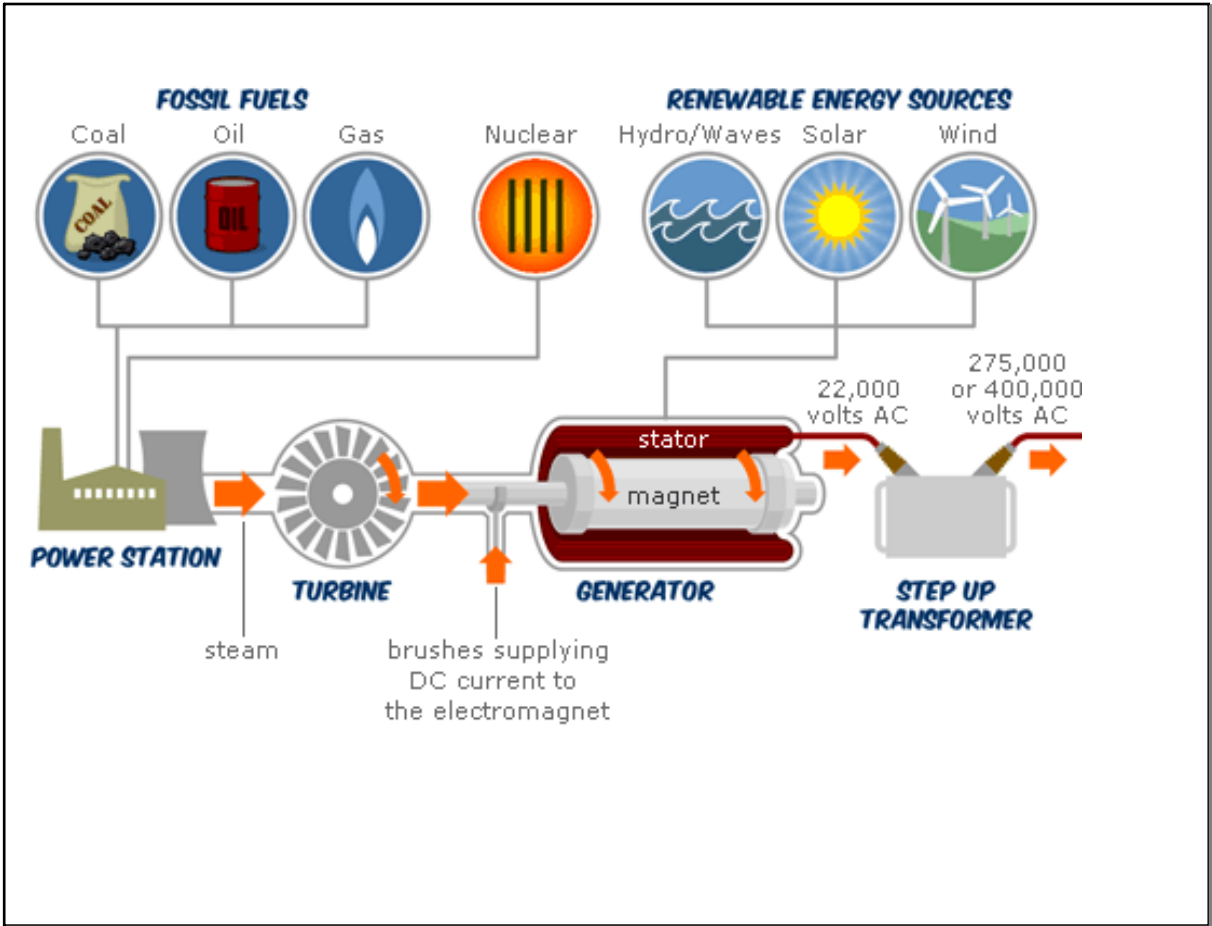
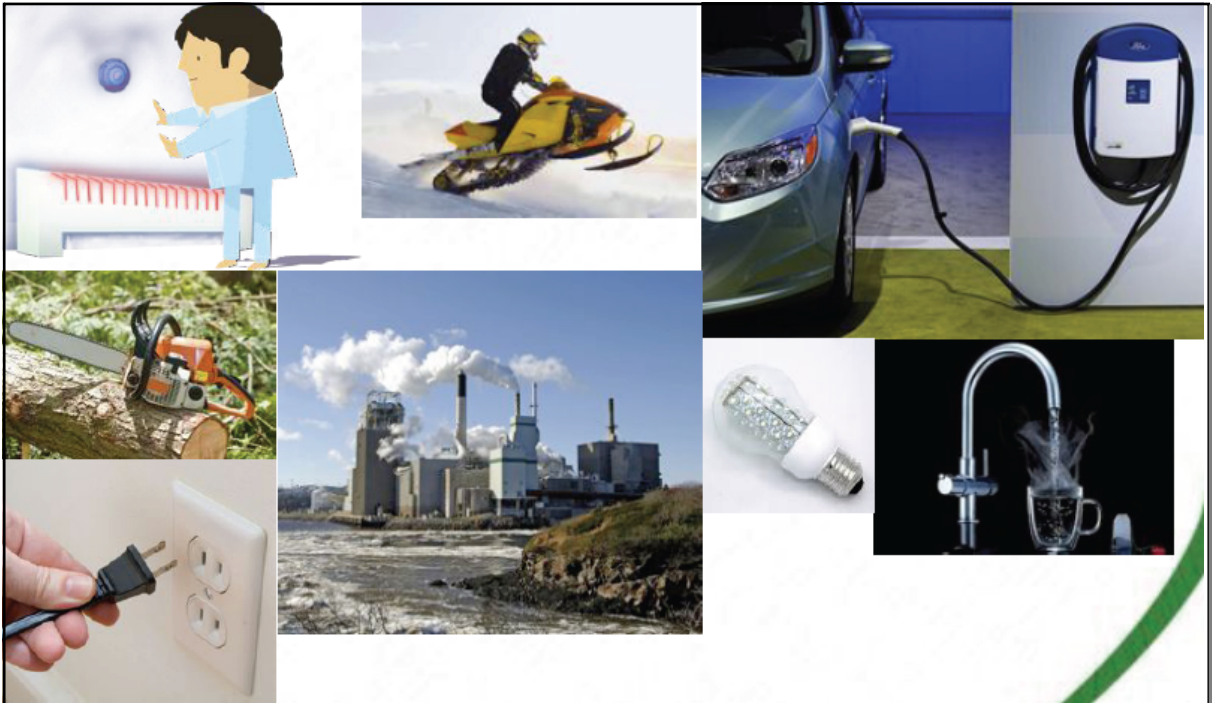



May 10-8:03 AM




May 10-10:27 AM



25% of NB's CO₂ emissions come from generating electricity




May 10-8:05 AM



Electricity cannot be stored

Electricity is consumed at the moment it is produced



Generating Capacity Hydro	
Macquarie	668 MW
Beechwood	112 MW
Grand Falls	66 MW
Tobique	20 MW
Nepisiguit Falls	11 MW
Sisson	9 MW
Milbrook	3 MW
Total Hydro	889 MW
Generating Capacity Nuclear	
Point Lepreau	660 MW
Generating Capacity Combustion Turbine	
Milbrook	397 MW
Ste. Rose	99 MW
Grand Manan	29 MW
Total Combustion Turbine	525 MW
Total Generating Capacity	
Thermal	1,429 MW
Hydro	889 MW
Nuclear	660 MW
Combustion Turbine	525 MW
Total Generating Capacity	3,513 MW
Power Purchase Agreements (PPAs)	
Kent Hills (Wind)	150 MW*
Caribou Mountain (Wind)	99 MW*
Lamèque (Wind)	45 MW*
Bayville (Natural Gas)	285 MW
Grandview (Natural Gas)	90 MW
Two Rivers (Business)	39 MW
St. George (Hydro)	15 MW
Edmundston Hydro	9 MW*
Other Renewable	6 MW*
Total	738 MW
Number of Lines	
Distribution Lines	25,815 km
Transmission Lines	8,849 km
Exporting and Importing Capacity	
Export Capacity	2,137 MW
Import Capacity	2,378 MW
Number of Customers	
# of Direct Customers	352,208
# of Indirect Customers	41,425
Total Customers	397,633

*Nameplate Capacity: This capacity may not be fully available during times of peak demand

May 10-8:05 AM

What is the implication of this for wind, solar, tidal energy?

May 10-8:06 AM

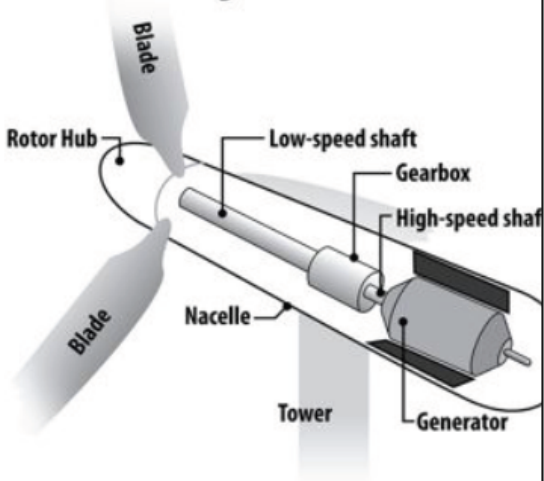


May 10-8:16 AM

Wind Power



Wind Turbine Diagram

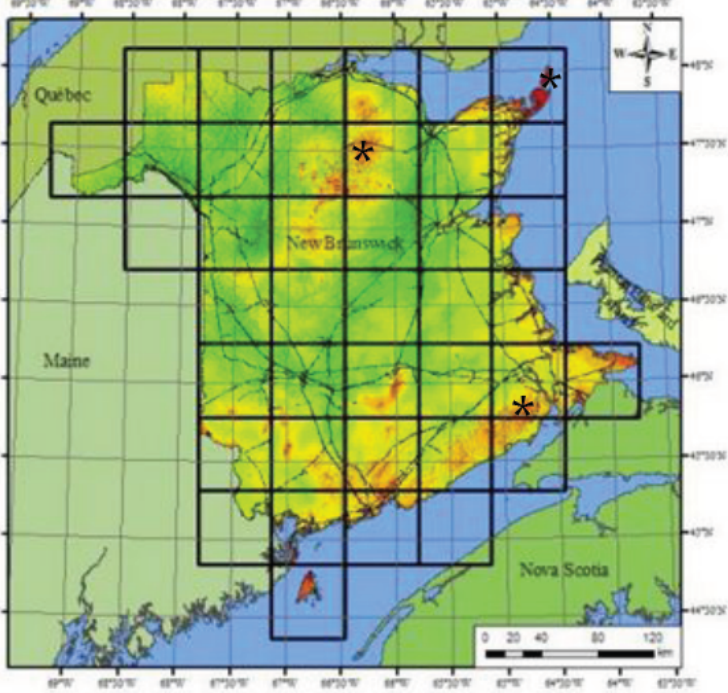


~6% of NB’s electricity generation in 2014/2015

Image: <http://need-media.smugmug.com>

May 10-8:06 AM

Where are some places near us that could have wind turbines?



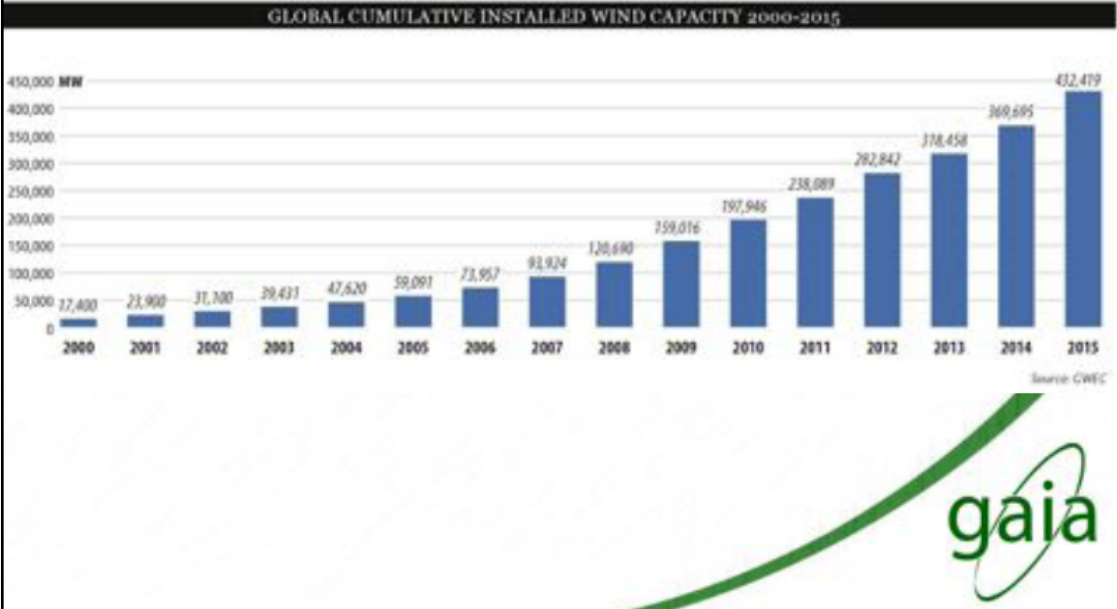
NB Wind Resource Map



Credit: University of Moncton and NB Energy and Mines

May 10-8:07 AM

Growth in wind deployment



May 10-8:06 AM

Hydroelectricity

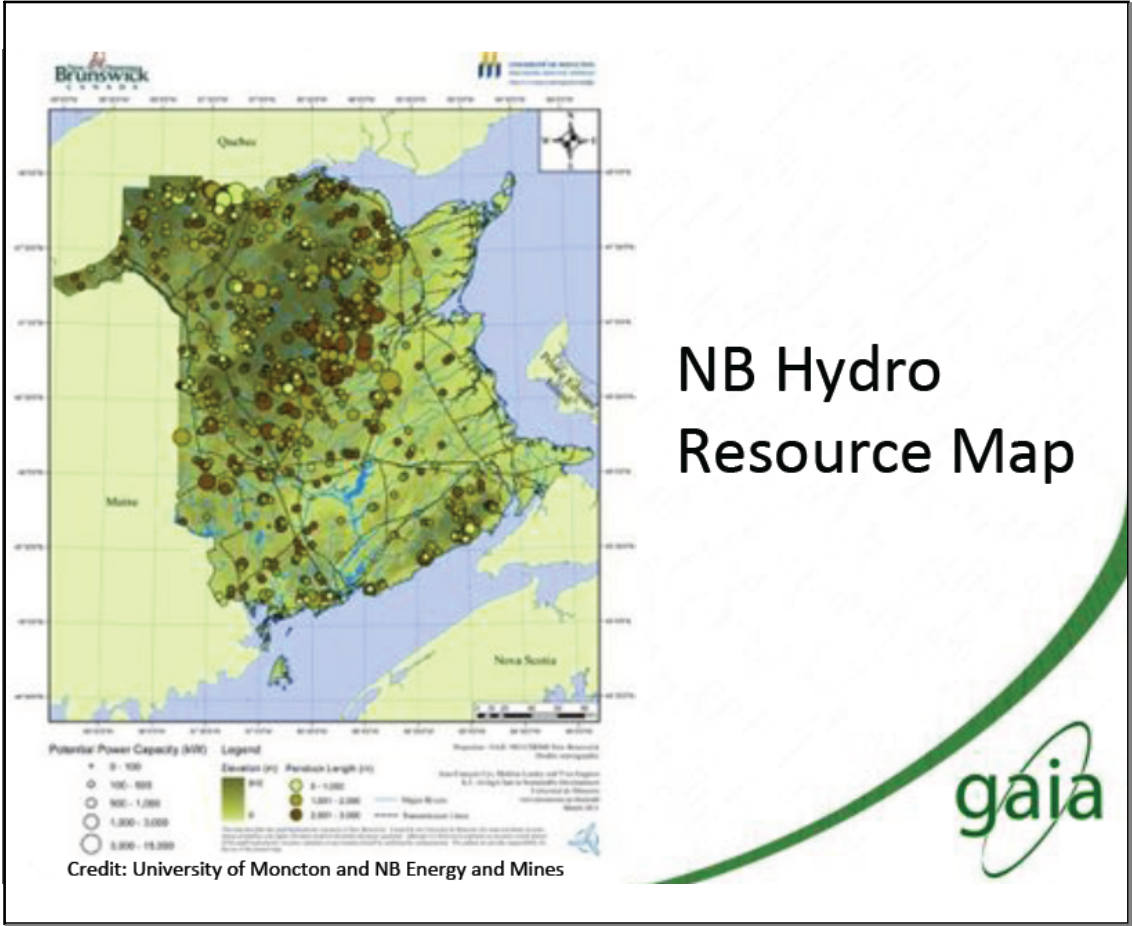


18% of NB's
electricity
generation in
2014/2015

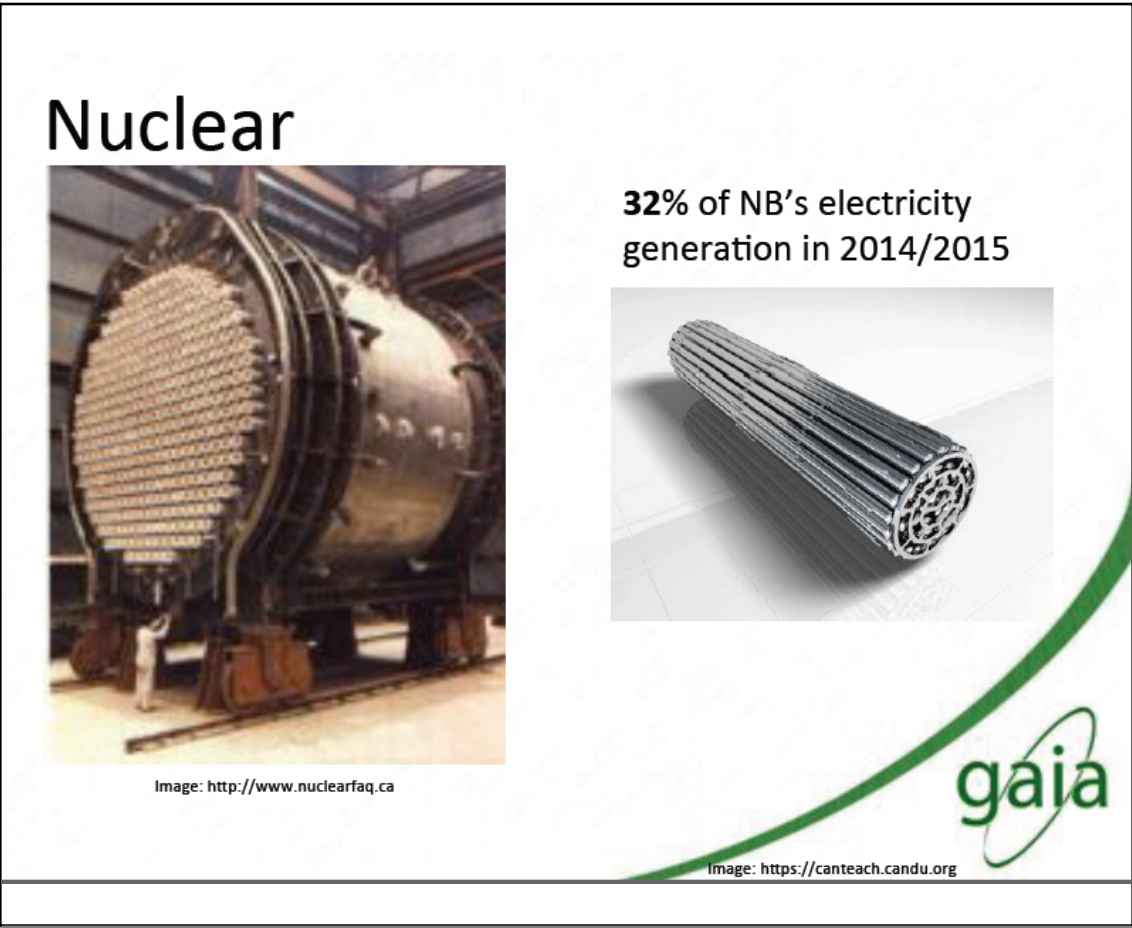


Image: <http://www.nanookofthenashwaak.com/>

May 10-8:08 AM



May 10-8:08 AM



May 10-8:08 AM

Latest speculation on Lepreau II 'beating a dead horse'

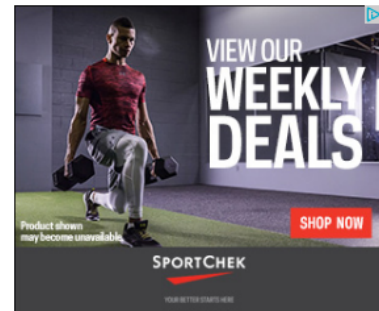
'Time has moved on' since second plant was first discussed in 1980s, says Green Party leader

By Julia Wright, CBC News Posted: Feb 20, 2017 11:20 AM AT | Last Updated: Feb 20, 2017 11:20 AM AT



The Point Lepreau site was approved for more than one reactor site when it received its environmental permitting in the 1970s. A second reactor was first contemplated when the plant was finished in 1981.

Stay Connected with CBC News



Feb 21-2:43 PM

Name the fossil fuels...

May 10-8:09 AM

Fossil Fuels



Oil



Diesel



Natural Gas



Coal

gaia

May 10-8:09 AM

44% of NB's electricity came from fossil fuels in 2014/2015








Image: www.tixik.com

gaia

May 10-8:09 AM

Biomass



Carbon Trust Jan 2009

gaia

image <http://pixshark.com/>

May 10-8:09 AM

437 MW of biomass energy (heat and electricity) across NB






Image: <http://www.acadienouvelle.com/> & bbtnb.ca & frswc.ca

May 10-8:10 AM

34% of NB's electricity is from renewables sources including hydro, biomass and wind.

72% of NB's electricity is from non-emitting sources including hydro, biomass, wind, and nuclear.



May 10-8:10 AM

If you were going to build a house energy efficient what would you have to do?

Design one now...

May 10-8:10 AM

House like Natalie
Window facing south
rocks in window ledges
middle of no where, but close to water with a
water wheel
Bathe in waterfall
human poop in flower garden
poop in house use for heat
green house and farm

tilet compost
paint house black for heat
solar panels on roof
no walls no internal walls
recycled furniture
repurpose barn boards
21 pepsi crates and ply wood
inground freezers
large amount of water for air conditioning
burn human poop (or anyone)
hand water pump
hunt instead of buying food
gardening
loading ammo
make homemade guns
use newspaper for insulation

Little solar panel
garbage walls
little cow garden
train cover to poop
cow poop burns
recycle cows
burn cow bones
place house near river for water wheel
little compost box for poop
lots of windows
black roof

tuckets instead of sinks
whole house made with solar panels
big windows
lots of windows
windows made from recycled glass
have recycled wood doors
candles instead of light
poop outside
dirt floor
burn poop after its ready
bathe outside
bathe in mud puddle
bow and arrows for hunting
have a chicken farm and pigs
sheep for wool

Apr 27-3:02 PM





Naugler Passive House in Douglas - \$77 per year in heating costs



May 10-8:10 AM

Sustainable Electricity - l'électricité durable





Énergie NB Power

Michel Losier, Director of Customer and Community Engagement
April 29, 2016


May 10-8:11 AM


I skate to where the puck is going

Wayne Gretzky

Je patine vers l'endroit où la rondelle va être

Wayne Gretzky





Énergie NB Power

REDUCE AND
SHIFT DEMAND

2

May 10-8:11 AM

100% renewable by 2020 - 100 % en énergie renouvelable par 2020
Walmart - USA



Énergie NB Power

May 10-8:13 AM

Why is Walmart doing this?

May 10-8:13 AM



May 10-8:13 AM



May 10-8:13 AM



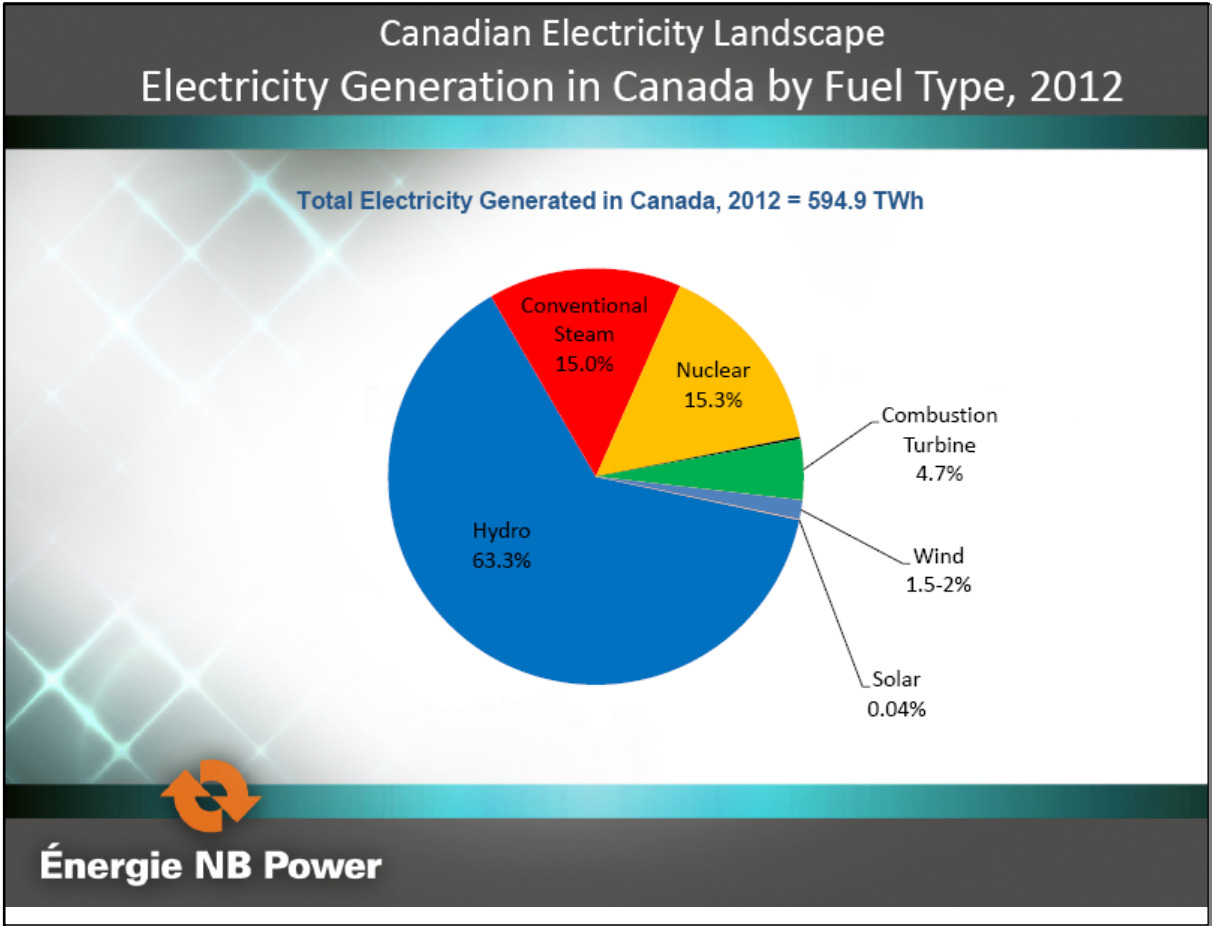
May 10-8:13 AM

Understand this:

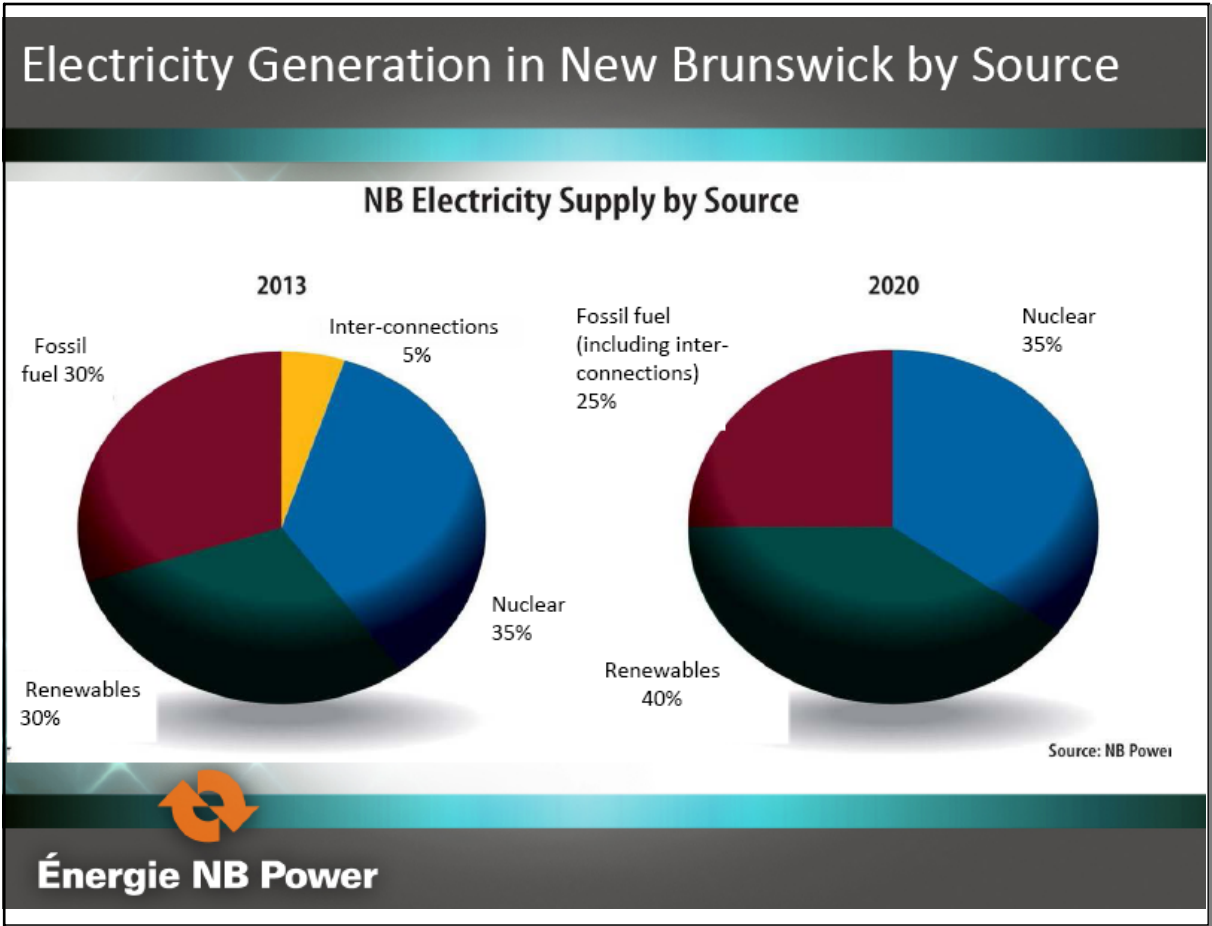
We have to have generating plants for those peak moments on the scale when there is a concert, a hockey game or on that one coldest day of winter when 60% of NB'ers heat with electric.

Think about what this means...

May 10-8:14 AM

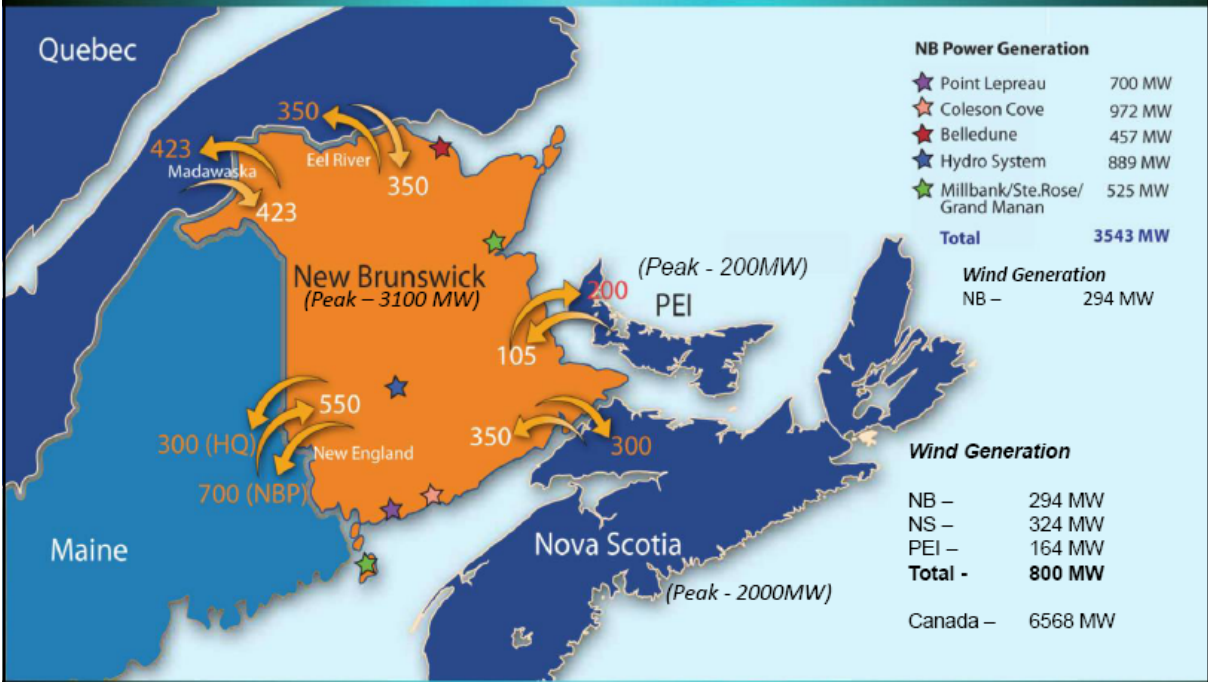


May 10-8:16 AM



May 10-8:16 AM

NB Power and Atlantic Canada

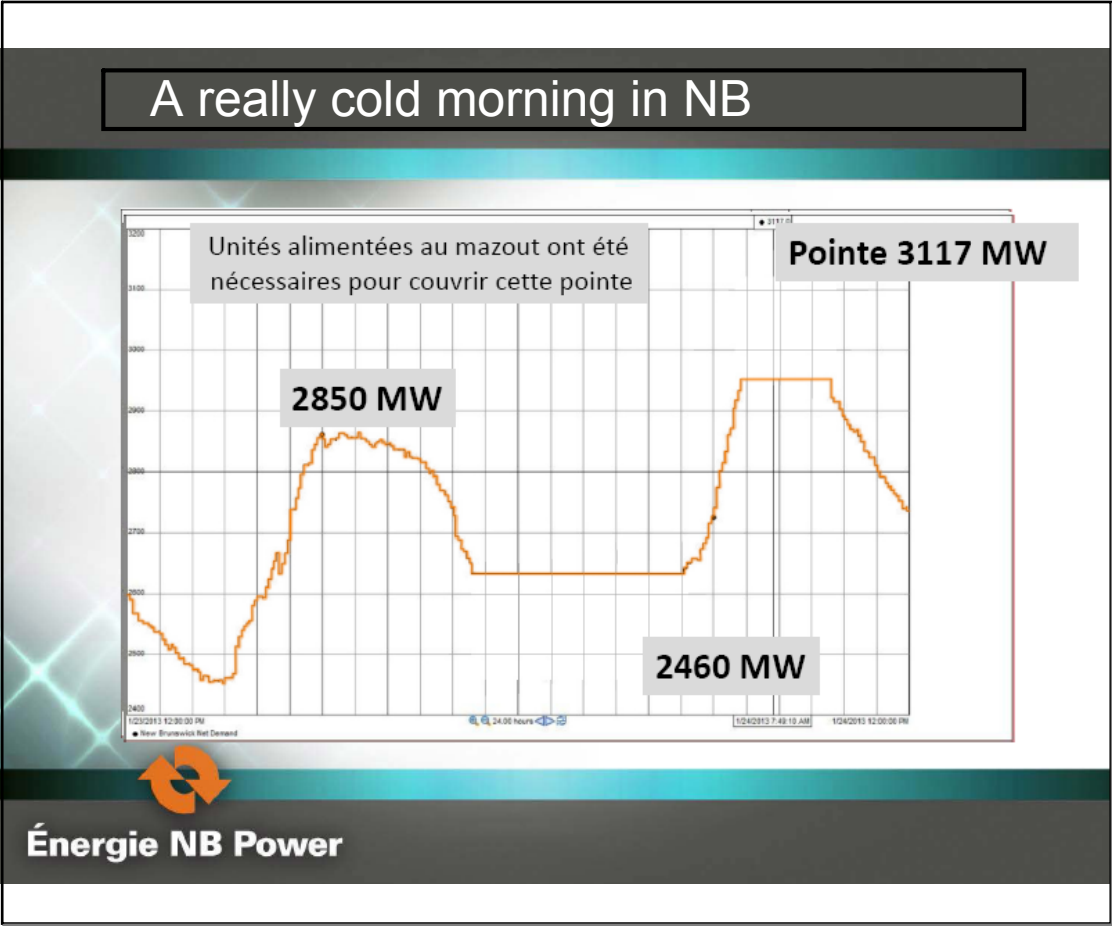


May 10-8:16 AM

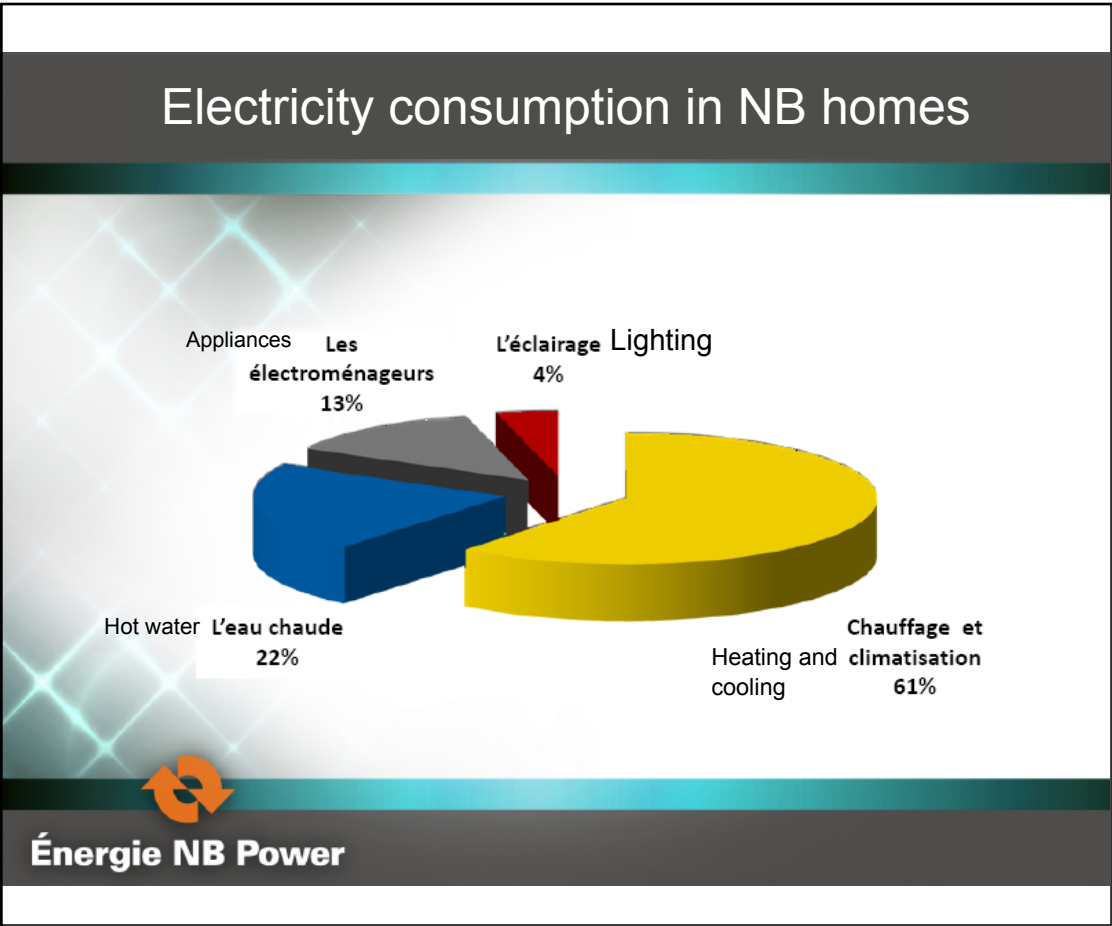
A very real problem at my house at 6:35am



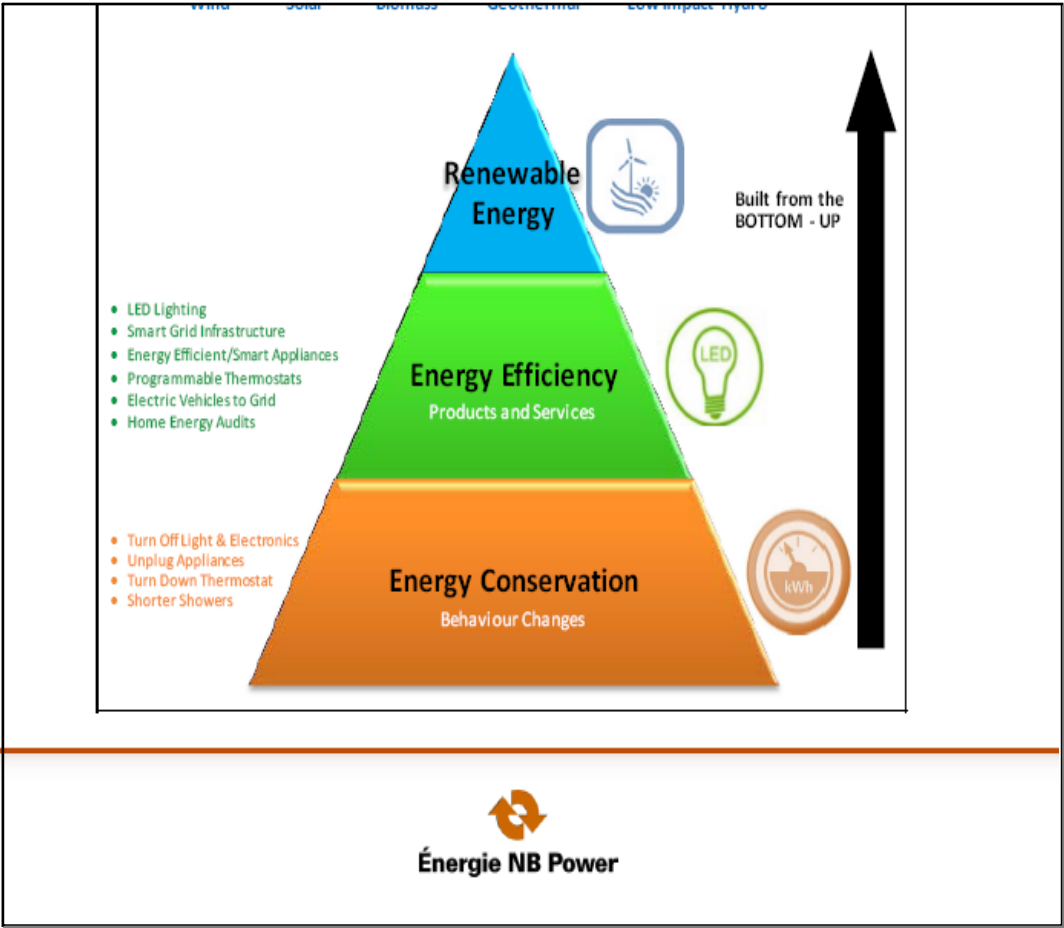
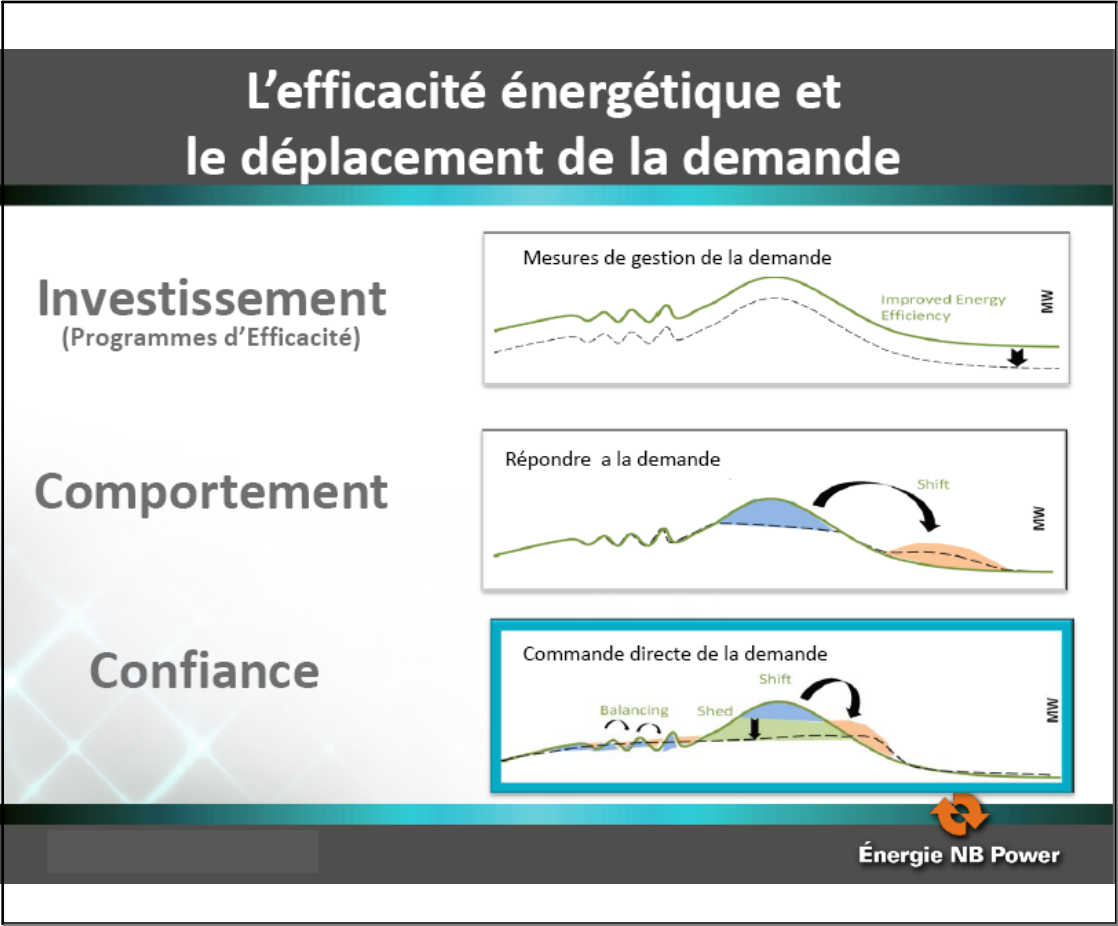
Dec 11-1:54 PM



May 10-8:17 AM



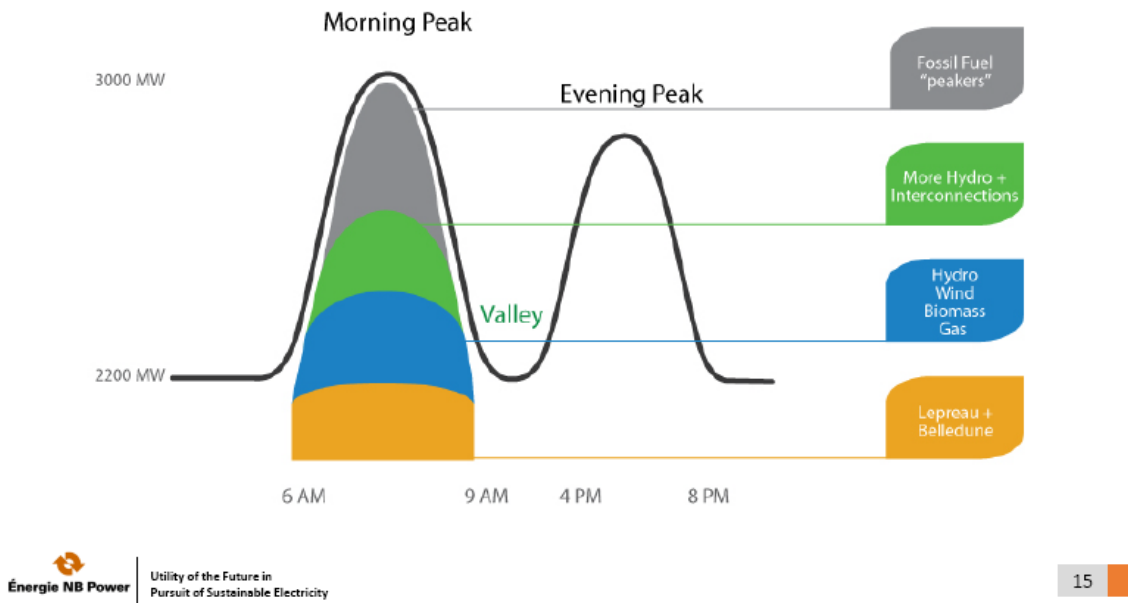
May 10-8:17 AM



May 10-8:17 AM

Step 1: Understanding why we are changing...

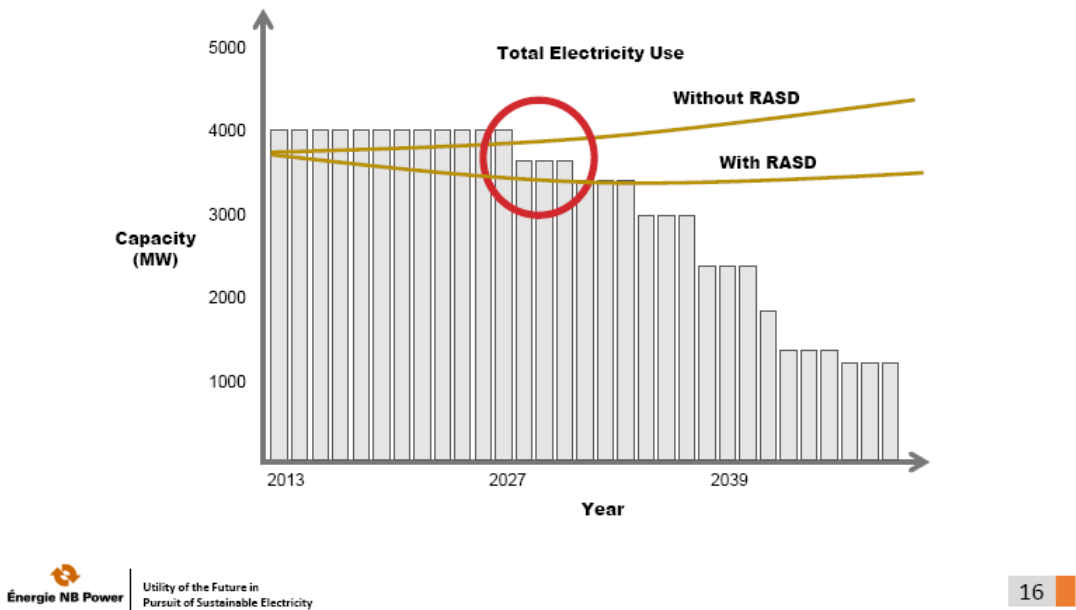
Our Two-Peak Challenge



May 10-8:18 AM

Step 1: Understanding why we are changing...

Our supply and demand challenge



May 10-8:18 AM



May 10-8:18 AM

Electric Thermal Storage In the home

Existing Baseboard
(60% of New Brunswick homes)



Electric Thermal Storage
(Potential solution for the future)



Reduce and Shift Demand



May 10-8:18 AM

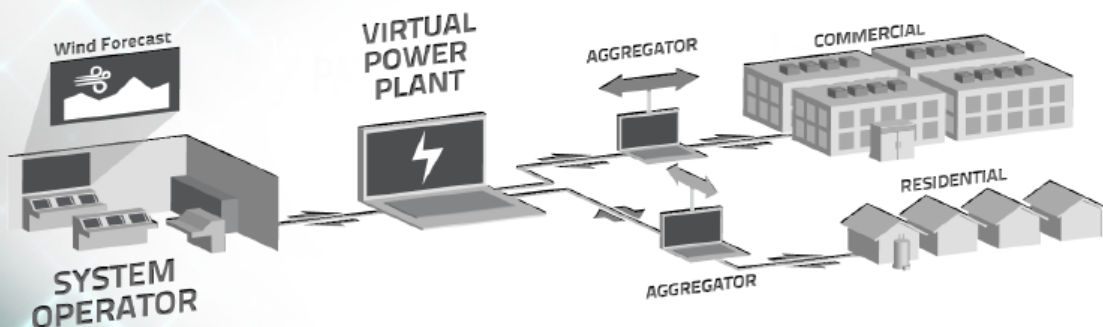
What other ideas can you come up with for storing energy for off-peak times? How do we get people to use electricity more in the off-peak times?

P.S. Charging more for "peak energy" is coming...

May 10-8:18 AM

VIRTUAL POWER PLANT

Intelligent Load Management – engaged customers and new technology solutions




Énergie NB Power


May 10-8:20 AM

Innovation des produits – Évolution de la clientèle



1950 et 1960



1970 et 1980



2000 au jour d'aujourd'hui





Énergie NB Power

May 10-8:20 AM

1950-60



1970 - 2005



Aujourd'hui





Énergie NB Power

May 10-8:20 AM

Our Customers

A new Partnership with new “value-added” solutions



INSPIRED BY AEROSPACE TECHNOLOGY

ida
INTERNATIONAL DIAL-UP ASSOCIATION

SAVE **Twice!**

ENJOY LOWER ENERGY BILLS

SAVE \$13 on a 60W incandescent bulb

SAVE \$14 on a 60W CFL bulb

SAVE \$15 on a 60W LED bulb

SAVE \$16 on a 60W LED bulb

SAVE \$10 on a 60W LED bulb

SAVE \$15 on a 60W LED bulb

Visit www.energie.ca or call 1-855-295-180 for a list of participating stores and program details.

Énergie NB Power

May 10-8:21 AM

Customer Engagement and Education



Why pay for electricity you don't need?

smart habits.ca

Pourquoi payer pour de l'électricité dont vous n'avez pas besoin?

de bonnes habitudes.ca

BEAT THE PEAK
COMMUNITY CHALLENGE

DÉJOUER LES POINTES
DEFI COMMUNAUTAIRE

Énergie NB Power

Reduce and Shift Demand

Énergie NB Power

May 10-8:21 AM

This is where the puck is going!
233,000 MW of solar

1/3 of North Americans at Grid Parity today
"Customers like solar"

Google closes \$3.2 billion purchase of Nest

ComEd wants to put a million smart thermostats in Illinois homes

11,000 sold in first hour

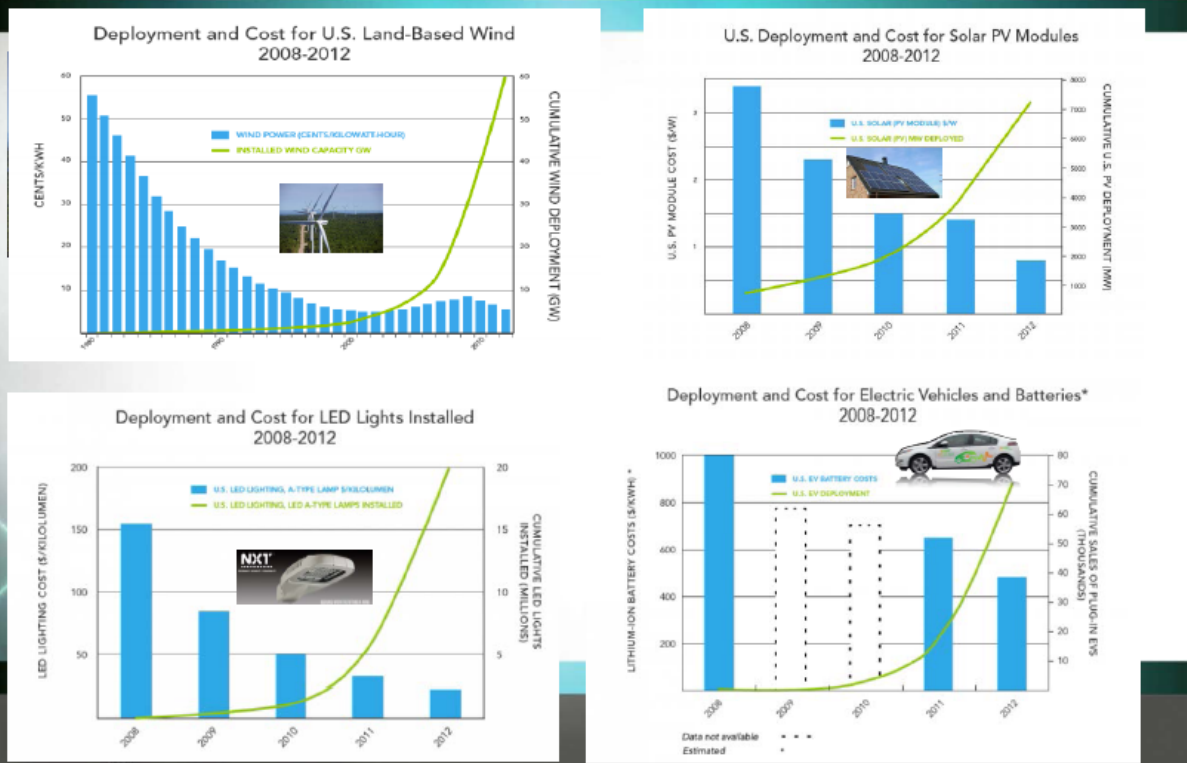
Tesla Model 3 – 300,000 orders in 48 hours (\$10B worth) "Mobile Energy Storage"

Global Wind capacity – 400,000 MW headed for 700,000 MW

Walmart U.S. - 100% renewable by 2020

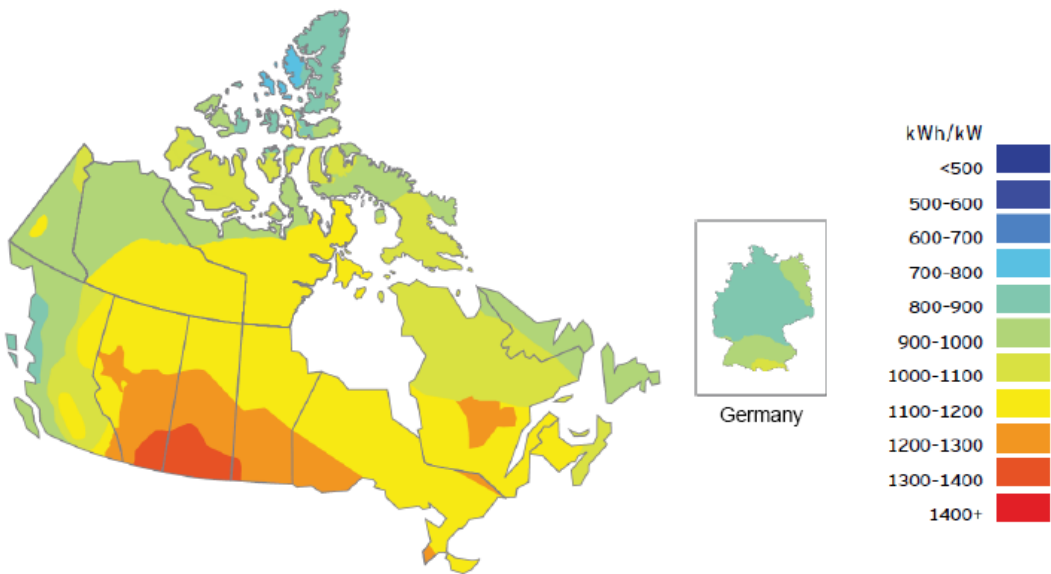
May 10-8:21 AM

Market Trends



May 10-8:21 AM

Canada's Solar Potential



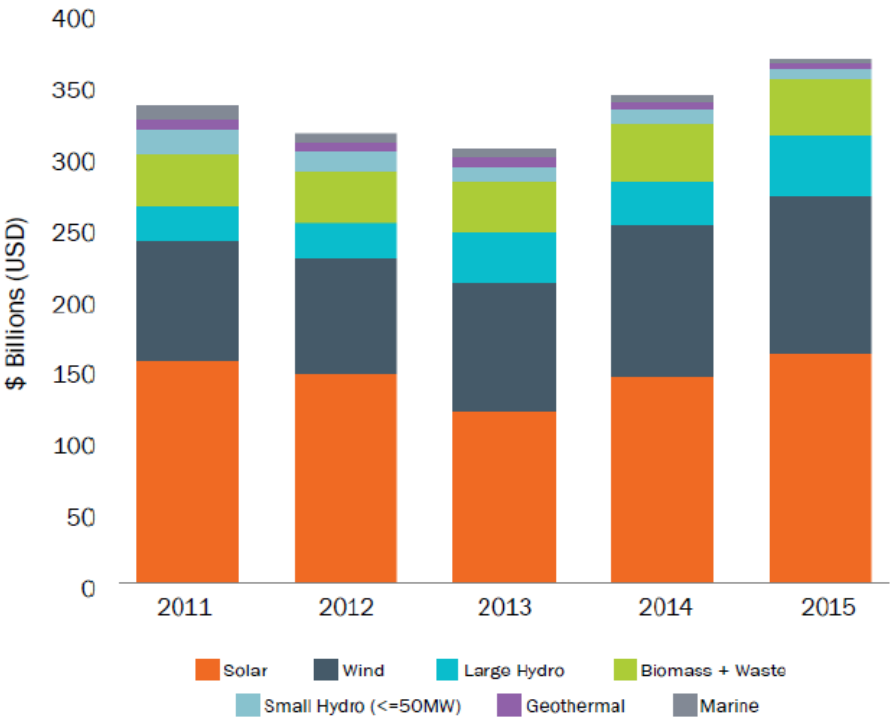
- While Canada has far superior solar resources to Germany, Germany's current installed capacity of 37.8 GW is 31 times the size of Canada's current installed capacity



28 Source: Natural Resources Canada, and the JRC European Commission

May 10-8:22 AM

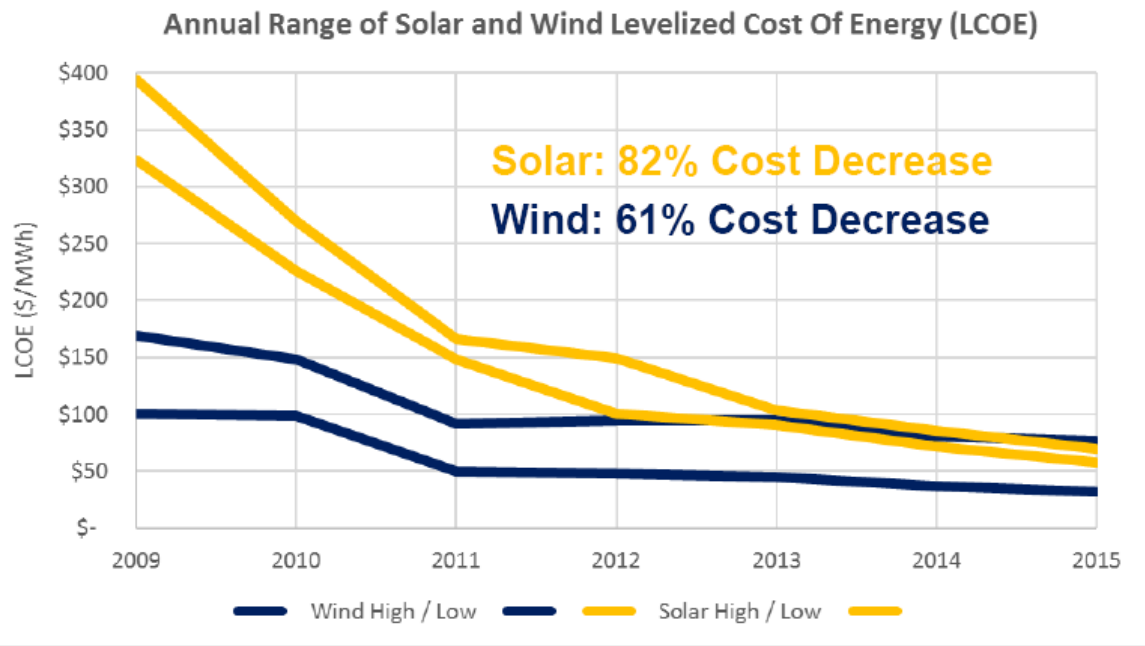
Global Clean Energy Investment - \$367B in 2015



29 Source: Clean Energy Canada February 2016

May 10-8:22 AM

Utility Scale – Cost Decrease (Solar and Wind)

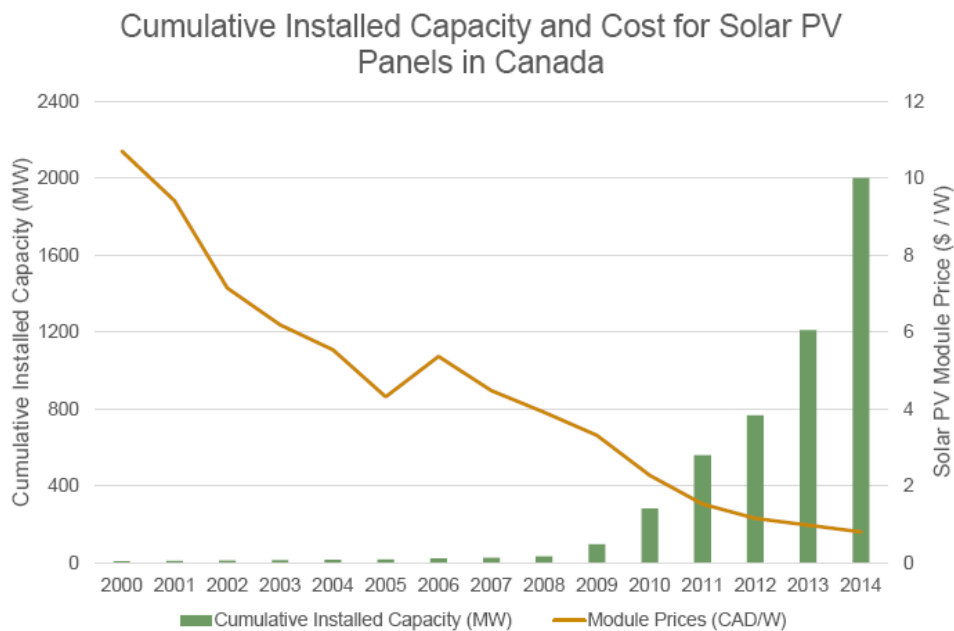


30 Source: Lazard November 2015



May 10-8:22 AM

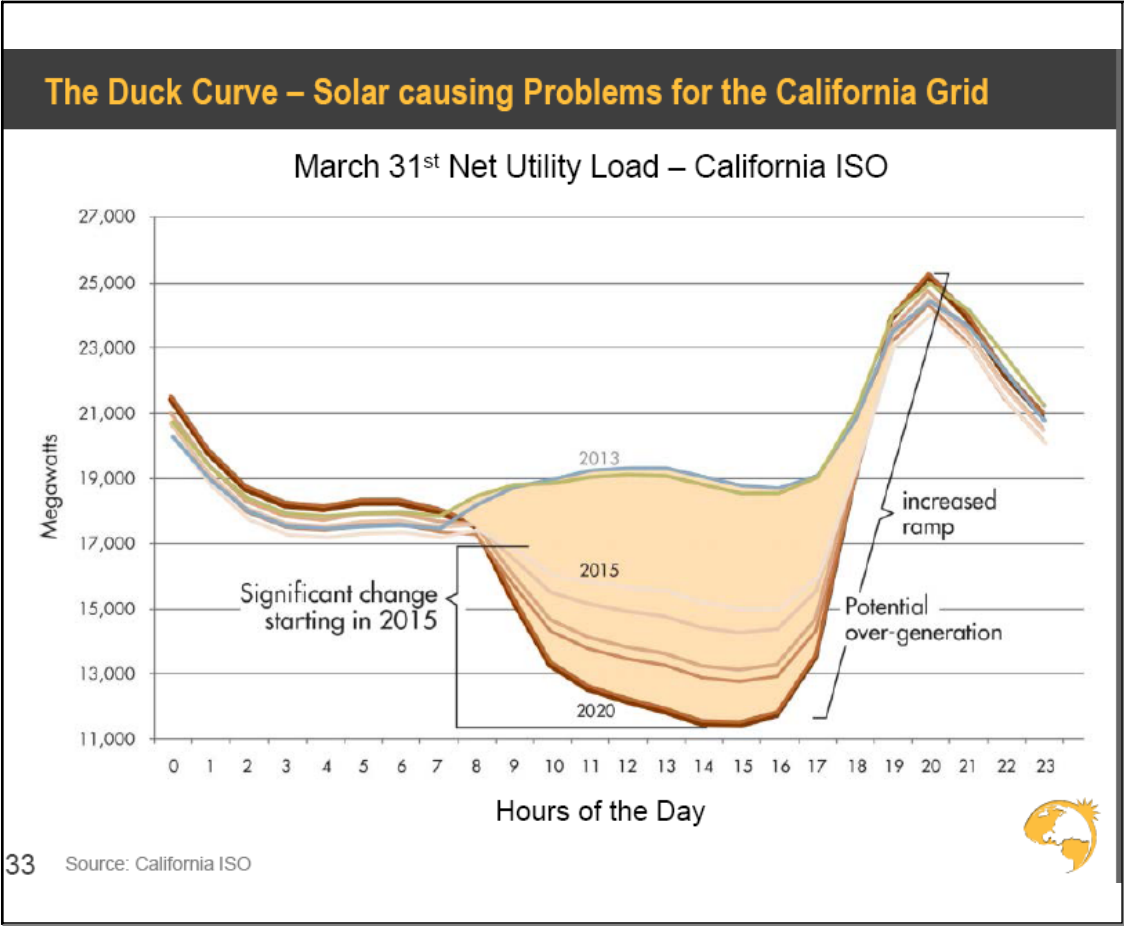
Solar Adoption Rate in Canada



31 Source: CanSIA and the International Energy Agency



May 10-8:22 AM



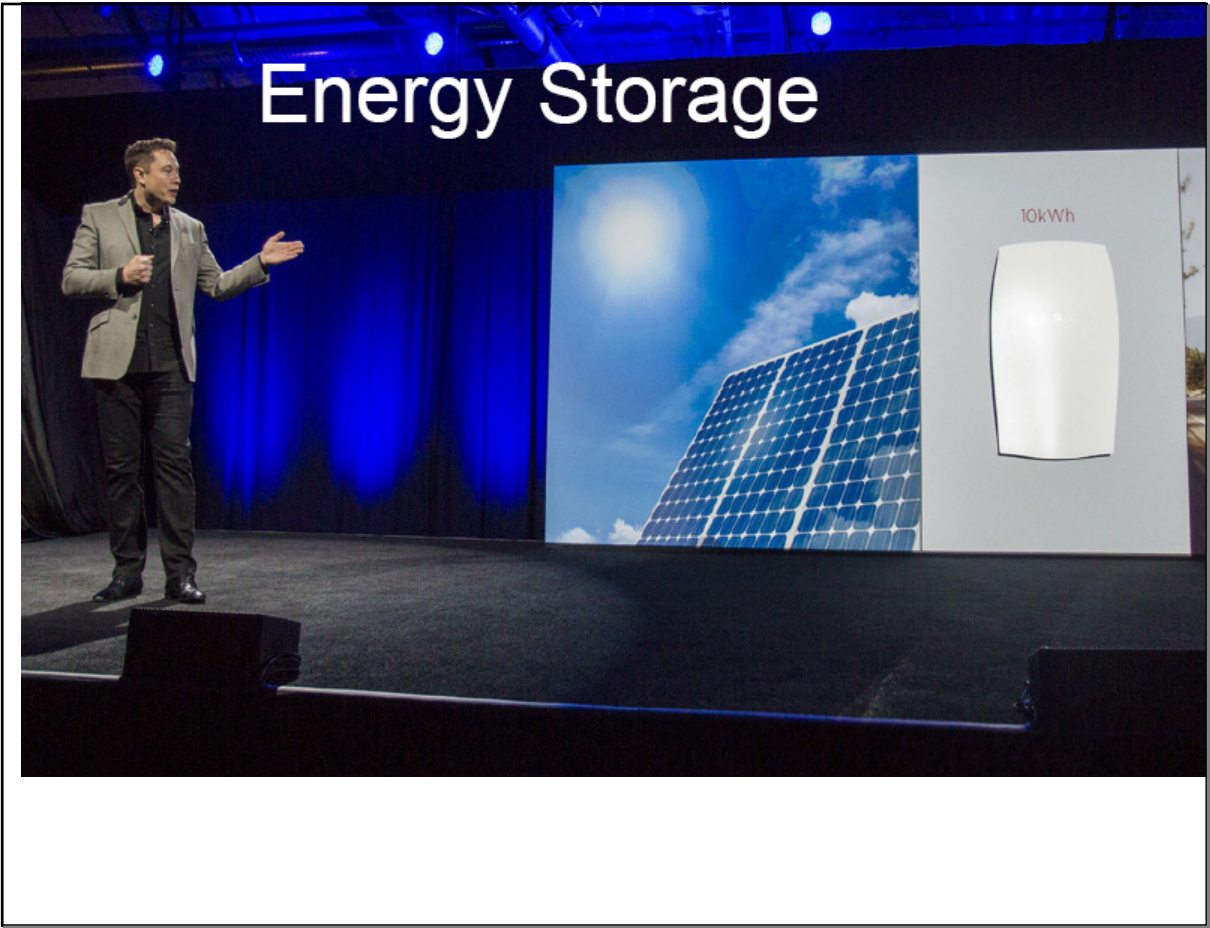
May 10-8:23 AM

nouveaux joueurs

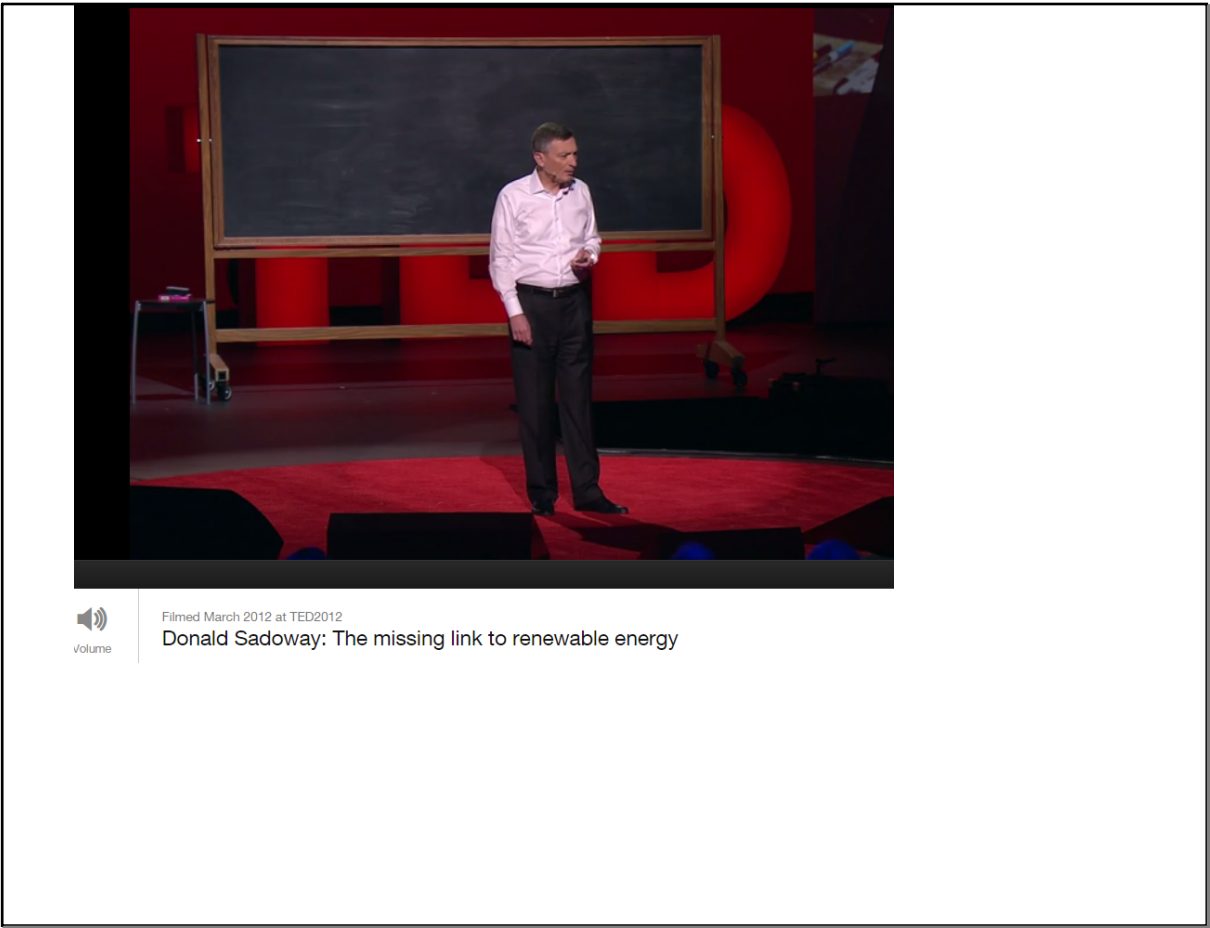


 **Énergie NB Power**


May 10-8:23 AM

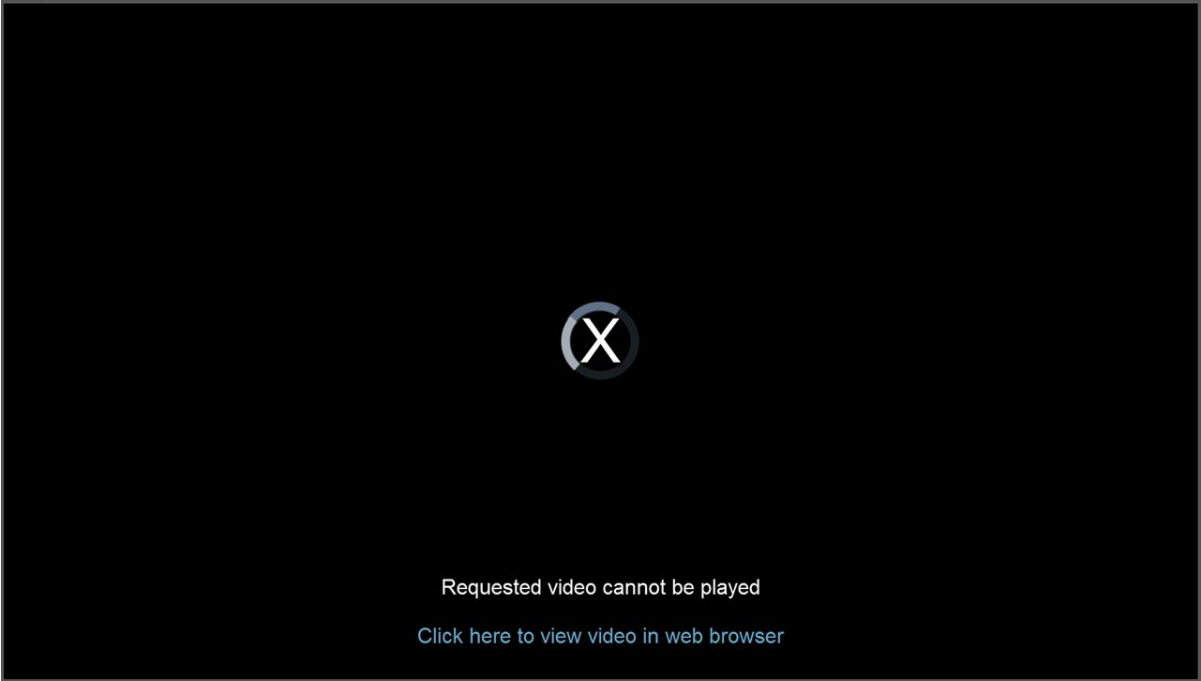


May 10-8:23 AM



Mar 13-9:14 AM

 William Kamkwamba: How I built a windmill



May 7-2:12 PM



May 10-8:24 AM

Small Scale Renewables in New Brunswick

APEGNB – Professional Engineers and Geoscientists
(15 KW of solar panels)



Net Metering Customers:

Total - 60 Customers
Total Capacity – 327 KW
(280 KW Solar + 47 KW Wind)
Average Size for Solar - 5KW
Approx. 33% of a typical NB Home



Smith House – Sackville (6 KW)
“Net Zero”



DNR – Florenceville (10 KW)



Solar companies in New Brunswick



Solar Arrays



Eastern Solar Solutions



Our "LED" Change-out Program (72,000 lights)





Reduce and Shift Demand

Énergie NB Power

May 10-8:25 AM



« Off the Grid » in Tanzania

la vie « débranchée »
en Tanzanie

May 10-8:25 AM

Où recharger mon
téléphone portable ?

Where can we charge our
cellphones?

May 10-8:25 AM



May 10-8:25 AM



May 10-8:26 AM



May 10-8:26 AM



May 10-8:26 AM



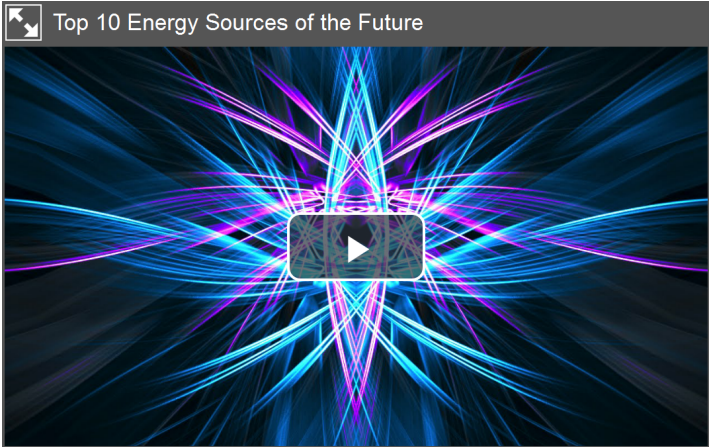
May 10-8:26 AM



May 10-8:26 AM



May 10-8:27 AM



May 7-2:13 PM



May 10-10:08 AM

The Mactaquac Project

Three Potential Options



- Repower by replacing the spillway and powerhouse
- Do not repower and maintain the head pond by replacing the spillway but not the powerhouse
- Restore the river/eliminate head pond

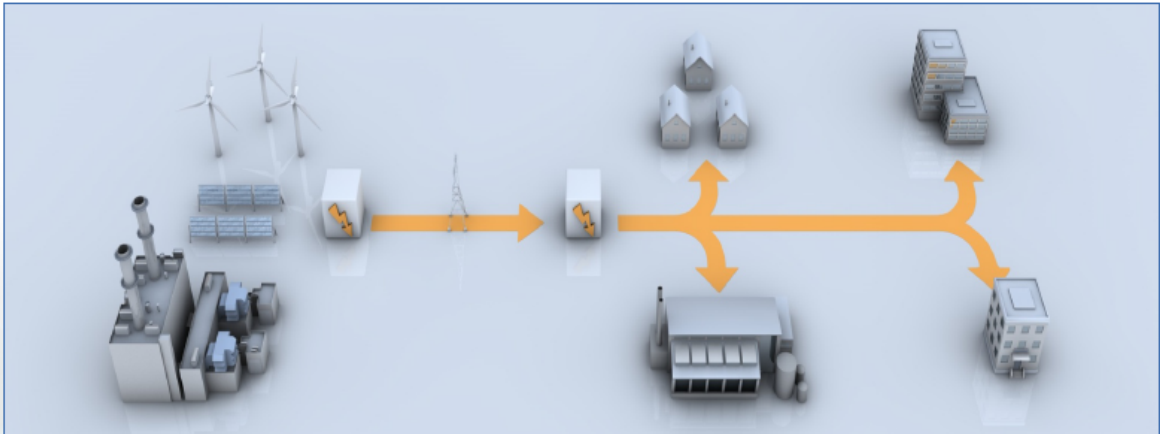
- *There is no “status quo” or “do nothing” option.*
- *The 2030 deadline is fixed.*



Énergie NB Power

May 10-10:09 AM

“A Traditional Grid”



Large Generation units with one way power flow...

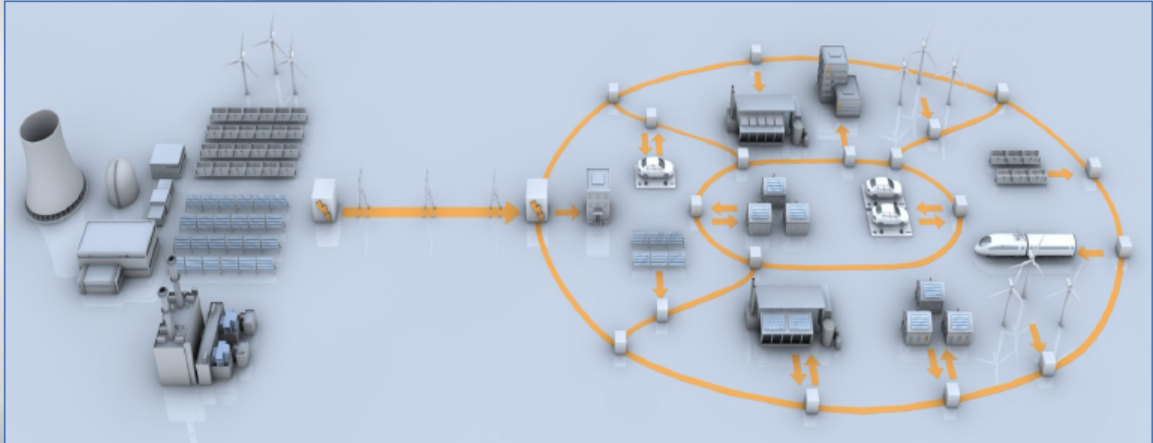
Reduce and Shift Demand



Énergie NB Power

May 10-10:09 AM


The future is integrated



Bulk Generation
Traditional Large Generation
Hydro, Nuclear, Fossil, Wind,

“meets”

Distributed Energy Resources
Engaged Customers with new technologies
EE, DR, DG, EV's, HAN, WAN

 **Énergie NB Power**

May 10-10:10 AM

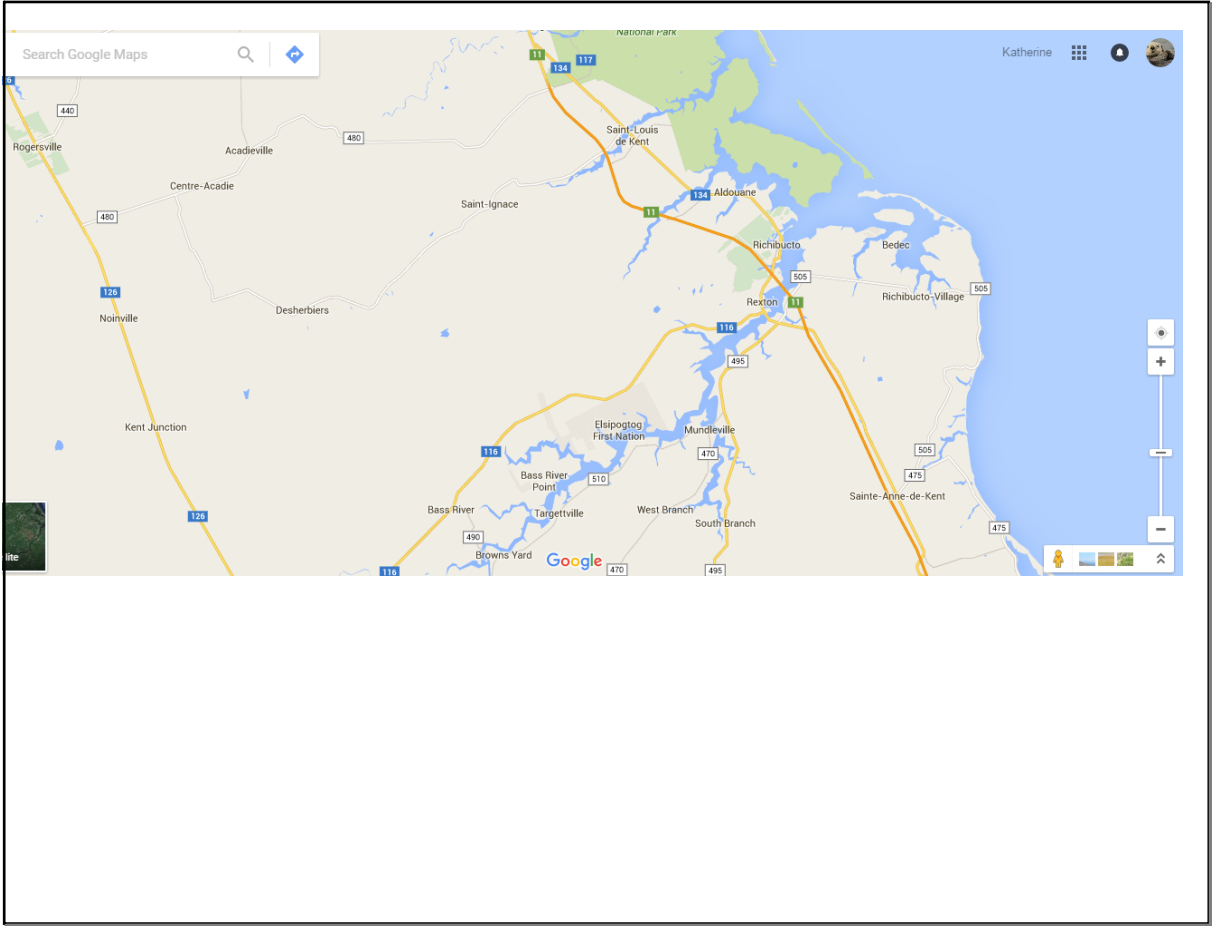
The future is integrated



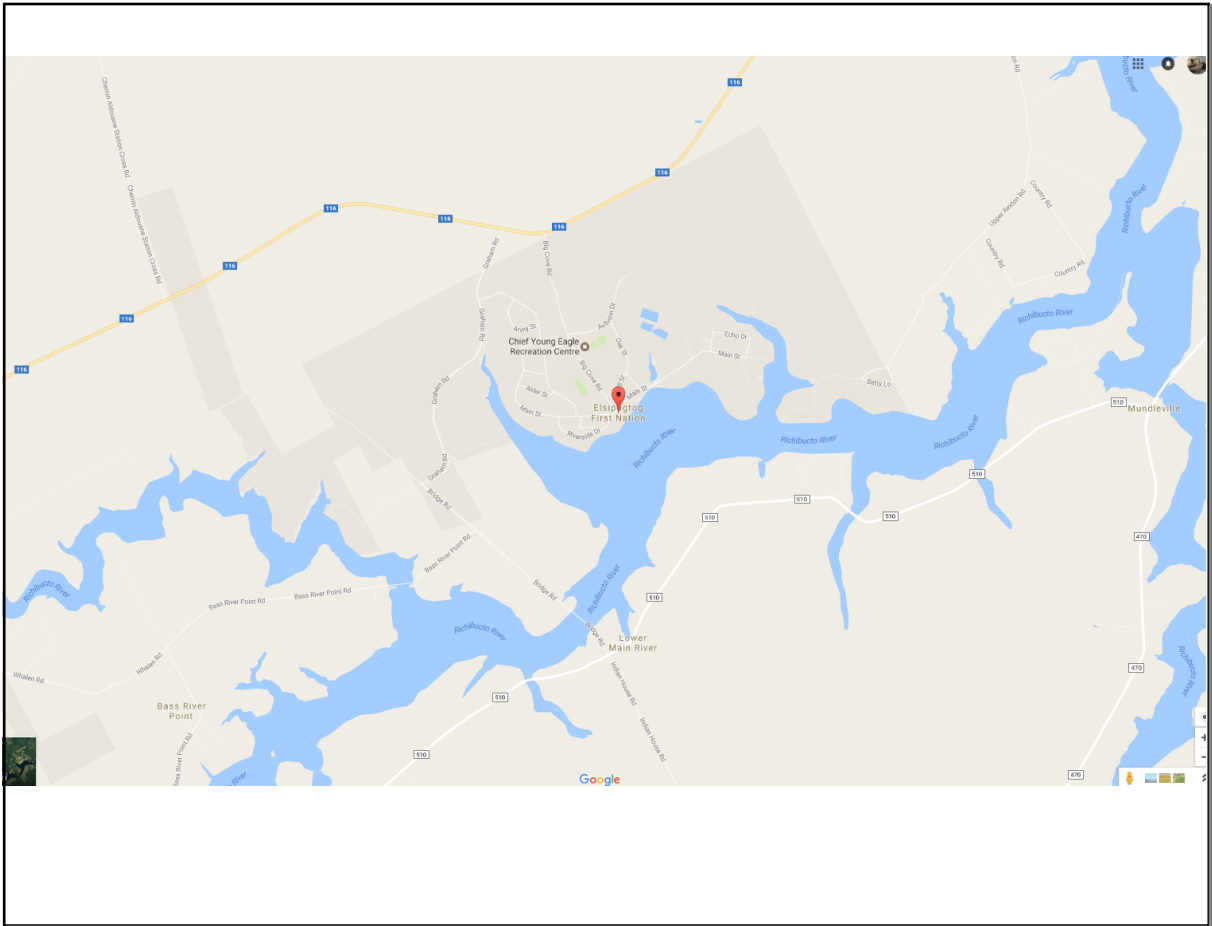
decarbonize
decentralize
digitalize

décarboniser
décentraliser
digitalisation

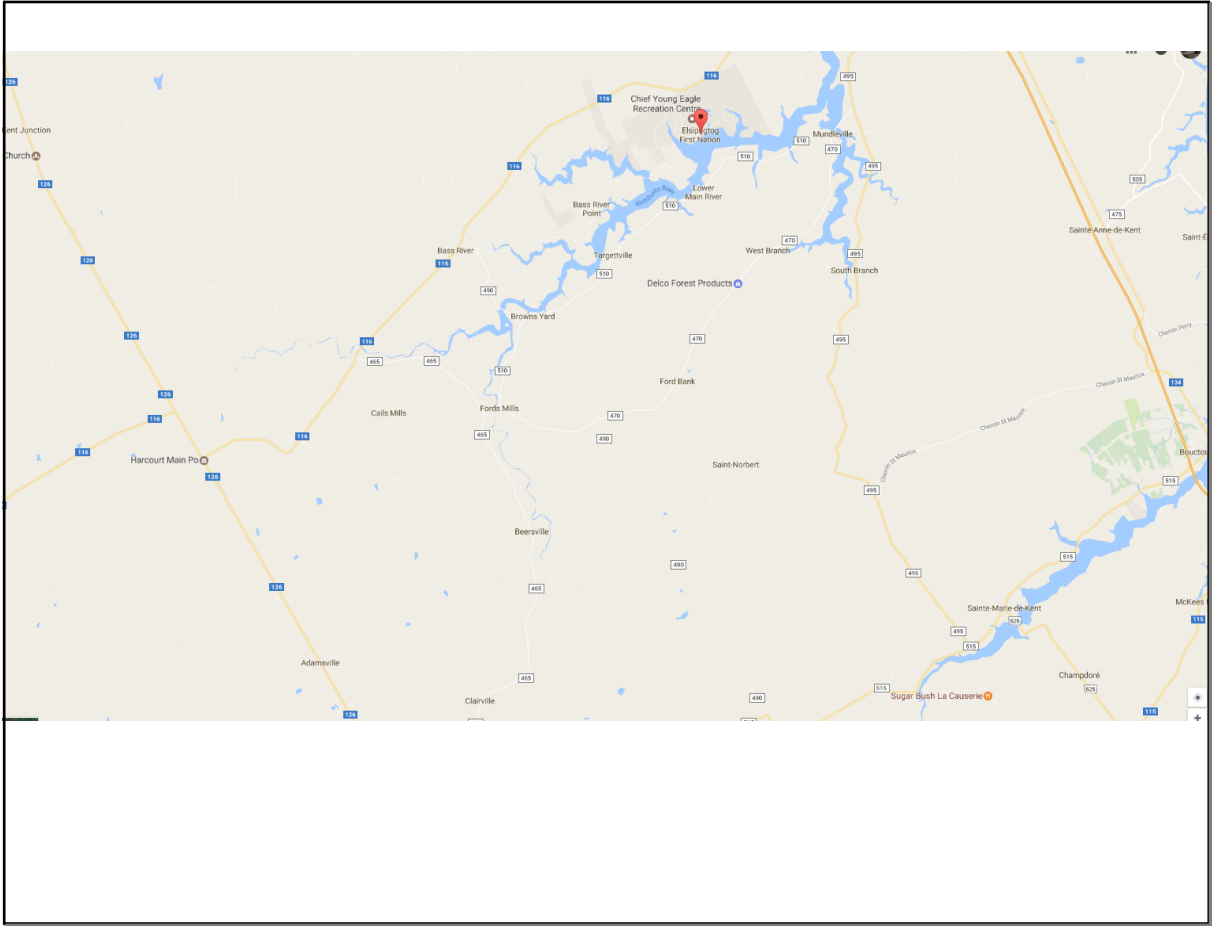
May 10-10:10 AM



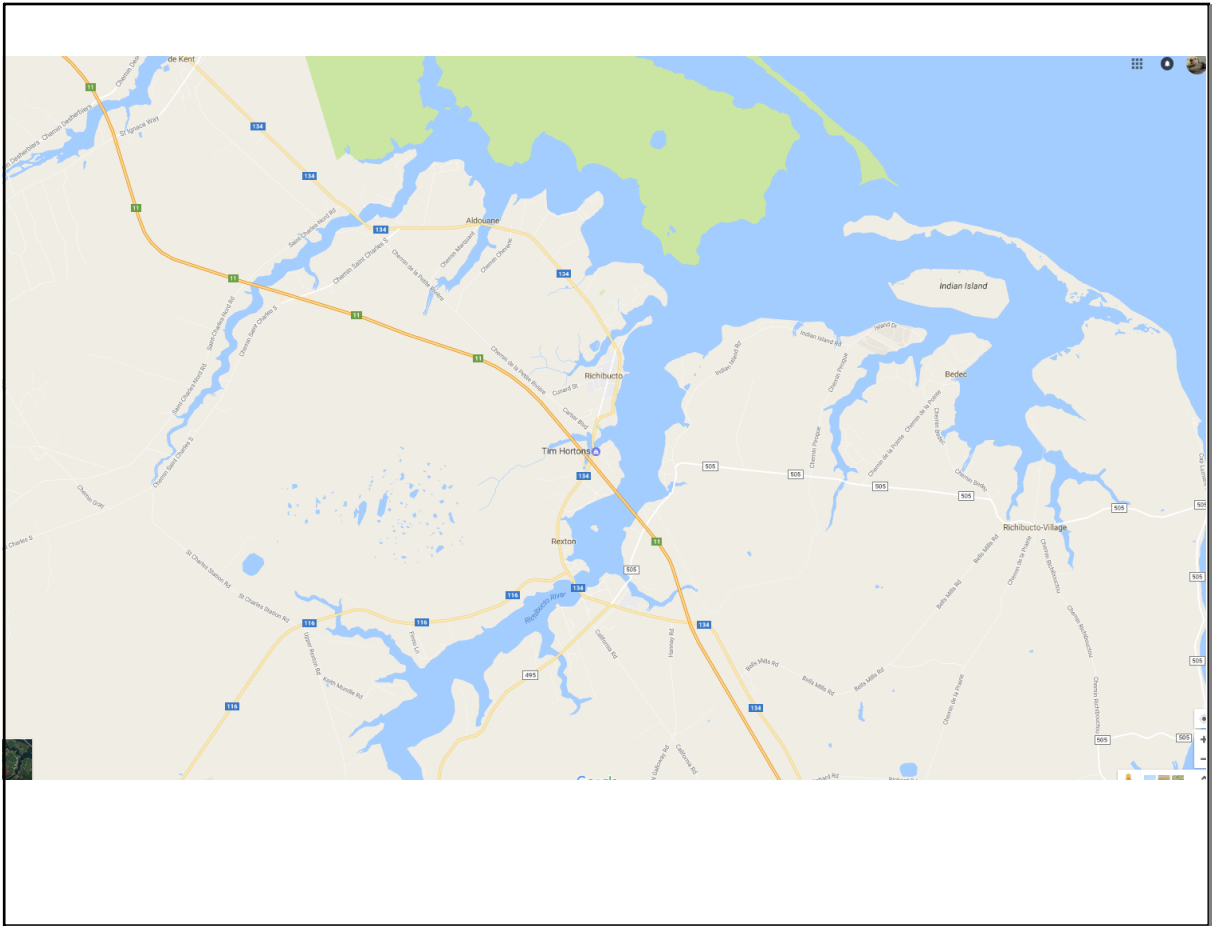
May 10-8:12 AM



Feb 20-9:10 AM



Feb 20-9:12 AM



Feb 20-9:13 AM



Feb 20-9:14 AM







1. Retrofitting to prevent energy loss

Identify older neighbourhoods that would have less efficient homes that would benefit from an energy retrofit program.

Circle those areas.


May 16-10:35 AM

2. Low-impact grid-scale electricity generation

- Wind 
- Micro-hydro 
- Biomass 
- Mill 
- Landfill 
- Solar PV (large buidlings) 

May 16-10:35 AM

3. Waste heat

- Paper mill 
- Brewery
- Rink
- Food processing plant
- Sewage treatment plant
- Pulp and paper mill
- Landfill
- Factory

May 16-10:35 AM

Add a star to the source of energy or heat that is

1. closest to densely populated areas or an area that has many new builds
2. secure



May 16-10:35 AM

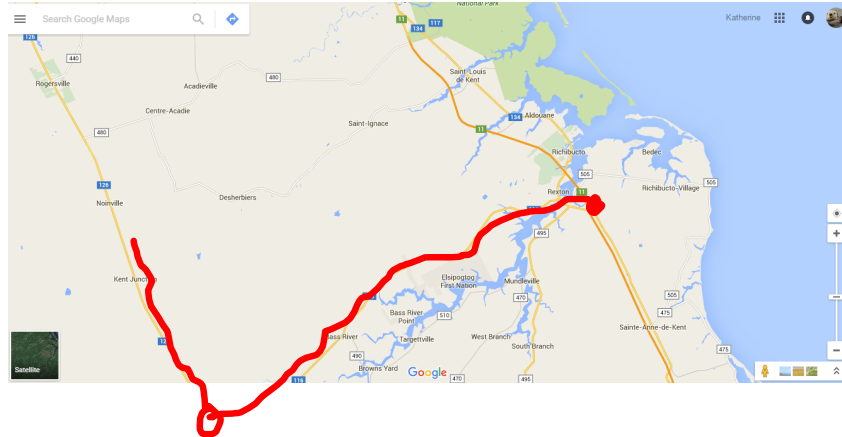
Transportation

1. Put lines over densely populated areas
2. Add green stickers to important destinations (grocery stores, restaurants) places of work and school



May 16-10:35 AM

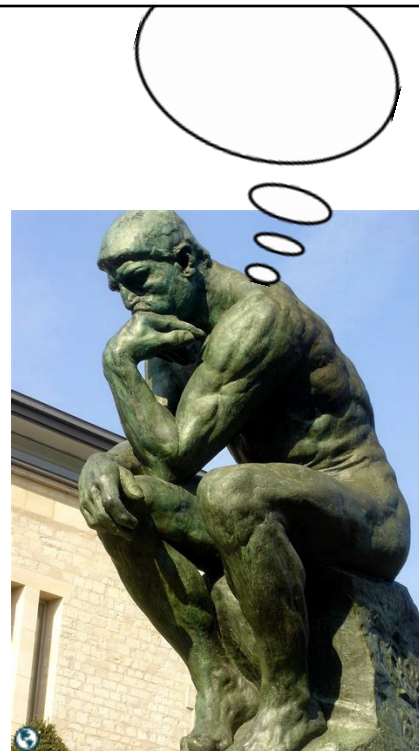
Draw lines to show transportation lines
with a solid circle showing stops and an
outline circle for connection stops



May 16-10:35 AM

Explain to the group all the
potential you came up
with.

Highlight the best solution
for your area.



Feb 19-8:53 AM



atoms together instead of splitting them apart,
so there's no threat of a runaway reaction

TDC

11:32 / 13:11

Top 10 Energy Sources of the Future

TDC The Daily Conversation

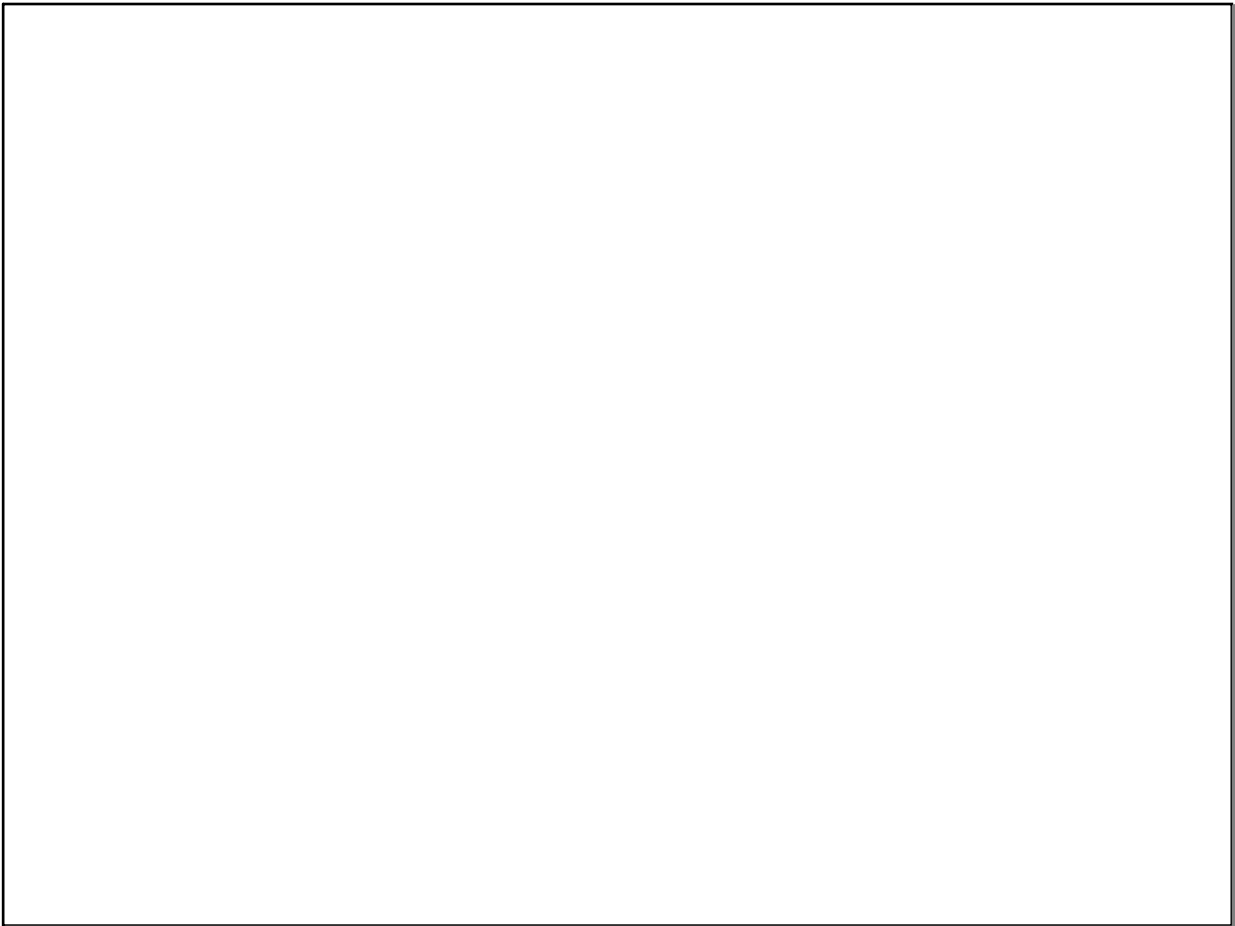
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10,443 354

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Mar 13-9:30 AM



May 7-3:13 PM