



Canada as an energy superpower

Posted by [benk](#) on May 22, 2008 - 12:00pm in [The Oil Drum: Canada](#)

Topic: [Supply/Production](#)

Tags: [canada](#), [energy superpower](#), [natural gas](#), [nuclear](#), [oil](#), [synthetic crude](#), [tar sands](#), [uranium](#) [[list all tags](#)]

Ed note from PG: I am happy to announce that TOD:C is up and running again (and I believe overdue thanks are in order to Stoneleigh and Ilargi, now over at [The Automatic Earth](#), for their efforts here). One of the new editors is [benk](#) (and I believe you already know Khebab!).

Ben is completing his Ph.D. in Chemical Engineering in Canada. His research focuses on the fine details of solid oxide fuel cells, dealing with ceramics and long equations. He attributes his initial interest in energy to the documentary "[The End of Suburbia](#)," which he first saw about 4 years ago. Since then he has felt a duty to get the good word out. Ben has been the host of [theWatt Podcast](#) talking about various energy issues, a capacity we are exploring bringing the TOD. Welcome Ben!

To get TOD Canada rolling again, I've written a refresher on Canada's energy situation. Canada can't be ignored when it comes to energy. We are a land of plenty. Lots of land, lots of weather, lots of consumption, lots of production. Plenty can easily become scarce though and it has to be managed, and managed well. Management of our resources will be Canada's challenge in the years ahead. Unmanaged, Canada's energy consumption is close to the highest in the world and stands at 350 GJ/person, slightly more than in the U.S. and Canada's energy intensity is the worst in the G7 at 10.6 MJ per unit GDP.

It's wrong to average Canada's energy situation though. Even neighboring provinces have vastly different stances: British Columbia has [implemented](#) North America's first consumer based carbon tax and is [joining](#) the [Western Climate Initiative](#)'s cap-and-trade system while Alberta's Premier is still [talking about](#) bird kills by wind turbines. On the East Coast, New Brunswick has the largest Canadian refinery (288,400 bpd capacity) producing 45% of all U.S. reformulated gasoline imports, is building a new LNG terminal and has plans to become an energy hub for the Eastern U.S. by building a [second 300,000 bpd refinery](#) and a second nuclear reactor, both to be used exclusively for export to the US. Energy exports are a huge part of Canada's economy, accounting for 20% (\$90 billion) of Canada's total exports in 2007.

From the federal perspective, Canada's government has publicly stated that they are positioning Canada as a "reliable energy superpower". This is the closest we have to a national energy policy. The wording here is important: By definition, energy superpower implies at least two things: 1) multiple customers 2) willingness to use energy supply as a negotiation tactic.

As far as energy superpowers are concerned, Canada still has a long way to go. Multiple customers are difficult to come by for a country with a single border. As far as "reliable energy superpowers" are concerned, I recon Canada's just about there, we have no choice but to be reliable.

That being said, Canada is slowly gaining courage with respect to criteria #2 of an energy superpower: Our trade minister, David Emerson, recently suggested that he's willing to use the

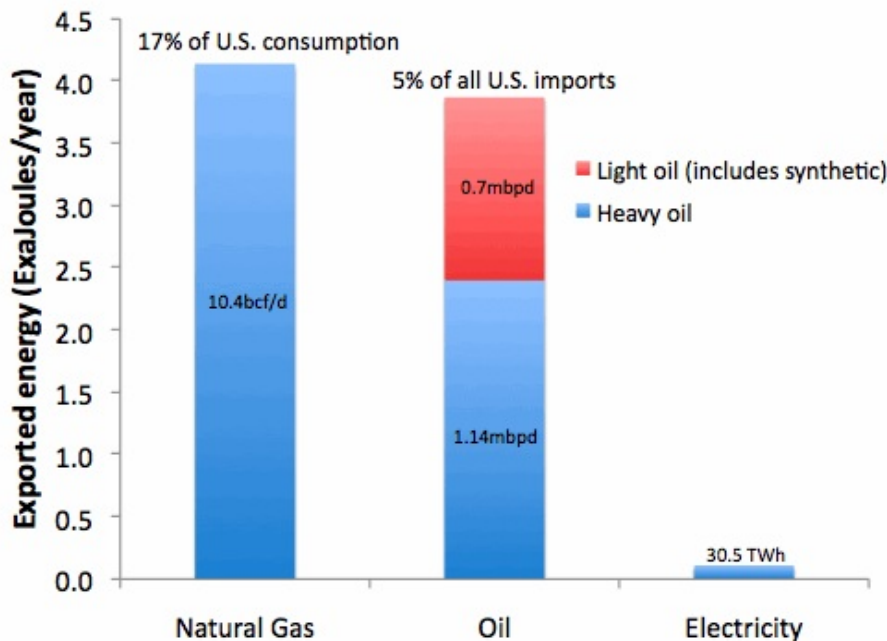
energy card after Hilary Clinton's and Barack Obama's talk of [renegotiating NAFTA](#), Emerson let this out:

"Knowledgeable observers would have to take note of the fact that we are the largest supplier of energy to the U.S. and NAFTA has been the foundation for integrating the North American energy market," said Emerson.

So, what can Canada offer?

Canada's credentials:

Having energy resources isn't enough to be an energy superpower. Those resources have to be exported. The National Energy Board just released the [Canadian Energy Overview 2007](#). From that document, I've put together a graph of Canada's average 2007 energy exports to the US:



Note: Here I assume all types of oil to have the same energy content

Even 30 TWh/year of electricity can be significant to small parts of North Eastern United States but obviously Canada's role as an energy supplier to the US is most important through natural gas and oil exports. The [future of natural gas in Canada](#) has been discussed on TOD before as well as Canada's [tar sands](#). What makes Canada's energy situation so fascinating is the coupling between energy sources.

In the table below, I've ranked Canada's energy resources against the rest of the world and compared them with Russia's (a real energy superpower) using the latest stats from the [BP Statistical review](#). It sheds some light on Canada's true situation:

	Canada's Rank	Russia's Rank
Oil Reserves	2 or 12*	7
Oil Production	7	2
Oil Consumption	8	4

Oil Exports	14	2
Natural Gas Reserves	21	1
Natural Gas Production	3	1
Natural Gas Consumption	4	2
Natural Gas Exports	2	1
Coal Reserves	13	2
Coal Production	15	5
Coal Consumption	14	5
Coal Exports	17	5
Uranium Reserves**	2	10
Uranium Production**	1	-

* BP Statistical Review only considers Canada's oil sands reserves to be those currently under development. Governments don't.

** Src: [World Nuclear Association](#)

Alone, Canada's energy resources, other than oil and uranium reserves, don't look to be particularly impressive. A large part of Canada's success as an energy superpower though is its ability to develop its resources. At any cost.

My first observation after compiling the above table was that Canada ranks 21st in the world in terms of natural gas reserves, but production, consumption and exports all rank in the top 4. Here lies the energy coupling challenge: In order to exploit our oil reserves, of which we have a lot, we are further depleting our natural gas reserves, of which we have few.

For each barrel of synthetic crude coming out of Canada from strip mining, [28 cubic meters of natural gas](#) is used ([this source](#) claims 14-28 cubic meters). This means America is sacrificing roughly 1.14% of its natural gas supply to import synthetic crude oil. For Canada though, converting NG into oil is economically a no brainer: at \$125/bbl, we get \$22/GJ for oil compared with the current going rate of \$11/GJ for natural gas. [Alternative methods](#) like the nuclear option for upgrading bitumen do exist. In March, Bruce Power Alberta [filed](#) an application for a 4GW nuclear reactor for the tar sands, but if it goes through, would only come on-line by 2017.

To conclude, Canada is the most important energy supplier to the US. Canada has ambitions to become an energy superpower, which means that finding a second customer is likely a priority. But Canada's natural gas could quickly become a rate determining step in these ambitions and so resource management is the challenge that Canada will have to address if it is truly going to become a reliable energy superpower.



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