



Electricity Supply Resilience in NZ

2017 Wind Energy Workshop

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“a long habit of not thinking a
thing wrong,
gives it a superficial
appearance of being right ...”

Thomas Paine – from Common Sense (1776)



Questions...

How resilient is our electricity infrastructure?

- From who's point of view? Personally – variable at best

Who is monitoring the level of resilience?

- Everyone – and with better and better information

How is resilience measured? Where is the information and data?

- If it means different things to different people and can only be measured after the fact, are we actually measuring it?

Does the electricity market have the appropriate investment signals to ensure resilience?

- What is the price of reliability - VoLL?
- If it doesn't do other markets? Back-up generators, storage etc



Still more questions...

Is the resilience of electricity supply infrastructure changing, how will it change in the future?

- Yes – expectations change as uses of electricity change

What is the role of wind energy?

- What role does it want? In the beginning there was only DG – is more a good or bad thing? Regional versus national

Who is responsible for monitoring and managing the changing electricity supply?

- Lots of suspects - Minister, EA Board, SRC, Carl Hanson, Transpower Board, John Clarke...
- But decisions are only as good as the information available and information is ubiquitous



Reliability requires Resilience...

Reliability: re·li·abil·i·ty

The quality or state of being fit to be trusted or relied on.

Resilience: Re|sili|ence

The capacity of a system to tolerate and adapt to changes or disturbances and continue to function in good heart.

Increased Resilience requires a holistic appreciation of complex environmental, social and economic systems, their diversity and feedback and how these may be affected by change.

It is reliability that has value to consumers



Delivering the services that consumers want...

- Same opportunities as the consumers of any other product or service
- It is now about the quality of the service
 - How reliable is it and can we improve the performance?
- Reflects the continuing development of the digital economy
- Greater emphasis is placed on reliability
 - If VoLL is \$100,000/MWh then you want a reliable power system and you will pay for it

What services consumers want is not your decision, your decision is whether to provide the level of reliability customers are prepared to pay for



Of Black Swans and Blackouts or We don't know how lucky we are...

- We are good risk managers and have appropriate mitigation measures in place
 - But do we suffer from optimism bias?
- Numerous examples of known events that have surprised or will
 - Deep Water Horizon, Christchurch earthquake, Hurricane Katrina, GFC
 - Carrington Event (1859), Alpine Fault, Wellington Faults,
- Key feature of Black Swan events is that we rationalise them after the fact, but ignore them before the event
- New Zealand has no recorded history of many Black Swan type events – to quote Donald Rumsfeld
 - Known Knowns, Known Unknowns, Unknown Unknowns



What does the future hold?

- Smart technologies are a reality of the 21st Century – but where?
 - Utility level – storage, DG, smart grids, microgrids, etc
 - Consumer level – regulation and design in tandem enable the prosumer, , and megawatts
- Consumers already have real-time access to reliability information
 - Increasingly they share it and use it to inform investment decisions
 - Knowledge is power – there is no longer a monopoly on it
- In time today's managers (utility, regulatory, and government policy) will abandon their support for the current framework

“The consumer is the most important point on the production-line.”

Edwards Deeming



Problem Statement(s)

How do we get consumers to determine
reliability and resilience?

and

What level of resilience can we afford?



If there is a long habit of not allowing consumers to make decisions about reliability, does continuing this habit give it a superficial appearance of being right?



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