

***CHALLENGES OF INTEGRATING LARGE AMOUNTS
OF RENEWABLE INTERMITTENT GENERATION?***

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“Economic Paradox”

- Low-carbon power system
- High cap cost and very low variable costs eg. Wind, geothermal, solar.....
- Expect low prices (often zero) and price spikes when investment covers fixed costs.

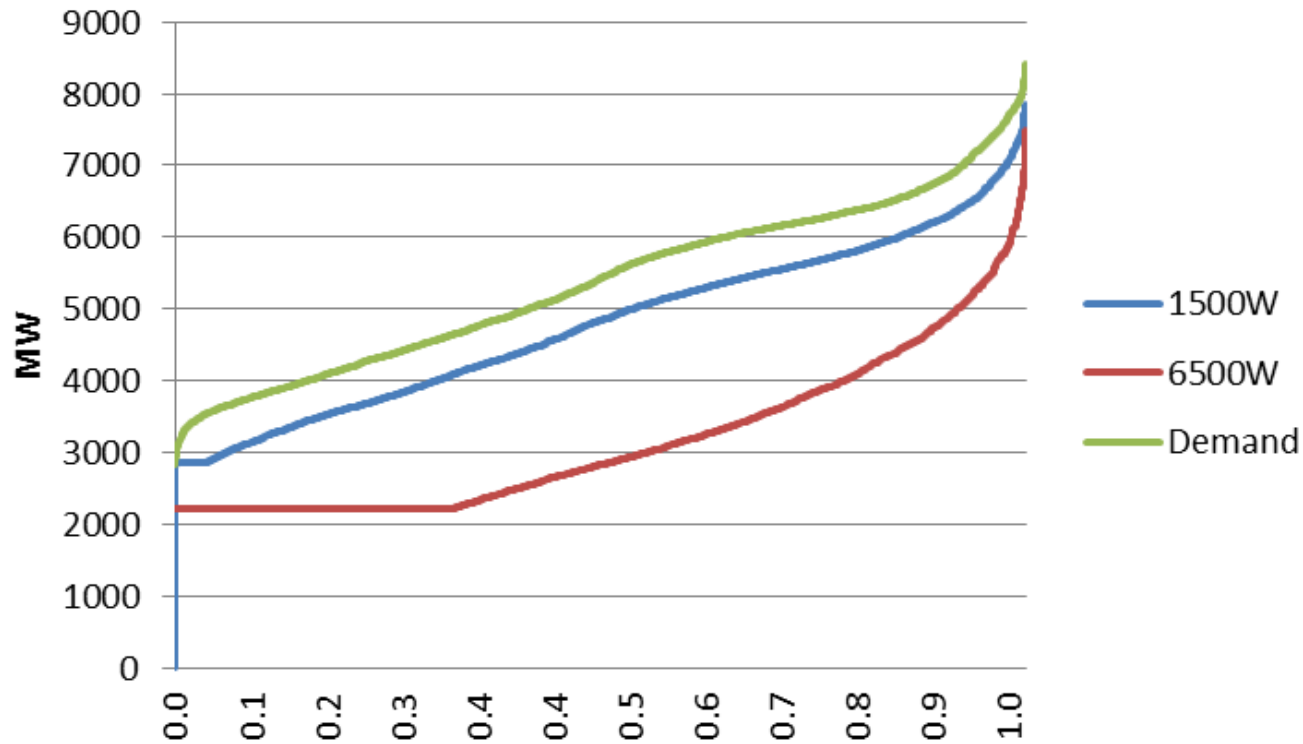
- Low Carbon power may put a lot of pressure on Electricity market design

Major new investment in wind farms expected

- Wind energy resource very promising as average wind speed high with long coastline.
- Look at scenarios with large amounts of wind generation (25% of electricity)
- Need “excess” supply since sometimes wind isn’t blowing.

Demand –wind

Flat section excess supply. Geothermal, must run hydro and wind more than demand -> spillage and waste. And price of zero



Electricity Storage.....?



Market Power

- Use a computer agent based model to simulate behaviour of big firms in NZ market....Meridian, Contact, Mighty River Power.....
- Find that although prices are zero 40% of the time when wind does not blow firms have opportunity to exercise market power.
- Some periods have extremely high prices

Conclusions

- Batteries or other ways to store electricity could be game changer.
- Market power issues with large amounts of wind suggest should look at different market design