

PNWER Summit LNG Exports Session
Monday, July 21, 2014
2:15pm – 5:00pm

Co-Chairs: Senator Cliff Larsen (Montana) & Gary Weilinger (VP External Affairs, Spectra Energy)

The co-chairs introduced the presenters and panelists

Topic I: Current LNG initiatives and what it will take to achieve a clean, low-cost form of energy and challenges presented by PNWER jurisdictions as well as a perspective from potential markets.

Hon. Rick Coleman (BC Deputy Premier and Minister of Natural Gas Development) presented an overview of LNG in British Columbia. *(no PowerPoint presentation)*

We are lucky to have a pretty significant opportunity in British Columbia, one that involves partnerships and relationships with all communities and First Nations groups. In 2001, in response to industry, cabinet changed how natural gas exploration was undertaken in BC and the provincial government developed incentive programs to shift from short-term and seasonal exploration. This program enabled BC to discover natural gas is a staggering resource in the province. Example: If 30% of the natural gas reserves in BC were extracted, the resulting product could fuel 5-6 large-scale LNG plants worldwide, North America and domestic growth, plus customers for 150 years. But natural gas prices, and royalties are low, to make extraction feasible, a market that is willing to pay needed to be found, and relationships with existing industry needed to be developed. Premier Christy Clark chose to focus on liquefied natural gas (LNG) opportunities. If LNG is moved from reserves to the coast, BC is in an ideal position with the closest ports in North America to get LNG quicker and more efficiently to the Asian Pacific market. But the challenge is to move the extracted natural gas from the northeast of the province to the northwest, which requires significant investments (\$14B investment for pipeline, drilling and plant to go ahead) but will also have a dramatic impact on jobs, industrial opportunities and GDP. LNG opportunities will provide revenue for healthcare, education and other services for generations.

It is also important to note that the most important relationship for success is with our First Nations and their willingness to work with industry and government. We want First Nations to be environmental stewards of the land, to protect it for the future and for all others to learn from them. First Nations youth are the fastest growing demographic of young workers and we need to build partnerships for economic development and jobs. The BC government also knows not to follow the past, by dictating the structure, but wants to come together collaboratively to discuss what challenges are faced by First Nations communities and how the process can be improved.

For the BC government, one of the biggest challenges is to address the need for skills training. Australia saw a 45% increase in labour costs when development of its LNG, mining and oil sectors increased. Companies want to ensure that BC and Canada have the right workforce and

skills necessary to be on time and under budget. So far, it appears we are on the right track to avoiding challenges faced by other resource-based economies (Australia).

LNG is going to be a zero-sum game. Canada is lucky we have the lowest mean temperature than other market players currently. Refrigeration is significant in liquefying and moving natural gas, and BC can lower operational costs by 38% compared to Perth, Aus. But we need to be collaborative and have a singular focus for success. It will result in over 100,000 jobs, revenue for small businesses, industry, healthcare and education and the GDP impact is huge. The economy in BC can change forever, but there is no mid-range deal. Partnerships are important and the province doesn't intend to miss the opportunity.

Jody Wilson-Raybould (Regional Chief, BC Assembly of First Nations) spoke of First Nations relationships within BC and Canada and what recent changes will mean for the future of collaboration and partnerships.

Presentation synopsis: Both BC and First Nations have economies that are integrated with our ecosystem and with the recent Williams decision (Tshilcot'in decision in the Supreme Court of Canada) our relationships with land, government, industry will also change. Additionally, First Nations are in a tremendous period of transformation themselves. First Nations view one generation as borrowing land and resources from future generations and original schools of thought argued there should be zero development of natural resources. This has shifted as we realized the need to balance the future requirements and quality of life with the current economic climate and how we can best position ourselves today to create better life for future generations.

The Williams decision resulted in the first declaration of Aboriginal title on Tshilcot'n ancestral lands. We anticipated the decision and likely future similar rulings and Nations will need to go through a decolonization and rebuilding transformation to take advantage of the practical and meaningful benefits on the ground the ruling has enabled. Current Band structures of government need to give way to robust, legitimate, accountable and legally recognized systems of government. We cannot assume that band councils speak for the land title holders. There are 203 distinct nations in BC and companies and government need to deal with the appropriate and correct title holders, not just any group that will speak to them.

At the moment, current risks are mitigated without addressing underlying issues of First Nations groups, hoping they would just go away, or wait for the next person. This needs to change and in both the short and long term, lots of work needs to be done, efficiently, to bring First Nations into the political and economic fold in BC and Canada. Aboriginal title is granted to protect a way of life, to provide economic freedom and alleviate poverty. Conservatively, First Nations could hold 50% of existing crown land titles in BC and the federal government has no process to deal with these claims. The Williams decision is the first, and can help to guide what happens next. Governments need to facilitate relationship building, as in the past, negotiations were approached from the idea that there was no First Nations title holder, or title only applied to

very small areas of lands. Similar discussions are already underway with Metlakatla, Lakwalaams, Haisla and other Nations.

While not the prevailing view of the vast majority of First Nations, there are troubling signs such as radicalism in communities with nothing to lose that can't be ignored. First Nations have a right to self-governance and to protect their way of life. Resolving land claims is a priority and will ensure economic development will continue to support people who believe in the idea of Canada and isolate those who do not. We want to preserve Aboriginal languages and culture within a stronger federation (Canada). We need all governments to negotiate in good faith with First Nations and support the rebuilding of First Nations governments to ensure legitimacy in the eyes of the people they represent. It is a period of transition and nation building and to succeed we need partners, governments to take responsibility. The collective future depends on it.

Rep. Caddy McKeown (MLA, Coos Bay, Oregon) addressed the two current proposed LNG projects in Oregon and the advantages and challenges to each. *(See PowerPoint presentation)*

Presentation synopsis: There are two currently proposed LNG projects in Oregon; the Jordan Cove Energy Project and Oregon LNG, which are in different stages of the permit process. The state is an ideal location for LNG Export facilities because of its prime location and access to the only deep-water port from Seattle to San Francisco. Shipping distance to current markets (Japan, Korea & Taiwan) and emerging markets (China, India) is 5,000 nautical miles shorter than Gulf Coast exporters via the Panama Canal. Neither project requires significant river transit, nor do they cross tribally-owned land. Workforce considerations are able to be met, as initial forecasts demonstrate that 80% of construction labour required can be met from southwest Washington & Oregon. Additionally, rural areas of Oregon would significantly benefit from LNG export development as the declining timber and coal industries have been devastating for many rural economies. Additional forecasts demonstrate the existing pipeline capacity in the Pacific Northwest is able to meet the demands of LNG export, therefore the impact on domestic natural gas prices will be negligible. Safety and environmental impacts have also been mitigated and are in the permitting process. With social license, political and market factors, it is likely one of the projects will be built. LNG on the west coast is inevitable, but we would like to see Oregon as a significant market player.

Joseph Balash (Commissioner for Alaska, Department of Natural Resources) presented the benefits and challenges to LNG in Alaska and the Department of Natural Resources impact on government and state economy.

Presentation synopsis: The Alaskan Department of Natural Resources is the heart of the state government and provides substantial revenue to Treasury for public services. They view their management of resources for Alaskans today and in the future as a significant responsibility. Alaska's Nikiski region is the location of North America's oldest LNG plant, since 1968 and thus have not only perfected water transport of LNG but are also familiar with, and thus able to better mitigate, issues with LNG plants located in and near populated areas. Additionally there is

great opportunity for access to lower priced energy and the commercialization of natural gas from the largest reserves in North America.

As well as significant opportunities, there are challenges as well, scale being the biggest challenge. The proposed Alaska LNG project is a combination of three mega-projects including a treatment plant (\$10B-\$12B), an LNG plant (\$23B) 800 miles away with pipelines traversing mountain ranges (\$10B). The scale is enormous and unprecedented which raises complicated questions for project sponsors, including a robust set of regulatory laws and permitting process. Skilled labour is another challenge as workforce requirements will produce 1000+ long-term jobs and short-term development and construction jobs. Arctic environmental limitations are also a factor in developing resources with limited window of summer for construction and development, and permafrost and freeze-thaw cycles need to be understood across locations. Due to Pacific Rim seismic activity, suitable locations are limited and the existing Nikiski location is ideal.

Additional constraints and impacts on a local level include an influx of families (labour) and impacts on schools and students. Additionally, increased demands on public safety and other social infrastructure and services will be required. All of this contributes to a very complicated project. To address these challenges the Department of Natural Resources has taken steps to become a large equity participant with a 25% stake as the second-largest owner and getting an equal seat at the table with other sponsors. This allows the department to access inside information and be aware of project timelines and can address community impacts, workforce requirements and long-term costs of services and infrastructure. This will let Alaskans to be in the best position to benefit from job creation and skills training. 2018-2019 will be when final investment decisions are made.

Yuen Pau Woo (President & CEO, Asia Pacific Foundation of Canada) presented at Asian market perspective on LNG in North America and specifically the PNWER region.

Presentation synopsis: First, it is very clear that North America has a surplus of natural gas reserves and North Americans will not be able to capture the full value of those resources. Secondly, it will require massive capital expenditures to transport natural gas to the coast for export and overseas transport. Additionally there are social and political licenses to overcome. Third, LNG export is a zero-sum game. There is a narrow window of opportunity because of overseas developments (Australia & Africa) before the market becomes saturated. LNG export is a race to market. It is very clear the incremental demand increases will be from Asia (Japan, Korea and obviously China). “Will the Pacific Northwest be able to export LNG to overseas markets or will we continue to emit hot air?”

At the current time, there is not sufficient understanding of the complexity of Asian markets and the work that is required on this side of the Pacific to ensure success. Coal is largest energy source as there are not cleaner alternatives to date to meet the demands of Asian countries. Renewables are not yet up to the challenge of demand growth, and Japan’s dislike of nuclear

power is a strong opinion in the region. Ensuring energy security through a desire to utilize energy from all sources is Asia's strategy. Additionally, Asia dislikes paying "Asian premium" prices that are significantly higher than North American costs because it is not yet a global market. LNG in the Asian market is not just a commodity. It is tied directly to the regulatory context and will fundamentally change resource allocation, production and distribution. The current LNG industry is very dependent on Asian infrastructure development, which will determine the pattern of how North America can access the markets. LNG cannot be treated as a B2B transaction as many customers are state-owned companies. It is suggested that North America looks at Australia's experience to learn from previous challenges.

Japan: Is the number one importer of LNG, buying 36% of the world's imports. There are 31 current receiving terminals and 9 additionally planned, but no existing national transport pipeline. Markets are regional but there are government plans to de-regulate the distribution network and increase competition. There are four major challenges for Canada to become a supplier in Japan. 1. The high initial cost of investment. 2. Escalation of natural gas prices –what is being done to mitigate them? 3. Both Prime Ministers have agreed to make it happen, so why has it not yet occurred? 4. Bilateral relationships will need to be leveraged for Canada to become a supplier.

China: Is the biggest opportunity for exports. It is currently the third largest consumer of natural gas, but will significantly increase within the next decade to number 1 by 2025. Currently there are only 9 terminals operational but 3-4 times growth is expected by the end of the decade. Natural gas will mostly be for industrial use, not power generation and the markets are even more regionalized than Japan as it is not a nationalized industry. Reforms in China will break up the monopoly of Big 4 petroleum producers and an introduction of municipal natural gas will also increase market demand. Currently pipeline operations are separate from production and interconnectivity in regional delivery will also need to occur. There are also domestic challenges Canada faces including: a complicated approval process including regulatory requirements and social license, a mixed domestic (Canadian) response to LNG developments from newspapers and commentary is heard in China, Canada is very far geographically from China in comparison to Southeast Asia and Australian resources. However if the political relationship with China is strengthened, it should also strengthen commercial pursuits.

India: Geographically India is more distant and underdeveloped (in both infrastructure and market opportunity) to be a realistic market for LNG export. But there are plans to increase infrastructure to 10 plants. It is important for Canada to not lose sight of the Indian opportunity as through the Dominion Project Louisiana and Maryland have signed export contracts to transport LNG through the Suez Canal to western ports in India.

Overall, Asia requires security of LNG supply with regards to price, reliability and geopolitical stability. Canada has a huge surplus and requires security of demand. LNG is a historic opportunity for BC and the window is narrow. It needs to involve more than just private sector

initiatives but with reform in Asia there is opportunity to be a part of Asia's quest for a rational and efficient energy market.

Topic II: Panel discussion addressing the following questions:

- *What are the long term implications of this development for North America?*
- *Would the market support Alaska, BC & Oregon projects?*
- *If one or more of these projects moves forward, what are the workforce impacts across the region?*
- *What are the safety, security and environmental impacts?*

Moderator: Dr. Andrew Walker (VP Global LNG, BG Group)

Panelists: Madeline Whitaker (VP, BG Canada), Doug Bloom (President, Canadian LNG, Spectra Energy), Larry Persily (Federal Coordinator, Alaska Natural Gas Transportation Project), Geoff Stevens (BC Natural Gas Workforce Committee)

Madeline Whitaker (VP, BG Canada) spoke on upstream and project development impacts of LNG.
(Reference PowerPoint presentation)

In BC companies are eager to seize the opportunities presented by LNG development. There are currently 16 projects, ranging in size and totalling 170M tonnes of natural gas, the equivalent of about 70% of current energy market. There are 6 currently proposed pipeline routes from Eastern BC & Alberta to the Coast, ending in either Prince Rupert or Kitimat. Canada has a very large, undeveloped resource base, an extensive existing gas pipeline network and opportunities for joint ventures or M&A. Many companies, including large players Chevron, Shell & XOM have entered the field. BG has identified Prince Rupert as an ideal location after looking at 140 sites along the BC coast. Prince Rupert has existing road and rail infrastructure, is a deep ocean port protected from weather and swells by Haida Gwaii and meets all safety criteria. It is in the early stages of engineering design. Madeline then detailed the environmental and risk assessments and BG's mitigation strategies, reiterated many of the BC advantages discussed by Hon. Rich Coleman, and BG's commitment to building relationships, gaining social license to operate and creating benefits now and for future generations.

Doug Bloom (President, Canadian LNG, Spectra Energy) discussed specifics surrounding LNG Pipelines and the proposed routes. *(Reference PowerPoint presentation)*

The context for LNG in North America has changed significantly in the last decade. 7 years ago there were 50 import projects and now there are over 50 proposed export projects although not all will go ahead. Key issues, already discussed earlier in this session will affect the number and locations of projects that succeed. Demand, particularly from Asia is critical, as there is a stronger push for clean energy sources, particularly with pollution already becoming a significant problem. Price is also a sensitive issues, the closure of nuclear power coincided with the climb out of global recession and oil prices increasing. Price levels need to be sufficient to create investments. Doug also touched on smaller, niche opportunities occurring including mining in constrained sites, shale gas etc. The large multi-nationals haven't necessarily cornered the market and opportunities are still available.

Finally, Doug addressed Spectra Energy's proposed pipeline application including its goal to link existing transmission pipelines and consolidate future proposed projects to leverage cost synergies and minimize environmental impact. There are 20 First Nation groups on the proposed pipeline corridor and Spectra is working closely with them to develop a project they are supportive of and participants in. Additionally the workforce required for the proposed pipelines will have significant positive impact on employment and revenues.

Larry Persily (Federal Coordinator, Alaska Natural Gas Transportation Project) added an Alaskan perspective on pipeline opportunities.

Presentation synopsis: The reason LNG is part of the conversation today is because of shale. Pennsylvania was extracting 300 million geofeet per day of natural gas in 2000 and now 15.5B gf/day is being extracted. Additionally, China was producing enough gas to meet its needs until 2007. Since then, it has been importing 500B cubic feet per day of energy in the form of coal, Russian gas, LNG etc. The certainty of knowing natural gas resources are there and the relatively low production costs of natural gas are also attractive enough that Alaskans want a piece of the market. But the cost of development and delivery are upward of \$ 45-65B and work needs to be done to narrow down these costs and provide a concrete price for consumers. Alaska has a number of key advantages to contain costs, minimize and mitigate risks and create a cost effective product including: proven gas reserves that have been known since 1977, a shorter tanker voyage from Alaska to Asia, a higher BTU product that is well suited for the Japanese market, and a number of projects that have gotten environmental approval and are waiting for government approval.

Geoff Stevens (BC Natural Gas Workforce Strategy) provided insight on the labour and skills required to undertake these LNG projects. *(Note: I did not ever get his PowerPoint but the slides were extensively referenced in his presentation so having it would be helpful)*

Presentation synopsis: The final investment decision on LNG will be dependent on our ability to mitigate the risks inherent in development. One of the key risk areas is our ability to have a skilled workforce to complete projects on time and under budget. Currently universities, industry, government and First Nations groups are all working to address these challenges. It is important to learn from other examples, particularly Australia, that saw projects cancelled because of escalating costs. For example, steamfitters in Western Australia had an average income of \$114K in 2004, which increased to \$180K by 2013 because of increased demand from competing industries (LNG, oil & gas, diamond mining etc.) which put project costs too high to rationalize development. In BC it is important to have a strategy to avoid these issues and collaborate between competitors. An LNG developer's alliance would create a common ground to work together and mitigate costs. It is critical to work with First Nations communities to provide opportunities and gain social license and that there is a shared investment in workforce development and training.

Topic III: Q&A as moderated by Dr. Andrew Walker

Q: One of the principle success factors is government preparedness for import/export of LNG. Are governments and their jurisdictions ready? What could they be doing better?

A: Madeline –The biggest key is understanding the scale of the challenge and the BC government really does understand the colossal opportunity available. They have provided clarity on how decision making works in their government and have been open with sharing fiscal and regulatory structures ahead of

time and soliciting feedback. Preparing for workforce and labour issues is one of the biggest risks and as Geoff discussed, the government is aware and addressing this.

A: Doug –To give an example of Madeline’s point, the government regulator worked through the Easter long weekend to ensure there was clarity and understanding from industry to ensure proposals could reach environmental review. This was done unprompted from Spectra Energy. On a national level, the Federal government made changes to substitute Federal review approvals for those done by Provincial review to eliminate duplication of work. Additionally, they established a Major Projects management office in BC to deal with the large volume of projects in the province. One thing that could improve is that we need to operationalise the regular processing of temporary foreign workers and immigrants. The process needs to be smooth as projects progress to critical development stages.

A: Larry –Keystone aside, environmental impact statements (EIS) are key and the Federal Energy Regulatory Commission (FERC) currently has 13 assessments and therefore will have lots of practice so this stage of the process should go well. Communication is vital. Not just for FERC and the Environmental Protection Agency but also project sponsors. It is important to address community groups differently than industry and gain social license. Anticipating the needs and questions of community is an area that could be improved.

Q: If it’s really about information outreach, we need to speak in a way that develops connection. Is the industry doing enough to really succeed at this? What can industry do to increase and improve outreach?

A: Doug –Acronyms are an impediment to effective communication and making projects understandable. In local communities Spectra uses helicopter flyover footage superimposed onto Google Earth, underwater footage for fisheries impacts and other visual media to communicate with community stakeholders instead of maps and engineering and geological drawings.

A: Madeline –Communication is vital to the development of industry and one of the biggest challenges is social media. Misinformation becomes truth in people’s eyes and the research needs to get out there to educate the public. In the past industry has been poor at this, with greenwashing PR videos of sustainability. And it isn’t just in the communities directly affected by development. Urban populations have significant influence on elections and government, and this misinformation and opposition in the media has obviously been seen as far as Asia (referencing Yuen’s presentation earlier). Industry needs to do a better job of education.

Questions from audience:

Q: Paul Kariya (Clean Energy BC) –What is BG’s view on the role of renewable energy and what are their plans to develop and /or use more renewables?

A: Madeline –BG’s view is there is not sufficient capacity to power an LNG plant (it will use gas) but BG does address its management of greenhouse gasses, undertakes offsetting initiatives and works on FN sponsored projects.

Q: Follow up by Paul –Over time will that capacity develop?

A: Madeline –Future projects could look at using renewable energy yes.

Q: John Leech (Applied Science Technologists & Technicians of BC) –With foreign worker policies and provincial nominees being a polarizing issue, what do you see as trends and the availability of workforce?

A: Geoff –It is a sensitive issue but realistically we won't be able to meet demand through our domestic workforce and current immigrants into the industry. Policy will need to be carefully considered and creativity could help. But realistically it has to happen.

Wrap up and closing –out of time for further questions and action items.