

Forces of Change – impacts of EV, Solar, TX & NX pricing....and

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2010 Energy Outlook;

This market scenario was almost implausible...?

Electricity Commission 2010 -Sustainable path;

New Zealand embarks on a path of sustainable electricity development and sector emissions reduction with a long-term average carbon charge of \$60/t. In addition, no new large gas discoveries are made in the future. The resultant high gas price make gas-fired baseload generation relatively uneconomic to run and forces some to be decommissioned.

Renewable generation, including hydro, wind, and geothermal, backed by thermal peakers for security of supply, are the least-cost option under this scenario.

2010 Energy Outlook;

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...and this part of the scenario almost impossible...?

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Electric vehicle uptake is high, and vehicle-to-grid technology is used to manage peaks and provide ancillary services. New energy sources are brought on stream in the late 2020s and 2030s, including biomass, marine, solar, and carbon capture and storage. Demand-side participation becomes a more important feature of the market, driven by consumer pressure.

Yeah right.

Tui

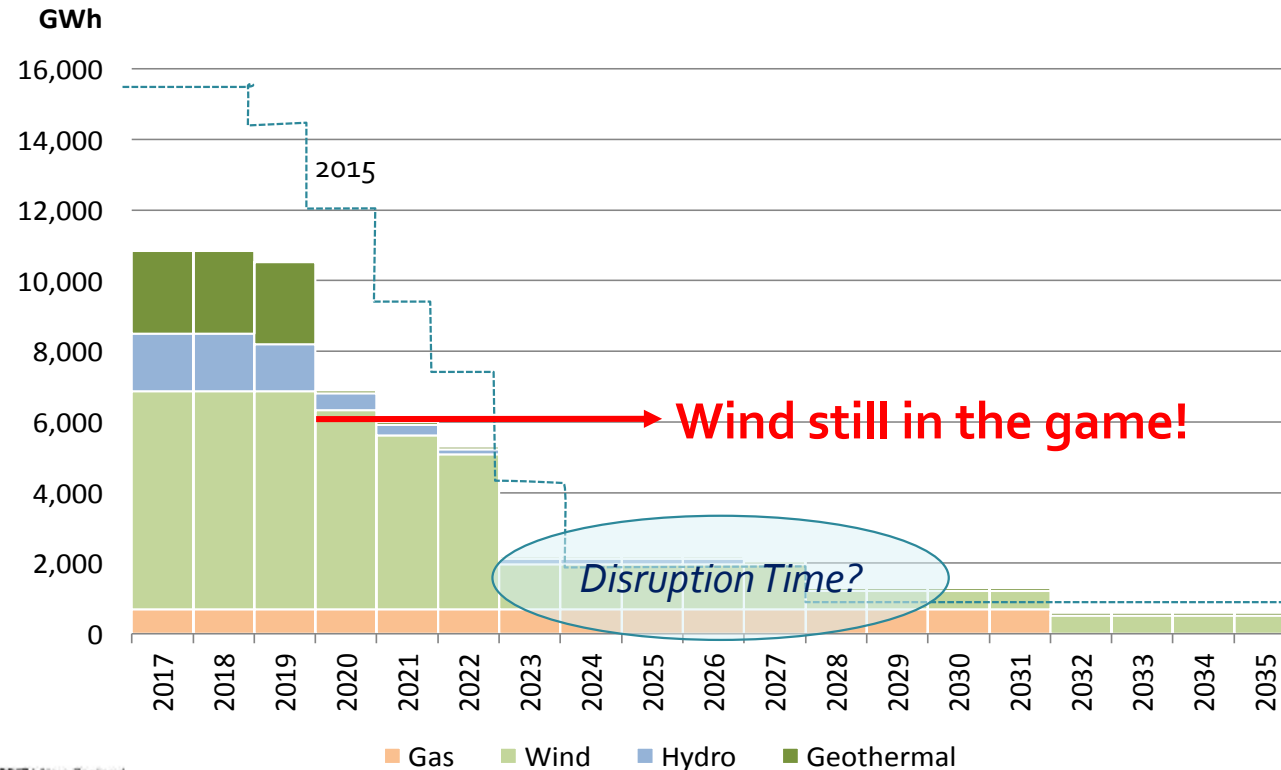
2017 Road Check;

No large gas discoveries ✓

Baseload thermal decommissioning ✓

Thermal peakers least cost security ✓

New Generation Consent Maturity Profile (2017)



Forces of Change

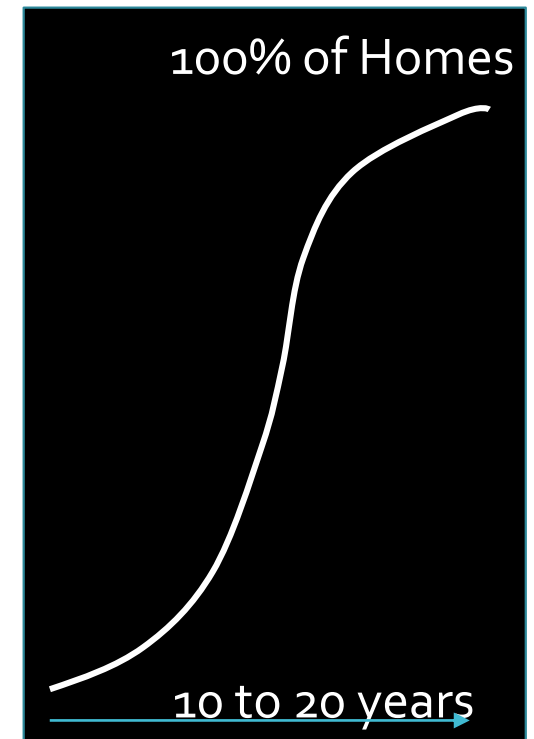
Are we making ice....?



1928



1930's



1950's



Disruption Time?

Policy ✓

Position ✓

Price ?

Investment Risk X

Competition X

Regulation X

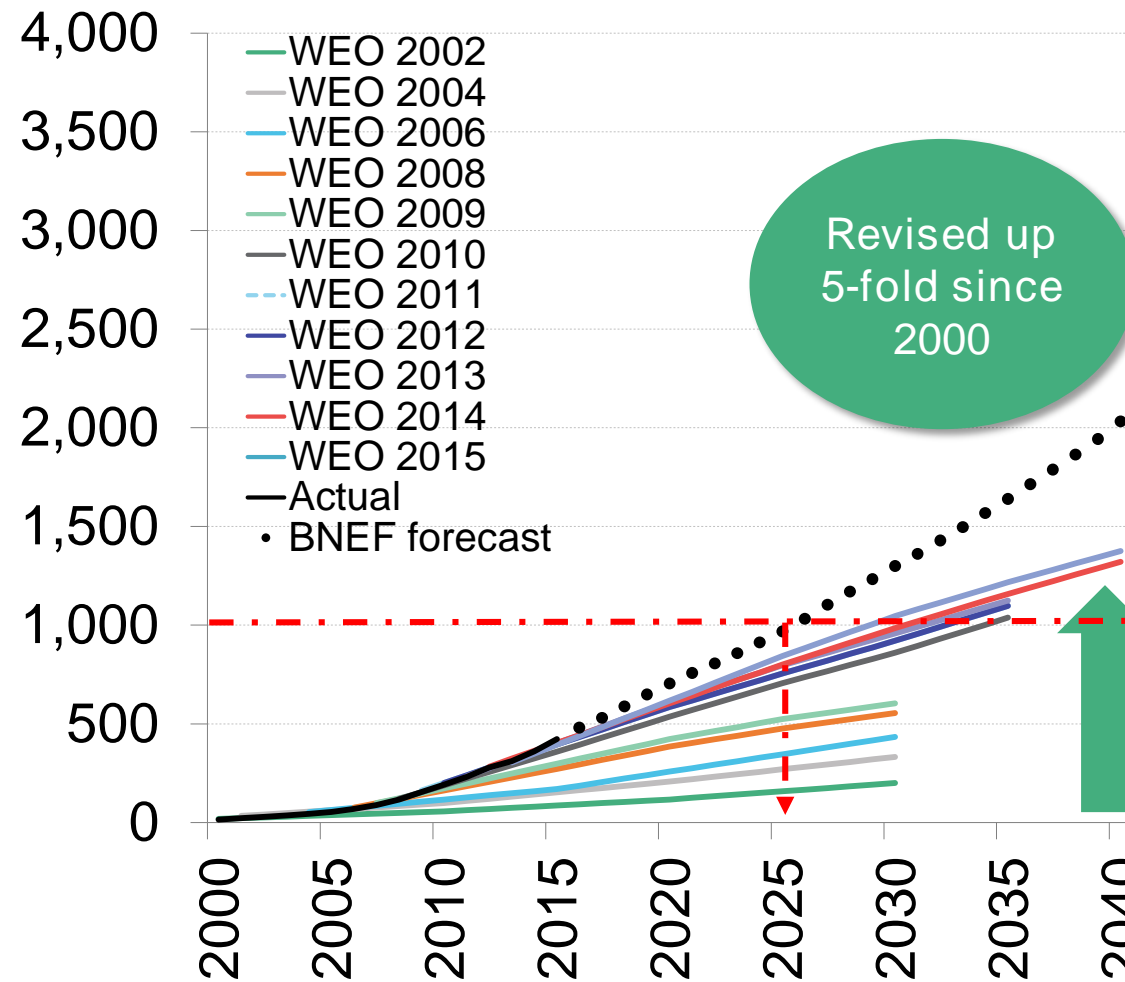
2010 – Sustainable path;

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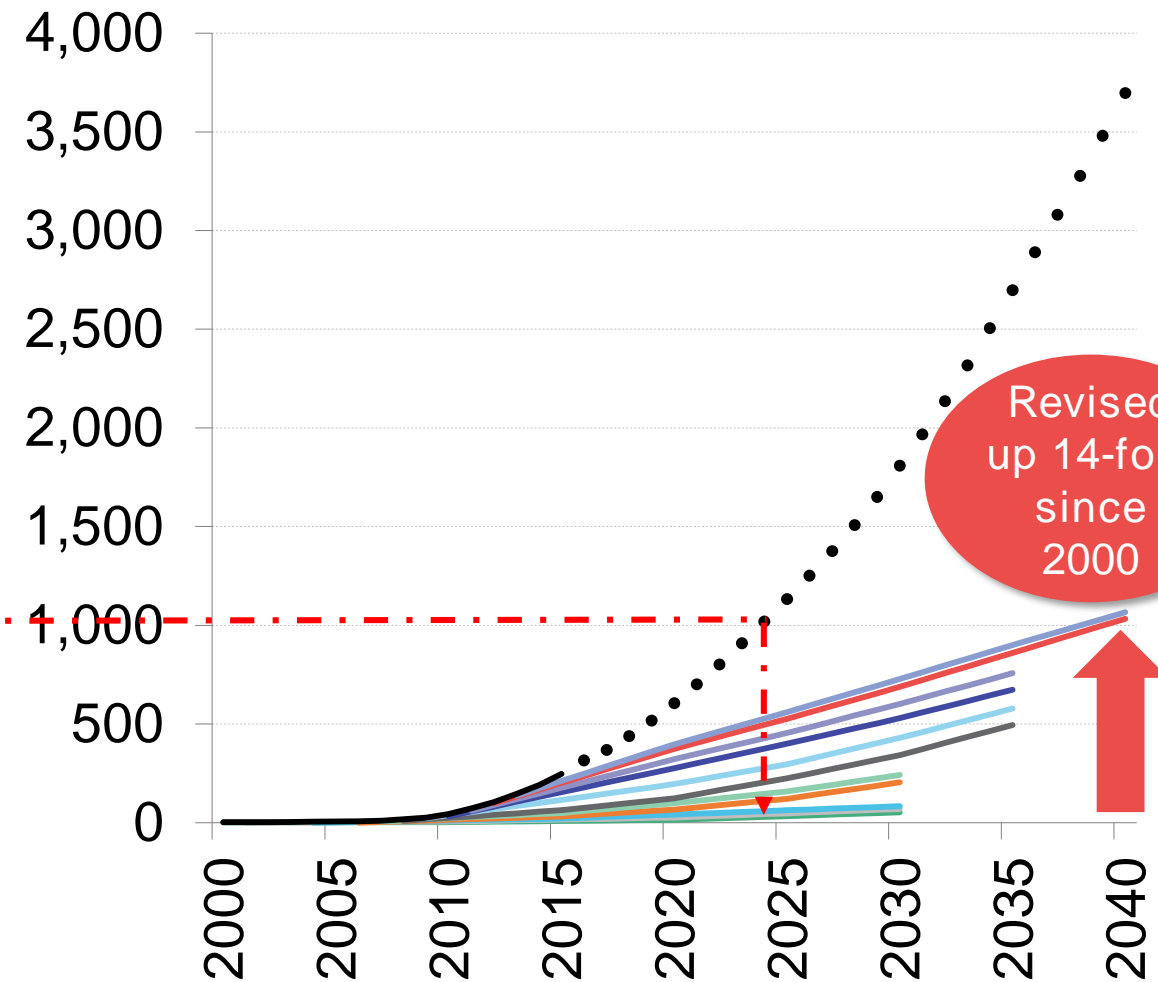
Bloomberg's 2016 Energy Outlook:

- Consumer power
- Solar, solar, solar
- Renewables rule
- Climate Change peril

WIND



SOLAR



Source: IEA, Bloomberg New Energy Finance,

Forces of Change –

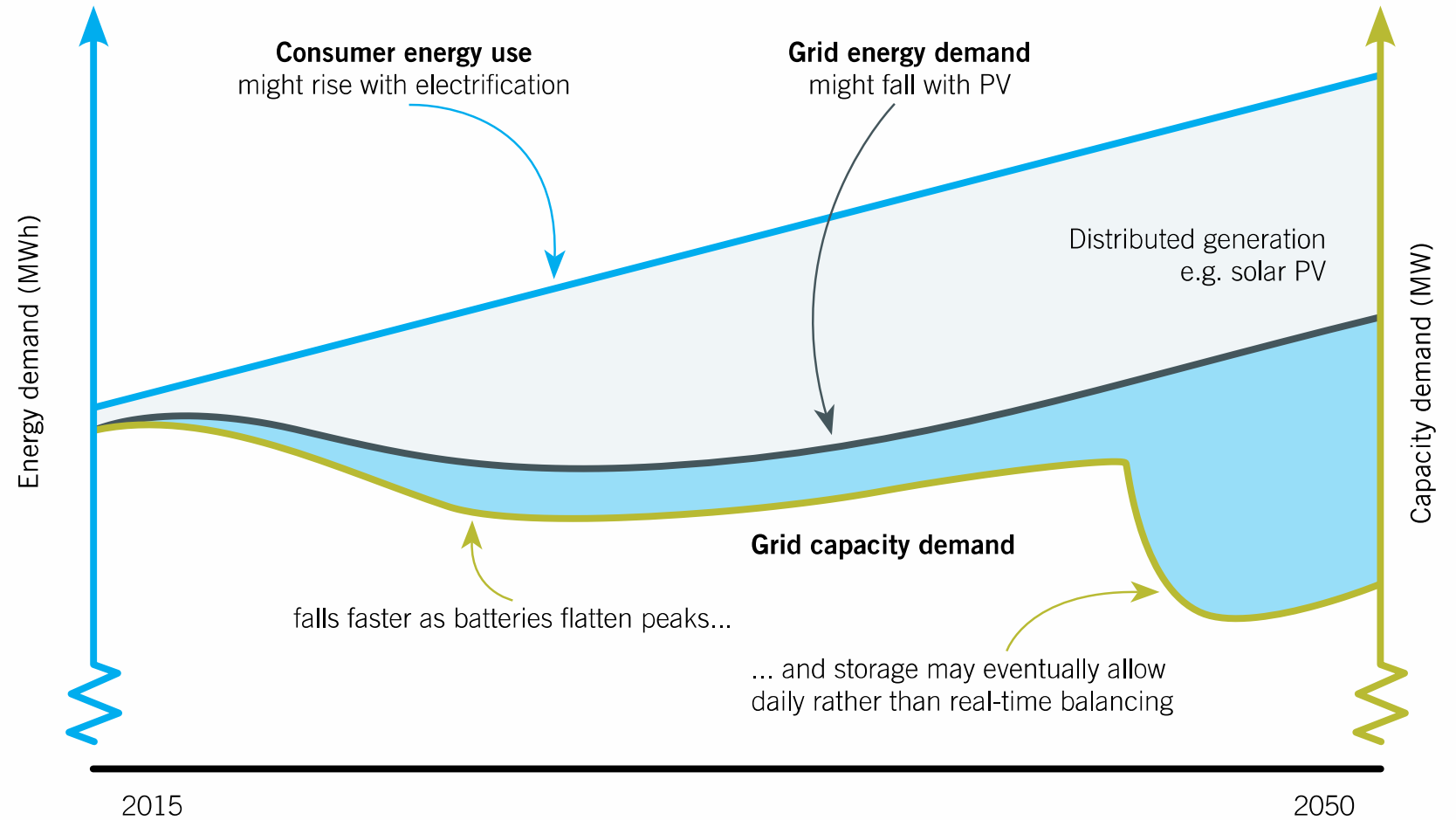
S³ Technologies;

Grid Price Parity

Off-Grid Solutions

Consumer Power

POTENTIAL EFFECTS OF TECHNOLOGY ON DEMAND



Transpower - Transmission Tomorrow

MitchellSmith

Forces of Change; Consumers

How does wind energy stack up..

Investment Drivers	Wind	Other Generation	Solar PV	Demand Side/Storage
Market Competition	Average	Average	Average	Strong
Technology Mass Production	Good	Poor	Strong (Swanson's Law)	Strong
Global Economics	Strong	Poor	Strong	Strong
Market Power	Poor	Strong	Average	Average

What do you do if you are;

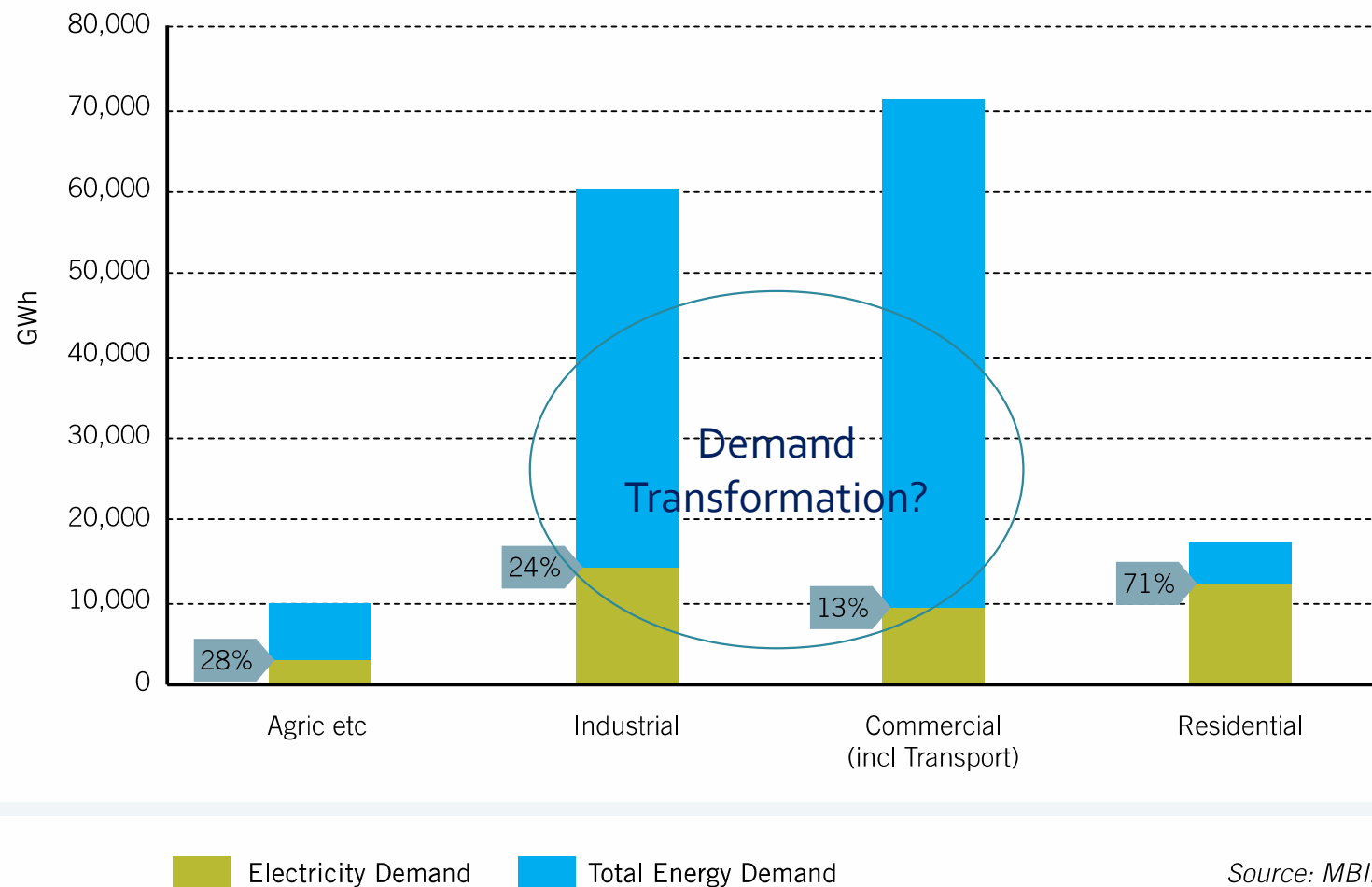
Mr. Iceman?

Lower Carbon Economy

R&D/Marketing efforts

Embrace Disruption

TOTAL ENERGY DEMAND VERSUS ELECTRICITY DEMAND PER SECTOR



Next Decade...



Tomorrows Transmission!

Your future business will no longer defined by your type of generation...but by your ability to keep up with the times.



We live in interesting times!



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