

Gatineau Monde Lecture series

Economist outlines energy future

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The price of oil in Canada is the highest it has ever been, except for a time in the early 1860s. It is likely to stay that way, said Professor Jean-Thomas Bernard. An economist at the University of Ottawa, he was speaking as part of the Gatineau Monde lecture series on November 20 at the Maison du citoyen.

After its high of close to \$120 a barrel (in 2012 dollars) in the early 1860's, oil spiraled up and down till 1879, and from then till 1970 the ups and downs were less steep, leaving Brent oil (sweet light crude) prices rather flat. Then there was a rapid rise followed by a significant dip, with prices then zig-zagging on a low level till around 1999. Since then, the prices are tending mainly upward, interrupted briefly by a dip at the end of the last decade. But today the price is above \$110 a barrel for Brent.

Some of the fluctuation reflected external events, such as the beginning of Russian exports leading to a decrease in the 1880's. Following that, other new oil coming on stream kept prices down. The Iranian revolution caused prices to shoot up briefly, and the invasion of Iraq and the Arab Spring also precipitated a price rise. At this point, Bernard does not see much downward movement because of increasing demand.

Consumption of crude oil in the United States actually dropped due to the great recession, going from 19.8 million barrels a day in 2002 to 18.9 in 2011 and 18.6 in 2012. Europe and Eurasia followed the same pattern, as did Japan. Canada's usage was fairly flat, from 2.2 in 2002 and 2.4 in 2011 and 2012. The rest of the world has been on an upward climb. Most spectacular was China's climb, from 5.3 in 2002 to 9.8 in 2011 and 10.2 in 2012, almost doubling.

If we look at who produces oil and who imports it, we get an interesting picture. In millions of crude barrels of oil a day, the United States produced 7.6 in 2002 and 8.9 in 2012. Yet, in 2012 it imported almost as

much as it produced—8.5—and it exported no crude. So much for the dream of U.S. oil self-sufficiency on the horizon. No one else imports so much. All of Europe imported 9.5 barrels in 2012.

The US reliance on imports is illustrated by considering reserves. Reserves in the U.S. amount to 35 billion barrels in the ground, compared to Canada's 173.9 and 807.7 in the Middle East.

Shale gas is controversial. Quebec has put a moratorium on drilling because of concerns about water contamination and earthquake potential. Yet, the area in Canada that shows the most promise for production of schist gas is in Quebec, in the location between Quebec City and Montreal. There are reserves in the West as well, and British Columbia's Premier Christy Clark wants to develop facilities for exporting the gas. She would have a ready market in Japan. In 2012, the price of natural gas in Alberta was \$2.27 per million BTUs, while in Japan the price was \$16.75. BTU is a British Thermal Unit, a standard measure of heat in physics.

Bernard outlined future energy usage for transportation and for production of electricity. His figures are in quadrillion BTUs. A quadrillion is 10 to the 15th power. By comparison, a billion is 10 to the 9th power. Let's start with transportation. In 2010, the world's population used 99 quadrillion BTUs for transportation. This amount is expected to rise to 141 in 2040. Oil made up 94 of the 99 in 2010 and is expected to make up 125 of the usage by 2040. Other sources of energy are expected to go from four to 16.

When it comes to electricity generation, energy use in 2010 was 192 and is expected to rise to 292 by 2040. Oil for this purpose is seen as decreasing from ten to seven. Gas will increase significantly from 45 to 84. Coal is expected to increase from 88 to 95, and nuclear to double, from 29 to 59. As for renewables, hydro is projected to go from 12 to 19, wind from one to ten, and other renewables from seven to 19.