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Bitumen – Adding Value: Canada's National Opportunity

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ABSTRACT

The conference "Bitumen – Adding Value: Canada's National Opportunity," was initiated and sponsored by the Bowman Centre at the Western Sarnia-Lambton Research Park, in partnership with Alberta Innovates – Energy and Environment Solutions, Sarnia-Lambton Economic Partnership and the Canadian Academy of Engineering. The conference brought together representatives from the private sector, the political scene at three levels of government, as well as labour, lobby groups, agencies and technical professionals (contributors shown on page 34).

The purpose of the conference was to focus on oil sands bitumen with a view towards enhancing the discourse about adding value to Canada's resources, specifically that of bitumen extraction and additional value-added processing in Canada.The goal was to stem the loss of wealth inherent in exporting the raw resource. This chapter focuses on the views and perspectives of the many contributors who participated in the conference's five sessions. The keynote presentations were highlighted by the Honourable Frank McKenna, Deputy Chair of the TD Bank Group, and Dr. Jim Stanford, Economist for Unifor. In addition, a key address was made by the Honourable Senator Elaine McCoy from Alberta. A further key address came from Mr. Kirk Bailey, President of Kushog Consulting, and former executive of Suncor Energy Ltd., addressing the perspective of the private sector from a position of his active involvement in oil sands development.

Conference Contributors

Mr. Kirk Bailey
Former Executive Vice President of Suncor's Oil Sands Business Unit and Vice President of Suncor's Sarnia Refinery; Consultant

The Honourable Bob Bailey
Member of Provincial Parliament, Sarnia-Lambton Riding

Mr. Bob Bleaney
Vice President External Relations, Canadian Association of Petroleum Producers

Dr. Clem Bowman
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Dr. Duke du Plessis
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Mr. Ray Fillion
President, Sarnia and District Labour Council

Mr. Brian Love
Assistant Deputy Minister, Ontario Ministry of Economic Development, Trade and Employment

Dr. Richard Marceau
President, The Canadian Academy of Engineering

Mr. John Margeson
Vice President, Chemistry Industry Association of Canada

Senator Elaine McCoy
Progressive Conservative, Alberta

Mr. Gil McGowan
President, Alberta Federation of Labour

The Honourable Frank McKenna
Deputy Chair, TD Bank Group

Mr. Justin Riemer
Assistant Deputy Minister, Alberta Ministry of Enterprise and Advanced Education, Economic Competitiveness Division

Dr. Jim Stanford
Economist, Unifor

Mr. Don Wood
Associate, Bowman Centre & Consultant

Introduction

To launch the conference proceedings, Drs. Clem Bowman and Richard Marceau examined the historical evolution of Canada and its economic development, and put forward a vision for Canada based on Big Projects. Big Projects have been the fundamental means by which nation-building has taken place through a basic cooperation and collaboration of the private sector and government. Investment economics have a requirement of a return on capital and was concluded not to be the deciding factor in the initiation of these projects which shaped the nation. With consideration of value-addition to resources as the main theme, perspectives from the provincial representatives were followed by the chemical producers' representative and discussions of potential markets and refining viability.

The second day of this gathering dealt primarily with bridging the economic impact of oil sands development with the realities of geography, national economics and interprovincial trade, as well as environmental considerations. The labour and small business communities of Sarnia-Lambton took the opportunity to communicate their respective attributes and capacities to support any significant capital investment slated to enhance the capture of full value for oil sands bitumen by locally processing it to fuels and chemicals.

It is apparent from the content expressed during the conduct of this conference, and offered by renowned and singularly eminent individuals from many walks of life, that there is much concern about the lack of clearly defined policies and a framework for creating a Pan-Canadian effort to maximize the potential wealth of oil sands bitumen. This chapter captures these contributions in a summarized and succinct way with a view towards addressing the possibilities that are on Canada's horizon.

The Last Spike

Conference Communiqué

The following set of statements represents the consensus conclusions of the conference.

1. Lack of access to international pricing for Canada's oil products represents a value destruction of $20 to $30 billion per year.
2. An expanded pan-Canadian pipeline network is key to accessing both domestic and growing global markets.
3. Canada should launch national-scale energy projects as the foundation of its energy strategy and its pathway to sustainable wealth creation and jobs.
4. The Ontario and Alberta governments commit to dramatically enhance their value-added collaboration to improve energy supply chain opportunities, to enhance transportation networks and to develop new energy-efficient and environmentally-advanced technology.
5. A Sarnia-Lambton bitumen upgrading project to produce refinery ready crudes was identified as a high priority national-scale project, with a call for action, with strong support by a committed region.
6. Delegates urged Canada to shift to a more diversified value-added economy, away from its historic staple-based economy.
7. An Alberta Government/Industry study is being launched to identify pathways to increase the competiveness of oil sand products in North American and International markets.
8. New technology is key for the long term sustainable development of Canada's natural resources. (The COSIA initiative was identified as an example of the commitment of oil companies to collaborate and share advances in improving environmental performance).

Background to Conference Communiqué Statements

The following sections contain the background discussions of the conclusions that led to the eight communique statements.

1. Lack of access to international pricing for Canada's oil products represents a value destruction of $20 to $30 billion per year.

Value Destruction: According to the Honourable Frank McKenna, Canada is seeing "value destruction of a scale we've never witnessed before in this country." The lack of take-away pipeline capacity means Canada is captive to a single purchaser, and this purchaser does what all purchasers do in a monopoly situation: gives Canada a discount to the benchmark price of oil. "The result of that has been an enormous economic and fiscal catastrophe for Canada." It is a catastrophe that Canadians don't speak of, because the magnitude of what is taking place is not appreciated. TD Economics Group estimates that:

- $25 to $30 billion in value will be destroyed in 2013,
- $276 billion will be lost in taxes by 2025, and
- $1.3 trillion will be lost in GDP by 2025.

The amount of money lost is so staggering that it is overwhelming, and must be reduced to meaningful terms. The Hon. McKenna said this represents thousands of nursing and teaching jobs, new schools, better highways, better healthcare, and more money for those in need. "Any fraction of that amount of money that we are vapourizing every day would make the life better of every single Canadian."

The Call: The Hon. Mr. McKenna issued a call not just for a value-added national energy infrastructure, but a call to create a symbol that will make Canada a better country. "This country could lead the world in growth if we could just get off the launching pad some of the exciting projects that we are capable of delivering." All Canadians must be part of the solution to build a national energy infrastructure from coast to coast. "So it brings the country together and I think that represents probably the most important value-added components of all." A pipeline from sea-to-sea will demonstrate that Canada is a country where provincial boundaries are not toll booths, where Canadians are working together to enhance the well-being of every citizen in this country.

The History: Dr. Jim Stanford shared the observation that Canada's economic history can be traced "from beavers to bitumen". Canada has a long history of exploiting staples, or natural resource-based products, for export. Canada sold staples in unprocessed or barely-processed forms to more advanced trading partners and, in turn, imported manufactured goods. Canada's earliest history is based on fishing and the fur trade. Later, timber was cut and exported, or processed to paper and exported. Canada continues to export grains, minerals, forestry products, energy, and petroleum products such as bitumen. Now, approximately two-thirds of all exports are unprocessed. "Canadians are asking is there not more for us in the world economy than just digging stuff out of the ground?" To answer this question, Dr. Stanford stated that "we have to be thoughtful about making the most of our resource base." The problem of over-reliance on staples production and a resulting structural underdevelopment of our national economy has been with Canadians since Confederation. The cycles of staples extraction and export have marked the chapters of the country's national economic history.

The Economics: Dr. Stanford added that resource development and export has costs as well as benefits to Canadians. Canada has seen these economic cycles and mechanisms in the staples industries in the past. Dr. Stanford has worked with the Canadian Centre for Policy Alternatives to understand the current so-called "Bitumen Cliff." Their report[1] states that there are declining exports from other Canadian merchandise and service sectors. This has contributed to a cumulative current account deficit of over $150 billion since 2008. The "Bitumen Cliff" report goes further to state that the country's resource dependence has negative implications for innovation, and productivity growth.

[1] Canadian Centre for Policy Alternatives: The Bitumen Cliff (2013), Tony Clarke, Diana Gibson, Brendan Haley, and Jim Stanford

Potential Policies: Dr. Stanford drew several conclusions. He stated that there is nothing automatic about the flow of oil sands benefits to research and development, nor to the economic activity of the other provinces. It was determined that interprovincial economic activity spin-offs from Alberta developments are surprisingly weak. "We have to go out and seek them. We have to put in place policy levers to maximize them." He emphasized that the long-run implications of resource dependence are serious and include economic impacts, environmental concerns, and geopolitical influence. This was confirmed by Senator Elaine McCoy, who explained Canada's current position in the world economy: Canada ranks third in the world for oil reserves, after Saudi Arabia and Venezuela. But Canada is sixth in the world for annual oil production. Sen. McCoy drew from a Senate report[2] to state that Canada is in this position because the country has not become a global trader. To become a global trader requires an attitudinal shift and a reconfiguration of the way Canadians view their country and its behaviour.

A Labour Perspective: Mr. Gil McGowan posed a challenge to create a new consensus of what Albertans and Canadians can do to add value to Canada's resources. Canadians cannot allow others, such as "Big Oil", to continue to create a consensus for Canada. When there is a conflict between the positions of industry and the expectations of the public, the broad public interest must trump narrow private interests. Mr. McGowan also added that former Alberta Premier Peter Lougheed was correct, and Albertans must "think like owners", such that owners should never let others make all the important decisions regarding their assets. In this regard, Mr. McGowan pointed to the experience of Norway and the development of North Sea oilfields. The Norwegian developments occurred within a framework that the oilfields are a public resource. The development of this public resource would be public policy that recognized the public interest, and is strengthened by public participation. Policy must not shy away from public participation and even public ownership to ensure that public interest goals are met, Mr. McGowan concluded "the oil sands are one of Canada's most important public resources. We need a clear public policy framework that ensures it is developed in the Canadian public interest."

2. An expanded pan-Canadian pipeline network is key to accessing both domestic and growing global markets.

Senate Perspective: Sen. McCoy brought two priorities from the Senate Report "Now or Never" supporting the conclusion that an expanded pan-Canadian pipeline network is key for access to both domestic and growing global markets. The priorities are:

1. **Canada must strive for collaborative energy leadership.**
   The federal, provincial, territorial and municipal governments, industry, environmental groups and Aboriginal leaders need to come together to chart a course for responsible development and marketing of Canada's energy resources.

2. **Advance nation-building through energy infrastructure.**
   Canada must modernize and expand its electricity systems and oil and gas pipelines to connect regions and diversify export markets to further strengthen the national economy.

[2] "Now or Never" The Standing Senate Committee on Energy, the Environment and Natural Resources: July 2012

Pipeline Discussion: Mr. Kirk Bailey emphasized that while concerns about the economy are mainly expressed by Canadians, there are international concerns about the environmental impacts of the oil sands. These concerns centre on pipelines, greenhouse gas emissions, water use, and land impacts. Recent evidence and historical experience continue to support the assertion that pipelines are the safest way to transport crude oil. The next best alternative is rail. While this does not mean that leaks from either pipelines or rail are acceptable, it confirms that the safest way forward is to continue pipeline capacity growth.

Several contributors noted that, in the midst of the bitumen value destruction, there is a huge pipeline debate in Canada. Canada has had pipeline debates before, such as the Trans-Canada pipeline debate and the MacKenzie Valley pipeline debate. The current debate is different because it is a proxy for other issues such as Aboriginal land claims, the rights of provinces, and the development of the oil sands. This has led to the emotion of the debate being magnified a hundred-fold by vested interests. The specific case of the proposed West-to-East Energy Pipeline project was brought forward because of its significant impacts:

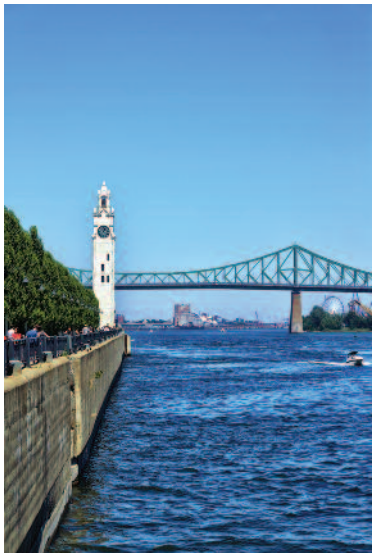
- A ship takes 9 days less to reach Mumbai, India from New Brunswick than from the Pacific coast. This is one of the huge market opportunities off the East coast of Canada.
- Over 5,700 direct construction jobs in New Brunswick and Quebec, and more jobs to move the product through terminals and shipping facilities are at stake.
- If the West-to-East pipeline can be built to Montreal, there is an even bigger opportunity for upgrading more of our petroleum. It just makes sense that if more processing occurs in Canada, then more jobs and wealth stay in Canada.
- Moving the oil from Alberta to the west coast or east coast allows for the transport of oil to the skilled workers. This leads to the distribution of the demand for human resources around the country.

Policy Considerations: Dr. Stanford urged adoption of several policy levers including one to target higher Canadian value-added content both upstream in the extraction of staples, and downstream in the upgrading and processing of raw materials through to final manufacturing. This includes the consumption of Canadian bitumen. Another policy lever is to have a pro-active national strategy to expand interprovincial links. Pipelines are an example of the interprovincial links and the flow of raw materials to the end users.

Mr. Bob Bleaney shared recent data on global crude oil reserves by country. Canada is at the top of a list of 14 countries for openness and attention given to environmental rigour and stewardship of the resource. Canada's petroleum producers have a number of initiatives underway to continue to improve environmental performance. These efforts address production, the integrity and operation of pipelines, and protection of marine environments with the prevention of spills and improved abilities to respond and recover oil from spills.

3. Canada should launch national-scale energy projects as the foundation of its energy strategy and its pathway to sustainable wealth creation and jobs.

Economic and Social Balance: Dr. Stanford urged that active management of resource developments is essential to increase the benefits to all Canadians, and to reduce economic and social costs. There is an opportunity to enhance national net benefits from both sides of the equation. The first key policy priority Dr. Stanford put forward was to constrain the pace of development consistent with Canada's environmental and economic objectives. He pointed out that former Alberta Premier Peter Lougheed also called for this. Dr. Stanford added that resource development is a tremendous source of potential opportunity for Canadians, but the country must be smart and proactive about how the resource is used. He added, "I am heartened by the fact that we are meeting here together, all of us stakeholders, business, labour, government, community, with the goal of trying to do that."



Markets and Government: The cost of doing nothing is the destruction of health care, education and many other services Canadians hold dear. Canada is a country of dialogue and consensus. Economic theories tell Canadians the markets should find, finance and profit from adding value to our resources. As history has proven, however, this is not the case. If it were not for government intervention, Canada would not have had the Hibernia oil field, the Churchill Falls hydro-electric development, the St. Lawrence Seaway, and even the Oil Sand developments. There are times government has to give a helping push. Governments can give a legal licence to operate and Canadian society gives a social licence after reaching a consensus on key issues. There is a need for a clear call to the federal government to launch national-scale energy projects as the foundation of its energy strategy and its pathway to sustainable wealth creation and jobs.

BIG Projects: Dr. Bowman and Dr. Marceau examined 12 past Big Projects in Canada, to understand the driving forces and the financial structures that led to their launch. Two forms of partnerships were identified as significant to the launch of the projects: the first form of partnership involved the establishment of crown corporations – seven of the twelve big projects involved this model, and in five of these projects, the government has since divested fully to the private sector. The second form of partnership is that of a private sector company entering the market with the negotiated support of a range of government risk sharing mechanisms, such as technology support, pioneer project grants, tax policies, and even equity participation. Four of the big projects involved this type of partnership.

Additional commonalities of Big Projects include:

1. Big Projects are nation-wide, or enable connections between Canadians in the east and the west. None of the projects have a north to south, nor export focus.
2. Big Projects have been used, or have become, symbols of nation-building.

For decades it has been commonly known that Canada has strengths in basic and applied research. Canada's weakness has been crossing the chasm from research to successful commercialization. Big Projects are the enablers of transitioning Canadian research to

successful commercial applications. Canada must now identify champions to execute the next Big Projects, such as bitumen upgraders for Lambton County, Montreal, St. John and Kitimat. Based on prior public and private sector risk sharing examples, a suitable financial architecture can be established.

4. The Ontario and Alberta governments commit to dramatically enhance their value-added collaboration to improve energy supply chain opportunities, to enhance transportation networks and to develop new energy efficient and environmentally advanced technology.

Pan-Canada: The base case of goods and services flow from Ontario to Alberta is:

- $8.4 billion of goods in 2010, and
- $16.0 billion of services in 2010 (more than doubled since 1999)[3].

This conference called on the Ontario and Alberta governments to dramatically enhance these figures.

Mr. Justin Reimer and Mr. Brian Love addressed the topic of value-added collaborations between Alberta and Ontario. Mr. Reimer referred to the report "Fuel for Thought"[4] published by the Conference Board of Canada. It indicated that nearly one-third of the domestic inputs for oil sands investment are from outside Alberta, and 15% of the domestic inputs come from Ontario. This investment translates into direct and indirect jobs, including the manufacturing industries in Ontario.

Mr. Love referred to a Canadian Energy Research Institute report[5] which projected annual sales of Ontario products and services to the oil sands could potentially surpass most of Ontario's traditional international export markets. It is expected that approximately 80% of the oil sands reserves will be developed by in situ or drilling technologies. This will demand the sophisticated engineering and manufacturing capabilities which exist in Ontario.

Mr. Reimer emphasized that oil sands production facilities are increasingly engineered for modular construction, shipping, and assembly. This provides many advantages including capital cost savings, Canadian sources of materials, and the use of Canadian skilled labour. Currently, there are logistics limitations regarding the size of modules that can be moved from Ontario to Alberta. Innovations in module construction, as well as improvements of the transportation corridors, will support the growth of modular facilities. Mr. Love added that Ontario offers a number of advantages, compared to international suppliers, for collaboration with Alberta. These include no foreign exchange, cross-border or customs issues. There are no language or cultural barriers between the two provinces. Ontario offers top-notch manufacturing, quality, and labour standards. As well, there is a large existing manufacturing capacity, with potential for growth.

Mr. Reimer offered that there are four areas of policy collaboration between Alberta and Ontario in the areas of transportation, manufacturing, technology, and also in value-added

[3] "National and provincial-territorial input-output tables, 2010"; CANSIM 386-0003, released November 8, 2013

[4] "Fuel for Thought: The Economic Benefits of Oil Sands Investment for Canada's Regions"; The Conference Board of Canada report by Alan Arcand, Michael Burt, Todd A. Crawford: October 2012

[5] Canadian Energy Research Institute (CERI) Study No. 125, Aug 20122, A Decade of Staged Oil Sands Growth (2010-2020)

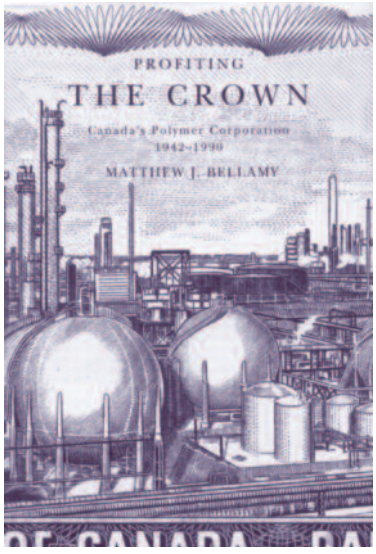
upgrading and refining facilities. In addition to all the business-to-business collaboration that is well-established, the provincial governments are already collaborating in other areas. An example of a government program is the "Energy Connections – Oil Sands" program[6] which engages Ontario manufacturers directly with Alberta project owners, engineering procurement companies, and tier-one suppliers.

Mr. Reimer noted "our two provinces are pillars of the petrochemical industry", and this point was confirmed by Mr. John Margeson of the Chemistry Industry Association of Canada. Alberta and Ontario are the home of many key participants in the Canadian downstream chemical industry, which is the fourth largest amongst all domestic manufacturing industries. Chemical product exports rank second among all manufacturing industries.

The Canadian chemical industry links Canada's rich resource endowment to recognizable value-added manufacturing products used in construction, textiles, electronics, and other day-to-day goods. Petrochemical products are a higher value-added end product for bitumen than fuels. The value of petrochemicals can be four times greater than the value of bitumen, while further manufacturing to raw materials for consumer goods can generate products valued at over five times greater than the value of bitumen.

While the Canadian chemicals industry has had limited investment in new capacity over the past 10 years, it is now poised for growth. The situation has changed due to new government policies as well as changes in feedstocks. The emergence of Sarnia as a bio-hybrid chemistry cluster is also an advantage.

The history of the Canadian chemical industry is defined by step-changes in growth driven by government policy or strategic decisions. Mr. Margeson gave three examples of decisions, starting in 1915 in Quebec, when acetone was first produced to supply the munitions industry. This decision catalyzed the growth of the chemical industry in Quebec. The second example was the manufacture of synthetic rubber in Sarnia during World War II. This strategic decision laid the foundation for the Chemical Valley in Sarnia. The final example is Alberta, where in 1974 the government influenced companies to use ethane to produce ethylene. Now, two world-scale petrochemical clusters exist in Alberta.



Several speakers indicated that the inter-provincial benefits of the oil sands are limited now, but there are opportunities. Mr. Reimer was clear that "these benefits can only be realized if we take a strategic, collaborative, and intentional approach." He went on to challenge the conference participants to do something "to optimize the value of this resource for Alberta, Ontario, and Canada".

Labour's Views: The perspective and situation of labour in Sarnia and Lambton was presented by Mr. Ray Fillion, President of the Sarnia and District Labour Council. He confirmed that Sarnia has the capabilities to fulfill Alberta's needs for skilled trades and available labour. The Labour Council works diligently with its membership to assure that there is a match between the demand for labour, and the availability of skilled trades. There have been many recent examples of how the Labour Council has drawn workers from outside the region to meet the timelines of local projects. A unique advantage brought forward by the

[6] This is an ongoing effort with the Canadian Manufacturers and Exporters (CME) comprised of regular conferences and trade shows to bring businesses in Alberta and Ontario together.

local labour movement, supported by the government and industry, is the opportunity to have project agreements which assure steady work without any interruptions during the term of the project agreement. Another local strength is the ongoing education of members through the Sarnia-Lambton Industrial Education Co-operative. This effort avoids expensive duplication of training, and delivers current and world-class education. The result is an exceptional safety record in Sarnia-Lambton.

5. A Sarnia-Lambton bitumen upgrading project to produce refinery ready crudes was identified as a high priority national-scale project, with a call for action, with strong support by a committed region.

Case Study: Mr. Don Wood examined the business case for an upgrader in Sarnia-Lambton. A hypothesis was proposed that a Sarnia-Lambton upgrader is viable. This hypothesis was evaluated by examining the following six essential and supporting conditions.

1. Capture of the value-added will benefit all Canadians.
2. Bitumen is deliverable through existing pipelines.
3. All stakeholders will be advantaged.
4. Production will be globally competitive and markets are available.
5. A social license is obtainable.
6. The project is financeable via single proponent or multiple partners.

The development of a business case has continued from the date of the conference to the publishing of this book and has confirmed the validity of these conditions. The details of the business case are presented in chapter 4 of this book.

6. Delegates urged Canada to shift to a more diversified value-added economy, away from its historic staple-based economy.

Dr. Stanford explained that dependence on staples leads to a number of concerns. In general, staples are globally traded commodities with volatile price and demand cycles. Dr. Stanford reminded conference attendees that resources, such as the cod fishery on the east coast, will eventually run out. Value-adding jobs in the many processing industries are located abroad instead of in Canada, and the extraction of staples in Canada is both capital and infrastructure intense. There can be a disproportionate reliance on foreign capital, as seen recently with foreign ownership of companies in the oil sands. Due to the significance of the oil sands on the domestic economy, companies in the staples extraction industry may have disproportionate political influence.

Canada has witnessed wave after wave of interest in the country's abundant natural resources and has not captured their full value in Canada. Dr. Stanford clarified this by stating, "that problem of over-reliance on staples production and a resulting under-development of our national economy has been with us since Confederation. The cycles of staples extraction and export have defined our national economic history. The pejorative term of "hewers of wood

and drawers of water" now has been expanded in the current decade to "hewers of wood, drawers of water, and scrapers of tar."

Dr. Stanford asserted that, "We have to be thoughtful about making the most of our resource base," to allow workers to add value to the economy, as well as be part of their communities. On this point Mr. Bob Bailey added, "I think a big part of being a responsible political leader is to have these men and women at home every night with their children." Mr. McGowan added that jobs at upgrading sites are not remote, so workers get home each day, and that is important to the labour movement. The Hon. Mr. McKenna emphasised these points by saying, "So it brings the country together and I think that represents probably the most important of the value-added components of all." Mr. Kirk Bailey added that Canada can reduce exposure to boom-and-bust commodity price cycles where success is dictated by global pricing by investing in innovative value-adding processing of resources into competitive products.

Fundamentally, if Canadians are to realize the value of the country's resources, Canadians must heed the advice of Sen. McCoy, who urged that the time is "now or never." Sen. McCoy mused, that even if Canada does not seize the opportunity to become a global trader in diversified markets and products, then Canadians will continue with safe, peaceful and rewarding lives. However, Canada has a national opportunity to go beyond seeking simple "access to markets" for our raw materials. This applies not only to the oil industry, but also to other Canadian industries such as Ontario's manufacturing base, and the British Columbian forest products industry.

Reviewing recent research, Dr. Stanford concludes that there is strong evidence of resource-driven deindustrialization in Canada. "This doesn't mean that we have to leave everything in the ground – that's not what I've argued nor what most participants in this debate have argued. What it does mean is that we have to be cognizant of the risks of resource-driven deindustrialization and take policy measures to look at it." Dr. Stanford elaborates on this important topic in Chapter 2 of this book.

7. An Alberta Government/Industry study is being launched to identify pathways to increase the competiveness of oil sand products in North American and International markets.

Today's oil sands export products fall into two main categories of crude oils: diluted bitumen (dilbit) and Synthetic Crude Oils (SCO). Various blends of these products are also marketed. Bitumen-derived refinery feedstocks have several challenges that impact their marketability, including market value, growth potential and the overall competitive position in US and international markets. Several government initiated studies have been carried out to understand the challenges and opportunities in different markets. A study conducted by the Institute of Energy Economics Japan (IEEJ) examined the marketability of various oil sands products in Asian Countries[7].

More recently AI-EES working in partnership with other government departments and industry has embarked on a phased investigation of the competitiveness of oil sands products in North American and international markets. Phase 1, completed in 2012, examined how

[7] Marketability of Oil Sands Products in Asian Countries; Prepared for: The Alberta Government by: The Institute of Energy Economics, Japan (IEEJ), March 2007

various quality levels impact competitiveness in PADD II refineries[8]. The study's findings highlighted the importance of reducing vacuum residue and TAN through lower cost partial upgrading to improve the market value of dilbit products while also reducing diluent requirements for pipeline transport. The suitability of different quality improvement technologies (thermal conversion, hydro conversion, solvent deasphalting) were identified. The methodology used to quantify the impact of vacuum residue, TAN, sulphur, aromatics and basic nitrogen was described.

Phase 2, started in February 2014 by Alberta and Saskatchewan in partnership with six oil sands operators, will first identify what crude qualities are valued by different world refinery regions and markets, and then determine the infrastructure and technologies needed to produce crudes suitable for these markets. The suitability of dilbit and partially upgraded pipelinable bitumen products in Asian and North American markets will be evaluated. The study is being carried out under the direction of a government-industry steering committee.

8. New technology is key for the long term sustainable development of Canada's natural resources. (The COSIA initiative was identified as an example of the commitment of oil companies to collaborate and share advances in improving environmental performance).

Environmental Considerations: In 2012, the Canadian Oil Sands Innovation Alliance (COSIA) was created. This alliance allows the sharing of intellectual property to find alternatives to reduce the volumes of water and steam used in oil sands operations. There are also efforts to improve the recycling of water, and allow for faster land reclamation. These efforts have resulted in a significant reduction in the GHG emission footprint of the products from the oil sands.

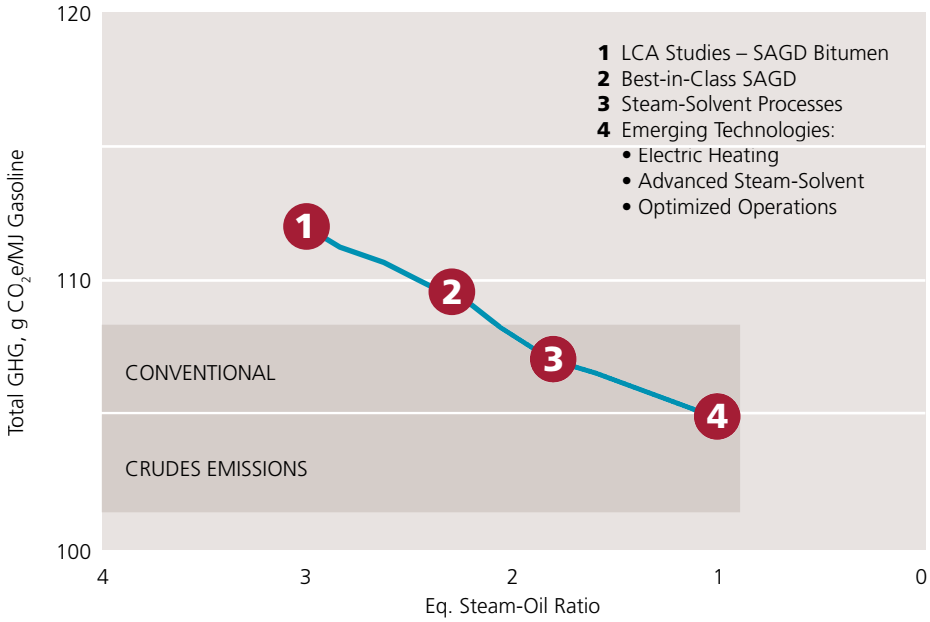
A comparison of full life-cycle GHG emissions shows that the most recent in situ oil sands production produces 5% more kilograms of CO_2 equivalent per barrel of refined product than the average barrel of oil refined in the US. The most recent production from mined oil sands has only 2% more. Dr. du Plessis presented a chart at the conference which showed the effect of different technologies on the amount of greenhouse gas emissions produced. As efficiency improvements occur in the Steam Assisted Gravity Drainage (SAGD) process, the steam required to oil produced ratio has improved. With the introduction of steam/solvent processes, as well as the optimization of operations, the steam to oil ratio continues to decline. A number of emerging technologies, such as electric heating, advanced steam/solvent systems, and the further optimization of operations, will continue the downward trend. This also leads to a reduction in GHG emissions since steam production generates more GHG emissions than conventional crude production processes. The trend of improving efficiencies in the steam to oil ratio, along with the concurrent decrease in GHG emissions, positions oil sands production close to conventional oil production in terms of emissions production intensity.

The environmental impact of the oil sands and the current downstream industry is recognizable, measureable, and reported. Dr. Stanford reminded the audience of the ongoing

[8] Technology Opportunities to Improve the Competitiveness of Alberta's Oil Sands for U.S. Refineries, conducted by Jacobs Consultancy for Alberta Innovates-Energy and Environment Solutions, October 2012

need to hold the industry accountable for environmental impacts. Mr. Reimer added, "We place a very high value on our environment and we are taking significant measures to protect it." Several examples of efficiency improvements and reductions in GHG intensity were presented by Dr. du Plessis (Figure 1).

Figure 1
Reductions in Greenhouse Gas Emissions from Bitumen Recovery



Many speakers asserted that technology innovations, and capturing value in Canada, reduces the environmental impact of bitumen extraction and processing. Mr. Bleaney added, "By virtue of these efforts we've been able to significantly improve the GHG footprint of the product from the oil sands."

Call to Action

It is demonstrated that Canada's Energy Strategy is already being acted upon. Such a strategy is not a document, but it is the way that interested parties are getting together and figuring out ways to move our country forward. There are engaged discussions and debates underway across Canada: where energy sources are found, along the pipelines and corridors that transport it, where oil products are refined and processed, as well as within governments and amongst stakeholders such as First Nations and environmental groups. These discussions will change the current perception of Canadians as "hewers of wood, drawers of water, and scrapers of tar."

While the discussions and debates are healthy, and typically the way that Canadians achieve consensus, there must be urgency directed towards a common goal of nation-building. Canadians must be thoughtful about the pace of resource development and Canada's role in maximizing the value of its resources.

All the analysis is available. It is leadership that is needed. Who will push the button?

Biography

Dr. Katherine Albion is the Director of the Bowman Centre, located at the Western Sarnia-Lambton Research Park. Dr. Albion joined the Western Research Park in 2008, as the Commercialization and Research Engineer. Katherine is a graduate of Western University, where she received a Bachelor's Degree in Biochemical and Environmental Engineering, and was awarded a PhD in Chemical Engineering. Her PhD research involved the development of non-invasive acoustic flow monitoring techniques for pneumatic and hydraulic transport pipelines. As Director of the Bowman Centre, Dr. Albion is responsible for the research and small business centre at the Research Park, where she works with industry, entrepreneurs, and academic researchers to advance and commercialize their technologies and processes. Since joining the Research Park, Katherine has co-authored Academy reports focused on the development of renewable and sustainable energy technologies identified as having a significant impact on the future of Canada's energy supply. She has also made energy presentations to the private and public sectors, including the Federal Conservative Energy Caucus in Ottawa.

Marshall Kern is an Associate at The Bowman Centre. He is a corporate director in the healthcare sector, and a conference speaker on governance processes. He teaches ethics through the Nipissing University School of Business. Marshall completed a career with Dow Chemical; leaving from a global position where he was recognized with the company's highest honour for his environmental commitment.

Walter F. Petryschuk was born outside the Point Pelee National Park in the most southerly part of Canada. Raised on a farm, his schooling included a one-room elementary facility, his secondary education was in Leamington, attending the University of Toronto for his Bachelor's degree and McMaster University for his Masters and Doctorate degrees in Chemical Engineering. His professional career led to plant and site management of Polysar Corporation's facilities and Suncor's refinery in Sarnia and the presidency of the Sun-Canadian Pipeline. Subsequently, he was responsible for McMaster University's spin-off start-up, the Management of Technology and Innovation Institute, and ended as Director General of the National Research Council's manufacturing technology institutes in London and Vancouver. He is currently a volunteer contributor as Associate, the Bowman Centre.