

**CANADA
OPPORTUNITIES**

12 March 2010 – NOF Energy, Durham

**Opportunities for
Renewables in
Canada**

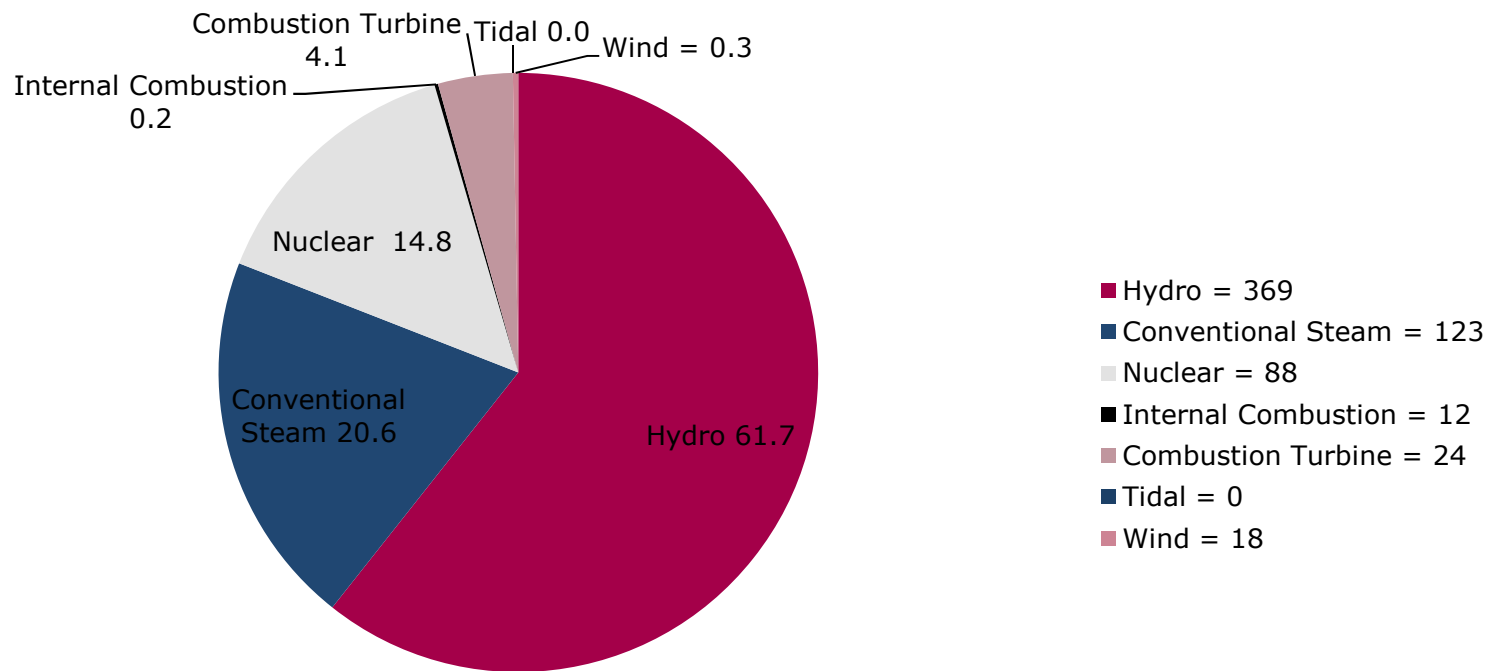
Agenda

- Canadian and Provincial Overviews
- Nuclear
- Wind
- Wave/Tidal
- Solar
- Other areas
- Upcoming Events
- Contact details

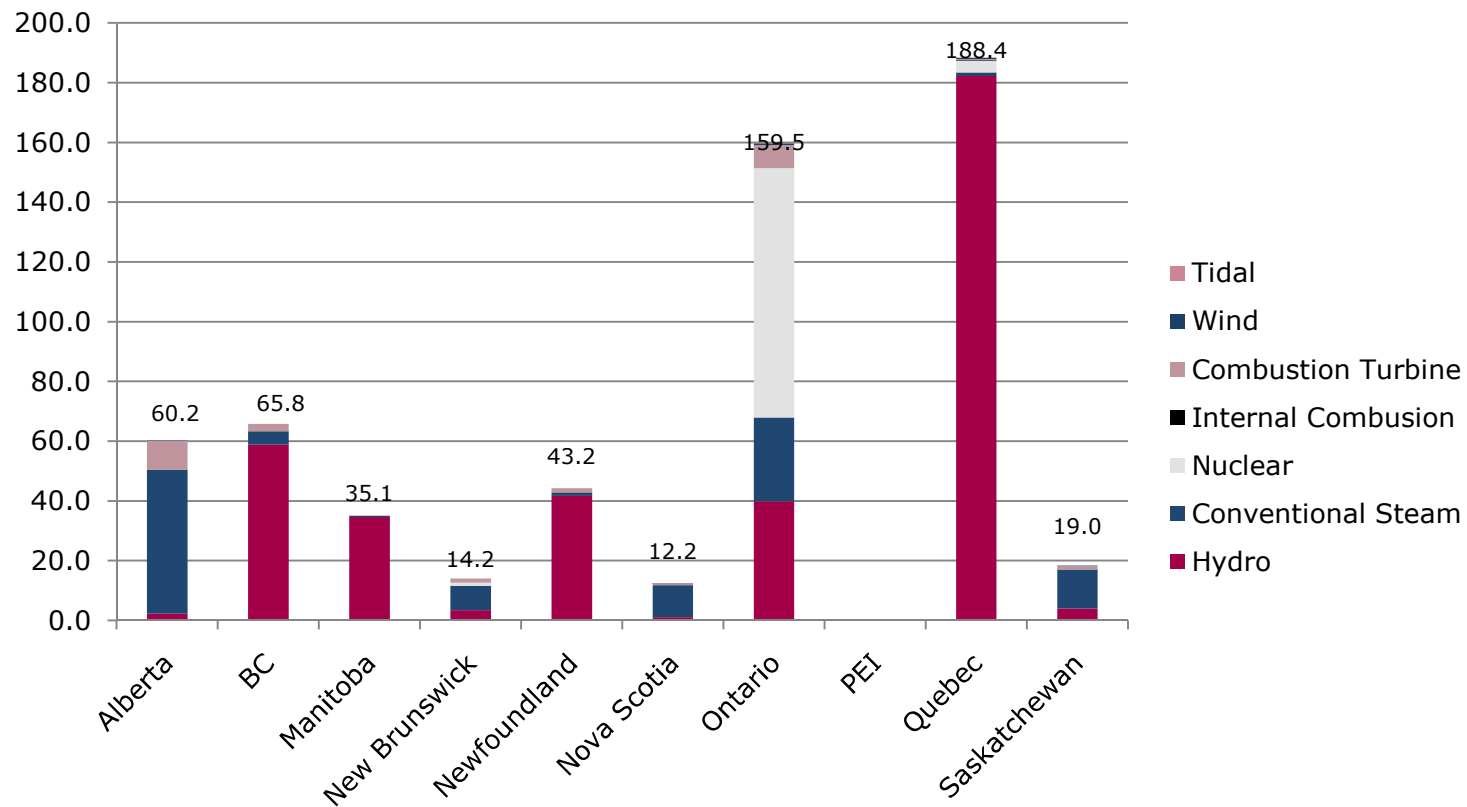
ELECTRICITY IN CANADA

- Total electrical production in Canada in 2008 was 598.8 TWh.
- Canada is No. 1 user of energy, per capital, worldwide
- Provincial /territorial responsibility with individual climate change plans.
- Transmission lines tend to run North/South, rather than across the country.
- Priorities are growing the electricity supply, with emphasis on sustainability, while lowering greenhouse gas emissions.
- In Canada, hydro electricity rules.
- All non-hydro renewables (wind, solar, bio-mass and tidal power) account for <2%.
- Canada has some of the lowest prices for electricity in the world, mainly due to Canada's natural resources, such as inexpensive hydro (i.e., water resources) and a vast coal supply.
- Price of electricity in Ontario: first 1000 kWh is 5.8 cents
- Canada is a net exporter.

TOTAL ELECTRICITY GENERATION IN CANADA (2008) = 598.8 TWh



ELECTRICITY GENERATION IN CANADA BY PROVINCE AND FUEL TYPE (2008)(TWh)



PROVINCIAL LANDSCAPE: A SNAPSHOT

- **Newfoundland**
 - Construction of Lower Churchill Falls Project (2,800 MW)
 - Labrador-Island Transmission Link (1,200 km HVDC line).
- **New Brunswick**
 - Point Lepreau nuclear refurbishment and potential second unit.
 - Energy hub under development.
- **Nova Scotia**
 - Recently imposed regulated caps on GHG emissions and electricity
- **Prince Edward Island**
 - Goal of growing wind capacity to 500 MW by 2013.
- **Quebec**
 - New hydro under development.
 - Refurbishment of Gentilly-2.
 - Quebec-Ontario Transmission Interconnection Project (1,250 MW).
 - Proposed legislation for a cap-and-trade program.
- **Ontario**
 - Potential for new nuclear development.
 - Policy to shut down coal plants by 2014 (represents 6,000 MW).
 - Green Energy Act and proposed legislation for cap-and-trade program.
 - Smart Meter initiative and Smart Grid Forum.

PROVINCIAL LANDSCAPE: A SNAPSHOT

- **Manitoba**
 - Wuskwatim (200 MW) Project.
 - Proposed Conawap (1,485 MW) and Keeyask (695 MW) stations.
 - Bipole III Transmission Project (2,000 MW)
 - Power Smart Program.
- **Saskatchewan**
 - Boundary Dam and Belle Plains clean coal projects.
 - Net Metering Program incentives.
- **Alberta**
 - Clean coal projects planned for Genesee and Pioneer Stations
 - Southwest Alberta 240 kV project
 - Provincial energy strategy.
 - Alberta Climate Change Strategy.
- **British Columbia**
 - Additional units at Revelstoke (500 MW) and Mica (1,000 MW) stations.
 - Peace River Site C Hydro Plant (900 MW) under consideration.
 - Proposed interior to Lower Mainland Transmission Project (255 km).
 - Standing Offer Program and Clean Power Call.
 - Legislated cap-and-trade program.
 - Smart Metering and Infrastructure Program.

NUCLEAR

- 17 reactors in service; 3 reactors being serviced (two at Bruce A, and one at Point Lepreau); 2 reactors being placed in safe storage at Pickering.
- Reactors at Quebec (Gentilly), Ontario (Darlington, Pickering and Bruce), and New Brunswick (Point Lepreau).
- In 2008, generated 14.8% of Canada's electricity, with 53% in Ontario, 3% in Quebec and 6.1% in New Brunswick (normally 30%).
- Largest producer of natural uranium, with 21% of world production from Saskatchewan.
- Major Players:
 - Ontario Power Generation
 - New Brunswick Power
 - Hydro Quebec
 - Bruce Power

NUCLEAR (Cont'd)

- Opportunities in Ontario:
 - AECL only bid accepted for 2 new reactors (at Darlington). Too expensive at \$26 billion. Delayed as re-negotiating better contract.
 - With US announcement, now stiffer competition for materials and labour.
 - Refurbishment at Darlington: \$6-10 billion to extend 30-40 years, construction to start in 2016.
 - Pickering: \$300 million upgrades for extension of 10 years.

- Quebec: Gentilly refurbishment, to begin 2011-2012, extend life by 35 years.

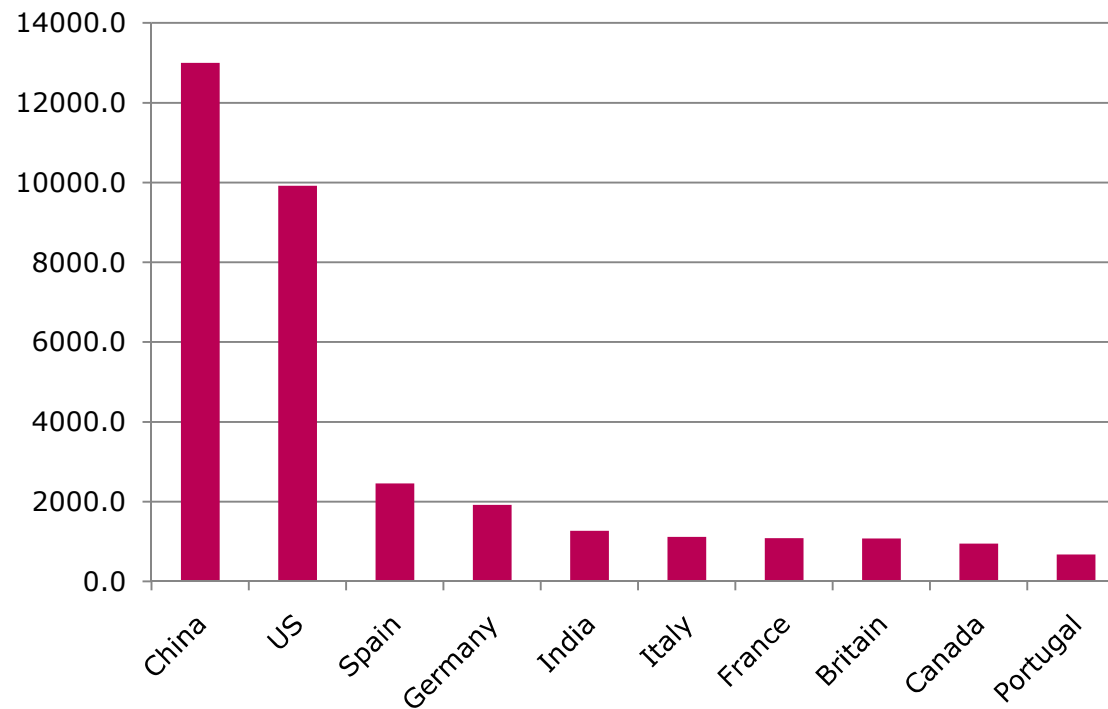
- New Brunswick: refurbishment to be completed by early 2011.

- Potential nuclear in Alberta; sub for natural gas

- AECL

WIND

- Canada breezes into the world's top 10 for new turbines, with 950 MW added in 2009.



WIND

- Canada has 3,000 MW of wind capacity, enough electricity for 1 million homes.
- Represents 1% of total, in contrast with Europe at 9% wind energy.
- Every province has a wind regime, with Ontario (1208MW), Quebec (659) and Alberta (590MW) offering highest growth opportunity.
- Off-shore opportunities in Great Lakes and offshore BC.
- Big players include: Vestas and RES (manufacturing facilities in Quebec).
- Sgurr Energy and GarradHassan have presence in Canada.
- Canada Wind Energy Association (www.canwea.ca)
- CANWEA conference: 1-3 November 2010, Montreal, Quebec

WAVE/TIDAL

- Significant opportunities on East Coast/Bay of Fundy with tidal.
- Canada is #3 in technology development, US #2
- Wave is primarily on West Coast/British Columbia.
- Potential nearshore (wave):
 - Queen Charlotte Islands – 9600 MW
 - Vancouver Island – 9400 MW
 - Sable Island – 1000 MW
 - Southeast Newfoundland – 9,000 MW
- Potential tidal: 42,240 MW; 191 sites; average size of 221 MW
- Tidal projects in Bay of Fundy.
- Association: Ocean Renewable Energy Group (www.oreg.ca)

SOLAR

- Installed PV power capacity increased by 2.7% in 2008 to 32.72 MW.
- Largest module sales in off-grid market (residential and non-residential) with 66% of market share, with grid-connected at 34%.
- 53% increase in full-time employees engaged in PV activity in public and private sectors , with largest increase in manufacturing sector (modules, BOS and silicon feedstock).
- Ontario has introduced a feed-in-tariff, enabling smaller producers to get onto the grid. ROI of 10 years with solar PV, but prohibitive domestic content requirement.
 - Wind: 25% initially with 50% by Jan 1/12.
 - Large solar projects: 50%, with 60% by Jan 1/11.
- Ontario FIT pays solar energy producers rate of 44.3 cents to 80.2 cents per kWh over contract life of 20 years for projects under 10 megawatts.
- More info: Canadian Solar Industries Association (www.cansia.ca)

OTHER AREAS

- Emissions Trading
 - No federal scheme in Canada.
 - Following US lead, with provinces are going it alone.
 - Ontario has interests in UK software/IT for ET.

- Green Buildings
 - LEED – adapted for Canada.
 - Most green buildings in BC, then Ontario.
 - Canada Green Building Council

UPCOMING EVENTS

- Canadian participation at Low Carbon Vehicle Congress, 22-25 March 2010, Newcastle.
- UK delegation to Globe, Vancouver, 24-26 March 2010.
- Participation at All Energy, 19-20 May 2010, Aberdeen, with Canadian delegation; plus energy roadshow.
- World Energy Congress, Montreal, 12-16 September 2010.
- Canadian trade mission to BWEA conference, Glasgow, November 2010.
- Emissions trading seminars, Toronto and Calgary, Fall 2010.
- Canadian Nuclear Association Conference, Ottawa, February 2011.

UK
TRADE &
INVESTMENT



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