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Risks to Canada's Energy Security

by Kenneth P. Green and Stephen Eule

Main conclusions

- **Canada's energy security ranking is the 8th best among the world's top 25 energy users, just below that of the United States, according to an international index of energy security risk produced by the United States Chamber of Commerce.**
- **Canada's ranking dropped from 2009, when the same group ranked it 7th in energy security.**
- **An interesting implication in the index is that one of Canada's greatest external risks (its ability to continue moving energy exports to markets) is a by-product of US policy, which has led to vastly higher US production of oil and natural gas and decreasing gasoline consumption in the United States.**
- **The resistance to Canada's Keystone XL pipeline also poses a challenge to the activity seen as critical to preserving Canada's energy security—finding access to markets other than the US.**

Energy security is one of those things that everybody seems to want, but few really want to define. When talking about energy security, are we talking about security of energy supply? The security of having stable energy prices? Security of energy transportation infrastructure? Security in avoiding trade with unstable or hostile regimes? Environmentally benign energy? All of the above?

In the United States, the terms “energy security” and “energy independence” often are used interchangeably, even though they are very different concepts. As enticing as the prospect of complete energy independence may be, it would be very difficult to achieve in the United States, even with the shale revolution. In today's globalized economy, it may not even be desirable, particularly if it means reliance on high-cost energy that could be provided more cheaply by a reliable and diversified global market. Energy autarky is not energy security.

Manhattan Institute scholar Robert Bryce suggests that energy security is actually energy interdependence—that is, free participation in global energy markets. Another way of putting this is that energy security is achieved when you can sell energy resources to, or buy energy resources from, countries because you want to, not because you have to (Bryce, 2009).

It is important to define energy security in a meaningful way, because the risks of unintended consequences of government interventions into energy markets are very large, and use of the term “security” is often used to imply that broad government intervention is warranted by virtue of the state’s primary mission of ensuring national security. As Bryce points out, the cry of “energy security” in the United States has been used to justify everything from blending corn ethanol into gasoline all the way to expanding America’s military footprint in the Middle East (Bryce, 2009).

A collaborative report written jointly by the University of Ottawa Capstone Seminar and the Canadian Security Intelligence Service points out that the definition of energy security is unique for each country:

Countries rich in raw energy resources but suffering from economic underdevelopment, for example, are liable to see their energy security in a very different light than a developed country in Western Europe or North America. There are many specific definitions of energy security, which vary by context.

Australia defines its energy security as the “adequate, reliable and affordable supply of energy to support the functioning of the economy and social development.” Similarly, the International Energy Agency (IEA) defines energy security as “the uninterrupted physical availability at a price which is affordable, while respecting environmental concerns.” Both of these definitions assign primary importance to securing energy supply. The United Kingdom’s 2007 Energy White Paper also highlights the importance of a secure supply, this time linking it to the dangers of climate change and global warming. Finally, the American Department of Energy lists the diversification of energy supplies as its primary energy security goal, along with improvements in efficiency and environmental performance. (Capstone Seminar Student Report, 2010: 5.)

Canada, the Capstone/CSIS report observes, does not have an official definition of energy security, but puts forward a list of eight factors the report’s authors view as most important:

- the diversity of Canada’s energy mix;
- market transparency;
- continued investment in energy;
- free trade;
- energy infrastructure;
- energy intensity;
- the environment; and
- geopolitics

Words from those in leadership positions in Canada, however, provide a slightly different view. For them, “energy security” increasingly looks a lot like market diversification, with leaders emphasizing the need to look beyond the United States as a market for its energy products.

After the United States failed to allow the construction of the Keystone XL Pipeline in 2012, Prime Minister Harper told a US audience that “We cannot be in a situation where really our one and only energy partner can say no to our energy products.” Mr. Harper added that “The very fact that a no can be said under- scores to our country that we must diversify our energy export markets” (Yakabuski and Koring, 2012).

But what is “energy security,” really, and how does Canada perform in pursuit of it? In 2012, the Institute for 21st Century Energy, a project of the United States Chamber of Commerce, published an International Index of Energy Security Risk, which assesses energy security for 25 large energy-consuming

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countries based on the 28 performance metrics listed in table 1 (Institute for 21st Century Energy, 2012a: 15). Performance on these metrics was assessed for each country from 1980 to 2010, the last year for which data was available. To make them comparable, the different country results were normalized to an Organization for Economic Cooperation and Development (OECD) baseline average, resulting in the country rankings shown in table 2. The report discusses each country's performance on the security index with reference to how it compares to the OECD baseline (Institute for 21st Century Energy, 2012a: 73).

Table 2 shows how the world's 25 large energy consuming countries performed on the index.

As figure 2 shows, Canada ranks 8th on the Security Index, with a score very close to that of the OECD as a whole, and comes in one spot below the United States. The report observes that

Canada's energy security risk scores have tracked closely to the OECD average. In 2010, its overall risk score was just 1% higher than the OECD average, although in most years it has been slightly lower. Canada has extensive hydrocarbon resources and is a large energy producer and exporter. Canada can improve its own and other countries' energy security by further developing its huge oil sands reserves provided necessary infrastructure, including the Keystone XL pipeline, is built to bring this oil to international markets. Canada's scores

would be lower but for its energy use per capita risk scores, the highest of any country in the large energy user group. (Institute for 21 Century Energy, 2012a: 7.)

Canada's energy risk score, like that of the OECD, has increased significantly (i.e., worsened) since the beginning of the 21st century.

Figure 1 shows how closely Canada tracks with the OECD, despite, as the report observes, having very different energy economies.

The authors of the index summarize Canada's situation thus:

Canada's oil, natural gas, and coal have negligible import exposure risk, a situation that compares very favorably with the OECD. Also, because Canada is a stable and reliable trading partner, Canadian production and exports of these fuels enhances energy security globally. In particular, the addition of about 175 billion barrels of oil reserves from Canada's oil sands marked a major improvement in the risk index for global crude oil reserves, and as production from these reserves increases, diversity and reliability measures of world oil production should also improve.

In the electricity sector, Canada also is among the world's largest producers of hydroelectric power. Roughly 60% of its generating capacity is hydroelectric, and an additional 10% is nuclear power. Conventional thermal capacity accounts for about 27%. Canada therefore scores better than the OECD average in non-carbon

Table 1: Risk Policy Factors

Global Fuels

- Global oil reserves
- Global oil production
- Global gas reserves
- Global gas production
- Global coal reserves
- Global coal production

Fuel Imports

- Oil Import Exposure
- Gas Import Exposure
- Coal Import Exposure
- Total Energy Import Exposure
- Fossil Fuel Import Expenditure per GDP

Energy Expenditures

- Energy expenditure intensity
- Energy expenditures per capita
- Retail electricity prices
- Crude oil prices

Price & Market Volatility

- Crude Oil Price Volatility
- Energy Expenditure Volatility
- World Oil Refinery Usage

Energy Use Intensity

- Energy Consumption per Capita
- Energy Intensity
- Petroleum Intensity

Electric Power Sector

- Electricity Capacity Diversity
- Non-Carbon Generation

Transportation Sector

- Transport Energy per Capita
- Transport Energy Intensity

Environmental

- CO₂ emissions trend
- CO₂ per capita
- CO₂ GDP intensity

Table 2: Energy Security Risk Scores and Rankings for 25 Large Energy Using Countries, 2010

Country	Score	Large Energy User Group Rank
Mexico	851	1
United Kingdom	878	2
Norway	940	3
New Zealand	941	4
Denmark	942	5
Australia	942	6
United States	964	7
OECD	988	
Canada	995	8
Germany	1,006	9
Indonesia	1,013	10
France	1,028	11
India	1,045	12
Poland	1,061	13
Russia	1,072	14
China	1,098	15
South Africa	1,100	16
Spain	1,105	17
Japan	1,119	18
Turkey	1,154	19
Italy	1,159	20
Brazil	1,165	21
Netherlands	1,239	22
South Korea	1,361	23
Thailand	1,689	24
Ukraine	2,277	25

Source: Institute for 21st Century Energy, 2012a.

Figure 1a: Canada vs. OECD Risk Index Scores, 1980-2010

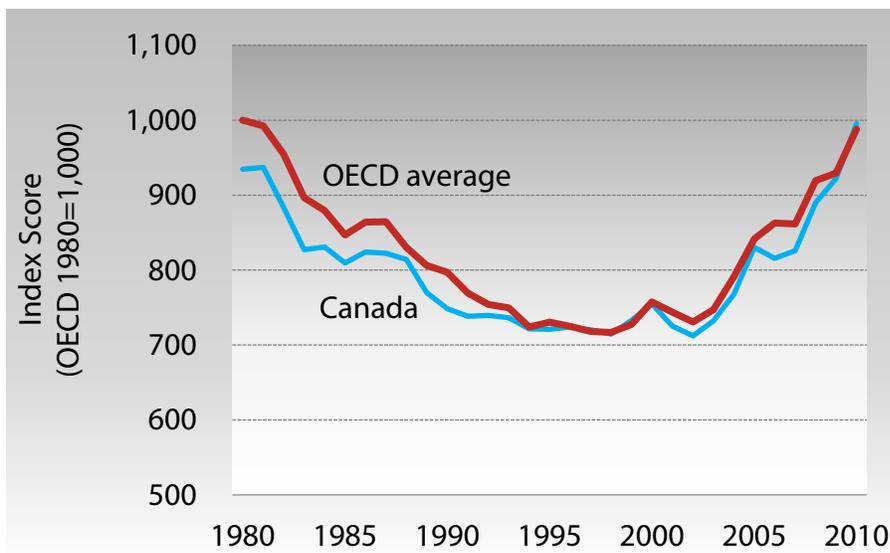
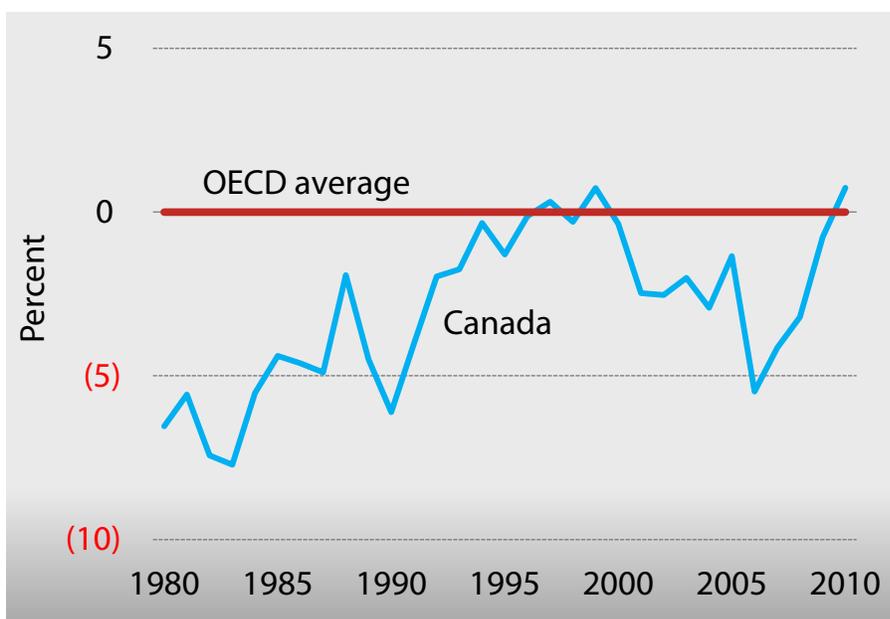


Figure 1b: Canada: Risk Variance from OECD, 1980-2010



power generation. However, Canada's power sector shows a higher level of capacity concentration than the OECD average.

Canada is a large country with a cold climate and a low population density, and a lot of energy is used for space heating and travel. It is not surprising,

therefore, that its risk measures of energy intensity and energy use per capita, especially in the transportation sector, are above the OECD average. In fact, Canada has the largest energy use per capita of any country in the large energy user group. This is also reflected in Canada's relatively large carbon dioxide

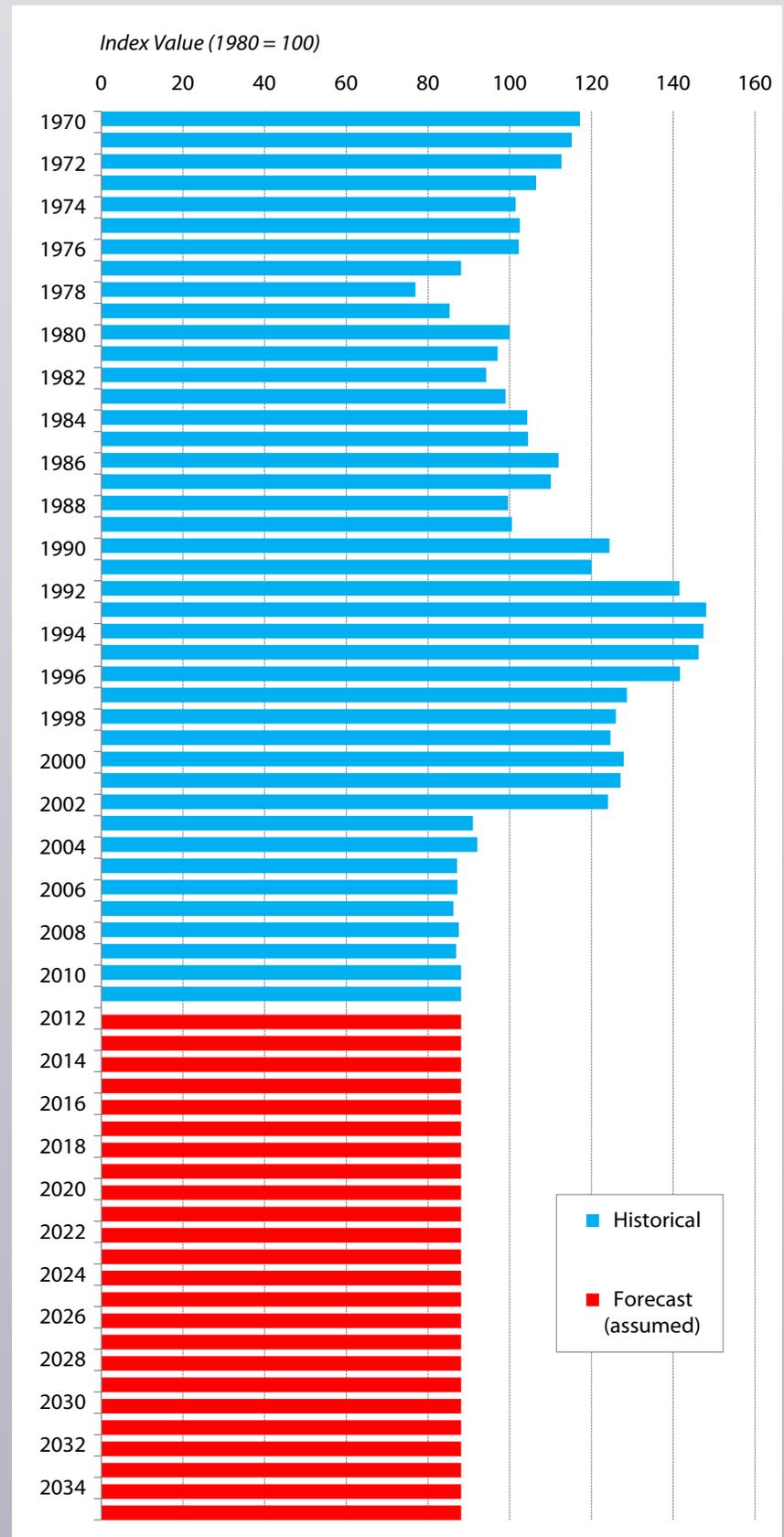
emissions per capita. Greater energy efficiency could improve all of these metrics.

On balance, Canada’s energy security is about average, but it has tremendous potential to improve its own security. It can also contribute to better the energy security of other nations through further development of its oil sands. Much will depend, however, on market conditions and the development of necessary infrastructure to bring this oil to international markets, including pipeline infrastructure to move this oil from Alberta to US markets via the Keystone XL pipeline and to Asian markets via the Northern Gateway pipeline to Canada’s west coast. (Institute for 21 Century Energy, 2012a: 25.)

Since that was written, the Keystone XL and Northern Gateway projects remain in limbo, TransCanada is looking into an Energy East Pipeline running to a refinery center in New Brunswick and eventually to the port of Saint John. The new line could be up and running in 2017. It shows how diversification is not just a concern for energy users, but for energy producers, too (Geman, 2013 and CBC News, 2013).

A larger lesson from the International Index is that the energy security of one country is inextricably linked to energy security in every other country, so that improving security in one country improves it everywhere. The importance of Canadian oil sands to global markets can be seen in figure 2, which is from the US Chamber of Commerce’s 2012 *Index of US Energy*

Figure 2: Security of World Oil Reserves



Source: Institute for 21st Century Energy, 2012: 29.

Security Risk (Institute for 21st Century Energy, 2012: 29). It uses measures of political freedom (a proxy for reliability) and supply diversity to plot the security of world crude oil reserves (Institute for 21st Century Energy, 2012b: fig. 4). It shows how in the 1990s the growth in oil reserves reported in Iran, Iraq, Saudi Arabia, and Venezuela led to sharply rising supply risks. The large drop in risk measured in 2003 is attributed almost entirely to the addition of some 175 billion barrels of Canadian oil to global reserves.

How does the US compare?

Like Canada, the US Energy Security Risk ranking tends to track quite closely with that of the OECD, though as the report points out, the

the energy security of one country is inextricably linked to energy security in every other country

US has comparatively lower energy costs than the OECD, an advantage that is growing over time as the US enjoys massive increases in energy production that are reducing the costs of electricity generation sharply.

The US's strengths are seen in its growing production of oil and natural gas, its vast reserves of coal, and in its ongoing reductions in gasoline consumption due to the use of domestically derived biofuels. It is

hard to overemphasize the impact the revolution in shale oil and gas is having on US energy security. The Chamber's International Index does not reflect the full extent of these developments because the data ends in 2010. However, the group's most recent edition of the *US Index of Energy Security Risk*, which goes through 2012, shows how the "shale gale" is driving risks lower in the US (Institute for 21st Century Energy, 2012b).

Threats to the US maintaining its place in the rankings primarily include very high levels of consumption, relatively high levels of greenhouse gas emissions, and the potential for environmental regulations to short-circuit the growth in domestic oil and gas production. Interestingly, the International Security Risk report suggests that approving construction of the Keystone XL pipeline would be in America's best security interest: "To the extent the Keystone XL pipeline—which once completed would carry oil from the oil sands in Alberta, Canada to US refineries on the Gulf Coast—increases access to Canadian oil production, it would contribute to US and global oil security" (p. 71). Further, the pipeline would aid US oil production by providing an alternate route for Bakken crude oil output that now moves primarily by rail. A tie-in to the Keystone XL Pipeline would remove a potential bottleneck that eventually could limit production.

Conclusion

The definition of energy security is diverse. Every country, by nature of its natural resource endowments, its climate, its geographic

characteristics, and its economy, will have a unique definition of "energy security." According to the first *International Index of Energy Security Risk*, Canada ranks well in the world, primarily because of its huge resource base and energy self-sufficiency. The main risk to Canada's energy security, as seen in the Index, is the need for high levels of domestic energy consumption, comparatively low levels of energy efficiency, and a lack of access to diverse markets, particularly in the face of increased US production of oil and natural gas, and ongoing opposition to the Keystone XL oil pipeline.

The development of Canada's oil sands coupled with US unconventional oil and gas production is shifting the world's energy center of gravity from the Middle East to North America. The impact of these trends is rippling through world markets. It has, for example, caused the Mexicans—who are seeing their oil output drop—to rethink the wisdom of their constitutional prohibition of foreign investment in the oil industry, and it is leading OPEC to worry that its sway over the world oil market is weakening. These and other trends potentially beneficial for Canada, however, are contingent on the ability to move energy to markets. Keystone XL is a critical piece of that.

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