based on engineering principles and judgment, using knowledge of the chemical and physical processes involved, the design features of the source, and an understanding of the applicable physical and chemical laws.

Reporters are reminded of the legal requirement to keep copies of the information submitted, together with any calculations, measurements and other data on which the information is based, for a minimum period of three years from the date the information must be submitted.

Currently, there are no specific protocols to define how reporters must calculate their GHG emissions. However, reporters must use methods that are consistent with the methodologies approved by the UNFCCC and developed by the IPCC. Refer to sections 3.1–3.3 for background information and a more complete description of the flexibility allotted to reporters in their estimation procedures. Facilities can also refer to Annexes 3 and 6 of Part 2 of the National Inventory Report to obtain detailed explanations of estimation methodologies and emission factors used by Environment Canada in the development of the estimates.

For further details on the IPCC methodologies, reporters should refer to Table 3, which presents specific references to the relevant sections of the 2006 IPCC Guidelines for the emission sources subject to reporting.

Regards,
Marie Johnson
Regulatory Advisor
T: 403 539-1759



1200, 205 Fifth Ave. SW
Calgary, AB Canada T2P 2V7
ProgressEnergy.com

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cette communication par erreur, veuillez immediatement communiquer avec son expediteur et detruire toutes les copies.

Duncan, Laurie ENV:EX

From: Jones, Troy <troy.jones@capp.ca>
Sent: Wednesday, May 18, 2016 3:06 PM
To: D'Souza, Don MNGD:EX; 'Marie Johnson'; Lesiuk, Tim ENV:EX; Wakelin, Tony; Peyman, Hurrian ENV:EX
Cc: XT:Sian, Sherry FLNR:IN
Subject: RE: Methane baseline for BC

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CAPP CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS
Canada's Oil and Natural Gas Producers
D: 403.776.1414 | Email: Troy.Jones@capp.ca | Website: www.capp.ca

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Sent: Monday, May 09, 2016 6:13 PM
To: 'Marie Johnson'; Lesiuk, Tim ENV:EX; Wakelin, Tony; Jones, Troy; Peyman, Hurrian ENV:EX
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Sent: Friday, May 6, 2016 6:50 AM
To: Lesiuk, Tim ENV:EX
Cc: Peyman, Hurrian ENV:EX; Jones, Troy (troy.jones@capp.ca); Wakelin, Tony; D'Souza, Don MNGD:EX; Jones, Troy (troy.jones@capp.ca)
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http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=47B640C5-1&offset=6&toc=show

4.4 Estimation Methods

The reporting facility must identify and report the type of estimation method or methods used to determine the quantities of emissions reported. Such methods include monitoring or direct measurement, mass balance, emission factors and engineering estimates. These are defined below.

Monitoring or Direct Measurement:

This type of method may involve continuous emission monitoring systems (i.e., emissions recorded over an extended and uninterrupted period), predictive emission monitoring (correlations developed between measured emission rates and process parameters) or source testing (e.g., stack sampling).

Mass Balance:

This type of method involves the application of the law of conservation of mass to a facility, process or piece of equipment. Emissions are determined from the difference in the input and output of a unit operation where the accumulation and depletion of a substance are included in the calculations.

Emission Factors:

This method uses emission factors (EF) to estimate the rate at which a pollutant is released into the atmosphere (or captured) as a result of some process activity or unit throughput. The EFs used may be average or general EFs, or technology-specific EFs.

Engineering Estimates:

This type of method may involve estimating emissions based on engineering principles and judgment, using knowledge of the chemical and physical processes involved, the design features of the source, and an understanding of the applicable physical and chemical laws.

Reporters are reminded of the legal requirement to keep copies of the information submitted, together with any calculations, measurements and other data on which the information is based, for a minimum period of three years from the date the information must be submitted.

Currently, there are no specific protocols to define how reporters must calculate their GHG emissions. However, reporters must use methods that are consistent with the methodologies approved by the UNFCCC and developed by the IPCC. Refer to sections 3.1–3.3 for background information and a more complete description of the flexibility allotted to reporters in their estimation procedures. Facilities can also refer to Annexes 3 and 6 of Part 2 of the National Inventory Report to obtain detailed explanations of estimation methodologies and emission factors used by Environment Canada in the development of the estimates.

For further details on the IPCC methodologies, reporters should refer to Table 3, which presents specific references to the relevant sections of the 2006 IPCC Guidelines for the emission sources subject to reporting.

Regards,

Marie Johnson
Regulatory Advisor
T: 403 539-1759

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Duncan, Laurie ENV:EX

From: McQuade, Mikaela <mikaela.mcquade@capp.ca>
Sent: Thursday, April 21, 2016 11:35 AM
To: Jones, Troy; Peyman, Hurrian ENV:EX
Cc: Lesiuk, Tim ENV:EX; XT:Sian, Sherry FLNR:IN
Subject: Data Discussion Follow-Up

Good afternoon:

In light of my impending departure, I wanted to connect you all directly with our in-house data analytics expert, Troy Jones (copied here). As discussed, we're hoping to get access to fugitive and vented methane emission data for the industry at a bit more granular of a level than is publicly available.

Hurrian, Troy – I will let you two take it from here!

Thanks,

Mikaela

Mikaela McQuade
Policy Advisor, Environment
CAPP
(403) 776-1406 | mikaela.mcquade@capp.ca

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Duncan, Laurie ENV:EX

From: Marie Johnson <mjohnson@progressenergy.com>
Sent: Friday, May 6, 2016 6:50 AM
To: Lesiuk, Tim ENV:EX
Cc: Peyman, Hurrian ENV:EX; Jones, Troy (troy.jones@capp.ca); Wakelin, Tony; D'Souza, Don MNGD:EX; Jones, Troy (troy.jones@capp.ca)
Subject: Federal GHG Report Action Item

Hi Tim,

Thank you for taking the time to meet with us yesterday and review and recap the progress to date on the methane file.

I took a look at the figures that were sketched out at our earlier meetings and you are right about the slope of the line being the same. I apologize for the confusion.

There were some action items that came out of the meeting. One of them was for me to take a look at the 2015 federal report that was submitted for our b-88-I facility to see if the methodologies are provided within it. They are but not in great detail. I was also asked for an electronic copy of the spreadsheet that I had yesterday. It is attached. The target values within it were generated to see what an industry target of a 45% reduction might look like, and also if Progress was to set its own target to match industry, what that might look like. The source data is taken from the CAS website.

If there is anything else you need from me please let me know.

http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=47B640C5-1&offset=6&toc=show

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Regards,

Marie Johnson
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From:	Tate, Shirley
To:	Climate Leadership Plan ENV:EX
Cc:	Minister, JTST JTST:EX; Minister, MNGD MNGD:EX; Minister, FIN FIN:EX; Minister, CSCD CSCD:EX; Transportation, Minister TRAN:EX
Subject:	For Review: CAPP Feedback on BC's Climate Leadership Plan Consultation Guide
Date:	Friday, April 8, 2016 2:20:09 PM
Attachments:	Microsoft Word - CAPP_EDMS-#279029-v18-DRAFT_submission_to_BC_regarding_Climate_Leadership_Plan_-_March_2016.DOC.pdf

To: Honourable Mary Polak
Climate Leadership Consultation
Ministry of Environment Climate Action Secretariat

Cc: Hon. Rich Coleman, Minister of Natural Gas Development
Hon. Michael de Jong, Minister of Finance
Hon. Shirley Bond, Minister of Jobs, Tourism and Skills Training and Responsible for Labour
Hon. Todd Stone, Minister of Transportation and Infrastructure
Hon. Peter Fassbender, Minister of Community, Sport and Cultural Development and Responsible for TransLink

Please find attached the Canadian Association of Petroleum Producers (CAPP) feedback on BC's Climate Leadership Plan Consultation Guide.

Sincerely,
Shirley Tate on behalf of

Brad Herald | VP, Western Canada

CAPP CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS
Canada's Oil and Natural Gas Producers

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CANADIAN ASSOCIATION
OF PETROLEUM PRODUCERS

Canada's Oil and Natural Gas Producers

April 8, 2016

Honourable Mary Polak
Climate Leadership Consultation
Ministry of Environment Climate Action Secretariat
PO BOX 9486, STN PROV GOVT
Victoria B.C. V8W 9W6

via e-mail: climateleadershipplan@gov.bc.ca

Dear Minister Polak:

Re.: Feedback on BC's Climate Leadership Plan Consultation Guide

The Canadian Association of Petroleum Producers (CAPP) submits the following comments in response to the *Consultation Guide: Building B.C.'s Climate Leadership Plan*. CAPP appreciates the opportunity to provide our industry's perspective on addressing climate change in British Columbia as the province finalizes the development of the new Climate Leadership Plan.

It is clear that both generally and in the context of natural gas producing and LNG exporting jurisdictions that BC is a leader on carbon policy and addressing greenhouse gas (GHG) emissions. BC has a unique opportunity to help tackle global climate change by making LNG available to countries looking to move off of coal-fired power generation. We are firmly of the view that the economic benefits from responsible natural-gas production and export can be achieved while also meeting BC's ambitions to tackle global climate change.

CAPP supports a climate policy framework in British Columbia that creates a vibrant and competitive oil and gas sector while efficiently and effectively managing greenhouse gas emissions. To this end, CAPP provides the following key recommendations, aligned with the relevant sections of the Consultation Guide. These views remain consistent with CAPP's submission made to Government September 2015, in response to the Climate Leadership Plan Discussion Paper, which outlined the importance of competitiveness and supporting further emissions reductions opportunities for oil and gas, such as electrification and methane emissions reductions. [1]

What We Value: Protecting BC's Competitiveness & Minimizing Carbon Leakage

From a competitiveness standpoint, BC's upstream natural gas industry faces significant challenges due to a continued low commodity price environment coupled with the unique challenges associated

[1] https://engage.gov.bc.ca/climateleadership/files/2015/12/179_-Canadian-Association-of-Petroleum-Producers.pdf

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with BC's resource plays. We recommend that the BC government consider how any climate policy initiatives undertaken by the province can not only preserve, but enhance the economic competitiveness of BC's upstream oil and gas sector to attract investment and create jobs. Carbon policy design requires full cost accounting of options when evaluating the cumulative burden across policies and regulations in order to prevent further deterioration of industry competitiveness and to minimize the risk of carbon leakage to competing jurisdictions. We offer the following carbon policy recommendation for how to minimize both carbon and investment leakage from BC.

Carbon Tax

The CLT recommended increases to the current $30/tonne carbon price commencing in 2018. Applying additional increases to our sector would further diminish competitiveness of the natural gas industry and increase the risk of carbon leakage to competing jurisdictions. Economic competitiveness is of paramount importance to ensure the industry is able to thrive, attract new investment, create jobs and generate revenues for government.

Emission-Intensive, Trade-Exposed (EITE)

CAPP strongly supports the efforts of the Government of BC to protect EITE industries. On November 27, 2015, Minister Polak stated that the province would only consider changes to its carbon tax under a regime where EITE industries are "fully protected from any carbon tax increase."

CAPP fully supports the government's position to protect EITE industries, and believes the upstream industry clearly qualifies as an EITE industry.

Given BC's strong leadership on carbon pricing, applying further increases in BC's carbon price to our sector without full protection would further impair the competitiveness of the province's oil and gas sector, especially in the current low price environment when operating margins are already suppressed. An EITE policy applied to carbon price increases would recognize the importance of managing inter-jurisdictional competitiveness, until the carbon policies in key trading jurisdictions are equivalent and/or aligned in level of effort and price. Additional policy principles are provided in the Appendix.

The Way We Work: GHG Emissions Reduction Opportunities

CAPP is looking forward to engaging with the B.C. government in the development of the province's Climate Leadership Plan to meaningfully address GHG emission from upstream oil and natural gas activities while enhancing the overall competiveness of the industry in British Columbia. The following section provides recommendations on key emissions reductions opportunities from our industry.

Electrification

The consultation guide references the Climate Leadership Team's recommendation 14 to supply clean electricity for the electrification of the upstream industry in a competitive and timely manner.

CAPP believes competitive electrification of the upstream will help BC move toward its provincial GHG reduction targets, representing a foremost opportunity for significant GHG mitigation for the oil and gas sector in BC. Based on our sector's experience, there exists two significant risks to competitive electrification: Reliable and timely in-service transmission capacity; and economic considerations related to rates and tariffs. Practical work is required by BC Hydro and government to work with our sector to align business processes and to find equitable means to balance risks.

Methane

In 2013, upstream oil and gas methane emissions accounted for approximately 20 per cent of BC's total methane emissions. CAPP is committed to making reductions to methane emissions and recommends the following, taking care that responses to each of these demonstrate leadership in seeking alignment with Canada, other provincial jurisdictions and, where appropriate, with competing jurisdictions like the US:

- Applying enhanced regulated standards to new facilities and a regulated standard of practice for leak detection and repair (LDAR) of fugitive equipment leaks; building on existing LDAR requirements.
- A market-based approach to achieve a specified reduction target using fiscal measures focused on reductions from legacy methane emissions sources installed at existing facilities.
- A specific reduction target for vented and fugitives sources at existing facilities that is ambitious yet achievable with the appropriate policy and fiscal mechanisms in place to provide industry with a pathway to achieve the specified reductions. In addition, this target should align appropriately with other provincial and federal goals, including Alberta's Climate Leadership Plan.

CAPP believes properly designed and prescribed programs will achieve greater reductions than those that would be achieved through a carbon tax approach, which increases operating costs and could discourage needed investment in BC. Consequently, CAPP does not at this time support recommendations to increase the rate or scope of the BC carbon tax, as applied to our sector, and believes that all uncombusted methane should be exempt from carbon tax to enable reductions using the market-based mechanisms above. For legacy assets, a market-based approach to achieving a specified methane emissions reduction target is critical to mitigate the costs of retro-fitting industry's inventory of existing equipment to lower emitting devices.

Fiscal Measures

To incent methane emissions reductions, and to incent greater uptake in electrification, a viable path forward hinges on the development of fiscal mechanisms to enable investment. Given the current competitiveness pressures on our sector (including the cost burden of the carbon tax), industry and government will need to work together on ways to improve the economic value of emission reduction projects. By doing so will contribute to more reductions being achieved.

The following fiscal measures should be considered further by the BC government for application by the industry to emissions reductions opportunities:

- *Offsets*: Could be achieved via BC government guaranteed/targeted purchase of offsets, to provide certainty around supply and price, and/or enabling linkages to other offset markets, to expand demand for BC offsets.
- *Carbon compliance certification*: Reduction in carbon tax payable based on emission reductions achieved.
- *Clean infrastructure royalty credit program*: Investing in innovation and technology will enable BC to reduce emissions while also creating and maintaining jobs. CAPP recommends that the province create a broad clean royalty infrastructure credit program that would support investments in infrastructure/technology to reduce methane emissions. A royalty credit program would contribute to investment economics supplemented by fiscal support through offsets or compliance certificates.

In conclusion, BC needs to find the balance so that it can be both a strong world leader in the fight against climate change and a more competitive place to invest in oil and gas. Climate policy should be designed to focus on targeted emissions reductions through enhanced technology investment and deployment, enable flexible compliance options and prioritize economic competitiveness in order to simultaneously enhance competiveness, attract new investment, while achieving the emissions performance objectives. Going forward industry and government will need to work together to achieve greater GHG reductions in a way that can support or enhance industry's competitiveness. We believe a significant opportunity does exist and can be supported by BC in its climate action plan by: designating EITE industries, supporting upstream electrification, and providing the fiscal mechanism that will enable methane emission reductions. CAPP is committed to working together to find ways to help achieve BC's emissions reduction targets while continuing to grow the economy.

Sincerely,

Brad Herald

Brad Herald
Vice-President, Western Canada

Cc: Hon. Rich Coleman, Minister of Natural Gas Development
Hon. Michael de Jong, Minister of Finance
Hon. Shirley Bond, Minister of Jobs, Tourism and Skills Training and Responsible for Labour
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April 8, 2016

Appendix: Emission-Intensive, Trade-Exposed (EITE) Policy Design Principles

Currently, many different carbon management regimes around the world utilize an emission-intense trade-exposed (EITE) methodology to determine the need to protect industries competiveness and minimize carbon leakage under carbon pricing policies. The EITE designation serves to recognize those segments of the economy that represent a leakage risk, whereby investment could shift jurisdiction with less stringent carbon policies providing no gain in global GHG reductions but shrinking economic benefit for BC through loss of investment, jobs and government revenue.

CAPP has worked with industry associations along the natural gas value-chain in British Columbia to consider other jurisdictions' EITE methodologies and develop policy design principles for EITE. Through this effort, the following principles have been established and should be part of a BC mechanism for EITE determination:

- *Fair and transparent*, creating competitive parity across competing jurisdictions.
- *Science-based*, with a strong analyses and understanding of implications in practice.
- *Clear, predictable and simple to administer*, with clear and established processes for review of EITE protection.
- *Cost-efficient*, offsetting the difference in incremental carbon price that exists between competing jurisdictions.
- *Balanced and efficient*, recognizing the totality of emissions policies on industry.
- *Viable*, with readily available compliance pathways that support open market mechanisms.
- *Consistent with developing a clean LNG industry*, achievable within the context of a growing and transitioning lower carbon economy.
- *Recognizes the risk of carbon leakage*, and that BC is currently a world leader in carbon price and industry emissions regulations.
- *Does not disadvantage BC natural gas producers*, in existing North America markets and in emerging international markets.

Using these principles as a framework for EITE policy design, CAPP looks forward to working further with the BC government to further develop a BC solution to EITE determination and application.

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