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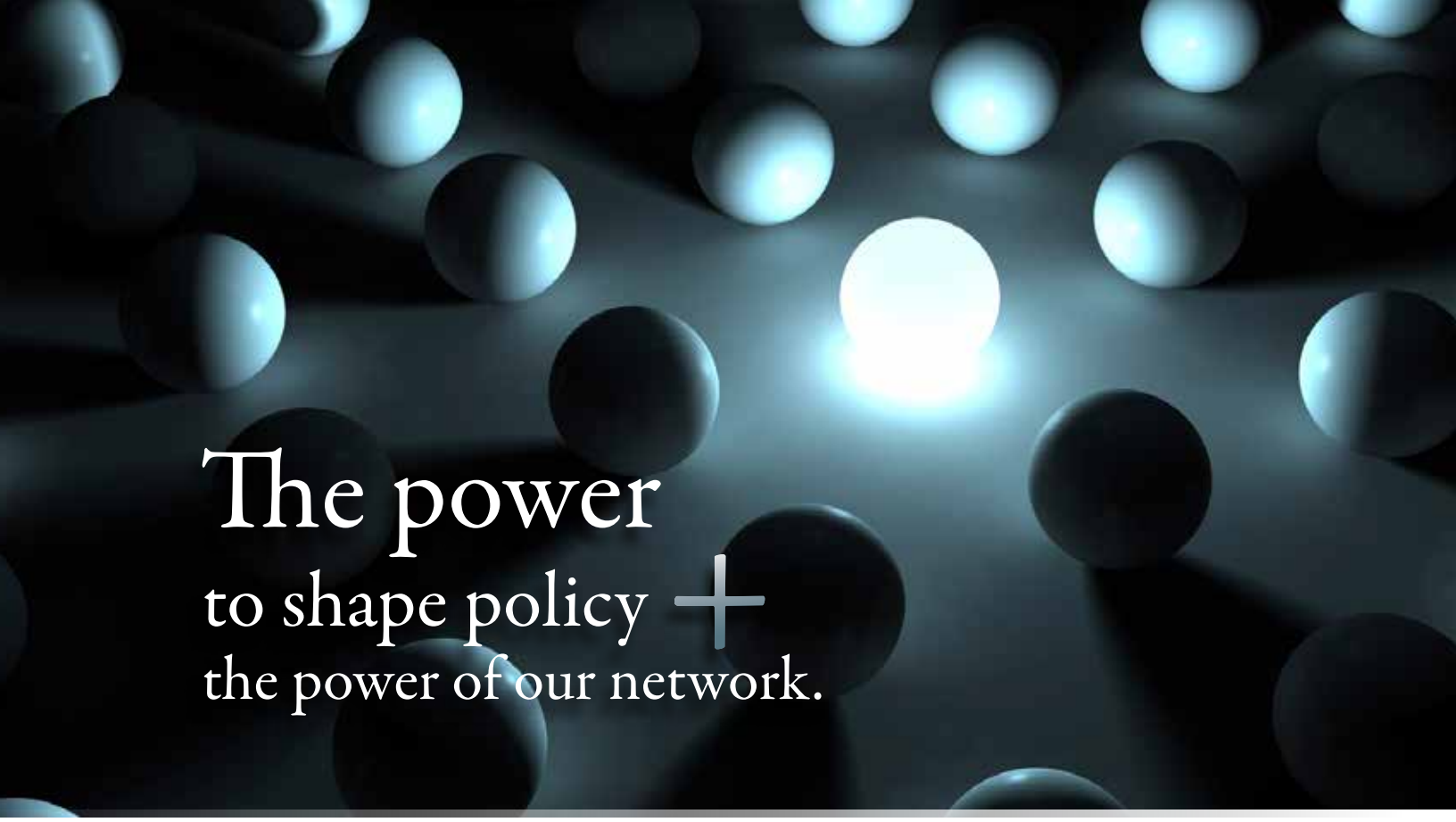
$50 MILLION A DAY

A lack of infrastructure is preventing Canadians from maximizing their potential benefits in energy markets.

Right now, it costs us millions every day.

In the future—as U.S. demand declines—it's going to really hurt.



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Six Cold Hard Facts about Canadian Oil and Gas

Oil and gas, its transportation and its environmental and social impacts, have become one of the most pressing policy debates of the last few years. This report lays out six facts every Canadian needs to understand about the issue:

1. Oil and gas power the Canadian economy.
2. Canada's only international energy market, the United States, is on a path of declining imports.
3. New opportunities lie in Asia, but Canada lacks the infrastructure to get there.
4. Canada loses billions each year from its lack of energy transport infrastructure.
5. Energy can be, and is, transported safely.
6. The world is not running out of oil. Today's energy companies must be the catalysts to move to a lower carbon energy future.

ENERGY MARKETS ARE CHANGING. WILL CANADA ADAPT?

A revolution has taken place over the past decade, radically transforming the balance of power in global oil and gas markets.

The United States, the destination for virtually all of Canada's oil exports, has dramatically increased its production of oil and gas to the extent that the International Energy Agency is predicting energy self-sufficiency for North America by 2035.[1] Canada's only energy market will not need as much of our oil, and in many North American natural gas markets, the U.S. is transitioning from customer to competitor.

The U.S. is virtually Canada's only foreign market for oil and gas: 98 per cent of our petroleum exports and 100 per cent of our natural gas exports go to our southern neighbour. Our only gas market is expected to become a net exporter by 2020. Our only crude oil market will experience zero growth in imports over the next 30 years. Canada must respond to changing energy markets or face a major risk to national prosperity.

We cannot continue to rely on U.S. energy markets alone.

The fastest growing markets for Canadian oil and gas now lie in non-OECD nations, which will drive almost all growth in global energy use for the foreseeable future. This is particularly true in Asia, which is set to double its energy demand from 2008 levels over the next 30 years.[2]

This century's great opportunities for trade lie in Asia; our energy commodities could open these doors for Canada.

What $50 million a day means to Canada

"We're losing some $50 million every single day—$18-19 billion every year because our resources are landlocked."

When Minister Joe Oliver spoke those words to the Saint John Board of Trade last December, he was referring to the incredible discount Canadian companies are forced to give for their oil products because they cannot access world markets. Different analysts come up with different numbers, and the value of the discount demonstrates significant fluctuations over time. However, the basic fact is that Canada's failure to diversify its energy markets is leaving millions of dollars on the table every day.

$50 million can make a real difference to the life of Canadians.

In one day, $50 million could pay for the Saint-Laurent Sports Complex in Montreal ($43 million).

In two days, $50 million could pay for a year's worth of medical, laboratory and drug supplies for the Hospital for Sick Children ($72 million in 2013).

In three days, $50 million could pay for one year of funding for the federal government's Homelessness Partnership Program ($119 million per year).

1 International Energy Agency. *World Energy Outlook 2012*. November 2012.

2 Asia Pacific Foundation of Canada. *Securing Canada's Energy Future: Report of the Canada-Asia Energy Futures Task Force*. June 2012

Canada should be well positioned to respond to these opportunities. Canadian oil production is expected to double to over six million barrels per day over the next two decades, which would place Canada among the world's top four oil producers.[3] Production from shale gas will grow in B.C., Alberta and Saskatchewan, with potential production in Quebec and New Brunswick as well. We also possess deep experience in the extraction, transformation and transportation of natural resources and in mitigating the environmental effects of their production.

However, instead of emerging as a force in global oil and gas markets, Canada lacks the infrastructure needed to access new markets abroad and at home. We lack the infrastructure to get our energy to tidewater and overseas, and as a result must accept lower prices for our landlocked products. We lack the infrastructure to transport Western energy across the country, and as a result the Eastern provinces have no choice but to import oil from places like Algeria, Angola and Iraq.

What's at stake for Canada is millions of jobs, tax revenues and other economic benefits. Several reputable businesses and research organizations have attempted to quantify exactly what's at stake for the Canadian economy:

- A 2012 CIBC report argued that transportation bottle necks are causing Canadian oil to be sold well below world prices, resulting in a *$50 million dollar a day* loss to Canadian oil producers at that time.[4]
- A 2012 Canadian Energy Research Institute report claims that failing to realize currently planned pipeline projects could cause Canada to forego *$1.3 trillion in GDP and $276 billion in taxes* between 2011 and 2035.[5]
- A 2013 Canada West Foundation report stated each stalled pipeline project that would open up access to world markets costs the country *$30 to $70 million in forgone economic benefits every day.*[6]

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3 Canadian Association of Petroleum Producers. *Crude Oil Forecast, Markets & Transportation*. June 2013

4 Nathan Vanderklippe. Oil price gap cost producers $50 million a day. *Globe and Mail*. March 12, 2012. Accessed August 26, 2013. www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/oil-price-gap-costs-producers-50-million-a-day/article4096108/#dashboard/follows/

5 Canadian Energy Research Institute. *Pacific Access: Part 1 – Linking Oil Sands Supply to New and Existing Markets*. Study no 129 Part 1. July 2012.

6 Canada West Foundation. *Pipe or Perish: Saving an Oil Industry at Risk*. February 2013. http://cwf.ca/pdf-docs/publications/PipeOrPerish_Feb2013-1.pdf

While the exact figure varies as a function of market dynamics, all these analysis agree that the economic cost of inaction is huge.

Despite the urgency of Canada's need for new energy transport infrastructure, we have been slow to act. Canadians are struggling to reconcile Canada's role as an energy producer with the challenge of climate change. They are worried about the safety of energy transport infrastructure and its impact on their communities. These concerns are important, but need to be understood in the light of some key facts.

The fact is, from 2002 to 2011, Canadian pipeline operators moved 1.5 trillion litres of oil with a success rate of 99.999 per cent.[7] In the 2000s, there was not a single tanker oil spill by a Canadian vessel.[8] The tragedy in Lac-Mégantic underlies the need for Canada to ensure the highest standards of rail operating safety as this petroleum traffic expands. As with bridges, roads or any other infrastructure, 100 per cent safety cannot be guaranteed, yet Canada's overall safety record is strong.

The fact is, failing to export Canadian energy products will have little impact on global greenhouse gas emissions. Up to 80 per cent of the emissions from a barrel of oil is created when gasoline burned, not when crude oil is produced.[9] The world will rely on oil and gas to move goods and people and to power homes for the foreseeable future. If Canada does not export Canadian oil and gas, the world will not stop using hydrocarbons, but Canada will have missed the opportunity to invest the proceeds of its energy resources back into Canadian society.

The fact is, Canada can best play a role in protecting the global environment by learning how to develop these resources in the best way possible. Canadian oil and gas resources are not uniquely damaging to the global climate; in 2010 the emissions from a single U.S. coal plant were half as large as the entire oil sands.[10] The world's largest shale gas reserves lie in China and there are bitumen or heavy crude reserves in Russia, Venezuela and other nations with less stringent environmental standards than Canada.[11] Developing ways to minimize the environmental impact of energy production and transport and sharing this knowledge with the world could lead to real and important outcomes for the environment.

It is time to have a balanced discussion about what it means to be an energy nation in the 21st century. The lack of reliable access to tidewater for oil and gas and its attendant effects on the Canadian economy is one of the key barriers to our nation's competitiveness.

Balancing the essential contribution oil and gas makes to our standard of living with environmental and social responsibility is not easy. But the hard fact is we do not have the option of sitting this one out.

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7 Canadian Energy Pipeline Association. *Maintaining Safe Pipelines*. Accessed August 26, 2013. www.cepa.com/about-pipelines/maintaining-safe-pipelines

8 Macdonald Laurier Institute. *Making Oil and Water Mix: Oil Tanker Traffic on Canada's West Coast*. March 2012.

9 Government of Canada. *Oil Sands: A Strategic Resource for Canada, North America and the Global Market*. Accessed August 26, 2013. www.nrcan.gc.ca/energy/sites/www.nrcan.gc.ca.energy/files/files/OilSands-GHGEmissions_e.pdf

10 According to the U.S. Environmental Protection Agency, the Scherer plant emitted about 23 million metric tons in 2010, compared to 48 million metric tons for the oil sands. http://chronicle.augusta.com/news/metro/2012-01-12/coal-fired-georgia-plants-lead-nation-greenhouse-gas-emissions-epa-data-show

11 U.S. Energy Information Administration. *Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States*. June 10, 2013.

OIL AND GAS POWER THE CANADIAN ECONOMY

The oil and gas sector has long been a significant contributor to Canada's economy, accounting for approximately seven per cent of GDP and 550,000 direct and indirect jobs in 2012.[12] Oil and gas activity impacts the economy through many channels, including:

Exports – In any given year, a full fifth of Canada's exports come from the oil and gas sector. As a trading nation, our exports play a key role in ensuring the prosperity and quality of life of all Canadians.

Investment – Oil and gas revenues are a strong source of investment in Canada. TD Economics has calculated that the contribution from increased investment in Canada's oil and gas sector accounted for 20 per cent of Canada's GDP growth in 2010 and 2011.[13]

Government revenues – Royalties and taxes from oil and gas projects contribute to government revenues and help to fund vital government services and programs. For example, in 2011/12 the oil or gas industry provided:[14]

- $1.2 billion in payments to the British Columbia government;
- $1.8 billion in payments to the Saskatchewan government;
- $100 million in payments to the Nova Scotia government;
- $2.8 billion in payments to the Newfoundland and Labrador government. Incidentally, in 2013, the province's spending on health care was $2.9 billion.[15]

New shale gas plays in Quebec and New Brunswick also offer the potential for substantial economic benefits. For example, a recent report by the Canadian Energy Research Institute (CERI) found that if Quebec were to produce enough gas from the Utica Shale to export, the potential boost in tax revenues to the province would rise to $21 billion over the next quarter century.[16]

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12 Canadian Association of Petroleum Producers. Basic Statistics. Accessed August 26, 2013. http://www.capp.ca/library/statistics/basic/Pages/default.aspx

13 TD Economics. Pipeline Expansion is a National Priority. December 2012. Accessed August 26, 2013. http://www.td.com/document/PDF/economics/special/ca1212_pipeline.pdf

14 Canadian Association of Petroleum Producers. *Industry Across Canada*. Accessed August 26, 2013. http://www.capp.ca/canadaIndustry/industryAcrossCanada/Pages/default.aspx

15 Government of Newfoundland and Labradour. Budget 2013: A Sound Plan, A Secure Future. Accessed August 26, 2013. http://www.budget.gov.nl.ca/budget2013/highlights/future_newfoundland_labrador.pdf

16 Canadian Energy Research Institute. *Potential Economic Impacts of Developing Quebec's Shale Gas*. Study no 132. March 2013.

Purchases of goods, equipment and services – Apart from the direct impacts on government coffers, oil and gas industries are also major consumers of goods and services from central Canada. For example, oil sands projects will need $55 billion in goods, materials and services from Ontario suppliers by 2035.[17] Energy is also important to the country's financial sector centred in Toronto. Twelve per cent of the listings on the Toronto Stock Exchange are from energy companies, the second largest industrial group on the TSX after mining.[18]

The economic impacts of the oil and gas sector are not concentrated in a single province but reach across the country. From direct contributions to government revenues to acting as a customer for machinery and equipment suppliers, the oil and gas sector is a driver of economic growth.

However, radical changes in global energy markets are threatening to undermine this important cornerstone of national prosperity.

17 Canadian Energy Research Institute. Economic Impacts of the Petroleum Industry in Canada. July 2009.

18 TMX. A Capital Opportunity: A Global Market for Oil and Gas Companies. Accessed august 26, 2013. www.tmx.com/en/pdf/OilGas_Presentation.pdf

CANADA'S ONLY OIL AND GAS CUSTOMER IS ON A PATH OF DECLINING IMPORTS

A new combination of older technologies have allowed for the exploitation of oil and gas right in the heart of North America.

Hydraulic fracturing, or fracking, is not a new technology, but it has only recently been used in such broad commercial application. First employed by Stanolind Oil in 1949, fracking involves using a mixture consisting of 98 to 99 per cent water and additives under high pressure to create fractures in the rocks that trap oil and gas.[19] When combined with horizontal drilling techniques that have been widely used since the 1980s, fracking has enabled access to resources long thought commercially inaccessible.

Fracking has transformed energy production in North America. Ten years ago, investment in North America was flowing into import terminals for liquefied natural gas (LNG), and there was widespread talk of *peak oil*. Today, the IEA projects energy self-sufficiency in natural gas production for the U.S., and the LNG terminals are being built for export. North American oil supply is projected to rise by almost four million barrels per day (BPD) over five years or nearly two-thirds of the total non-OPEC increase.[20]

This is, quite simply, a situation few but the most optimistic petroleum geologists would have thought possible 10 short years ago.

Nowhere is the impact of fracking been more pronounced than in the United States. The International Energy Agency predicts the use of fracking to unlock light tight oil and shale gas resources, coupled with fuel efficiency advances, will transform North America into a net energy exporter around 2030.

The U.S. is currently Canada's only foreign market for oil and gas: 98 per cent of our petroleum exports and 100 per cent of our natural gas exports go to our southern neighbour.[21] As Figure 1 shows, our only gas market is expected to become a net exporter of natural gas by 2020. Net natural gas imports into the U.S. fell by 25 per cent in 2011 alone.[22] Over the next 30 years, imports to our only crude oil market will experience zero growth.

The U.S. will continue to be an important customer for Canadian energy, but as it continues to reduce its reliance on imports, we can no longer afford to assume that its patronage will be enough.

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19 Carl T. Montgomery and Michael B. Smith. Hydraulic Fracturing: History of an enduring technology. Journal of Petroleum Technology. Accessed August 26, 2013. http://www.spe.org/jpt/print/archives/2010/12/10Hydraulic.pdf

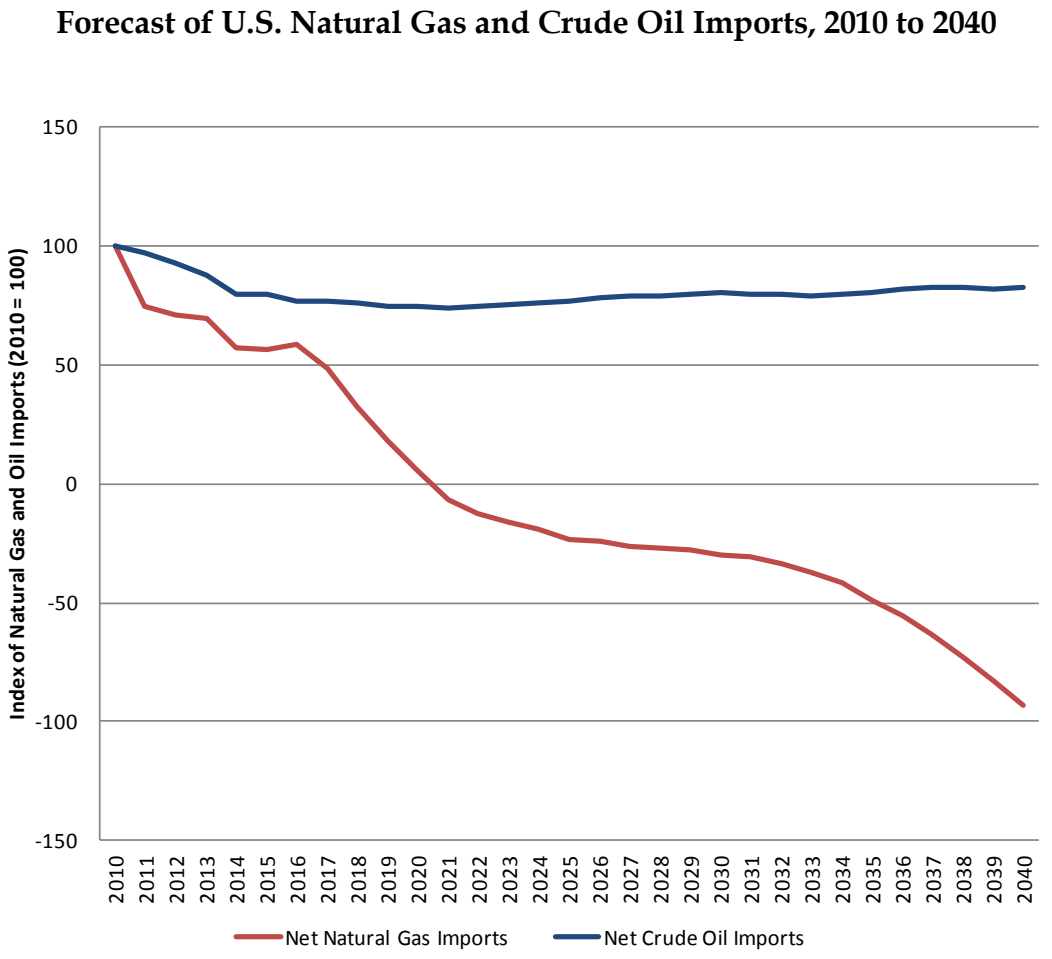
20 International Energy Agency. Supply shock from North American oil rippling through global markets. May 14, 2013. Accessed August 26, 2013. http://www.iea.org/newsroomandevents/pressreleases/2013/may/name,38080,en.html

21 Natural Resources Canada. Important Facts on Canada's Natural Resources. October 2011.

22 U.S. Energy Information Administration. Annual Energy Outlook 2013. April 2013. http://www.eia.gov/forecasts/aeo/source_natural_gas_all.cfm#pipeline_exports

Figure 1
Canada's only oil and gas customer is shopping at home

Hydraulic fracking has made an abundance of natural gas and oil resources available to U.S. markets. As a result, U.S. natural gas imports are set to fall dramatically over the next thirty years, to the point where the U.S. will become a net exporter by 2020. Imports of oil are set to remain stagnant, falling -0.6 per cent over that period.



Source: U.S. Energy Information Administration Annual Energy Outlook 2013

NEW OPPORTUNITIES LIE IN ASIA, BUT CANADA LACKS THE INFRASTRUCTURE TO GET THERE

While the U.S. market does not provide growth opportunities for Canadian energy, there are other options. In fact, the U.S.' declining energy imports is a special case, as most of the world's largest economies—including the European Union, China, India and Japan—are expected to become increasingly dependent on energy imports over the next 20 years.[23]

Asia is the region that will see its energy imports increase the most dramatically. The Asian Development Bank predicts the region's oil imports will rise by 207 per cent over the next 30 years (Figure 2). Natural gas consumption will rise by 201 per cent from 2010 to 2035.[24]

Much of this growth will be driven by China, which will become the world's largest energy importer by 2015. Over the next 20 years, China's demand for gas will rise 283 per cent while demand for oil will rise 73 per cent.[25] However, significant trade opportunities also lie in Japan, currently the world's largest importer of natural gas, and in South Korea.

Canada has a number of advantages in competing for Asian energy markets.

We have energy. Canada's oil reserves are the third largest in the world, and we are currently third in gas production.

We allow private investors open access to oil and gas resources, unlike many other parts of the world (*see Open Access: A huge Canadian advantage*).

We have a stable political and economic climate that encourages investment.

We have a strong record of technological innovation and management expertise.[26] Chinese investors, in particular, are increasingly looking for partnerships that can expand their knowledge base.

We have strict environmental protection and safety laws and regulations for all companies involved in developing Canada's oil and gas resources.

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23 U.S. Energy Information Administration. Annual Energy Outlook 2013. April 2013. www.eia.gov/forecasts/aeo/source_oil_all.cfm#tightoil

24 Asian Development Bank. Asian Development Outlook 2013: Asia's Energy Challenge. 2013

25 British Petroleum. BP Energy Outlook 2030: China Fact Sheet. Accessed August 26, 2013. www.bp.com/content/dam/bp/pdf/statistical-review/EnergyOutlook2030/Country-insights/China_Fact_Sheet.pdf

26 www.pwc.com/en_CA/ca/energy-utilities/publications/pwc-canadian-survey-2013-05-en.pdf

Open Access: A huge Canadian advantage

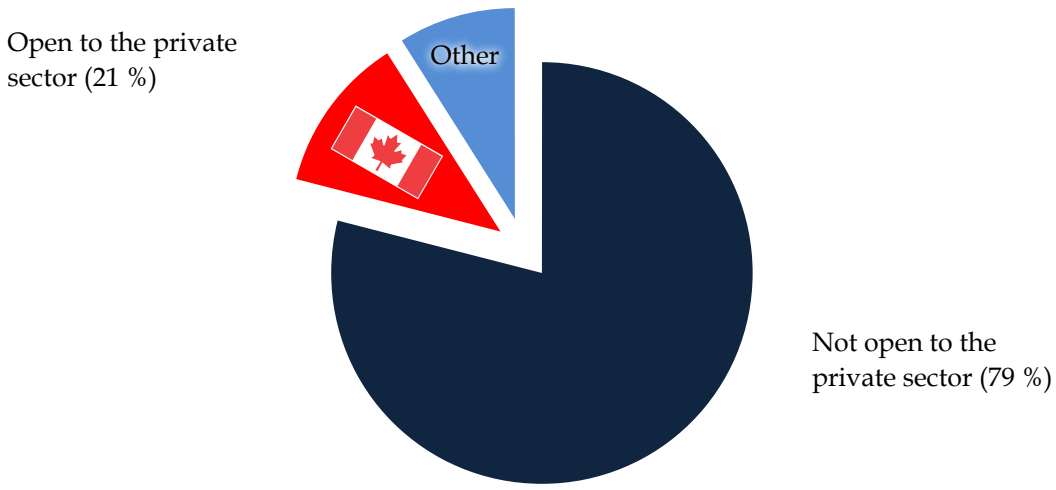
An under-appreciated aspect of this discussion is the sheer size and scope of the oil and gas industry itself. A very large proportion of the world's oil and gas resources are held by governments and are not open to investment by private firms.

It is difficult to accurately capture the size of many state-owned enterprises, many of whom feed their profits directly into government revenues, but The Economist attempted to quantify the relative size of each of the principal players in late 2011.

It concluded that the two largest State-Owned Enterprises (SOE) in the petroleum sector were each roughly four times as large as the 10 largest publicly traded oil & gas companies combined.

The fact that Canadian oil and gas resources are available to private investment is a significant advantage. While Canada holds only around 13 per cent of global oil reserves, the country holds almost 60 per cent of the oil that can be accessed by private investments.

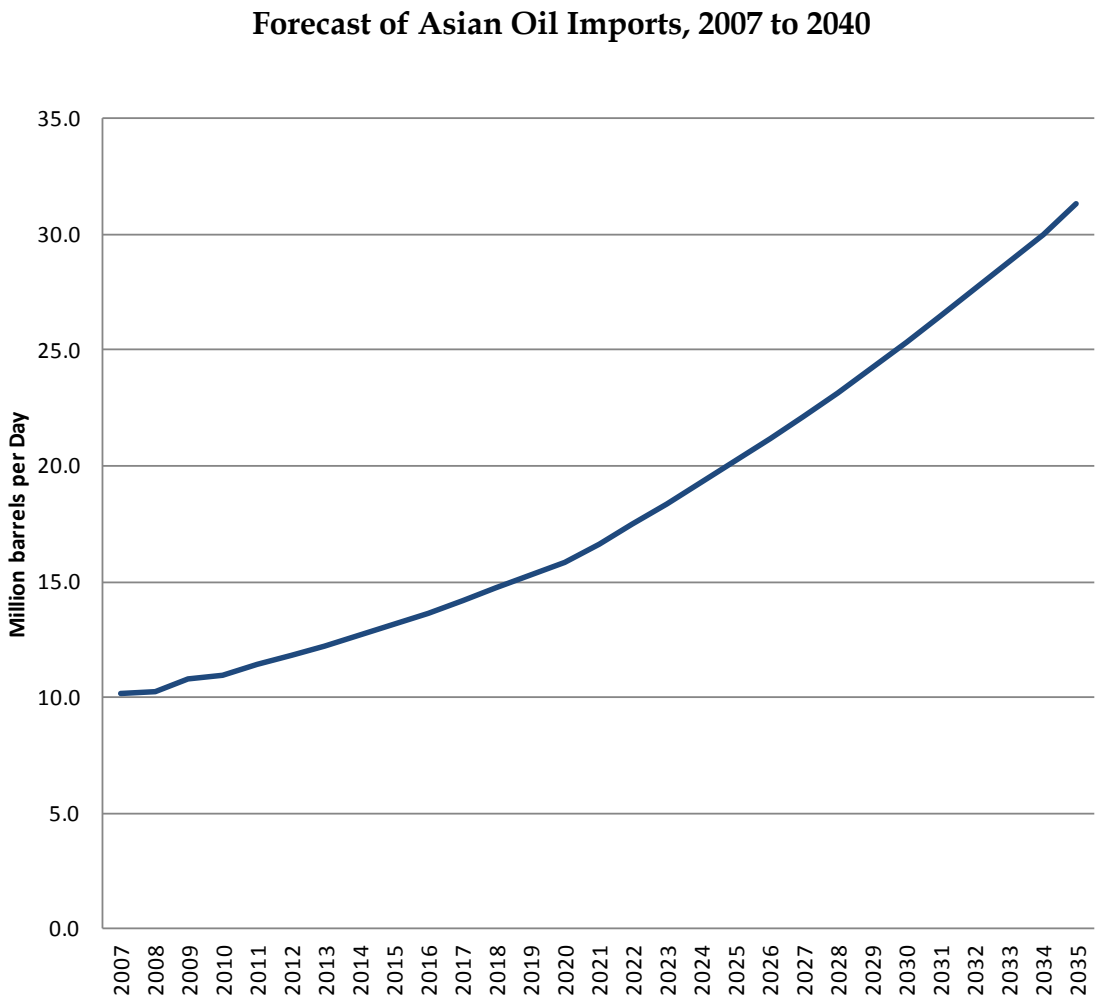
Global Oil Reserves



Source: Natural Resources Canada, CAPP

Figure 2
Energy Hungry Asia

Asian economies will need substantially more oil and gas to fuel homes and move their goods and people as they continue to industrialize. Production will not keep up with consumption, causing oil imports to more than triple by 2035.



Source: Asian Development *Bank Asian Development Outlook 2013: Asia's Energy Challenge*

But all these advantages mean nothing if Canadian energy producers cannot get their products to world markets. We simply do not have the pipeline, rail or LGN processing infrastructure to get our oil and gas products to tidewater.

As of spring 2013, Canada does not have a single LNG export facility. We have only one oil pipeline—Kinder Morgan's Trans Mountain line—capable of bringing oil to the West Coast. Our energy resources are essentially landlocked.

This lack of infrastructure is preventing Canadians from benefiting from new dynamics in global energy markets. It is costing us millions each and every day and, unless resolved, will stand in the way of future opportunities.

THE LACK OF ENERGY TRANSPORT INFRASTRUCTURE IS COSTING CANADA BILLIONS

Transportation infrastructure is holding Canada back from leveraging its oil and gas endowment into economic prosperity.

In terms of oil, the existing North American pipeline capacity is not sufficient to service both the planned development of Western Canadian resources and the rapidly expanding production coming online in the United States.

Canadian producers are losing money even when their products are sent down to the United States. Pipeline bottlenecks in the U.S. have caused Canadian oil products to be heavily discounted against world prices (see *Canada's Double Discount*).[27] In 2012, CIBC calculated that this discount costs Canadian oil producers as much as $50 million *a day*.[28]

Canadian Oil's Double Discount

Oil prices are set relative to international benchmarks. The two most commonly used benchmarks are North Sea Brent, based on oil produced off the coast of Norway, and West Texas Intermediate (WTI), the principal North American benchmark.

While the price difference between Brent and WTI is normally around $5, over the last few years it has widened to around $20 (in early 2013) due to pipeline bottlenecks at WTI's delivery point in Cushing, Oklahoma, which made it difficult to get North American crudes down to the gulf coast and off to world markets.

Source: TD Economics

Canadian producers face a second discount for their products. Canadian oil products tend to be heavier, and hence harder to refine. To some extent, it is normal that they trade for a lower price than high quality crude like WTI.

However, Canadian oil blends have had to compete with growing U.S. production for the same pipeline roots, resulting in dramatically lower prices than normal. The difference between WTI and Western Canadian Select reached as high as $34 in December 2012.

Add on the price difference between WTI and Brent, and Canadian heavy oil was trading at $57 below world prices at that time.

27 TD Economics. Drilling Down on Oil Price Differentials. March 2013. http://www.td.com/document/PDF/economics/special/DrillingDownOnCrudeOilPriceDifferentials.pdf

28 Vanderklippe. Oil price gap cost producers $50 million a day. Globe and Mail.

The price difference between Canadian crudes, WTI and Brent fluctuates depending on production levels in Canada and in the U.S., and on the availability of alternative transportation, like rail, among other factors (Figure 3). Yet, railways are releasing some of the pressure on pipelines by moving an anticipated 140,000 carloads of crude in 2013. With new origins and destination facilities being put in place, it is expected that rail will move two to three times more crude within the next three years.

While the discount will ebb and flow, the issue will likely never completely subside as long as North American transport infrastructure essentially landlocks Canadian crude.

Some of the proposed oil pipeline projects under consideration would not target world markets but Central and Eastern Canada instead. Because eastern ports are more easily accessed from North Africa and the Middle East, central and eastern importers are facing the exact opposite problem from western producers: while western producers export at a discount, eastern refiners import at the world price. The lack of flexibility hurts refiners and consumers in Eastern Canada, which currently meets 40 per cent of its demand for crude oil domestically and imports the remaining 60 per cent from OPEC nations.

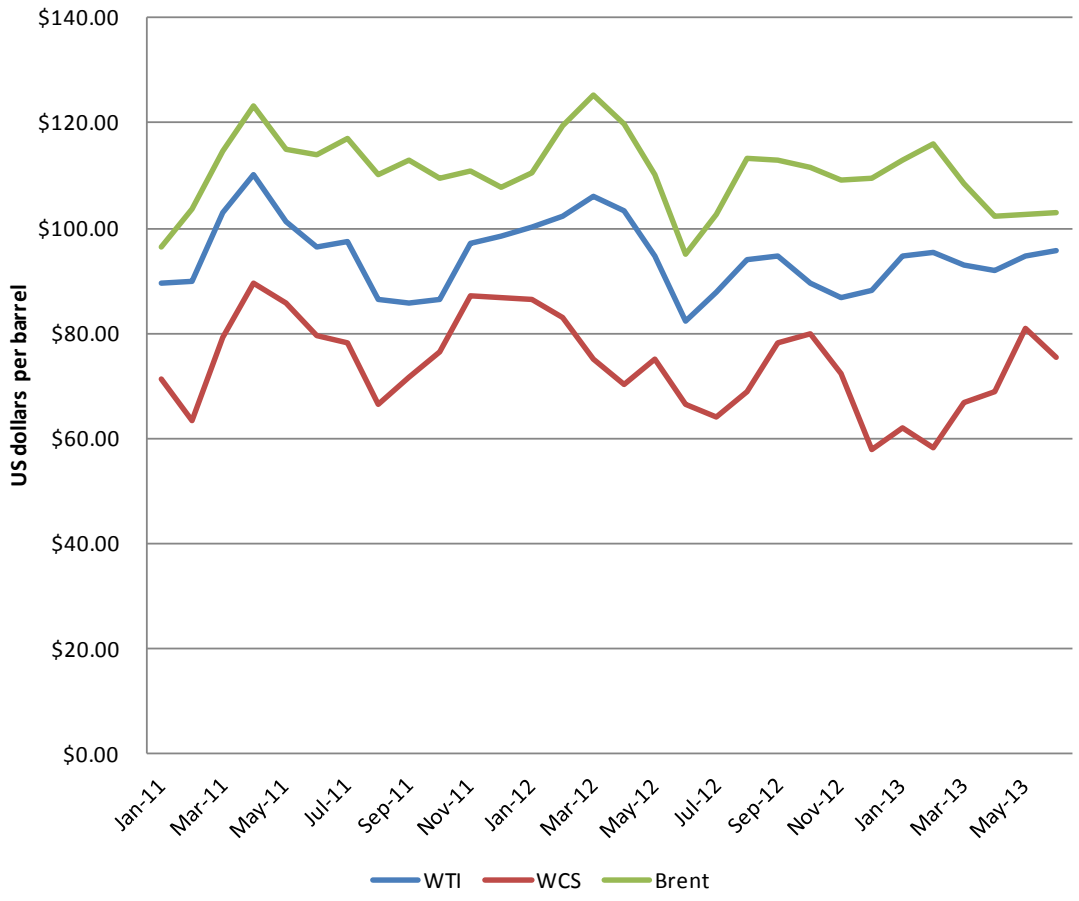
Inadequate transportation infrastructure is also preventing Canadians from fully leveraging the benefits of their natural gas resources. New production of shale gas in the U.S. has driven North American gas prices to record lows. While North American gas producers receive about US$3 per million Btu of liquefied natural gas, Asia consumers pay between US$14-US$18.[29]

29 Yadullah Hussain. Asian push for lower prices may hurt Canadian LNG project. Financial Post. Accessed August 26, 2013. http://business.financialpost.com/2013/03/27/asian-push-for-lower-prices-could-hurt-canadian-lng-projects/?__lsa=f925-ce93

Figure 3
Canada's Double Discount

Over the last few years pipeline bottlenecks in the U.S. have been pushing down the price of Canadian crude oils like Western Canadian Select (WCO–the benchmark oil sands blend), or Edmonton Par Crude (the benchmark for conventionally produced Western Canadian oil). As this graph shows, Canadian crude oils have been trading well below both the North American benchmark (Western Texas Intermediate or WTI), which itself has been trading below Brent (the global benchmark), hence the 'double discount' that is costing Canada millions of dollars per day.

Average monthly prices of Brent, WTI and WCS, January 2011 to June 2013



Source: U.S. Energy Information Administration, Baytex

If Canada can build the necessary infrastructure on time, there is an obvious opportunity for Canadian producers to sell into the higher market. Six proposed export terminals are underway, and Canada could start exporting gas to Asia as soon as 2014.

However, Canada is not the only nation seeking to access the tremendous opportunity Asian natural gas markets represent. After 2015, Equatorial Guinea, Australia, Indonesia, Russia, and possibly the United States will have LNG export capacity. With more than 650 million tonnes of new LNG capacity planned for around the world, it is clear that someone will be left out in the scramble for Asian markets.[30]

Being the first to the market matters. Ninety per cent of the world's 372 LGN tankers are booked on long term charters, making market entry difficult in the short to medium term. Many of the new LNG tankers being built are contracted to transport Australia's burgeoning gas production.[31]

Billions in economic benefits and thousands of jobs are at risk. The Conference Board of Canada has estimated that increasing Canada's gas production by 365 billion cubic feet per day would provide 8,854 additional jobs, almost $1.7 billion in additional GDP and $416 million in additional payments to governments over the next 25 years.[32]

But it can't be done while remaining captive to North American markets. Canada needs to act fast if it is to secure the tankers and contracts to be able to supply natural gas to Asia.

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30 Hussain. Asian push for lower prices may hurt Canadian LNG project. Financial Post.

31 Reynold Tetzlaff. Oil and Gas Export Challenges. Pricewaterhousecoopers. Accessed August 26, 2013. http://www.pwc.com/ca/en/doing-business-in-alberta/oil-and-gas-export-challenges.jhtml

32 The Conference Board of Canada. The Role of Natural Gas in Powering the Canada's Economy. December 2012.

ENERGY CAN BE, AND IS, TRANSPORTED SAFELY

Much attention of late has focused on the means by which energy resources are brought to market. High profile accidents like the derailment in Lac-Mégantic (2013), the pipeline spill into the Kalamazoo River (2010) or the Exxon Valdez (1989) spill are tragedies that have caused widespread and lasting fear over the risks inherent to energy transport. It is important that the transportation of energy be done safely.

But decisions on something as essential as energy transport must be decided based on a full assessment of the facts, taking into account overall safety records as well as actions and regulations and technologies that can reduce risks to the greatest degree possible.

What is the safety record of oil and gas transport in Canada?

Pipelines are an incredibly effective and safe way to transport oil and gas. Almost all of Canada's onshore oil and gas resources are transported by members of the Canadian Energy Pipeline Association (CEPA). From 2002-2011, they moved 1.5 trillion litres of oil and spilled only 8.3 million litres. That's a success rate of 99.999 per cent.[33]

Liquids pipelines in Canada carry everything from bitumen that has been mixed with diluents (dilbit) to conventional and synthetic crude oils to natural gas liquids.

Recent studies by the National Research Council in the U.S., among others, have concluded that dilbit is not more corrosive than other crude oils, a concern often cited by environmental groups.[34] Both dilbit and synthetic crude bitumen blends (synbit) have been safely transported in pipelines in Canada for more than 30 years and conventional crudes for greater than 60 years.

Safety technology is continuously evolving. As each improvement emerges, new technology is absorbed into the safety system.

In the past few years, the railway industry has increasingly been called upon to transport oil, offering the industry greater flexibility in routes and a better ability to service some coastal refineries. The scale is smaller, in the order of approximately 250,000 bpd in mid-2013, but it is growing quickly to address market needs.

33 Canadian Energy Pipeline Association. Maintaining Safe Pipelines.

34 National Research Council. TRB Special Report 311: Effects of Diluted Bitumen on Crude Oil Transmission Pipelines. 2013

The tragedy in Lac-Mégantic underlines the need for Canada to continue to ensure the highest standards of rail operating safety. Railways are highly regulated, including all aspects of operations and safety. The industry has a long history of transporting dangerous goods like hydrocarbons and the Canadian carriers have established the leading safety records in North America. As the investigation proceeds, Canada will learn more about the causes of the accident and any proposals for regulatory changes to address them.

Canada, thanks in part to its rigorously-enforced maritime transportation practices, has an excellent safety record in transporting oil by sea. Despite growing marine traffic, there was not a single oil spill by a Canadian oil tanker in the 2000s.[35] There are extensive safeguards in place that escape casual observation but that stand as testament to the commitment of the sector to ensuring as close to 100 per cent safety as possible. For example, modern ships that export crude oil must have features like a double hull to protect the cargo from exposure to the outer hull of the vessel (missing from the Exxon Valdez) as well as dual engines and propellers for ease of control and propulsion system redundancy.

These measures have been very effective, with the rate of spills falling dramatically over the last few decades despite a rise in seaborne trade (Figure 4).

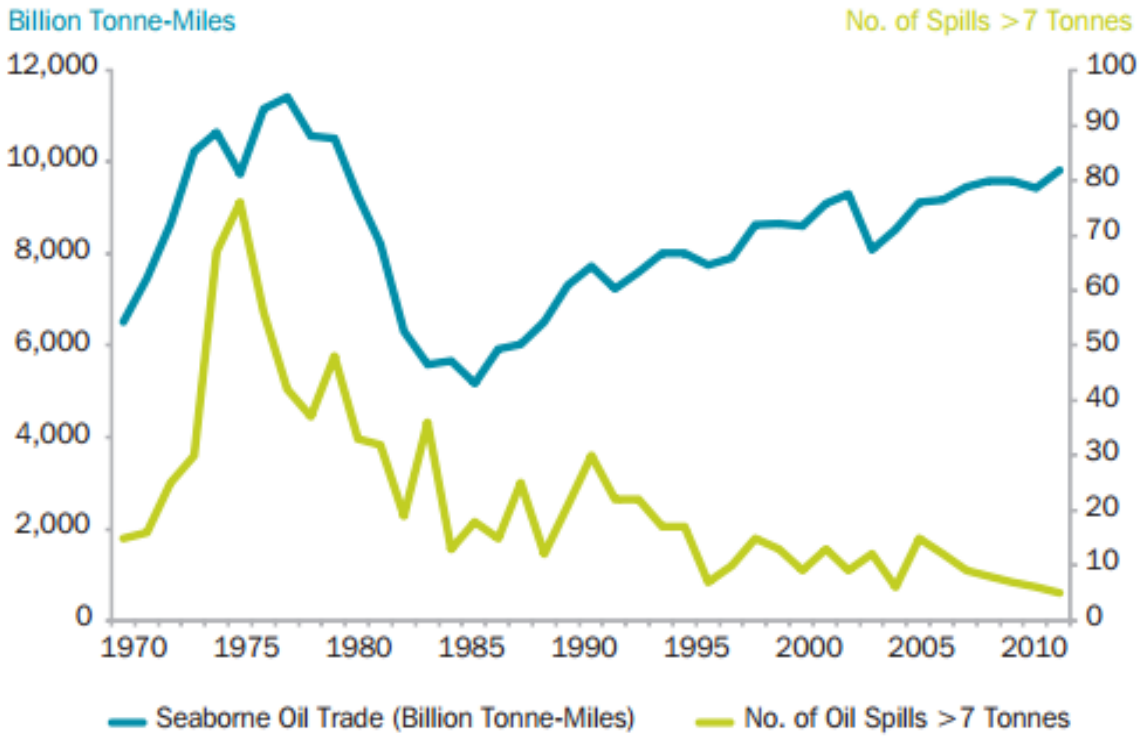
So long as we need oil to power our gas and gas to heat our homes, ending all transport of oil and gas is not a realistic option. Instead, we push for better practices and better technology to ensure the risk for any transport method—car, truck, train, ship or pipeline—is as low as possible.

35 Macdonald Laurier Institute. Making Oil and Water Mix: Oil Tanker Traffic on Canada's West Coast.

Figure 4

Despite strong growth in seaborne trade, the number of major oil spills by tankers has fallen sharply since the 1970s. This has been due to the adoption of new practices and technologies to prevent accidents. Canada's oil tanker safety record is particularly strong, with zero spills recorded in the 2000s.

Volume of seaborne Oil Trade compared to the number of oil spills 1970 to 2010



Source: Oil Spill Statistics. 2010. The International Tanker Owners Pollution Federation Ltd., 12. Taken from Macdonald-Laurier Institute *Making Oil and Water Mix: Oil Tanker Traffic on the West Coast*

THE WORLD IS NOT RUNNING OUT OF OIL. TODAY'S ENERGY COMPANIES MUST BE THE CATALYSTS TO MOVE TO A LOWER CARBON FUTURE

Canadians are struggling to reconcile two visions of their country: one of pristine wilderness and natural beauty and another of a globally important producer of natural resources. Neither of these visions is new, but the Internet and social media have enabled peer-to-peer communication on a scale heretofore unseen. For many Canadians this new-found connectivity has meant confronting an uncomfortable truth: the prosperity they enjoy is largely based on natural resource production, and this production has an impact on their air, earth and water.

As a result, industries and infrastructure long seen as innocuous have taken on new visibility and meaning in the public mind. Driving this change is the story that Canadian oil and gas resources are uniquely damaging to the global environment. The oil sands have been singled out as the single biggest threat to our common future; they have been painted as "game over" for the global climate. Fears over the impact 'new' shale gas production techniques could have on water have slowed or stopped development in several jurisdictions.

The development of any natural resources, oil and gas included, has an intense impact on the air, water and earth. That is undeniable, and industry and governments must take action to minimize or mitigate these impacts. But the story that Canadian energy resources are uniquely damaging to the global climate is simply not true.

If you ask Canadians what is the single greatest source of greenhouse gas emissions, many of them would probably answer the oil sands. However oil sands production represented only 0.16 per cent of global emissions in 2010. In 2010, total emissions from the oil sands were equivalent to a small fraction—4 per cent—of the emissions from the U.S. coal-fired generation sector (Figure 5). In fact, in 2010, a single coal plant, the Scherer power plant near Macon Georgia, emitted half the amount of GHG emissions as the entire oil sands (23 million metric tons by Scherer, compared to 48 million metric tons for the oil sands).[36] Emissions from European power generation are 30 times that generated by oil sands production.[37]

The oil sands are Canada's fastest growing source of emissions, a fact that needs to be addressed with stronger policy and better technology. But to state the oil sands pose a unique threat to global climate ignores reality.

Most (about 70 to 80 per cent) of the emissions contained in a barrel of oil are created when the oil is burned, not when it is produced. While renewable energy is making important gains in electricity generation, almost 100 per cent of the world's transportation system runs on fossil fuels, and there is no ready replacement on the horizon. Growing energy *consumption* in China, India and other emerging economies will be the biggest driver of climate change in the decades to come.

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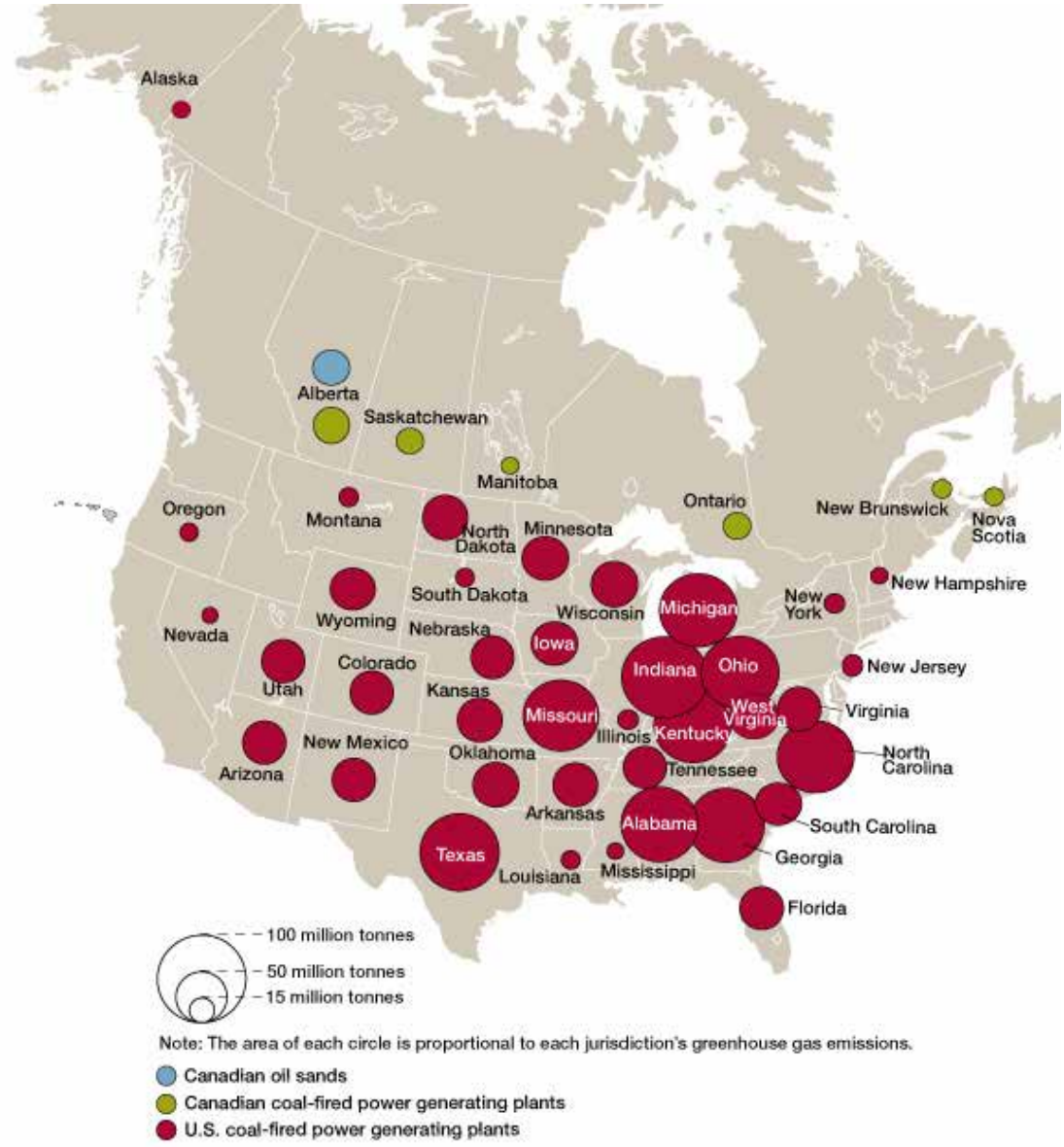
36 See note 12

37 Government of Canada. Oil Sands: A Strategic Resource for Canada, North America and the Global Market

Figure 5
Are the oil sands "Game Over" for the climate?

In 2012 a NASA scientist writing in the New York Times called the oil sands "Game Over" for the global climate. However, as this map shows greenhouse gas emissions from the oil sand production (blue dot) are only a fraction of the emissions from U.S. coal (red dots).

North American Greenhouse Gas Emissions from Oil Sands Production and Coal Electricity Plants



Source: Canadian Association of Petroleum Producers

Failing to export Canadian oil and gas resources will do little to change global energy consumption—the most significant driver of climate change—as there are many other energy producers ready and willing to service these markets. However, Canada can play a role in making energy production more environmentally responsible by developing and implementing new technologies to reduce impacts on air, land and water.

The story Canada has to tell on this front is much better than many people realize. Canada's oil sands operations have achieved efficiency improvements of 26 per cent on a per barrel basis from 1990 levels. New technologies have the potential to make even greater progress (see Greening the Oil Sands).

The world will not stop using hydrocarbons anytime soon. The only realistic option is to learn how to develop them better.

In Canada, leadership on energy production and leadership on the environment often go hand in hand. Alberta, the heart of Canada's oil industry, was the first jurisdiction in North America to put a price on carbon. Over the next five years, Alberta will spend a little over $6 billion on climate friendly technologies, more than the other provinces combined.[38] British Columbia, which is leading the development of LNG export capabilities in Canada, was the first jurisdiction in North America to implement a consumer-based carbon tax.

Developing new environmental technologies for responsible resource extraction will become increasingly critical. The technological advances that have unlocked shale oil and gas in the U.S. have the potential to make these resources globally abundant (Figure 6). Much of the world's reserves of shale oil lie in places without the strong democratic and environmental controls. Russia, China, Libya, Venezuela and Pakistan hold almost half of the recoverable reserves of shale oil. It is China, and not the U.S., that has the world's largest deposits of shale gas, accounting for 15 per cent of the global total.[39]

Greening the Oil Sands

The oil sands have become a powerful symbol of environmental degradation. They could become a powerful symbol of technology's contribution to environmental protection.

Using natural gas to produce steam is a big source of the oil patch's GHG emissions. Several projects are underway that will use solvents to reduce or eliminate the need for steam, with the potential to reduce greenhouse gas from production by 85 per cent.

Some operators integrate cogeneration, producing electricity and steam from natural gas. This results in one of the cleanest barrels imported into the U.S. on a wells-to-wheels (lifecycle) basis.

Industry and government are partnering to build a demonstration plant near Bonnyville, Alberta that will use algae to soak up carbon emissions from oil sands facilities and recycle them into products like biofuels, livestock feed and fertilizer.

The University of Calgary and the University of Alberta are collaborating on a system to use bacteria to clean the water used in oil sands tailing ponds—a process similar to existing municipal water treatment plants. Just like sewage is purified and returned to the source, the goal is to be able to flow clean water back into the environment.

One oil sands producer has developed a new tailings management process that has allowed them to cancel plans for five new tailing ponds at their operation. In the future, they expect the process will reduce land use from tailing ponds by 80 per cent.

Technologies developed in Canada have the potential to be used around the world to reduce GHG emissions or clean the water or earth. But these technologies will not be developed if Canada chooses to sit on the sidelines of global energy markets.

Source: Canadian Association of Petroleum Producers

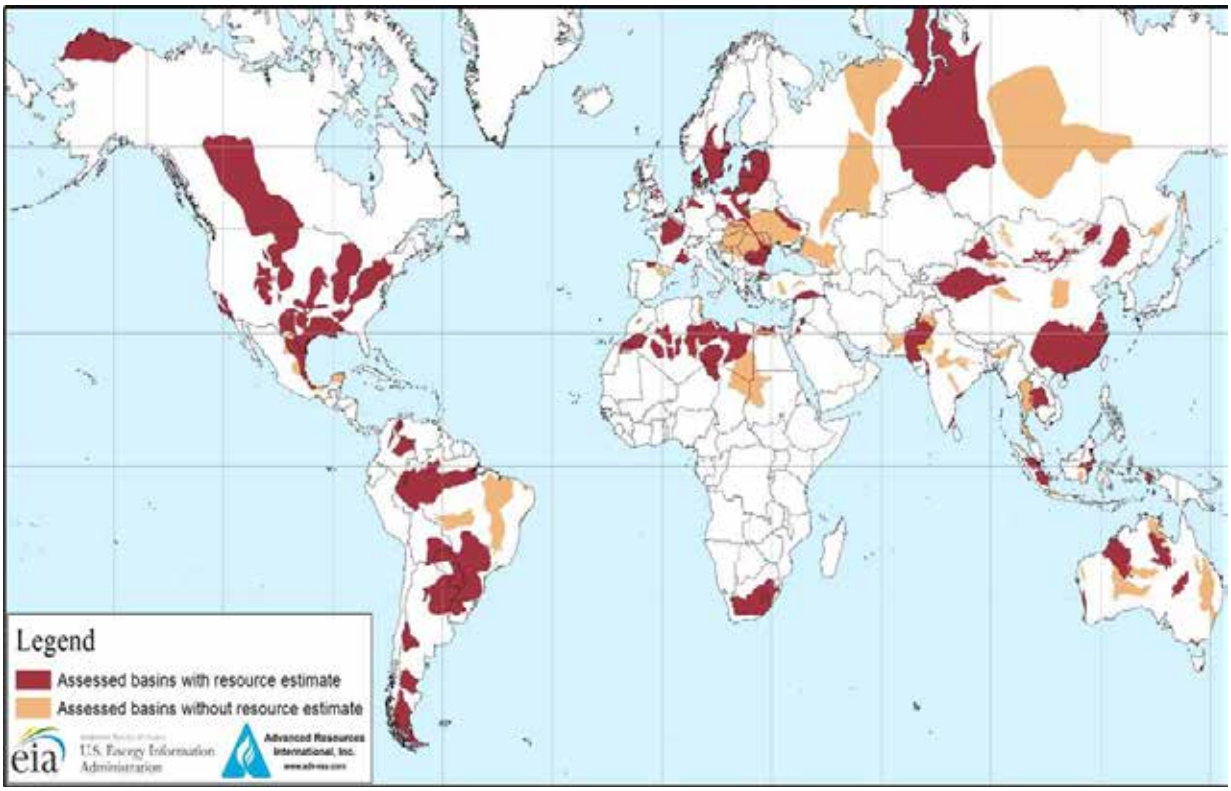
38 Government of Alberta. Alberta's Oil Sands: Research and Technology. Accessed August 26, 2013. www.oilsands.alberta.ca/researchtechnology.html

39 U.S. Energy Information Administration. Technically Recoverable Shale Oil and Shale Gas Resources

Figure 6
Unconventional oil and gas resources are plentiful

Canada's oil sands are unique in that they are the largest bitumen deposits in the world. But Canada is not unique in terms of having access to large amounts of unconventional resources. As this map shows, shale oil and shale gas basins can be found all over the world. The U.S. Energy Administration states that shale resources, which until very recently had not been considered technically recoverable, will add 11 per cent to global oil resources and 47 per cent to global gas resources.

Map of basins with assessed shale oil and shale gas formations as of May 2013



Source: U.S. Energy Information Administration

Canadians need to ask themselves what role they wish to play in combating global climate change. Opposing Canadian energy export on climate grounds is symbolically satisfying, but it would be a pyrrhic victory. The transition to a low carbon economy will be led by changing energy consumption patterns, not by failing to develop one or two sources of supply.

Canada can play a role in improving global environmental sustainability by taking the call to become a responsible energy producer seriously. Just as our firms have a fiduciary responsibility to their shareholders to maximize profit, our leaders have an ethical responsibility to future generations to ensure environmentally and socially sustainable development practices. Choosing instead to sit on the sidelines of the global energy trade will not only undermine Canadian prosperity but will be a missed opportunity for true leadership on this essential question.

CANADIANS NEED A CLEAR EVALUATION OF THE PROS AND CONS

Canada must decide how to shepherd its natural resources for the good of Canadians. We need to engage in an in-depth conversation that is based on evidence.

Increasing energy literacy among Canadians is one piece of that puzzle. Organizations such as the Senate of Canada, Canada West Foundation, Pollution Probe and the Energy Policy Institute of Canada have all called for heightened energy literacy among the Canadian population. Increasing awareness of the interconnectedness of systems and the potential of conservation to blunt future demand will both buy Canada time to build the required infrastructure as well as enable Canadians to provide clearer guidance to politicians with respect to the future they wish to see for Canada.

As a country, Canada has the skills and technology to develop tidewater access to rapidly growing international markets from the coasts of British Columbia and Eastern Canada. Yet, we currently have virtually no export capability for oil beyond the U.S. market, and the same can be said for offshore natural gas.

The solution to this dilemma is clear: we need to build the infrastructure to connect Canada's supply with demand in the international market. And, we must come to grips with the facts.

Oil and gas are key contributors to economic prosperity across the country.

Our only energy customer, the United States, will need less and less of our oil and gas.

Tomorrow's energy growth lies with the rapidly expanding economies of Asia.

Canada already loses millions a day from a lack of diversified oil and gas markets and stands to lose more if infrastructure is not built.

Canadian firms have a strong record in transporting oil and gas products safely and should continue to move the frontier for technologies and processes to make the risks of energy transport as low as possible.

Fossil resources abound to satisfy global energy demand, meaning today's energy companies must be the catalysts to move the global economy forward in a more carbon-constrained energy future.

The speed with which we as a country can react to these realities will determine our ability to compete as a nation in the 21st century.

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