



100% Renewable Generation

Workshop 2nd April 2015

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A transition is underway

Yesterday we heard:

- > **The global debate on climate change is shifting from targets to a transformation to a low carbon economy.**
- > **Science and engineering are winning! New technologies are becoming available.**
- > **Policies are really important – they drive the energy sector in certain directions.**

Some Reuters' headlines 2014



- > **E.ON to close 13 GW of plants, Enel to mothball 8 GW**
- > **European power industry crisis to persist**
- > **E.ON cuts dividend to 0.60 euros/share, from 1.1 euros**
- > **Enel, E.ON expect core profits to fall further**

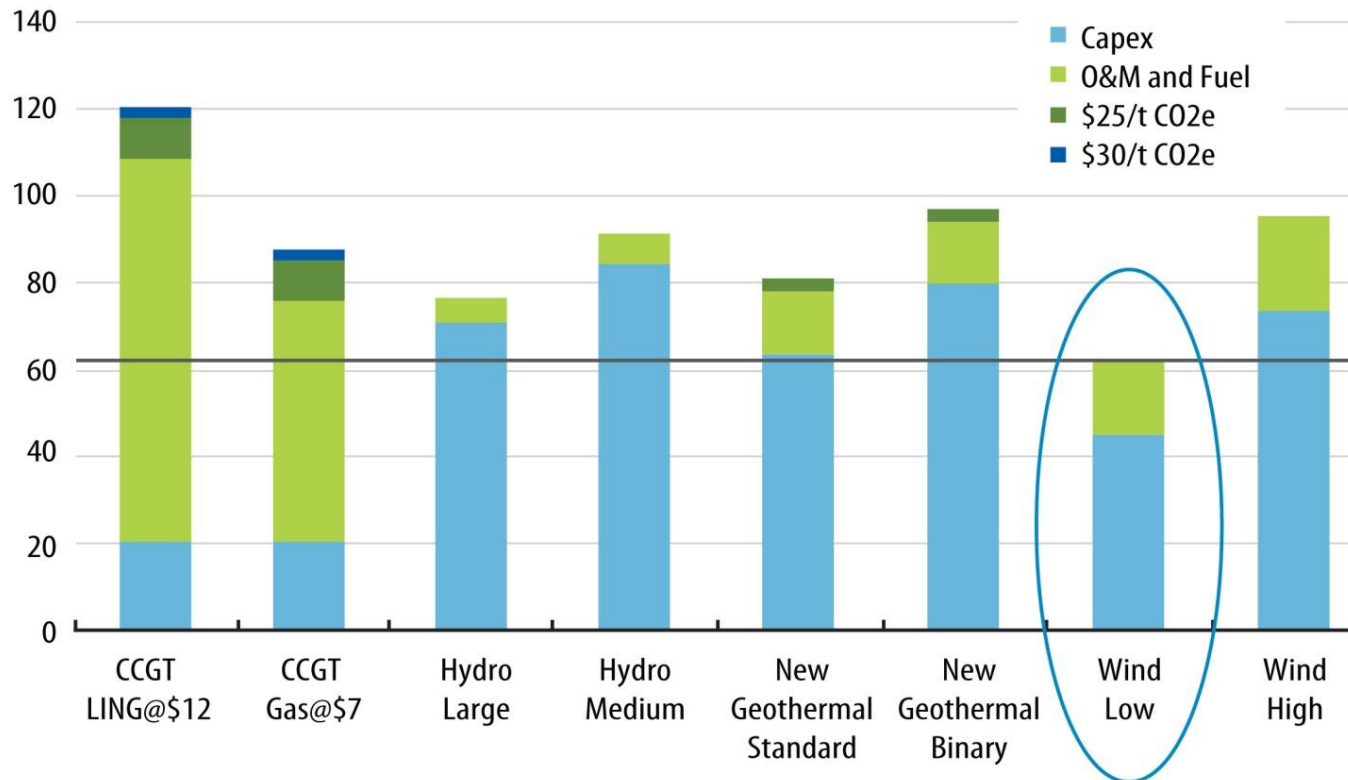
The global climate picture

- > Ambitious (sensational?) plans.
- > Inconceivable that governments will not take action on climate change.
- > Coal use in China declining? Unbelievable? Yes, but look at the depressed coal industry.
- > IEA says global CO₂ emissions plateauing 2015/6?
- > And New Zealand's policy...



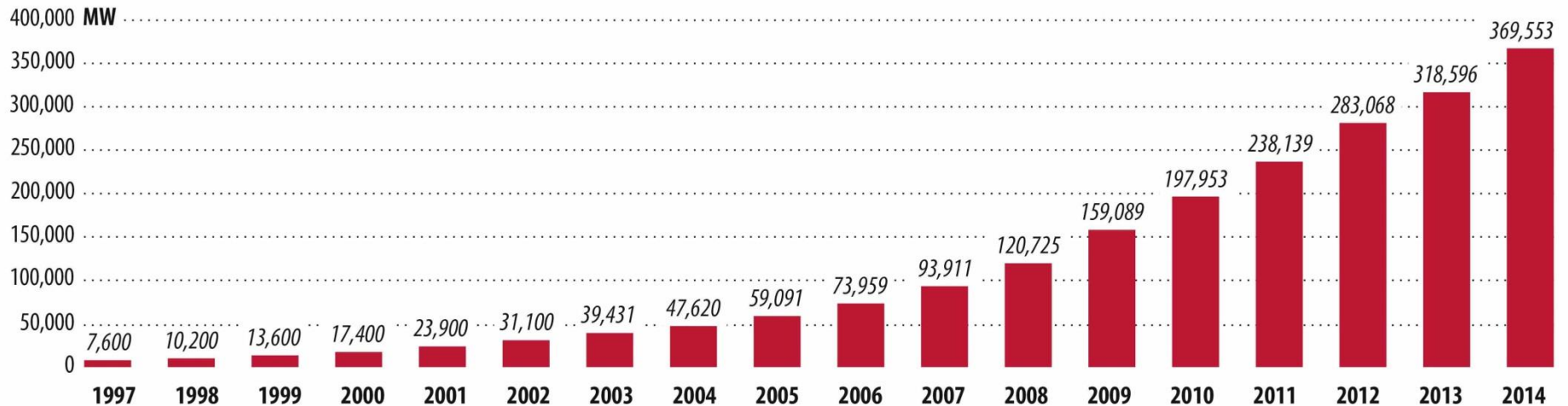
The price picture for wind in NZ

LRMC - 2016 \$/MWh



The global wind picture ctd

GLOBAL CUMULATIVE INSTALLED WIND CAPACITY 1997-2014



Source: GWEC

- 2015 wind generation growth = all wind generation installed end 2004.
- Total of 370GW installed by the end of 2014
- 370GW = 40X NZ's total installed generation fleet
- Amazingly positive US government wind report

What will we cover today?



- At 75-80% renewable NZ has 4th highest renewables in OCED.
- But others are catching up; Portugal.
- Some developing countries also.
- All countries need to get to 100% renewables; advantages for those who get there first?
- How could we do it?
- What technologies are there?
- Does current policy help or hinder?
- Does the market favour existing technology versus new?

Purpose

Add to the debate about NZ's climate change position for Paris.

Explore

- > **the technical issues with 100%.**
- > **the policy issues.**
- > **The opportunities**

The start of a discussion and a journey.