Shale Gas Thought Leader Forum

Forum Proceedings

Eli Angen and Jason Switzer

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PEMBINA institute

About the Pembina Institute

Leading Canada's transition to a clean energy future.

The Pembina Institute is a national non-profit think tank that advances clean energy solutions through research, education, consulting and advocacy. It promotes environmental, social and economic sustainability in the public interest by developing practical solutions for communities, individuals, governments and businesses. The Pembina Institute provides policy research leadership and education on climate change, energy issues, green economics, energy efficiency and conservation, renewable energy, and environmental governance. For more information about the Pembina Institute, visit www.pembina.org.

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Facilitators and Hosts

Ed Whittingham, Jason Switzer, Ellen Pond, Josha MacNab, Steven Cretney, Tom-Pierre Frappé-Sénéclauze, Stephen D'Esposito, Devika Shah, Eli Angen and Penelope Comette.

Logistics

Nimra Amjad-Archer and Sara Muir-Owen.

Note takers

Tayber Yastremski, Doris Leong, Edwin Gershom, Stephen Mak, Sally Rudd, Hayley Dunning, David Adams and Jeremy Moorhouse.

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Executive Summary

On September 19 and 20, 2012, the Pembina Institute convened a Shale Gas Thought Leader Forum, bringing together a group of 72 stakeholders representing key decision makers and experts on shale gas from the public and private sectors, First Nations, community groups, environmental non-governmental organizations (ENGO) and academia to:

- Convene a representative cross-section of key stakeholders and decision makers in shale gas development from across Canada.
- Establish a base level of knowledge of environmental concerns across this group.
- Provide a forum for airing sources of frustration and for moving past this into shared understanding.
- Develop a list of specific and achievable actions that can increase shared understanding, clarify uncertainty and disagreement, and (where possible) resolve controversy.

In advance of the forum, Pembina worked with a multi-stakeholder expert advisory panel to create a pre-read and meeting agenda that would work towards these goals. The pre-read package covered shale gas development in Canada, the state of science around environmental issues, and industry voluntary initiatives to address these issues.

The agenda for the two-day session tackled three broad areas: environmental concerns, industry practices, and policy frameworks. Expert speakers were brought in to lead off each session, providing a common grounding for the topic. This was followed by breakout sessions where participants tackled a particular aspect of the subject area in groups of eight. The final session was an open session where participants worked together on opportunities for action, choosing the ideas from amongst those generated in the preceding sessions.

The forum participants identified significant gaps in public awareness, in science, in having a voice in decisions, in communications and trust, and in regulation and regulator capacity. With a view to resolving these, participants coalesced around a set of potentially actionable recommendations:

- **Regional Strategic Environmental Assessment (RSEA):** Pilot a region-scaled and multi-disciplinary impact assessment process, with a proposed focus on the Peace River area in B.C. It was proposed that the planning phase could start with a group of thought leaders gathered by a trusted third party to establish design principles based on previous practice.
- **Industry leadership:** leading companies could work with ENGOs to differentiate leading corporations from those that are lagging on a range of issues. This could include model principles and practices that address key environmental concerns, and could build on comparable work in various jurisdictions, the CAPP Shale Gas Principles, and the Sundre Producers and Operators Group Proactive Engagement effort.

- **Lifecycle assessment of greenhouse gas (GHG) Emissions:** Building on similar work underway in the U.S. led by Environmental Defense Fund and many of the sponsor companies, it was recommended that a transparent, independent and credible group determine the GHG emissions associated with the lifecycle of shale gas in Canada, determine methane leakage rates from well to wire, and identify potential improvements to measuring, reporting, and reducing leak rates. The study could also consider questions like the relative GHG benefit of shale gas and coal for generating electricity and the relative GHG benefit of exporting shale gas from British Columbia.
- **Local-level negotiation and dispute resolution mechanisms:** Participants flagged the significant power imbalance between landowners and proponents of shale gas projects, based on access to expertise, capacity, and legal rights. Improving local capacity as well as consultation and compensation processes was identified as a key step to reducing costs and delays caused by legal action.
- **Cross-border collaboration opportunities:** Recognizing that the companies, issues, resources and water/airsheds span the U.S.-Canadian border, undertake a policy review and gap analysis across multiple jurisdictions cross-referenced against the set of environmental concerns raised during the forum to identify regulatory leading practices for each concern and potential gap. Combining and collaborating on the current work being done on both sides of the border could accelerate the research and solution finding, as well as increase the validity and usability of the data.
- **Next steps for the Shale Gas Forum:** Consider re-engaging the advisory panel to assess the topics and objectives for further dialogue, with the aim of addressing research gaps, policy and regulatory gaps, and region- and issue-specific actions; and convening continued dialogue as needed.

The Shale Gas Thought Leader Forum was a first attempt, in the Canadian context, to engage in a multistakeholder dialogue on shale gas without polarizing the conversation. The results and next steps from the forum provide a great opportunity to progress the dialogue on this important issue on both sides of the border.

1. Introduction

1.1 Participants and goals

On September 19 and 20, 2012, a group of 72 stakeholders representing key decision makers and experts on shale gas from the public and private sectors, First Nations, community groups, environmental non-governmental organizations (ENGO) and academia gathered at the University of British Columbia.

The goals of the forum were to:

- Convene a representative cross-section of key stakeholders and decision makers in shale gas development from across Canada
- Establish a base level of knowledge of environmental concerns across this group
- Provide a forum for airing sources of frustration and for moving past this into shared understanding
- Develop a list of specific and achievable actions that can increase shared understanding, clarify uncertainty and disagreement, and (where possible) resolve controversy

The forum was not a conference but rather a "roll-up-the-sleeves" facilitated dialogue. Pembina sought to enable stakeholders to move beyond talking points to advance opportunities for unconventional and creative collaboration, in support of responsible shale gas development in Canada.

In advance of the forum, Pembina worked with a multi-stakeholder expert Advisory Panel to create a pre-read and meeting agenda that would work towards these goals. The pre-read package covered shale gas development in Canada, the state of science around environmental issues, and industry voluntary initiatives to address these issues.

The agenda for the two-day session tackled three broad areas: environmental concerns, industry practices, and policy frameworks. Expert speakers were brought in to lead off each session and provide a common grounding for the topic. This was followed by breakout sessions where participants tackled a particular aspect of the subject area in groups of eight. The final session was an open session where participants worked together on opportunities for action, choosing the ideas from amongst those generated in the preceding sessions.

Figure 1: Participant expectations of the Shale Gas Thought Leader Forum indicate a shared desire to enhance understanding of shale gas development, drawing upon diverse perspectives.

1.2 Context

Over the last 15 years, advances in directional drilling and multi-stage hydraulic fracturing have unlocked vast unconventional natural gas resources, which started in the southern and then northeastern United States. Because it is home to major shale gas reserves, with a well-established oil and gas business and associated infrastructure, Canada is next on the list to tackle the economic, environmental and social consequences and opportunities of these resources.

"Shale gas" is natural gas — methane and other constituents — contained within organic shale rock formations. The shales themselves are the source rock for oil and natural gas, created through the aggregation of layers of small organic matter deposited at the bottom of seas or lakes and then buried, heated and pressurized over the course of millions of years.

To recover gas from a shale formation, a well is drilled down vertically to an appropriate depth before turning horizontally to follow the shale, generally many hundreds or thousands of meters below ground. Into this target shale formation, hydraulic fracturing fluid (a mix of water, proppants — sand or ceramic beads — gelling agents and biocides and other additives) is pumped under pressure to crack the rock. The proppant beads become wedged into the cracks within the shale, creating pathways for the gas to flow into the wellbore for production at the surface above.

In this report, "hydraulic fracturing" refers to the injection of fluid and sands (proppants) at depth to fracture rock. In some media and public documents, "hydraulic fracturing" (or fracking) has been applied more broadly to refer to the whole process of shale gas development, and this may create confusion when discussing impacts of each phase of development. While geologists have long known about the potential resource trapped in the shales, only the recent combination of horizontal well drilling and hydraulic fracturing treatments have made them economic to develop.

According to the International Energy Agency, "Producing unconventional gas is an intensive industrial process, generally imposing a larger environmental footprint than conventional gas development. More wells are often needed and techniques such as hydraulic fracturing are usually required to boost the flow of gas from the well. The scale of development can have major implications for local communities, land use and water resources. Hazards, including the potential for contamination of surface and groundwater, fugitive methane emissions, and air pollution must be successfully addressed. Greenhouse gas emissions (GHGs) must be minimised both at the point of production and throughout the entire natural gas supply chain. Improperly addressed, these concerns threaten to curb, if not halt, the development of unconventional resources. The technologies and know-how exist for unconventional gas to be produced in a way that satisfactorily meets these challenges, but a continuous drive from governments and industry to improve performance is required if public confidence is to be maintained or earned."[1]

Decision-makers in government, communities and industry are thus charged with determining if and how the resources are to be developed, establishing science-based limits, and earning social license from host communities and broader stakeholders.

Shale gas deposits are found across Canada, with the most significant in northeastern B.C., Alberta and Quebec. Smaller deposits are also found in New Brunswick, southern Ontario and the southern edges of Yukon and Northwest Territories. As in the U.S., there is controversy in some regions, and significant public efforts are underway to scope the issues and define mitigation plans.[2]

The record in the U.S. suggests that the speed of shale gas development can outpace efforts to develop appropriate infrastructure, regulatory frameworks and operating standards, particularly where oil and gas development is new. Because resources have been found in places that have never (or not in recent memory) been home to oil and gas producers, there is an urgent need to define and resource the appropriate regulatory frameworks, as well as to empower communities to decide for themselves the conditions under which responsible development can take place.

Public dialogue regarding development has become increasingly partisan, making it difficult to discuss the benefits and challenges of shale gas development. Canadian stakeholders recognize that they have only a brief window of opportunity to ensure that the Canadian approach meets the challenges it presents. Key issues include:

[1] International Energy Agency, *Golden Rules for a Golden Age of Gas*, World Energy Outlook Special Report on Unconventional Gas (2012). http://www.iea.org/newsroomandevents/pressreleases/2012/may/name,27266,en.html

[2] This includes the Quebec Commission on Shale Gas, the Council of Canadian Academies' review of the state of knowledge of shale gas development, and the New Brunswick Natural Gas Development Action Plan Framework.

1. The potential for reduction of greenhouse gas emissions (GHGs) in power and transportation, and the framework conditions governing upstream development that is necessary for doing so. Regardless of local decisions, it is likely that natural gas produced through hydraulic fracturing and horizontal drilling will play a growing role in the global energy mix, which could increase or decrease GHG emissions overall.
2. The management of legitimate concerns associated with local environmental impacts of shale gas development. These potentially include impacts on air, water, landscapes and communities, both during operations and after development is completed.
3. The apparent 'glut' in natural gas in North America and associated displacement of the traditional U.S. market for Canadian natural gas, along with the opportunities and challenges associated with the potential for Canadian export to Asia and Europe.
4. The need for credible, independent and multi-stakeholder information to inform decision-making. There are likely to be places where development should never be allowed for cultural or environmental reasons, but there are also locations where development may on balance be viewed as beneficial under appropriate conditions. It is critical to ensure that affected communities, decision makers and developers have access to necessary information and diverse perspectives in the process of charting — or foregoing — its development.

2. Forum

2.1 Environmental concerns

The first session sought to establish a shared understanding of the environmental concerns associated with shale gas development, where scientific understanding is at, and what the barriers are to resolving these concerns.

Participants were given an overview of expert perspectives on shale gas development in the U.S., based on a multi stakeholder survey conducted by the U.S.-based think tank Resources for the Future. This study indicated a high level of consensus that the top local environmental concerns associated with shale gas development include well cement and casing failures; surface flowback fluid impoundment failures; and truck/traffic accidents and impacts. They heard as well that the state of scientific opinion on many of these topics is evolving rapidly, with particular reference to the debate underway on the net GHG benefit of shale gas in displacing coal on the U.S. grid.

In a Canadian First Nation community that is home to extensive shale gas development, concern focused on the footprint of that development, associated with the loss of land for traditional use, the fragmentation of habitat and depletion of water for species of interest (moose, bison, beavers, fish and medicine plants), and the fear of wider contamination. The speaker also described one example of how oil and gas development could be integrated with environmental and cultural restoration objectives, through reinvigorating the traditional practice of controlled fire.

To help discussions, breakout tables were assigned one of five focus areas, based on the participant survey and the pre-read. From the list of concerns, participants sought to identify the gaps underlying these concerns, and whether they represent gaps in knowledge and science, gaps in communications between groups, gaps in regulation, or gaps in values. Some common themes that emerged from this discussion:

- It was widely perceived that an obstacle to wise decision-making associated with shale gas development is the different level of understanding of the oil and gas industry and its impacts amongst different stakeholder groups, project proponents and governments. Greater communication was urged between proponents, academics, stakeholders, regulators and investors to improve awareness, understanding and trust.
- There was a perception among some that government is not acting quickly enough to provide guidance/leadership around shale gas, and that this is a risk for communities, for the environment and for industry. In addition, there was a belief that governments currently lack resources to ensure compliance monitoring, and such monitoring needs to be visibly reinforced or better communicated.

- Communication has reportedly broken down between groups in certain jurisdictions. Some representatives of project host communities and First Nation groups expressed frustration at a lack of voice in decisions that affect them, noting that once trust has been lost in past interactions, it is difficult to re-establish. Some urged enhanced integration of local knowledge in regulatory decisions, greater understanding and respect for aboriginal treaty rights, and/or stepped-up efforts to level out the systemic disadvantages and enhance the voice of stakeholders in project-related consultation and decision-making processes.
- The current project approval/permitting process forces industry into a "project-by-project" view, so there is no incentive or mandate for them to be thinking more broadly or to integrate externalities into decision-making. Cumulative or regional strategic impact assessment and decision-making was proposed at a regional or watershed / river basin level, incorporating environmental, health and socio-economic impacts.

2.1.1 National environmental issues

Discussion here focused on net GHG benefits of shale gas and its role in the global and national energy mix. This breakout discussed the following themes:

- **Gaps in science:** Some identified a need for studies to better understand the well-to-grid life cycle GHG emissions, the impact of Canadian shale gas on global energy markets, and whether Canadian shale gas will displace coal or, instead, displace potentially more costly renewable energy sources (nationally and/or internationally).

- **Gaps in regulation:** Government action was urged by some to address methane and CO_2 venting. A question was raised regarding the obligation to conduct full environmental assessments as a condition for project approval. Some expressed the benefit to industry of comprehensive regulation in providing social license for operations, while others suggested that industry would oppose it. Some asserted that this perception of a gap in GHG (or wider shale gas) regulation was due to a lack of awareness and understanding of existing regulation, particularly in Alberta and B.C.

- **Gaps in industry practice:** It was suggested that more monitoring and reporting is needed of baseline and ongoing GHGs and other emissions. Others suggested that this information is already available and needs to be better communicated. It was noted that some companies are effectively implementing reduced-emission completions, and that these practices could be more widely adopted with appropriate incentives, voluntary commitments or regulation.

Some viewed other issues as being national in scale, due to the wide distribution of shale gas resources across Canada. Such issues include water use and landscape impacts, and the federal government's fiduciary responsibility to First Nations.

2.1.2 Water use

In this breakout session, participants discussed the cumulative impact of the use of large volumes of water for multiple hydraulic fracturing operations including the volumes that are permanently

removed and injected into deep formations, and the potential for damage to watersheds and ecosystems that could result.

Themes discussed included:

- **Gaps in science:** Some suggested there is a lack of knowledge regarding the hydrological cycle generally, and oil and gas / water terminology specifically, which challenges informed dialogue and decision-making. Key terms that need to better defined and understood include: water withdrawal, water consumption, flowback water, and water quality.[3] There was some consensus around the need for publicly credible information about water withdrawal and consumption impact at multiple levels, including: underlying regional water system levels and flow patterns, withdrawal/consumption/quality impacts per unit of energy produced, impacts at the level of the individual well and group of wells, comparative water impact across different industries, the life cycle of water in regions that are home to shale gas, and the cumulative effects of different development scenarios.
- **Gaps in regulation and capacity:** Concern was expressed by some participants regarding the difficulty in ensuring equitable distribution and allocation of available water for different needs, and of the need for tools for doing so, including e.g. water use rights vs. pricing of water. Some felt it important to undertake environmental impact assessments and baseline inventories; to ensure ongoing monitoring of natural resources and aquatic life; and to ensure the necessary data and knowledge of current technologies and capabilities is up to date. Many participants suggested that there is a gap in the necessary expertise for management of shale gas development. Associated with this concern was a perception by some that legislation governing water management, produced water and its reuse in many jurisdictions may be out of date in light of new technologies and practices.
- **Gaps in voice:** Some expressed concern regarding gaps in the involvement of local communities and First Nations in decision-making associated with water management, in particular around integration of local knowledge in project decisions, respect for aboriginal/treaty rights, and tools for redressing of the systematic disadvantage of non-experts in consultation processes.

2.1.3 Water quality and waste management

This breakout session focused on the treatment and management of produced (flowback) water and of waste associated with the drilling and completion processes. Gaps that were identified included:

[3] Helpful references in this regard include: World Policy Institute, *The Water-Energy Nexus: Adding Water to the Energy Agenda* (2011). http://www.worldpolicy.org/policy-paper/2011/03/18/water-energy-nexus; World Economic Forum, *Thirsty Energy: Water and Energy in the 21st Century* (2009). http://www.weforum.org/reports/thirsty-energy-water-and-energy-21st-century

- **Gaps in science and regulation:** Some stakeholders expressed concern regarding the potential for surface and groundwater contamination from storage of spent drilling mud and cuttings in surface impoundments, from additives or wastewater spills and from communication of fluid flow between legacy (pre-existing) wells and new wells. According to some, this could be addressed through input and produced water tracking, and through mandated baseline measurement and disclosure of water quality measurements and of chemicals in fracking fluids (including proprietary chemical additives).
- **Gaps in awareness:** It was noted that there is a lack of public knowledge on the regulatory process and adequacy of the regulatory regime governing development. Questions that were raised by participants included: What is the likely extent and expected duration and impact of potential contamination? Who would be impacted? What are the remediation measures and are they acceptable to key stakeholders? Are current regulations sufficient/current?
- **Gaps in voice and accountability:** Some noted a lack of government body to explicitly deal with landowner complaints, and a need for specialized oversight to ensure that the many companies, contractors etc. involved in each well have appropriate accountability for compliance/mitigation of impacts.

2.1.4 Land use and biodiversity

This breakout focused on concerns associated with the land footprint of shale gas development and its impacts on habitat and biodiversity. Impacts of concern include habitat fragmentation, shifts in predator-prey relationships and migration patterns, land use conflicts, impacts on property values, deforestation/erosion and legacy/remediation issues.

Key gaps identified:

- **Gaps in awareness and access to information:** Some participants noted that in jurisdictions where oil and gas development is new, there is a gap in understanding of shale-gas-specific issues when making decisions. Some suggested this could be reduced with tools for visualizing what landscapes will look like after shale gas development takes place. It was also proposed that industry be required to allow site visits.
- **Gaps in communication and trust:** Some flagged that there can be a gap between the stated policies of a company and the actions of the employees and contractors on site. A further challenge for some associated with integrated land use planning is a lack of trust-based communication between companies and communities on the full extent of the development plan, the value of different areas, and on the rationale for this value.
    - It was suggested that developers may lack information that could be used to reduce impacts as a result of this gap in communications. Communities may only say that a site is “important” instead of identifying specifically what it is or why it is important, and may have cultural reasons for maintaining this secrecy, according to one participant. By contrast, according to another participant, project proponents may not know the full extent of their development plan and as a result be reluctant to share it. It was recognized by a participant that industry can be a poor communicator, even internally, and that there needs to be an improvement in transparency in the planning process. Some expressed frustration with the lack of willingness within certain

stakeholder groups to trade development in some areas with no-go agreements in others, in order to reduce conflict between industry and communities.

- A few proposed that land use/value information be available at the genesis of a project, because by the time of permitting for the project it would be too late to modify development plans. A participant proposed that shareholder value and subsistence value associated with use of the land are fundamentally different and are not addressed through existing decision processes.

- **Gaps in coordination and cumulative effects management:** Key issues according to some stakeholders are updating older (pre-shale gas) land use plans to incorporate integrated land use planning between companies and government; and enhancing coordination of policy and regulation between federal and provincial governments. One tool that could bring these into alignment would be through cumulative impact assessment at a regional level. This would allow for direct engagement by affected stakeholders in managing the cumulative effects in a given region.

2.1.5 Legacy issues and reclamation

This breakout focused on the environmental concerns that outlive the development of shale gas resources, specifically the cleanup and remediation of impacts and footprint, and restoration of depleted species of interest. Gaps include:

- **Gaps in voice:** Some participants identified the importance of engaging stakeholders upfront in post-development planning and negotiation, in particular traditional land users and traditional ecological knowledge.
- **Gaps in awareness and knowledge:** Some pointed to a need for regional natural capital assessment to complement impact assessment as a basis for reclamation planning; and for the identification of indicators for wetland and agriculture functionality. There was a low level of broad knowledge regarding mechanisms for assuring reclamation takes place and to an appropriate standard, which may or may not indicate a gap in regulation.
- **Gaps in regulation:** Participants suggested the need for performance bonds, reform of land tenure systems, and, with respect to caribou, the need for protection of large-scale contiguous areas of habitat.

2.2 Industry practices

The industry practices session sought to discuss the upstream oil and gas sector's perspective on the opportunities and challenges posed by shale gas development, as well as their proactive efforts in responding to the environmental concerns discussed in the earlier session. Participants focused on analyzing the Canadian Association of Petroleum Producers (CAPP)'s Shale Gas Principles.

Participants heard that CAPP members have developed five guiding principles to govern shale gas development:

- safeguarding regional surface and groundwater resources,
- measuring and disclosing water use,
- promoting development of fracture fluids with minimal environmental risks,

- supporting the disclosure of fracturing fluid additives, and
- collaborating on technologies and best practices.[4]

These principles have been elaborated into more detailed voluntary operating practices. The initial set of voluntary operating practices produced by CAPP focus on addressing water-related environmental concerns, and include:

- fracture fluid additive disclosure
- fracturing fluid additive risk assessment and management
- baseline groundwater testing
- wellbore construction and quality assurance
- water sourcing, measurement and reuse
- fluid transport, handling, storage and disposal

Each operating practice provides a greater level of detail on the guidelines to be followed, for example, in terms of pressure testing of wells prior to injection of fracture fluids (a legal requirement in Alberta and B.C.). CAPP's member companies are encouraged to have internal procedures in place to demonstrate they are meeting the practices by October 2012, with the expectation that each company will make these internal practices publicly available. In 2013 participation and implementation of practices will be reported through CAPP's internal Responsible Canadian Energy program.

During the breakout, participants identified the perceived strengths, weaknesses and opportunities for improvement of the CAPP Shale Gas Principles. It was recognized that the brief presentation was insufficient to provide appropriate grounding on the content of the principles to enable informed critique, and many participants took copies of the principles with them for further review. Nevertheless, a cogent discussion of the principles yielded the following insights:

- **Strengths:** The principles were seen by many as a good start in building trust through being publicly accessible, and through demonstrating that industry can work together to move beyond regulatory minimums. Some noted that they provide a helpful benchmark or template for regulators. Several saw the principles as comprehensive in covering water issues and in applying across multiple jurisdictions. Some participants felt that the principles went far enough, and that it is the role of federal and provincial governments to enforce compliance up to this level.
- **Weaknesses:** Some felt the principles lacked enforceability and needed third-party audit to ensure accountability, and suggested that these are pre-conditions for building trust with external stakeholders. Some participants suggested the principles are too limited in scope in that they fail to address non-water related issues such as cumulative effects and induced seismicity. In response, it was noted that the principles are a first step and can be broadened. Some participants suggested that industry is not receiving enough credit for its proactivity, which may be due to a weakness in how the principles have been communicated, or in the process through which they were developed, which lacked external community and stakeholder consultation and engagement.

[4] Canadian Association of Petroleum Producers, *Guiding Principles for Hydraulic Fracturing.* (2011) http://www.canadiannaturalgas.ca/issues-policy/fracking/guiding-principles-for-hydraulic-fracturing

- **Opportunities for improvement:**
  - It was suggested that CAPP consider making compliance with the principles a condition for association membership, obliging reporting of performance against the principles in a way that is accessible to the public, and establishing third-party compliance audits (similar to those undertaken under the Mining Association of Canada's Toward Sustainable Mining framework). CEOs could sign the principles, and CAPP could consider independent certification (such as that done by the Forest Stewardship Council). Some participants urged CAPP (or other body) to more clearly define how companies are intended to demonstrate compliance with these principles, and to publish a 'black list' of those in violation. Others stressed that it is not CAPP's role to do so.
  - In terms of widening scope, in addition to cumulative effects and induced seismicity, CAPP was urged by various participants to develop principles covering public and First Nations engagement in decision-making, public safety, regional (baseline and ongoing) monitoring, pace/scale/sequencing of development and no-go areas, socio-economic impacts/development outcomes, waste/water management/recycling, and upstream venting ("green completions"). It was suggested that CAPP should engage with ENGOs, community members and First Nations groups, and academics/experts in the next round of principles review and development, particularly to address complex health and environmental questions, including for example toxicity of fracture fluid additives.
  - In terms of communications, it would be helpful from the perspective of trust building to clarify where these voluntary principles simply align with regulation, and where they go beyond regulations in Canada and the U.S. Some urged CAPP to actively engage with government to promote regulation aligned with these principles, and questioned why CAPP was seemingly distancing itself from lobbying for this.

2.3 Regulatory framework

The regulatory framework session was meant to enhance understanding of the public sector perspective on the challenges, opportunities and strategies for regulating shale gas development. Speakers provided a range of perspectives on how different jurisdictions are approaching shale gas, how legal treatment is evolving, and how Alberta is proposing to regulate water use associated with hydraulic fracturing.

A presentation on the Quebec Shale Gas Commission opened the discussion, introducing the challenges faced by a jurisdiction for whom oil and gas development is new. In response to public concern associated with the discovery of shale gas resources, in 2011 the Province of Quebec initiated a review of the environmental, economic and social issues associated with its development in the province, with a mandate to make recommendations in 2013 on:

- the socioeconomic benefits of exploiting the shale gas resource, and the conditions that would maximize revenue for the government;
- an assessment of the environmental risks and impacts, the factors influencing social acceptability, and appropriate mitigation measures;
- guidelines and parameters for regulation; and,

- assessment of the need for scientific "observatories" to ensure that regulations are kept up to date.

According to the speaker, while many jurisdictions are focused on "How will we develop the resource?", in Quebec the question being asked is "Should we develop the resource at all?". Among the key challenges that the process has uncovered are balancing benefits and drawbacks; framing the role for local communities in decision-making; respecting local culture and history; ensuring transparency, confidence and efficient participation by stakeholders; and gathering reliable and independent scientific information that is viewed as credible by all sides.

A noted expert provided a multi-jurisdictional overview of legal trends and litigation themes across Canada and the U.S. Key legal trends identified included:

- More detailed and publicly-available disclosure of hydraulic fracturing fluid content, and an emerging move from post-injection disclosure to pre-injection disclosure.
- More detailed and publicly-available reporting of planned water extraction/use, and an emerging move towards monitoring and reporting of actual use to regulators, and the development of aquifer/watershed water management plans to address cumulative effects. It was noted that B.C. currently places no licensing obligation on groundwater extraction, though efforts are underway to resolve this.
- Emergence of prescriptive well design rules to ensure integrity, covering cement type, casing and cementing depth (how much below water table), casing rules (surface, intermediate, production casing), 'shallow' fracking, etc.

Key litigation themes:

- Some 40 claims relying on common law, statutory rights of action, and Treaty/Constitutional rights are in progress in the U.S. and Canada that will likely affect how shale gas development is conducted on both sides of the border.
- Class actions are increasingly used in environmental litigation in both countries. Rules in the U.S. and Canada are very similar; Canadian rules are seen by some as more plaintiff-friendly.
- Citizen actions, where the citizen steps in for the regulator to seek a remedy for non-compliance, are becoming more common in the U.S. This is not available in B.C. and Alberta.
- Canadian First Nations and U.S. tribes share similar powers on reserves and reservations respectively. Off-reserve Canadian First Nations have access to the Haida and Sparrow Analysis. Haida considers current Crown decisions while Sparrow addresses historical grievances for decisions that might adversely affect Treaty or Aboriginal rights.

Alberta's approach to regulating multi-stage hydraulic fracturing, and oil and gas development more broadly was the subject of the final presentation that opened this session. Participants heard that cumulative effects management is the foundation for a range of policy and regulatory tools in place or under development, in support of meeting a broad range of economic, environmental and social interests. This has been informed by multi-stakeholder engagement to build trust and provide assurance that the right concerns are being tackled.

The provincial government has divided the province into discrete planning units based on watersheds. This management framework establishes limits and triggers, monitoring and

modeling to assess conditions, and response to triggers including validation, investigation, management actions and reporting.

Alberta is striving to reduce the amount of non-saline water used for oil and gas development. Based on its lengthy history of oil and gas development (with over 170,000 wells drilled and 3,300 multistage hydraulic fracturing operations), Alberta is focusing its efforts to manage unconventional oil and gas development on:

- coordinated development using a play-based management approach to optimize/minimize planning, footprint, and infrastructure
- expanded water conservation for all oil and gas activities, by articulating a hierarchy of water use (by source of the water)
- expanded baseline water well testing, to be completed before shale gas development occurs
- disclosure of hydraulic fracturing fluids using fracfocus.ca
- public reporting of water use from projects by volume and source

During the breakout session, participants identified strengths, weaknesses and opportunities for improvement in the Alberta Hydraulic Fracturing Water Management Framework. Highlights of this discussion included:

- **Strengths:** Some credited Alberta with making a genuine attempt to take a holistic approach to tackling cumulative effects of development, and for utilizing multi-stakeholder engagement to determine priority areas for action. The framework as presented suggests Alberta is establishing enforceable and transparent limits, building on lessons learned from many years of resource management and oil and gas development (and controversy). Some participants valued the clarity on what sources of water should be used first and requirements for proponents to justify their suggested source. A few suggested the framework could be a role model and provide helpful practices for consideration by other jurisdictions in establishing their own regulatory frameworks for shale gas development.
- **Weaknesses:** Participants noted that the framework as presented doesn't go far enough in addressing the pace and scale of shale gas development, focused as it is on one area of environmental concern (recognizing that this was the scope of the presentation). Others highlighted the need for expansive surface and groundwater baseline analysis in order to set appropriate limits on water extraction, such as minimum (ecological) flow rates for rivers. This type of framework places a substantial resource and capacity obligation on a provincial government, which not every government is capable of achieving, particularly in a time of financial austerity. There was for some a perceived disconnect between the regulations and industry action on the ground in Alberta, driven by a perception that enforcement has been limited. It was suggested that development can outpace efforts to establish framework conditions of this kind, due to the length of time required to complete cumulative effects or regional studies, and financial imperatives as well as (in some instances) ‘use it or lose it’ licensing stipulations.
- **Opportunities for improvement:** It was suggested that Alberta could enhance stakeholder engagement when developing limits, including providing communities with financial support so they can bring in third-party experts to analyze concerns and issues.

Because “seeing is believing” in enforcement of regulation, public access to information on key indicators including enforcement staff numbers, enforcement actions etc. was proposed by some participants. It was noted that some of this is currently being reported, but most participants didn’t know where to find it. In addition, some suggested that persons of trust should have power to shut down operations if needed (e.g. through community advisory panels or ‘synergy groups’). More broadly, it was proposed that engagement with communities and other stakeholders needs to take place earlier in the planning process, as the perception among some is that communities are only brought into dialogue at the point of the project application, too late to make substantive changes in water use. Some noted an opportunity to engage with cross-boundary (provincial or federal) regional management areas. Finally, there was a call from some to translate legal and regulatory jargon into layman’s terms, as this impedes understanding and is an impediment to trust.

3. Next steps

The final session of the forum was an "open space". Based on the preceding discussions and their own insights, participants put forward areas for action that they were interested in discussing further. These were captured on a wall chart throughout the morning of the second day, and then refined by the moderators into a short list of topics. Participants 'voted with their feet' in terms of which topic they wished to put their energy into for the remainder of the forum.

- **Regional Strategic Environmental Assessment (RSEA):** This breakout had the greatest energy behind it, as it sought to provide greater clarity to the concept of piloting a region (or 'play')-scaled and multi-disciplinary impact assessment process, with a proposed focus on the Peace River area in B.C. Participants noted a mix of optimism about the concept yielding benefits from a planning / co-optimization perspective, along with skepticism associated with its complexity. Others stressed the imperative of trying to develop a multi-stakeholder working model of a successful RSEA to incent governments at all level to expand to other regions beyond Peace River. There was consensus among participants to continue to work this concept further. While various models are available for undertaking this sort of strategic assessment, the challenge is how to decide whom to involve in the process, how to initiate and fund it, how to troubleshoot and how to avoid it going off-course. It was proposed that the planning phase could start with a group of thought leaders gathered by a trusted third party to establish design principles based on previous practice.
- **Industry leadership:** This breakout focused on how industry could establish a leadership position and the role that civil society could play to support this leadership. The absence of a civil society representative in the discussion was a noted gap. The group spent some initial time discussing the concept of 'social license;' however, the focus was on voluntary action by companies. The group discussed CAPP and the value added by their voluntary program. There was a sense that CAPP had taken a helpful step, and that specific companies can and should go further. However there was also discussion of the limits of CAPP's approach. For example, CAPP could strengthen its approach by providing more specificity, increasing transparency and ensuring that following the program is a condition of association membership. ENGOs can bring value to the discussion by demonstrating a willingness to point to and support progress and differentiation by individual companies, regional groupings (e.g. the Sundre Producers and Operators Group) and sector-wide initiatives. It was suggested that leading companies could work with ENGOs to differentiate leading corporations from those that are lagging on a range of issues. This benchmarking could include model principles and practices that address key environmental concerns, building on comparable work in various jurisdictions.
- **Lifecycle assessment of greenhouse gas (GHG) emissions:** The breakout group recommended that a transparent, independent and credible group determine the GHG emissions associated with the life cycle of shale gas in Canada. This assessment would address the concerns of a broad audience including ENGOs, business, academia and the general public. The study, at a minimum, would determine methane leakage rates from

"well-to-wire" and identify potential improvements to measuring, reporting, and reducing leak rates. The study could also consider questions like the relative GHG benefit of shale gas and coal for generating electricity and the relative GHG benefit of exporting shale gas from British Columbia. The group also suggested the study not be limited to GHG emissions but consider other criteria like water, air quality and land use. Potential study leads include the Royal Society of Canada, the Coast Information Team, academia (in general) and the Pembina Institute.

- **Local-level negotiation and dispute resolution mechanisms:** Participants flagged the significant power imbalance between landowners and proponents of shale gas projects, based on access to expertise, capacity, and legal rights. Landowners lack resources to engage in approval and regulatory processes; to engage meaningfully, they require access to independent consultants, legal advice, and supported local advocates making the connection between these experts and concerned community members. Ineffective notification, short time windows to identify all concerns ahead of regulatory processes, and the sheer number of projects to deal with accentuate this capacity gap. The Canadian legal framework, which limits greatly the capacity of a landowner to refuse access to their land, further compounds the power imbalance. Improving local capacity and consultation and compensation processes was identified as a key step to reducing costs and delays caused by legal action, and as a necessary condition to obtaining social license to operate. Participants made a range of proposals for further consideration (these do not represent consensus by the group, but rather individual suggestions):
  - immediate increase in participant funding to manage the rapid growth of development and resulting community concerns;
  - establishment of a regional industry/government participant funding pool for long-term sustainability;
  - adoption of play-based approaches to tenuring, application process, and operation plans, to limit the number of processes and better integrate regional considerations;
  - creation of local synergy groups to create a safe space for proponents to engage with the community;
  - inclusion of 'openers' in compensation agreements for multi-well sites and pipelines; and
  - grant of the right of refusal to land owners, to enable meaningful negotiations.
- **Cross-border collaboration opportunities:** Recognizing that the companies, issues, resources and water/air sheds span the U.S.-Canadian border, this breakout sought to identify opportunities to learn from each others' experience. Options that were discussed included: a policy review and gap analysis across multiple jurisdictions cross-referenced against the set of environmental concerns raised during the forum to identify regulatory leading practices for each concern and potential gaps; and engagement between CAPP and API to ensure sharing of learnings from the Canadian industry's Shale Gas Principles, and the work of the Marcellus Shale Coalition. In addition, the ongoing research on methane emissions and GHG being done on both sides of the border could be supported and accelerated by sharing data, methodologies and results. It was recognized that both regulators and industry would benefit from a harmonization of regulation across jurisdictions. Resources and water/air sheds span borders but it was felt the implementation of that process would likely be difficult due to several factors

including variety of geographic needs, ownership rights, state/provincial rights, and politics.

- **Next steps for the Shale Gas Forum:** One breakout group focused on developing explicit guidance for Pembina in terms of how to take the Shale Gas Forum itself forward, in terms of immediate follow-up and longer-term institutionalization.
  - In the near term, it was proposed that Pembina survey participants on their perspectives with regards to the forum process and outcomes (see results in the appendix); and that the advisory panel be re-engaged to review the forum and survey results. The survey could be used to test ideas for ongoing discussion. In addition, it was suggested to form a planning committee to work on longer-term initiatives.
  - In the longer term, the group suggested there is continued value in developing an ongoing neutral mechanism for collaborative multi-stakeholder discussions and/or working groups, possibly facilitated by Pembina. The goals would be to scope and address research gaps, policy and regulatory gaps, and region- and issue-specific actions; publish independent 'white papers' on topics of shared interest; as well as convene an annual and/or regional forum for continued dialogue. The priority topics would be those with perceived high risk to all major stakeholders' interests. Terms of reference and guiding principles would be one of the preliminary tasks.

4. Conclusions

The Shale Gas Thought Leader Forum set out to a set of ambitious goals for enabling informed dialogue across a representative set of key Canadian stakeholders, enhancing understanding of the set of environmental concerns associated with shale gas development, and moving from this to actionable recommendations to clarify disagreement, and (where possible) resolve controversy. Based on a survey of participants (see Appendix), there was consensus that the forum met its objectives, based on an average score of 4 out of 5 for the five questions asked.

While the overall survey results were very positive, criticism focused primarily on a lack of integration of the pre-read in the forum content; an overly-ambitious scope; and uncertainty regarding how likely the recommendations can be meaningfully taken forward.

The Shale Gas Thought Leader Forum was a first attempt, in the Canadian context, to engage in a multistakeholder dialogue on shale gas without polarizing the conversation. The results and next steps from the forum provide an opportunity to progress the dialogue on this important issue on both sides of the border. To that end, Pembina will publish the pre-read and meeting summary, and forward the relevant forum recommendations to CAPP and to the appropriate government agencies, with the aim of seizing the opportunities for improvement identified. Pembina will also take the recommended next steps from the forum and distill them into concrete follow-up plans, with the aim of identifying appropriate partners and funders to move them forward where feasible.

Appendix A. Participant survey results

Overview

Response Rate = 50 of 72 attendees (excluding 2 MCs, 8 note takers, 8 facilitators)

Check in on:

- Did we provide the foundation for a common base level of knowledge through the pre-read and speakers?
- Did we facilitate a good dialogue?
- Were we able to identify some actionable suggested outcomes/next steps?

Generally:

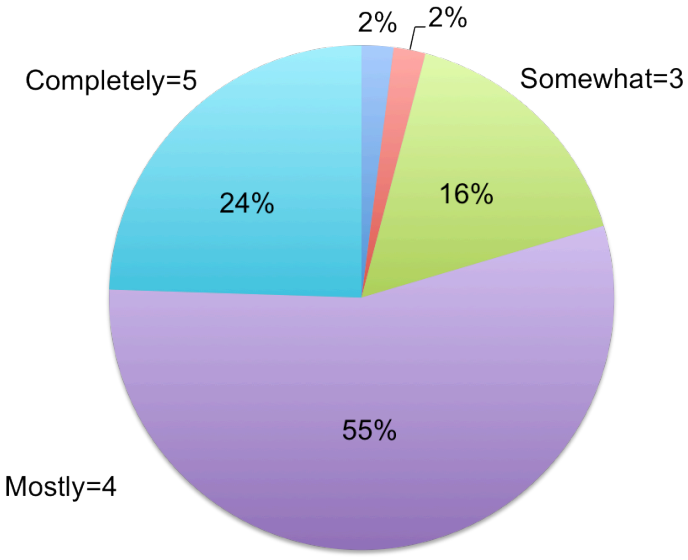
- solid pre-read and speakers, v. good facilitation, less convinced that results of forum are "actionable"

A.1 Pre-read

- "Well done"…could have been used more in the Forum
- Missing First Nations content

Q1: How well did the pre-read address the development, opportunities and challenges posed by Shale Gas development in Canada?

Average = 4.0

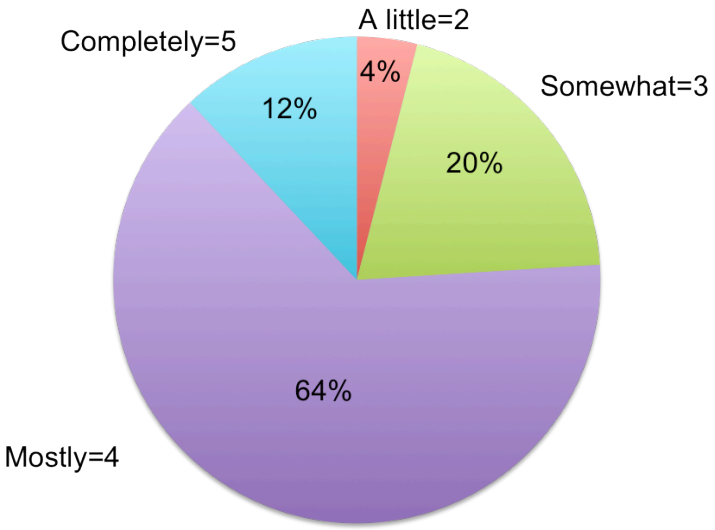


A.2 Speakers

- Mixed reviews
- Perception that Forum left participants with the impression that Shale Gas development is not being regulated in some jurisdictions; whereas the regulation is in place and being enforced. More space for discussion of the current regulatory framework would have been helpful.
- Liked presentations that were followed with opportunity for participant feedback
- More content (> 10 min) & fewer presenters,

Q2: How well did the workshop speakers address the development, opportunities and challenges posed by Shale Gas development in Canada?

Average = 3.8

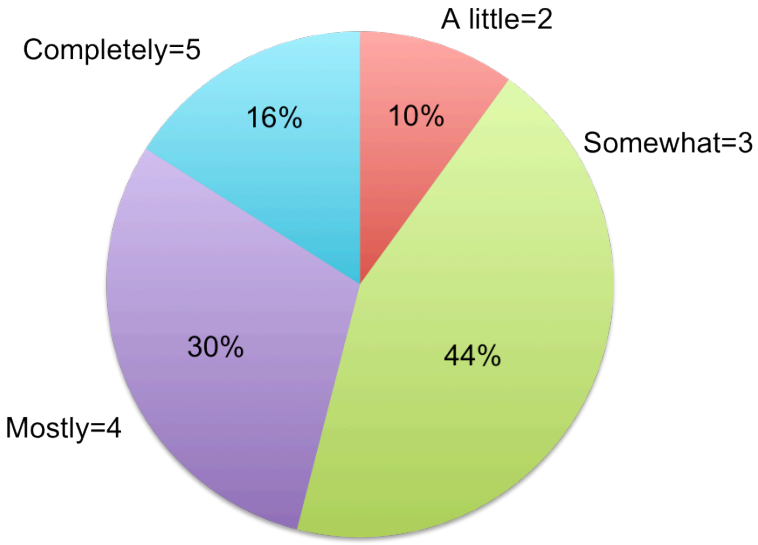


A.3 Actionable results

- Mixed: RSEA, Pilots are "doable"
- Necessary first step, but too 'high level'
- Will require commitment & momentum

Q3: Do you believe that the results of the workshop are actionable?

Average = 3.5

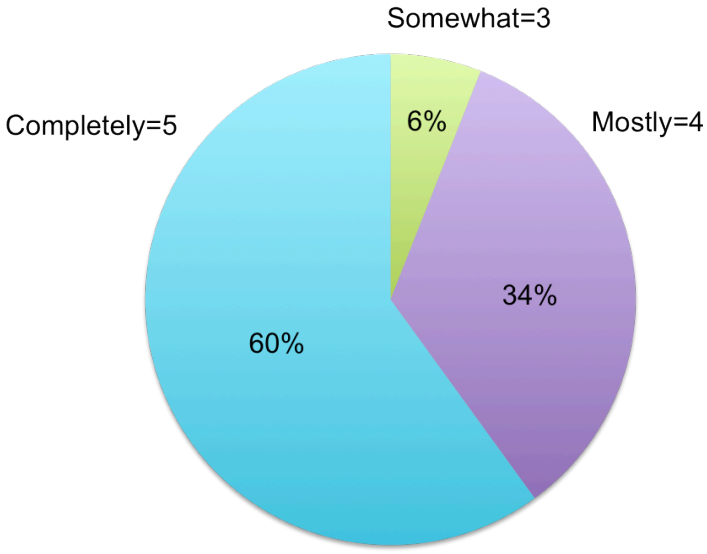


A.4 Facilitation

- "the high point"
- Some variation across facilitators

Q4: Do you believe the workshop was well-facilitated?

Average = 4.5

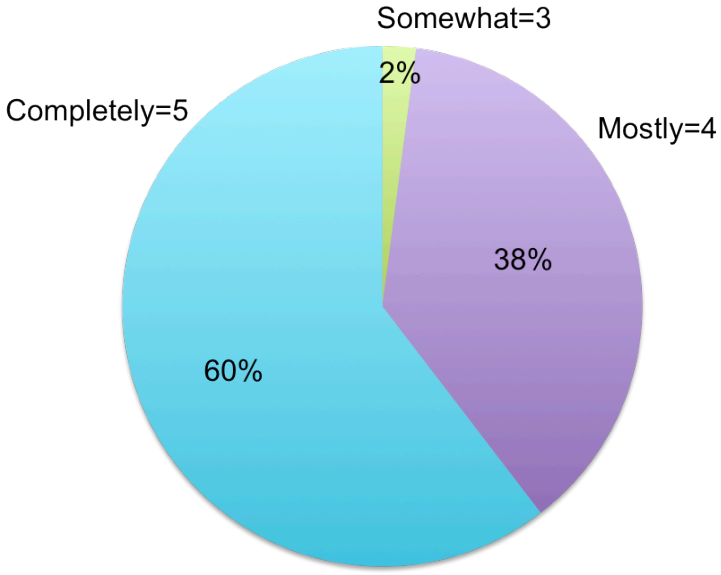


A.5 Relationship-building

- Very well done, great mix, "unique"
- "pleased to see FN representation as speakers and at tables"
- More land-owners, BC Government

Q55: This event sought to open the door for future dialogue, by establishing relationships between participants and experts. To what extent do you feel that you made contact with useful individuals?

Average = 4.6



A.6 Other comments

- High variability of knowledge between participants. Need more grounding on the production process -- Shale Gas (or Oil and Gas) 101.
- Fewer topics, focus on GHGs
- More table switchups, breakouts "not as smooth"
- Kudos: "worthwhile", "well done", "fascinating open space", "right tone at right depth to advance the debate", "build on this model", "pleased to have participated",
- "do it again"