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# SPECIAL REPORT

TD Economics



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## RISING U.S. ENERGY INDEPENDENCE: WHAT DOES IT MEAN FOR CANADA?

### Highlights

- There has been increased attention paid recently to the potential for U.S. energy independence in the coming decades as domestic oil and gas production is on the rise and imports have been waning.
- The U.S. government's base-case scenario sees the U.S. reducing its dependence on foreign energy sources by 2035, although it still needs significant imports of oil. A declining reliance on imported oil and gas would have clear implications for Canada, given that currently the U.S. is essentially the only destination for Canada's oil and gas exports.
- Fortunately for Canada, given its geographic proximity and pipeline infrastructure the base-case forecast for the U.S. suggests Canadian crude oil imports will continue to grow, making up an increasing share of the U.S.'s shrinking import basket. However, the rise of shale gas in the U.S. does mean continued reductions in natural gas imports from Canada.
- It is worth noting that there is a great deal of uncertainty surrounding those base-case projections, as divergent private sector forecasts indicate. There is a great deal of potential for unanticipated technological or policy changes that could have a big impact on the supply-demand balance for oil or natural gas.
- Whichever outlook you subscribe to, there is an increasing disconnect between Canadian forecasts for oil and gas available for export, and demand from the United States. This underscores the need for access to export markets other than the U.S. if Canada's oil and gas sector is to meet its growth potential.

Several recent studies and high-profile media reports have suggested that rising domestic production of oil and gas and declining demand could see the U.S. become "energy independent" within the next couple of decades. These bold predictions even led some columnists to state that these would end U.S. reliance on Canadian oil. However, putting aside the most daring predictions, the more conservative government outlooks show the U.S. needing less imported energy in the years ahead. Given the U.S. is essentially Canada's only export customer at the moment; this clearly has implications for Canada's oil and gas sector.

### What's the big deal about energy independence?

Energy independence has been a foreign policy preoccupation in the U.S. ever since the oil embargo of the early 70s; with every president since Nixon espousing a policy to pursue it. In the minds of policymakers, energy independence would mean the U.S. economy could not be hobbled by an overseas event cutting off its energy supply. Since crude oil and petroleum products account for 90% of energy imports, a move towards "energy independence" is really shorthand for achieving oil independence, and makes oil independence the most difficult part of the goal. Even if the U.S. market were to attain

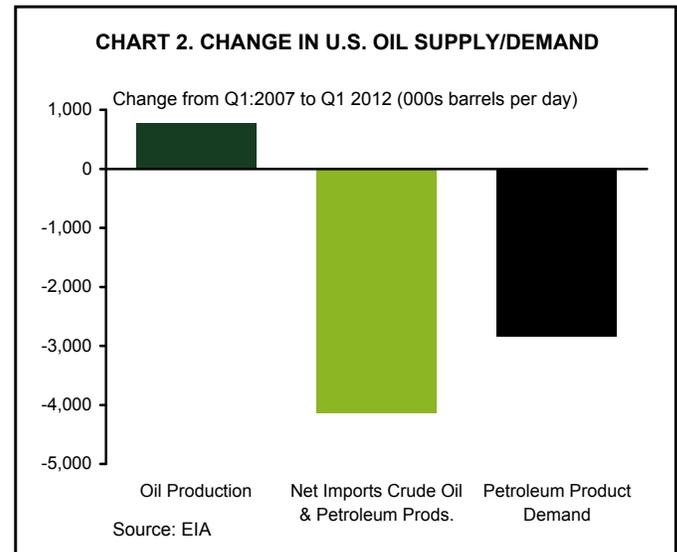
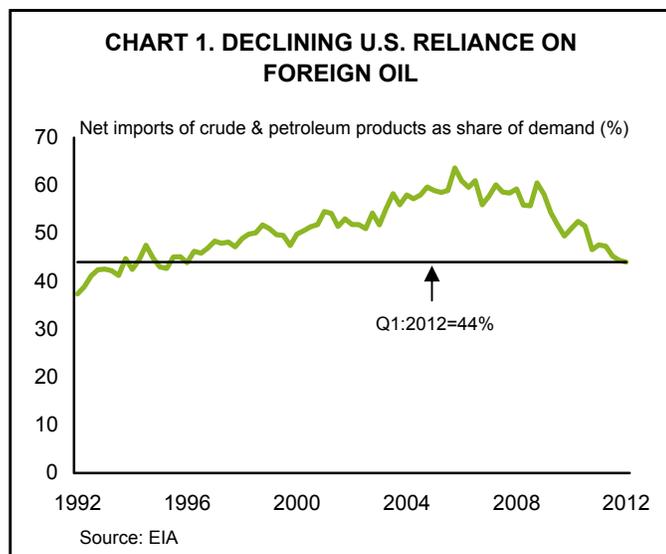
self-sufficiency in oil, it would not be immune to the economic fallout from an oil price spike caused by a disruption elsewhere. Nevertheless, as is the case for oil exporters like Canada, more of the benefits of higher oil prices would remain in the domestic economy, providing somewhat of a shock absorber.

**Energy state of the nation**

The U.S. currently imports 22% of its energy consumption, which has already fallen from a peak of 27%. Reduced dependency on foreign energy has been driven by a combination of increased domestic crude oil and natural gas production, and reduced demand due to increase efficiency standards, greater use of ethanol in gasoline, and rising prices altering consumption patterns.

Currently, coal is the largest domestically-produced source of energy, and the U.S. is already net exporter of coal. Booming production of shale gas has led the U.S. to surpass Russia to be the top producer of dry natural gas, but it does still import 14% of its consumption (90% of that from Canada). U.S. imports of natural gas are down 25% from in 2007, and those piped in from Canada have fallen 18% over the same period.

Perhaps the more impressive part of America’s declining reliance on imported energy is the 30% drop in net imports of oil and petroleum products since their peak in 2005. That has led the import share of consumption to fall from 64% to 44% in the first quarter of this year – the lowest level since 1996 (see Chart 1). The main driver of this trend has been declining U.S. demand for petroleum products, which has fallen 13% since its peak in the first quarter of 2007. Ris-



ing domestic crude oil production has played a supporting role, up 15% over the same period, but starting from a much lower level so it has contributed a relatively smaller 0.8 M b/d to the import decline (see Chart 2).

However, Canada has bucked the declining-import trend over the past few years, increasing its shipments of crude oil and petroleum products to the United States. That means Canada has increased its relative share of U.S. imports to roughly 25%, and is now America’s largest individual supplier of oil (OPEC as a whole is still 40%).

The decline in demand for petroleum products like gasoline has led to the historic shift to the U.S. becoming a net exporter of refined petroleum products. There has been a lot of hay made about this in the press, so it is worth adding some perspective. The U.S. exported 530 thousand barrels per day of refined products last year, only 3% of the total output of U.S. refineries, and only 40% of the crude oil feeding those refineries is produced domestically.

**The U.S. energy balance base-case forecast**

There are a number of outlooks for U.S. energy production and consumption from governments, private sector and industry groups that come to varying conclusions about what degree of energy independence the country will achieve over the next twenty years. The Energy Information Administration (EIA) is an impartial U.S. government agency that collects and disseminates energy-related data in the U.S. and makes projections out to 2035, and we will use their numbers as our “base case”.

As referred to previously the shale gas boom has already been a “game changer” in the North American natural gas

market and the EIA expects natural gas output growth to quadruple that of oil (in energy equivalent terms) to 2035. It projects the U.S. will start exporting liquefied natural gas (LNG) in 2016, and to be a net exporter of natural gas by 2021.

When it comes to U.S. energy independence, it is the close to 9 million barrels per day of crude oil imports that is the highest hurdle to clear. Lately, booming domestic production of shale or “tight” oil has gotten a lot of press, and is lauded as the key to future independence from imported oil. It is true that after steadily declining since 1986, domestic oil production is once again on the rise. This turnaround has been led by advances in shale oil production from plays like the Bakken in North Dakota and Eagle Ford in Texas, enabled by a combination of techniques that have already had dramatic implications for shale gas production. Hydraulic fracturing and horizontal drilling allow previously inaccessible oil to be released from shale, and are made economic by high oil prices; facilitating an oil boom in parts of the country. The EIA projects that tight oil production could reach 1.3 M b/d by 2030, more than double its 2011 level. The EIA expects tight oil to help lift domestic crude oil production to 6.7 M b/d by 2020 from 5.5 M b/d in 2010, and then decline slightly to 6.1 M b/d by 2035.

As for refined products, the EIA expects the U.S. to remain a net exporter over the forecast horizon, but it doesn’t see any real growth in net exports. That is not surprising given the slated refinery closures in the northeastern U.S. this year, it’s unlikely there can be much further growth in refined product exports beyond what can be met from reduced domestic consumption. So under the EIA’s base-case assumption the U.S. would still need 36% of its liquid fuels consumption to be met through imports. This marks an important improvement from 60% as recently as 2005, as the energy intensity of the U.S. economy continues to trend downwards, but is still a long way from oil independence.

### Upside and downside risks to the base case outlook

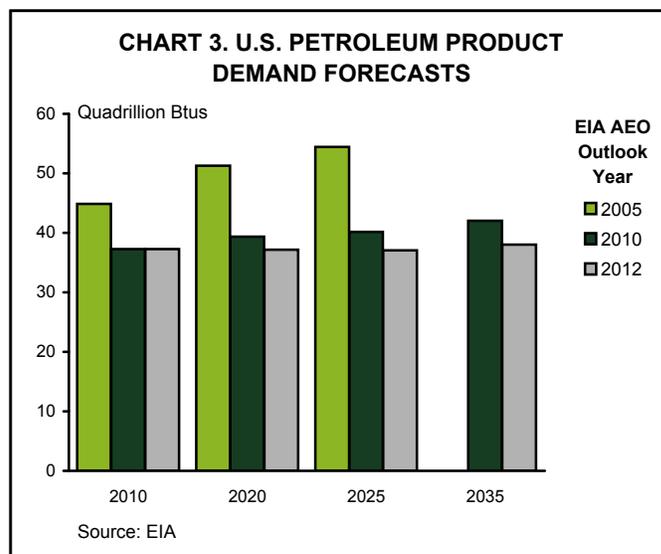
As with any forecast there is a certain amount of uncertainty surrounding these projections. Particularly since the EIA’s outlook is a projection that assumes no policy changes. That means on the supply side it doesn’t include any future changes to regulations surrounding hydraulic fracturing (New York State, for example, will be deciding on new regulations for fracking in the coming months). Alternatively, on the demand side, the EIA reference case has coal remaining the dominant source of electricity generation in

2035, albeit at a share reduced from 45% to 39%. If policies were pursued to more aggressively phase out coal-fired power generation in favour of natural gas, that would also significantly alter the demand side of the equation.

Recall that an oil-independent U.S. would not be immune to the economic drag caused by spiking oil prices, that is, as long as the U.S. consumes oil. Any new policy that reduced U.S. demand for oil, such as a price on carbon or stricter emissions regulations, would tip the balance much further towards oil independence. You only have to look at the picture of how the long-term forecasts for consumption have changed to see the potential for surprises (Chart 3) on the demand side. Forecast consumption for petroleum products in 2025 is now 30% lower than it was in 2005.

So how much consumption would need to be cut to get to oil independence under the EIA’s base case? The EIA’s projections show the U.S. continuing to import 4.4 M b/d (excluding imports from Canada) in 2035. If you could wave a magic wand and there was enough pipeline capacity to carry all of Canada’s potential growth in crude oil available for export estimated by Canada’s National Energy Board (NEB) to the U.S., Canada and the U.S. would still be 2.4 M b/d shy of meeting its projected demand. Erasing that deficit would entail a further 14% reduction in the U.S.’s consumption of petroleum products, on top of the 13% drop in petroleum product consumption already seen during 2007 to 2012.

That may be tougher than it sounds considering 2007-2012 encompassed a major global recession, and the EIA reference case already assumes continued improvements in the energy intensity of the U.S. economy and declining



energy use per capita. Although it is unclear how trends like an aging population, a declining preference for driving among young people and increased urban density will play out over the long term. It is possible they could make petroleum demand lower than expected. Any type of carbon pricing would also be a game changer for petroleum product demand.

The supply side is similarly full of unknowns. It's difficult to foresee what technological innovation could allow more oil to be recovered or previously inaccessible sources of oil and gas could be opened to development. It is really this potential that the more aggressive private sector forecasts are capturing. For example, while the EIA expects tight oil to reach 1.3 M b/d, that forecast is conservative viewed against various private sector forecasts which range between a potential of 2-3 M b/d. While increased tight oil production is enough to make a dent in the oil trade balance, it won't erase it on its own even under more aggressive private sector forecasts. Moreover, to put the tight oil resource in perspective the National Petroleum Council (NPC) estimates the recoverable resource potential is 10-20 billion barrels (EIA cites technically recoverable resources of 24 billion barrels), which sounds like a lot until you compare it to the potential 150-310 billion barrels in Canada's oil sands.

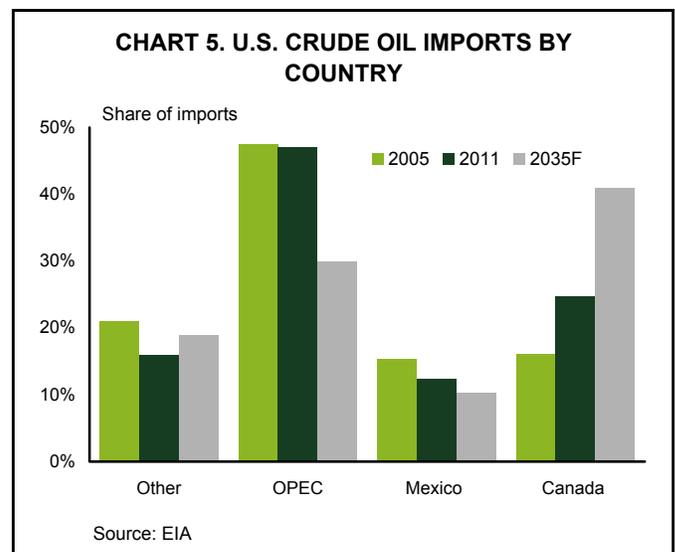
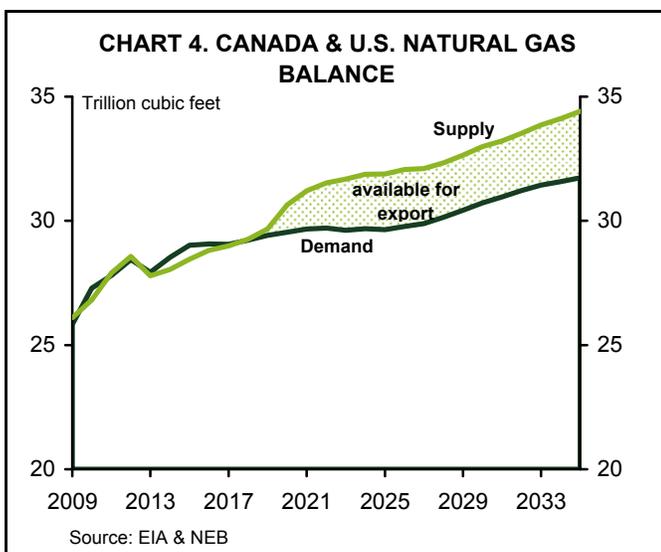
Under the NPC's the "high potential" scenario, which is the result of an "unconstrained" environment for oil production (but not what the NPC views as the likely outcome) in Canada and the U.S., there is enough growth to cover the U.S.'s current oil import requirement. That high potential scenario includes Canadian oil sands production of 6 M b/d, so the bottom line is that the U.S. is not oil independent

without Canadian production, even under aggressive growth assumptions.

### A larger slice of a shrinking pie - implications for Canada's oil & gas sector

Wherever the future lies on the spectrum of forecasts for U.S. oil and gas production, it will likely need less imported oil and gas. Where does this leave Canada – the U.S.'s largest supplier? This issue is important for the Canadian economy as a whole given the oil and gas sector's ascendance in recent years. The sector accounts for 3% of GDP by industry, but punches above its weight when it comes to other economic impacts. Exports of crude oil, natural gas and petroleum products accounted to 22% of all exports in 2011, and oil and gas industries accounted for over 20% of planned private business investment this year, and almost half of the growth in planned investment versus 2011.

Canada and the U.S. are essentially already independent in natural gas, and the EIA's base case scenario includes a 62% reduction (or roughly 2 trillion cubic feet) in the volume of natural gas piped in from Canada to 2035. At first blush this sounds alarming, but recall that Canadian production has already been declining, and with domestic demand expected to grow at a faster pace than production according to the NEB's forecast, the amount of natural gas available for export is expected to decline 37% by 2035. When you add U.S. and Canadian supply-demand balances together, the two countries will be in a sustained natural gas surplus position very soon (see Chart 4). When that is combined with the current low price levels in North America, the business case for establishing LNG exports to service higher-priced Asian markets is abundantly clear on

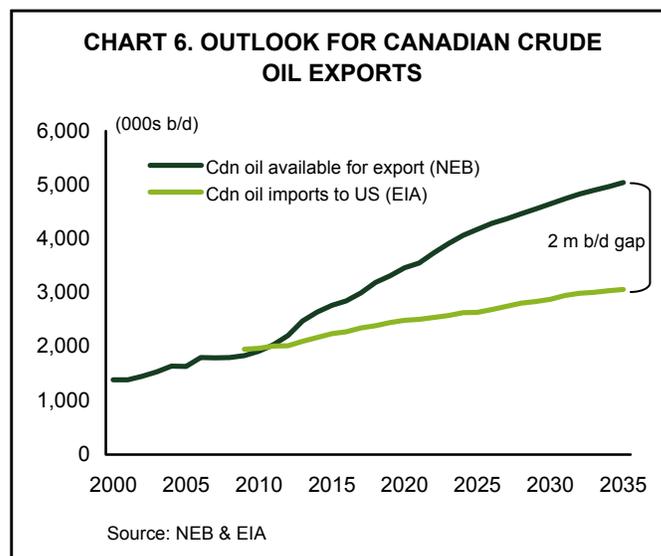


both sides of the border.

However, under current EIA projections oil independence remains elusive. Fortunately for Canada's oil patch, the EIA expects Canada to continue to buck the trend of declining shipments to the U.S., effectively giving Canada a larger slice of a shrinking pie (nearly every other jurisdiction shown sees their imports to the U.S. decline over the projection). The EIA's 2012 outlook shows imports from Canada increasing 50% to 3 M b/d by 2035, increasing U.S. dependence on Canadian crude from about one quarter to over forty percent (see Chart 5).

The challenge for Canada is the basket is clearly shrinking. That limits growth of Canada's oil sector if it remains solely reliant on U.S. markets. This can be seen in the difference between the EIA's projection for Canadian crude oil imports, and the NEB's expectation for the amount of crude oil available for export from Canada under their current production forecast (see Chart 6). For Canada's crude oil output to grow to the level currently projected by the NEB, Canada needs to significantly ramp up its export capacity to customers outside of North America.

This reality has not gone unnoticed by Canada's oil patch and underpins why it is seeking to develop export capacity to areas of the world where demand is growing, rather than flat lining. The same is true for natural gas, where LNG export capacity is in the works on both sides of the border. When you add up what the EIA is assuming about rising oil



imports and declining natural gas imports from Canada in 2035, it implies only 2.4% growth over 2011 export levels (in barrel of oil equivalent terms). That compares to an average growth rate over the past 10 years of 1.6% per year. The clear gap between the growth potential for Canadian production, particularly for oil, and projected U.S. demand shows that without greater access to export markets outside of North America, the growth trajectory of Canada's oil and gas sector could look quite different from what it has been in recent years.

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