

Sustainable Electricity In New Brunswick



March 26, 2015

Michel Losier, Program Director of PowerShift Atlantic and Director of Customer and Community Engagement



Énergie NB Power

Customer of the Future?

Walmart - 100% renewable by 2020



Microsoft, Wal-Mart and Johnson & Johnson want utilities to help them deploy clean energy and reduce costs.



What do customers want today?

Wal-Mart: The burden is on the utility

Wal-Mart's Ozment said the company has three "aspirational" goals: sell sustainable products, create no waste, and use 100% renewable energy. These are big, long-term goals, Ozment said, and it's now up to utilities to develop products and services that help Walmart get there.

"There is a lot of opportunity out there for utilities," he added. "But for renewable energy to be truly sustainable, it must be cost effective. ... I think there is a future to working with utilities. I do think they're going to have to get creative and innovative."

Utility Dive, September 15, 2014



Microsoft – Janous (An Integrated Future...)

"Distributed generation is not something that is an option for us," Janous said. "It is a part of our core infrastructure."

"The next 100 years will certainly not be as dominated by central station power as the last 100 years; however, I don't believe distributed generation will negate the need for the centralized power grid," Janous said. "In fact, once a generation or storage system becomes separated from the grid ... the value of that asset declines considerably."

Grid-connected generation can leverage the "network effect," Janous said, taking advantage of producers and consumers working together. **"Rather than the future being centralized or distributed, I really believe the future will be integrated."**

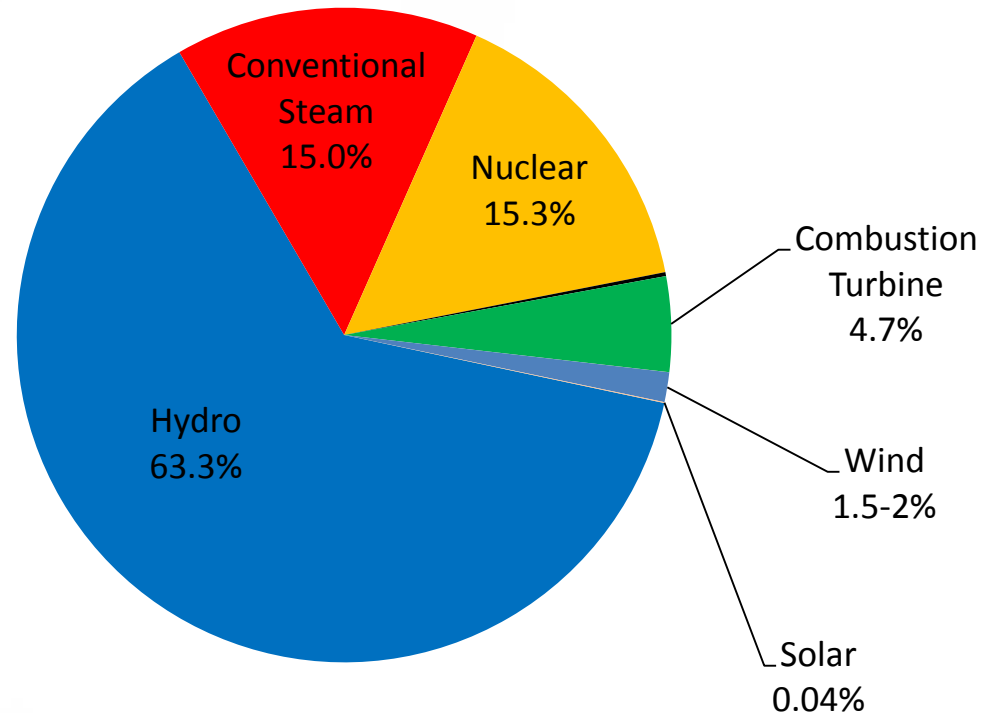
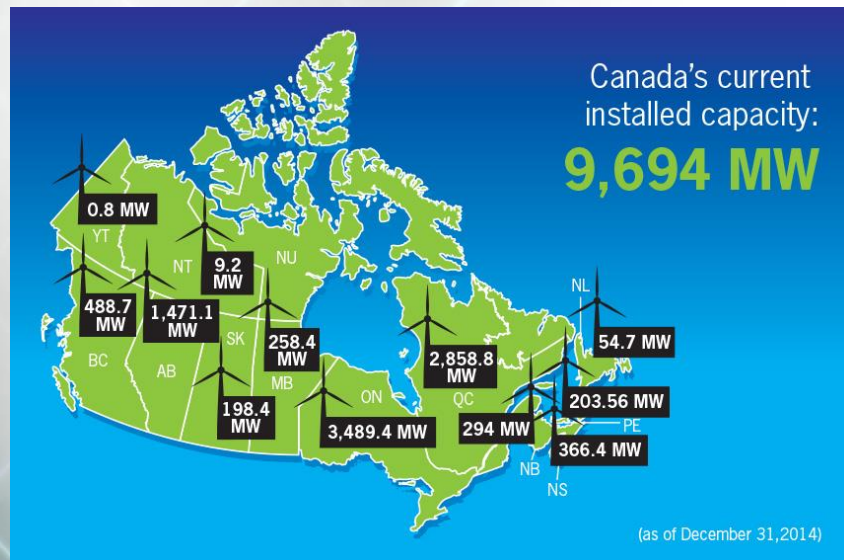
Utility Dive, September 15, 2014



Canadian Electricity Landscape

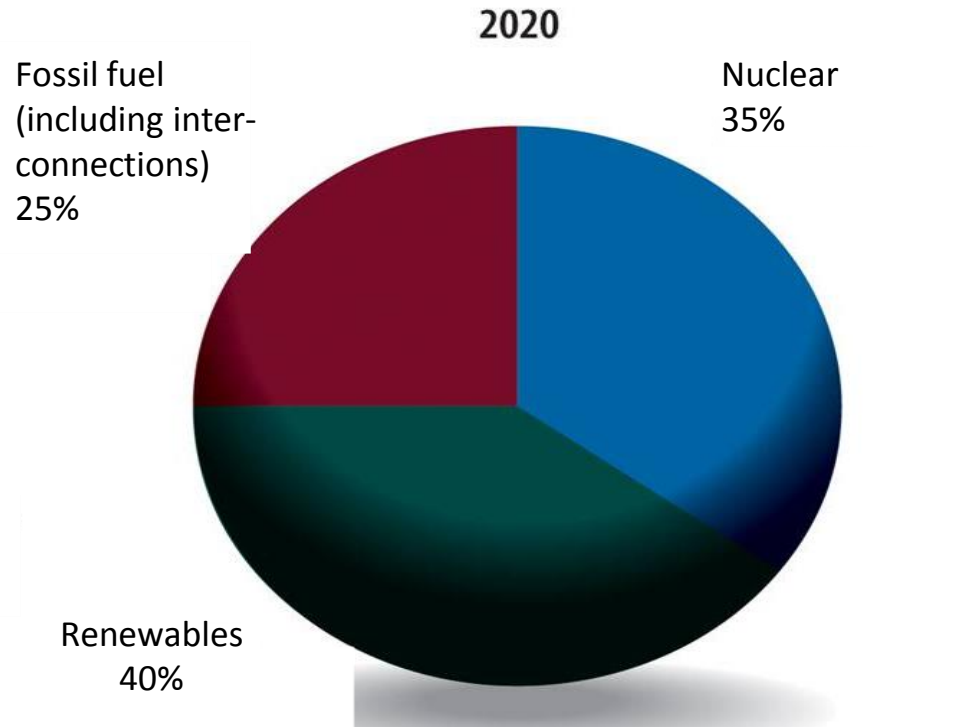
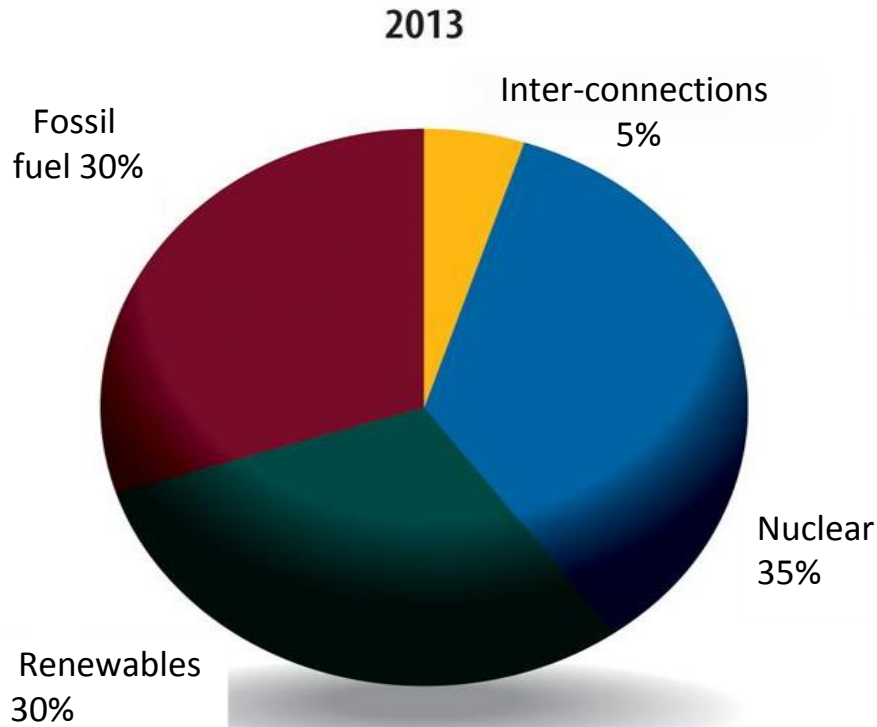
Electricity Generation in Canada by Fuel Type, 2012

Total Electricity Generated in Canada, 2012 = 594.9 TWh



Electricity Generation in New Brunswick by Source

NB Electricity Supply by Source



Source: NB Power



NB Power Strategic Direction

Vision

**Sustainable
Electricity**

Strategy

Reduce Debt

**Reduce and
Shift Demand**

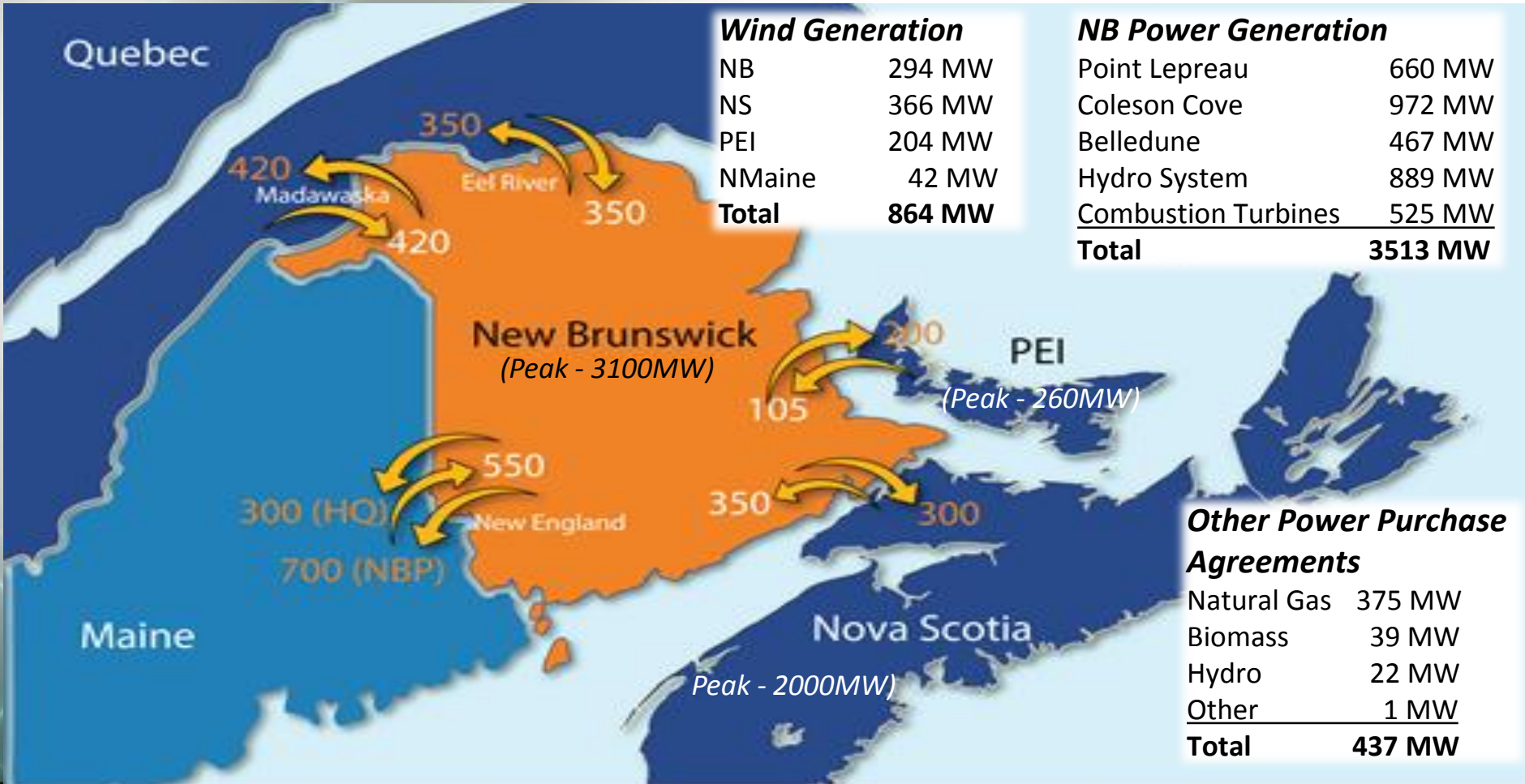
Top Performer

Enabler

**Smart Grid
(Siemens)**



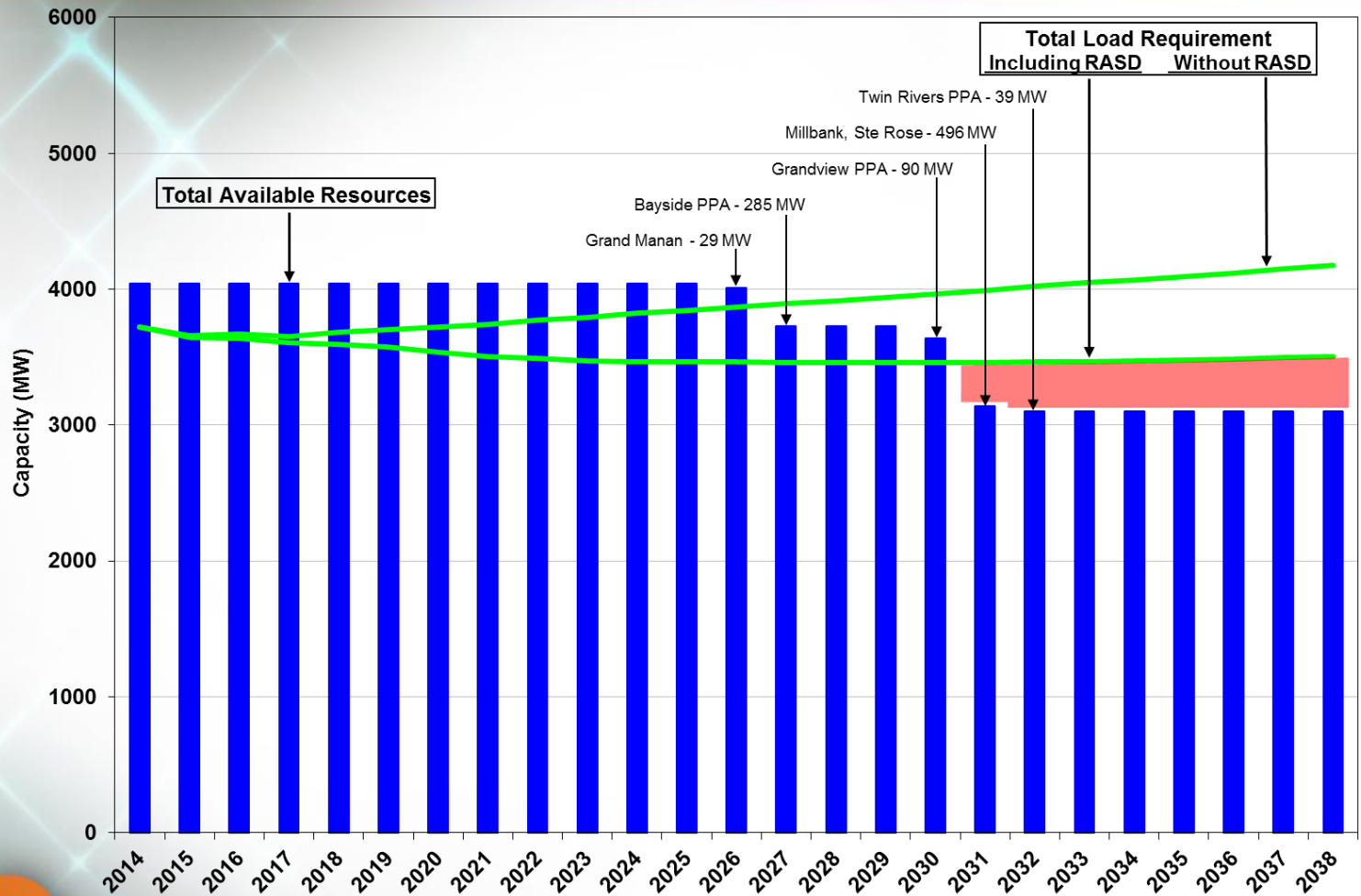
Atlantic Canada, Québec and Maine



Reduce and Shift Demand Why?



Integrated Resource Plan

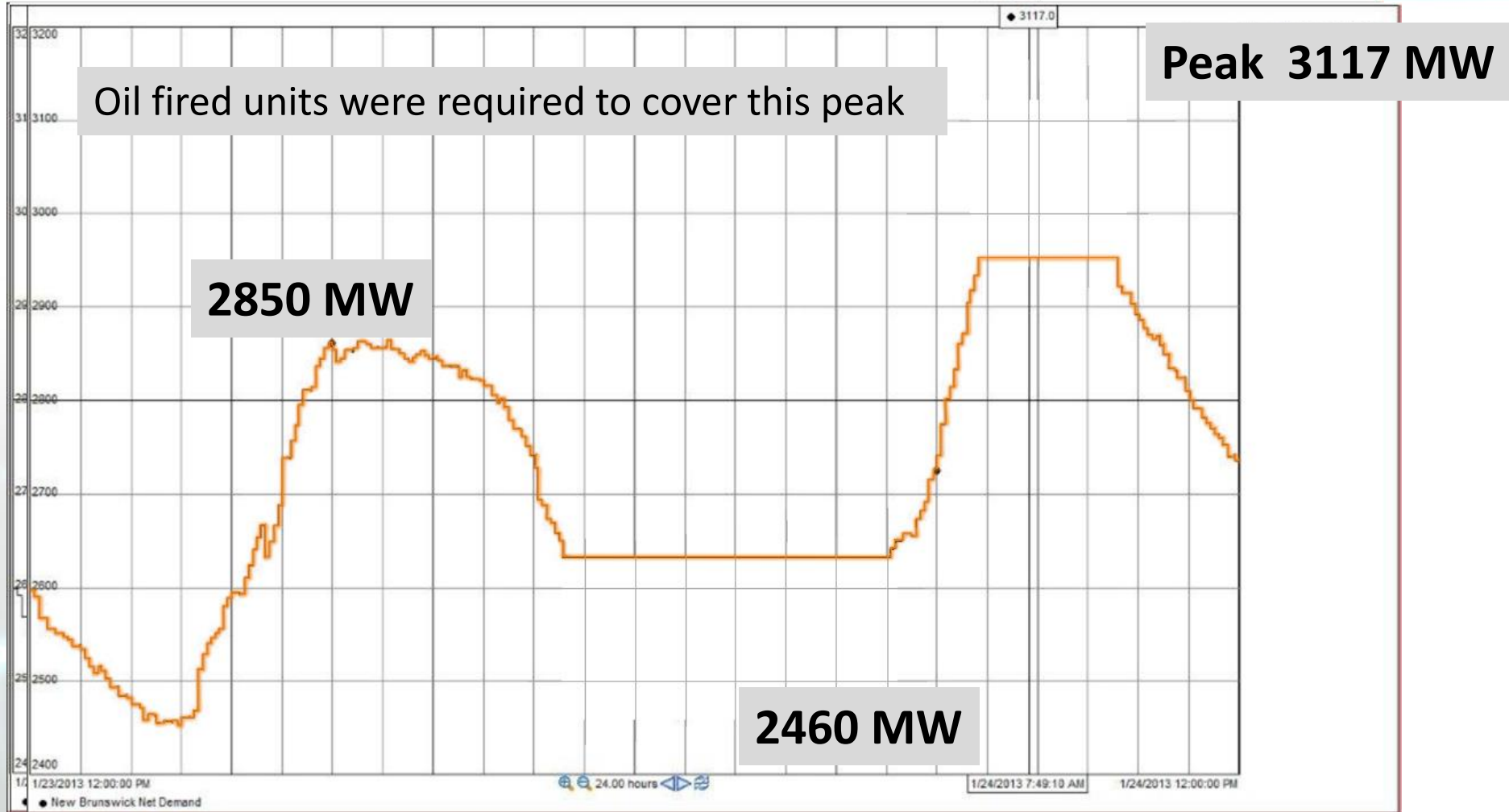


Smart Grid in New Brunswick

Why?



A bitter cold morning



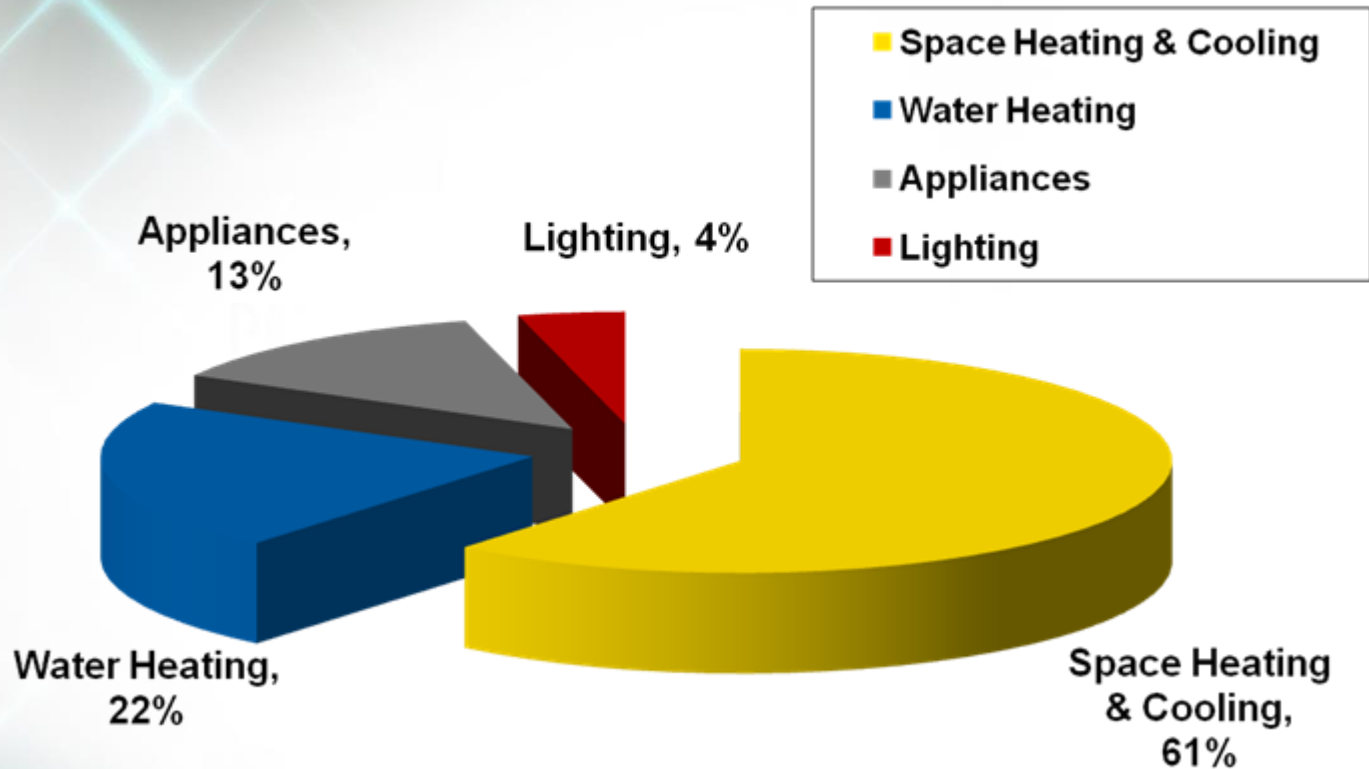
Oil fired units were required to cover this peak

Peak 3117 MW

2850 MW

2460 MW

Typical Household Energy Usage – New Brunswick

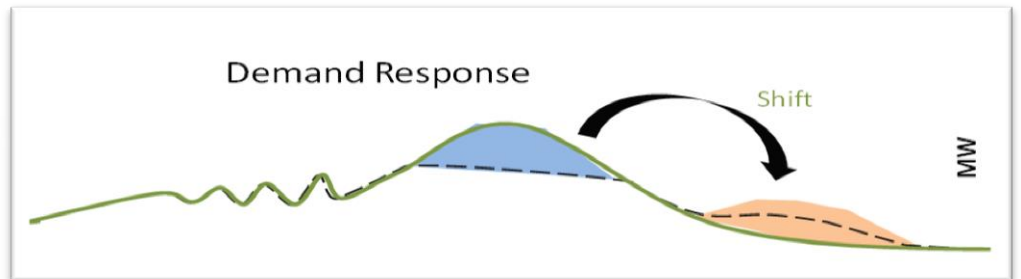


Energy Efficiency (Reduce) and Load Shifting (Shift)

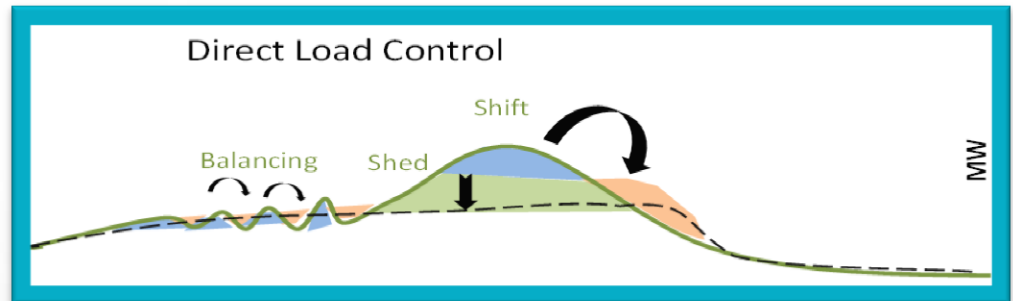
Customer Issue:
Investment
(Efficiency programs)



Customer Issue:
Behaviour



Customer Issue:
Trust



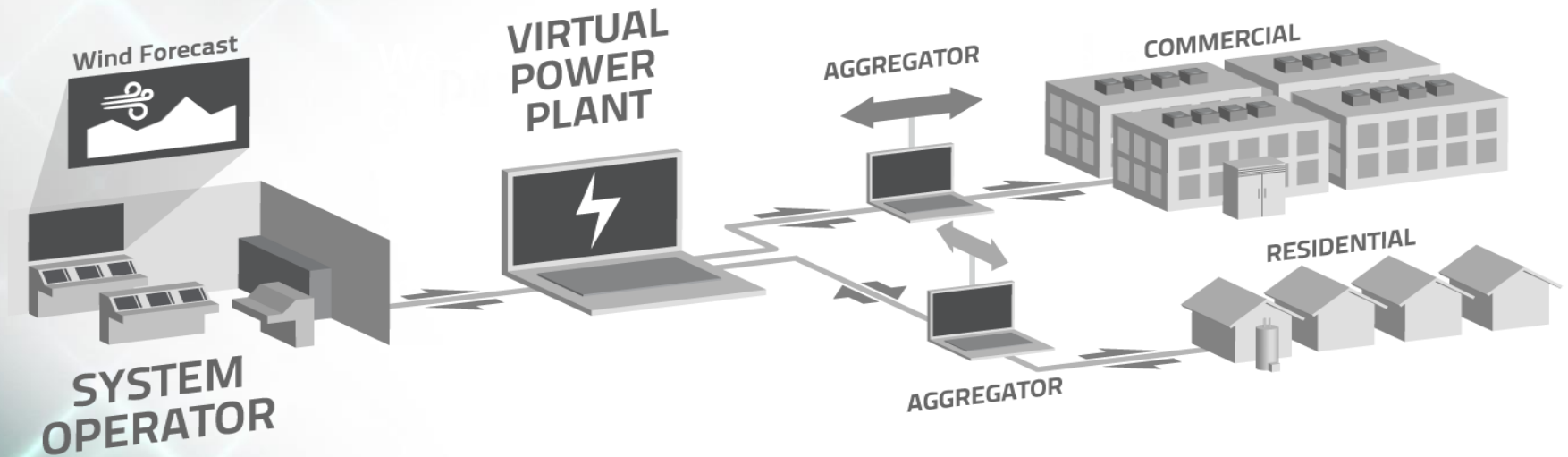


PowerShift Atlantic

Wind Integration via
Load Shifting

VIRTUAL POWER PLANT

Intelligent Load Management – engaged customers and new technology solutions



Electric Thermal Storage In the home

Existing Baseboard

(60% of New Brunswick homes)



Electric Thermal Storage

(Potential solution for the future)



Customers as Partners





“Our Customers” A new Partnership with new “value-added” solutions



SAVE Twice!

OFFER ENDS MARCH 31st

SAVE IN STORE + **Enjoy lower energy bills**

- SAVE \$3** on 100-watt compact fluorescent light bulbs (CFLs) - purchase 10 or more.
- SAVE \$4** on 100-watt compact fluorescent light bulbs (CFLs) - purchase 10 or more.
- SAVE \$5** on 100-watt compact fluorescent light bulbs (CFLs) - purchase 10 or more.
- SAVE \$6** on 100-watt compact fluorescent light bulbs (CFLs) - purchase 10 or more.
- SAVE \$10** on LED light bulbs - purchase 10 or more.
- SAVE \$15** on LED light bulbs - purchase 10 or more.



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INSPIRED BY AEROSPACE TECHNOLOGY



INTERNATIONAL DARK-SKY ASSOCIATION



Customer Engagement and Education



**BEAT THE
PEAK**
COMMUNITY
CHALLENGE

**DÉJOUER
LES POINTES**
DÉFI
COMMUNAUTAIRE

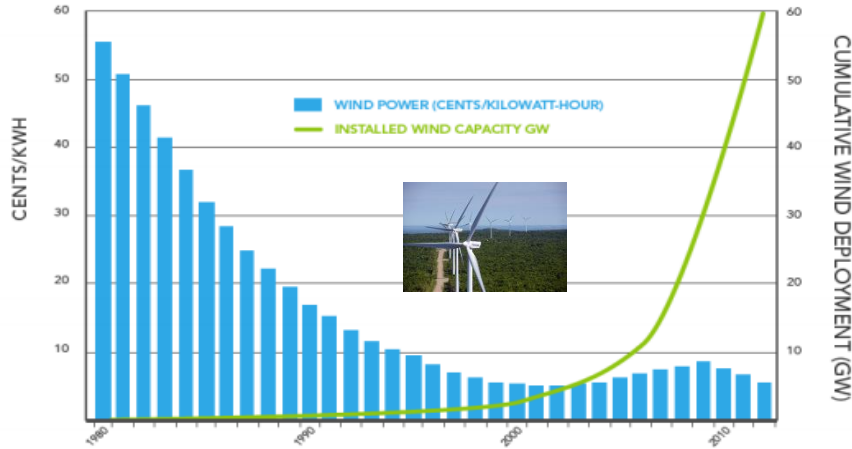


Market Trends & New Players

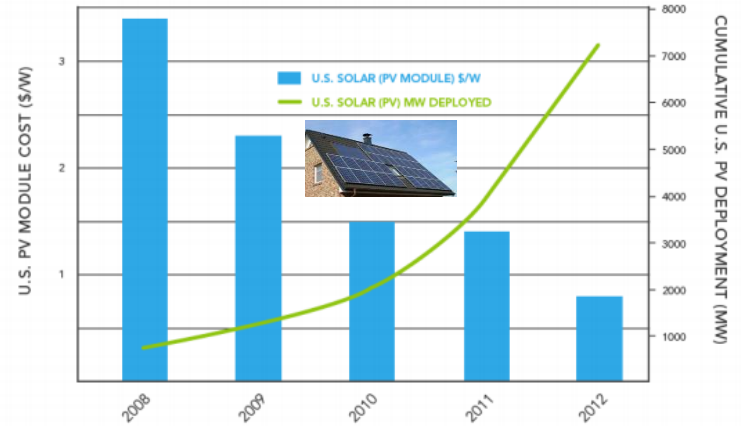


Market Trends

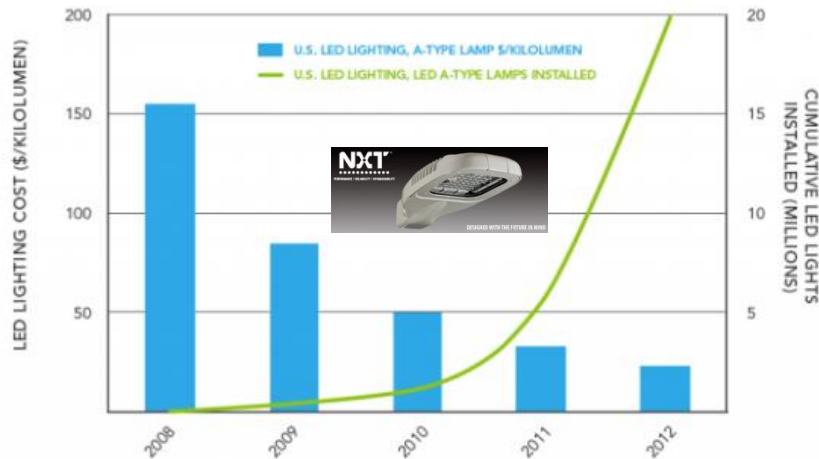
Deployment and Cost for U.S. Land-Based Wind 2008-2012



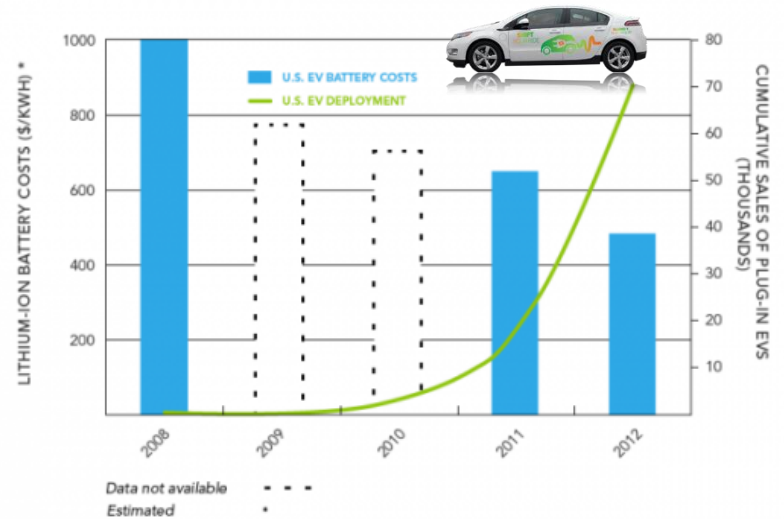
U.S. Deployment and Cost for Solar PV Modules 2008-2012



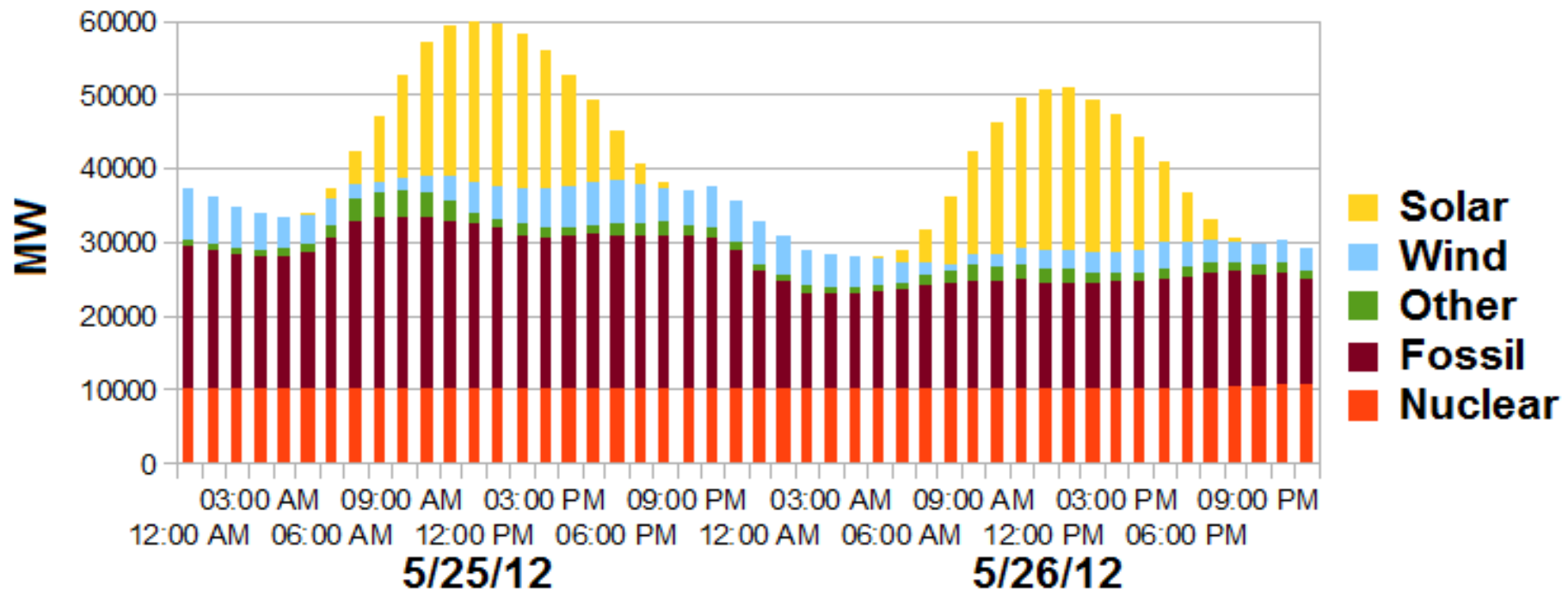
Deployment and Cost for LED Lights Installed 2008-2012



Deployment and Cost for Electric Vehicles and Batteries* 2008-2012



Germany Electricity Generation



New players on the scene



OFF THE GRID NEWS
Better Ideas For Off The Grid Living

 **ENERNOC**
Get More from Energy

nest



Énergie NB Power

“Many new Players”

Customer Engagement

Customer Engagement Platform



Customer Analytics App. (i.e., disaggregation, smart meter analytics)



DR Platform (Utility Services)

Residential Demand Response Platforms (incl. T-stat, DLC)



Data Mgmt. (Utility Enterprise Platform)



Notable Service Providers

Security



Select Telcos & Broadband



Solar/Inverter



Big Box Distribution



Home IoT Software Platform



Gateway



Home Hardware

Thermostat



In-Home Display



Smart Plugs



* Acquirer/Acquirees: Nest - MyEnergy, Revolv | Samsung - SmartThings | Alarm.com - EnergyHub | British Gas - AlertMe

** Bilateral Marketing Agreement with Vivint Inc

*** In-house developed, licensed, or through exclusive partnership

Mactaquac

Hydro Generating Station



Énergie NB Power

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.*



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Timeline

Mactaquac Project



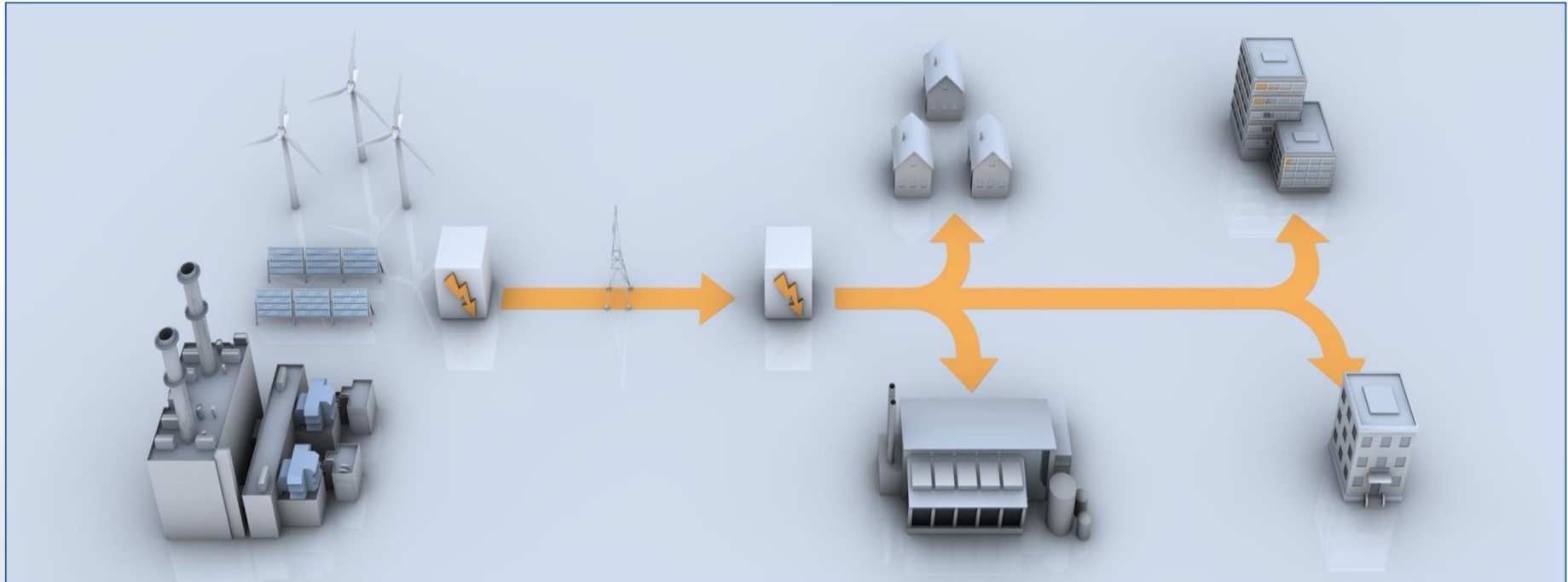
- Study Options:*
- Repower
 - Head Pond
 - River

Acquire Approvals for Preferred Option

Detailed Design & Site Work for Preferred Option



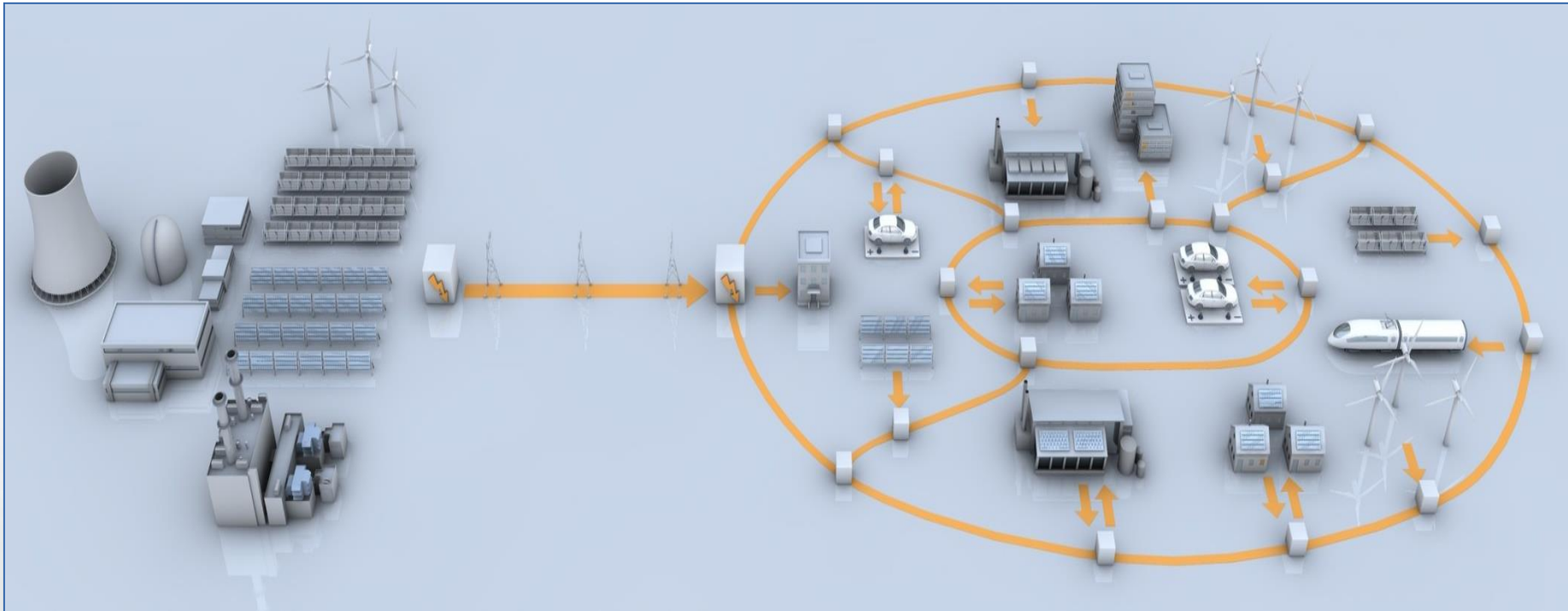
“The Past”



Large Generation units with one way power flow...

The Future - Integration

Bulk Generation meets Distributed Energy Resources



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

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