Québec’s 2030 Energy Policy: Reviewing the provinces evolving low-carbon profile and a 25% renewables increase, an inspiring move for Canada.

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Presented before
The Senate Standing Committee on Energy, the Environment and Natural Ressources
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Presentation plan

1. About AQPER
2. The situation of Québec's energy
3. Québec's GHG reduction objectives
4. The 2016-2030 Energy policy
5. Where will the growth be?
6. Closing remarks
1. About AQPER

- Founded in 1991, the Quebec Association for the Production of Renewable Energy is the voice of RE's segment in Québec.

- It gathers more than 100 companies (municipalities, research centres, first nation groups, etc.).

- Its mission is to increase the share of Renewables (from independent energy producers) in Québec’s portfolio and to maximize its value for the benefit of the people of Québec.
Fostering renewables in Québec

- Submitted a position paper titled *The Vision 30-30*:
  - +30 TWh of RE and
  - +15% of energy efficiency
  - -30% of petroleum products
  - +30 $G in capex needed for 2030

- Presented its conclusions before several commissions, medias, stakeholders.
2. Québec’s energy situation (2013)

Total energy consumption

In 2013, Québec’s total energy consumption broke down as follows:
- 172.5 billion kilowatt-hours (kWh) of electricity
- 18.2 billion litres of petroleum products
- 6.4 billion m³ of natural gas
- 3.0 million tonnes of oil equivalent (toe) of bioenergy
- 0.4 million tonnes of coal

All told, this represents 39.8 mtoe of energy.

Electricity 99% RE
Wind 10%
Oil < 1%
Another perspective (2014)

615 TWh
flowing in the system

53% is fossil & imported

47% is green & local

45% is useful

Québec households devote roughly 8% of their disposable income to energy. In 2014, an average household comprising 2.3 individuals spent $4 000 on energy for heating, lighting and travel.

The Québec government’s building inventory comprises roughly 14,900 buildings totalling 43.5 million m². Between 2002 and 2012, energy intensity (energy consumption by floor area) was reduced by 11.2% through energy efficiency measures.

Energy is a factor of production that is essential to economic activity. By way of an example, it can account for more than one-third of production costs in the cement manufacturing sector.

The transportation sector alone consumes 75% of all of the petroleum products used in Québec for energy purposes.
3. Québec's GHG reduction objectives

1990 based reductions

- **82.7 Mt CO2e** in 2014
- **-11.4 Mt CO2e** by 2020
- **-26.3 Mt CO2e** by 2030
What about Canada’s internal demand?

3,706 TWh
e

18% Renewable

29% Useful

http://www.cesarnet.ca/visualization/sankey-diagrams-canadas-energy-systems?scope=Canada&year=2013&modifier=none&hide=exp&scalevalue=0.01725194792604189#chart-form
What about Canada’s GHG emissions?

726 MT CO$_2$e in 2013

GDP and GHG decoupled between 2005-2013

-3% GHG

+13% GDP

512 MT CO$_2$e in 2030 = the target (-30%)
4. The 2016-2030 Energy strategy

The government has adopted ambitious, demanding targets to be achieved by 2030:

1. **Enhance** energy efficiency by 15%
2. **Reduce by 40%** the amount of petroleum products consumed
3. **Eliminate** the use of thermal coal
4. **Increase by 25%** overall renewable energy output
5. **Increase by 50%** bioenergy production

The targets are based on data for 2013, the most recent available.

**Annual effort**
- +1% Energy efficiency
- +2% Renewable energy
- -3% Petroleum products
Renewables will increase their share
5. Where will the growth be?

- Green Energy for economic development +11 TWh in 2016
- Supporting neighbours’ energy transition:
  - New York: X2 RE by 2030 (25% of 160 TWh in 2014)
  - New England: 9 TWh in 2017
- Decarbonization of the economy: thermal + transport
- Going for 100% renewable electric generation (isolated grid)
Electric generation: exports & isolated grids

- RPS in neighbouring US markets is favourable for a wind + product
- Authorization for new transmission capacities in the US
- New interties with Québec are planned
- Carbon tax will accelerate the transition in Québec: (5% + CPI)/yr
- HQ plans to shut down its oil fleet by 2023. RFPs on their way!
Opportunities in the Canadian electrical sector

- Replacing diesel generators:
  - Northern communities
  - Maritimes
- Phasing out coal
Lots of options, like wind
Solar is also becoming a competitive option.

Figure 1: Location of the 144 Canadian and 8 U.S. meteorological stations used as sources of insolation data.

Figure 3: Yearly PV potential map for latitude tilt and the 13 “PV hotspots” in each province and territory in Canada.

Table 1: Ranking of major Canadian cities and capitals in terms of yearly PV potential (latitude tilt).

<table>
<thead>
<tr>
<th>Capital or major city</th>
<th>Yearly PV potential (kWh/kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regina (Saskatchewan)</td>
<td>1361</td>
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<tr>
<td>Calgary (Alberta)</td>
<td>1292</td>
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<tr>
<td>Winnipeg (Manitoba)</td>
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<tr>
<td>St. John’s (Newfoundland/Labrador)</td>
<td>933</td>
</tr>
</tbody>
</table>
Solar LCOE is falling

[...] Deliveries of Tier 1 solar panels in 1MW volume to the northeast U.S. have fallen from ~$0.60-65/W to ~$0.45/W — coming out to price declines of 25-30%.

Electek 26-09-2016
Thermal energy: lots of room

- RCI used 850 M litres of gazoil in 2014
  - Remote communities can’t use electricity for heating and gas are not available.
  - District heating is uncommon
- Heavy industry consumed 323 M litres of bunker fuel in 2014
- 0.6 M tons of coal will need to be replaced in the industrial sector
- Solar is also an option!

http://visionbiomassequebec.org/?page_id=383
Thermal & Transport: renewable natural gas

- Greening the pipeline with a minimal content of renewables
- Landfill disposal of organic material will be banned in 2022
- 3 way sorting is underway
- Wood gasification is an option to consider
Transport: Biofuels in Québec

- The government will set a mandatory provincial blend which will be progressively increased.
- To reach -40% target, supply MUST go up!
- For biodiesel, each 1% of Québec’s demand represents 30 M litres.
- Residual biomass is available and can be guaranteed by the government under certain conditions.
- Room for several players.

Source: http://www.uvm.edu/~adahiya/bioenergy/?Page=projects.html
Transport: eMobility the way to go!

- 1M vehicles target by 2030 in Qc
- A California zero emission based regulation has been adopted
- Multi fuel filling stations in preparation
- Increase in charging stations
- Solar can be part of it too
- And so is Hydrogen
Will wind remain bullish?

- There will be other wind farms in Québec
  - Small RFP’s for the internal market
  - Large potential for exports in US RFP’s

“There are more than 5000 jobs in the wind industry, therefore we will keep supporting it.”

Energy and Natural Ressources minister, Mr Pierre Arcand
Energy transition, the way to go!

Slump in oil prices drives green energy uptake in top exporting nations

With oil at below $30 a barrel, countries such as Saudi Arabia, Russia, Iran and Kuwait are looking to curb fossil fuel use at home to maximise export profits.

US navy launches first biofuel-powered aircraft carriers

Carrier strike group of four ships is the first to begin operating regularly with a blend of petroleum and biofuels made from beef fat.


6. Closing remarks

- For Canada there are still lots of low hanging fruit in the electricity sector
- Solar and Wind are at LCOE
- Biofuels could be bullish depending on the coming mandatory blend regulation
- Strong actions required in the transport sector
- Canada should take energy transition by the hand, get the jobs and the exports, before change take it by the throat
Thank you!

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