

Achieving the NZES targets

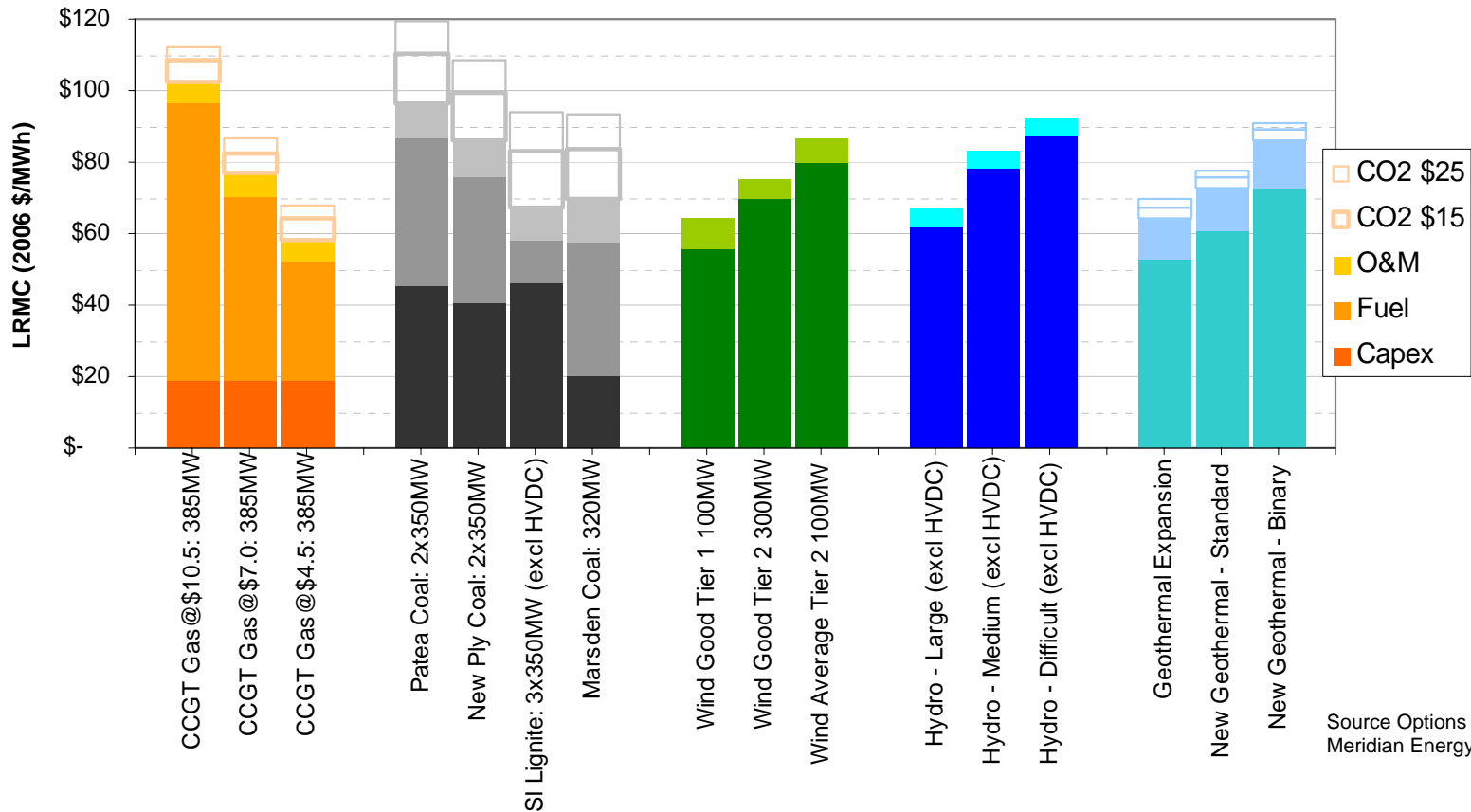


The NZ Electricity System in 2025?

- **Demand for Energy**
 - **Now** 42 TWh total generation
 - **In 2025** energy forecasts range between 54-61 TWh
- **Peak load**
 - **Now** 7 GW total generation
 - **In 2025** peak demand forecasts ranges between 9-10 GW
- **Primary Energy Supply**
 - **Now** (Average year)
 - Gas 11 TWh, Coal 4 TWh, Geo 3.5 TWh, Wind 1.2 TWh, & Hydro 25 TWh
 - Raw hydro inflows swing between 20-32 TWh in extremes
 - **In 2025** 10% thermal implies only 6 TWh (now 15)

Where will system flexibility come from to meet hydro variability?

Future Cost of Electricity Supply

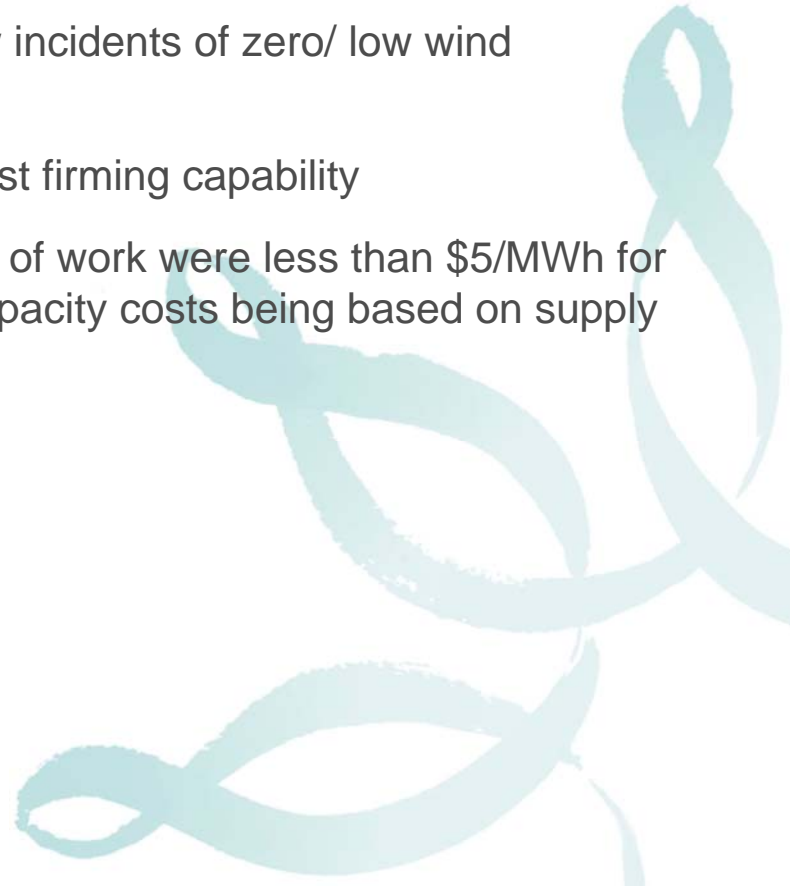


Source Options Choices Decisions
Meridian Energy 2006

- 12 months on and costs of all technologies have lifted, however, the cost of all renewable technologies still compares favorably with thermal generation.
- Gas prices and the price of CO₂ remain the key economic enablers of renewables
- NZ is uniquely placed with its relative abundance of economic renewable options

The System Costs of Renewables

- Work in progress by Professor Goran Strbac is reinforcing the point that the system costs of renewables (in particular wind) in New Zealand are an order of magnitude lower than overseas systems because of:
 - High capacity factors of wind
 - High degree of wind persistence (i.e. very few incidents of zero/ low wind production)
 - The presence of hydro with its flexible, low cost firming capability
- Order of magnitude costs based on his first phase of work were less than \$5/MWh for 20% wind penetration by energy, even with the capacity costs being based on supply from OCGT plant.



Regulatory Enablers

- **RMA still an issue with appeals against infrastructure projects common.**
- **Regulatory jurisdiction overlap is becoming a concern.**
 - Transpower likely to face re-litigation of the Auckland 400 kV case in the RMA.
 - Contact appealing SI wind farm developments brings transmission access and grid upgrades into RMA scope. May be a sign of things to come?
- **Transmission**
 - Focus on reliability investments must be augmented with a focus on economic investments in the grid in order to enable renewable generation.
 - In particular, Meridian would like to see a streamlined and pragmatic approach to incremental grid upgrades.
 - Pricing needs to be efficient, fair and stable.
 - The HVDC charge places a \$10/MWh uplift for new SI new builds versus \$3-4 MWh for Meridian (for existing HVDC assets).
 - A move to introduce further locational transmission pricing (in addition to the GIT and nodal pricing) would create more complexity and uncertainty for renewable investors.
 - Important that transmission is an enabler of renewable investment. Generation remains orders of magnitude more capital intensive than transmission.

Summary

- 90% renewables by 2025 is a stretch target. Maintaining flexibility to manage hydro variability remains a key issue.
- Economics of renewable supply in NZ remain strong compared to thermal (incl CO₂ costs).
- System costs in New Zealand are significantly lower than overseas (thermal based) power systems. NZ has a natural advantage in developing a heavily renewable based energy system.
- Regulatory enablers could be improved in the RMA and Transmission:
 - Clarification of jurisdiction and removal of opportunities for double jeopardy (i.e. not hearing the economic case for new investment in both jurisdictions).
 - Transmission access and grid upgrade issues being ruled out of RMA scope.
 - A transmission focus on economic investments to enable generation as well as reliability investments for security to the demand side.
 - HVDC pricing reviewed as it is an impediment to renewable investment.
 - Avoid introducing additional transmission locational pricing elements to further complicate generation investment decision making.