

Economics of wind development in New Zealand

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Introduction

- New Zealand investment environment
- Key cost drivers
- LRMC – methodology and conclusion
- Other investment considerations

New Zealand investment environment

The investment environment in New Zealand has important differences to most other wind energy markets

- Subsidies have come and gone
- There is no meaningful market or appetite for long term purchase contracts
- New Zealand's ETS scheme
- Vertically integrated market
- Strong wind resource

Dominated by Capital Cost

Wind investment is dominated by up front capital, mostly US\$ and Euro denominated

Breakdown of wind farm costs

Cost category	Range
Turbine capital cost	70 - 75%
BoP (switchgear, access, foundations, site electrical)	15 - 19%
Grid connection	8 - 10%
Total project costs	100%

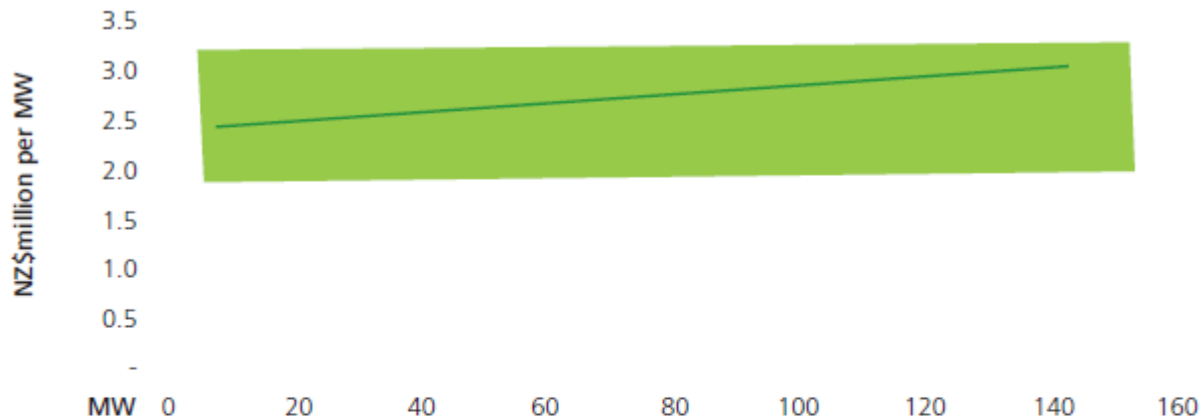
Turbine capital cost breakdown

Cost category	Range	Contract pricing
Nacelles and power conversion	55 – 60%	EUR
Blades (Class I turbine)	14 – 15%	EUR
Tower	9 – 12%	EUR or USD [1]
Transport	7 – 10%	USD
Installation & other	8 – 10%	EUR
Total turbine capital cost	100%	
[1] Pricing terms dependent on point of shipping		

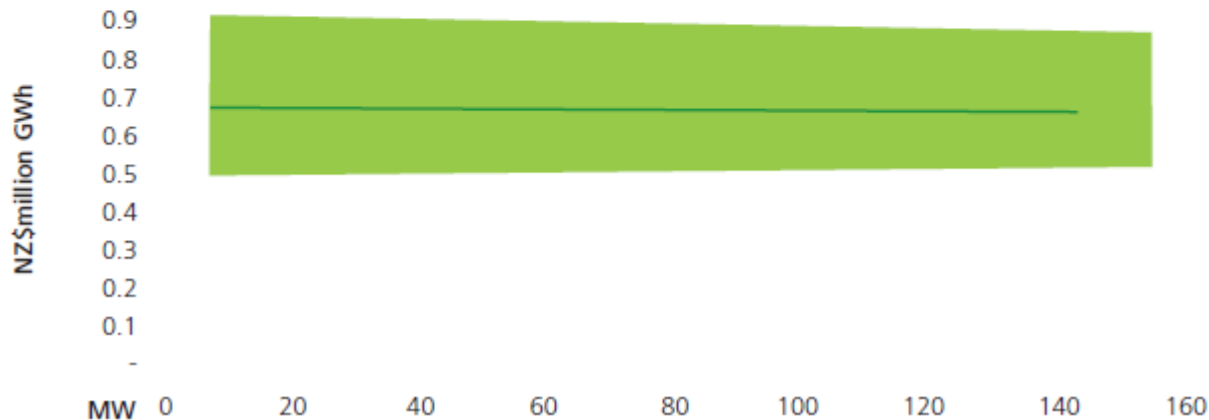
Key cost metrics

Our research indicates there are diseconomies of scale and limited benefits to increasing scale in New Zealand investment to date

Capex per MW installed



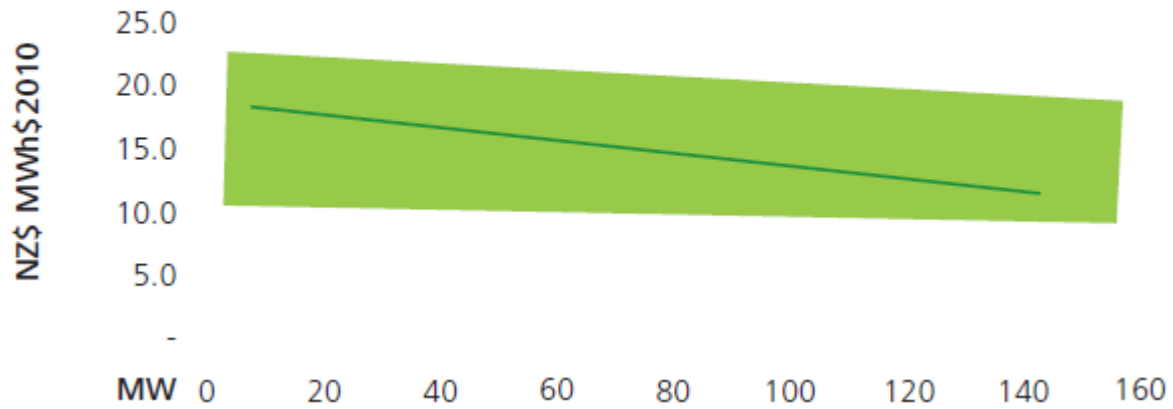
Capex per GWh/year



Key cost metrics continued

. . . . but operational efficiencies are being realised

Opex per MWh



Key cost metrics continued

. . . . and our costs appear competitive internationally

- Lower labour costs
- Fleet size becoming more material
- Economies of scale such as spares sharing across projects

Opex per MWh (\$2010)- Global Benchmark

COUNTRY	NZ	GERMANY	UK	USA
Currency	NZD	EUR	EUR	EUR
Low	10.0	5.2		
Average	16.0	8.3	22.5	20.1
High	22.0	11.4		16.4

Source: Deloitte analysis, WindPower Monthly
1 NZD = 0.52 Euro

LRMC Methodology

Our LRMC is the levelised cost of generating from current wind investments in New Zealand

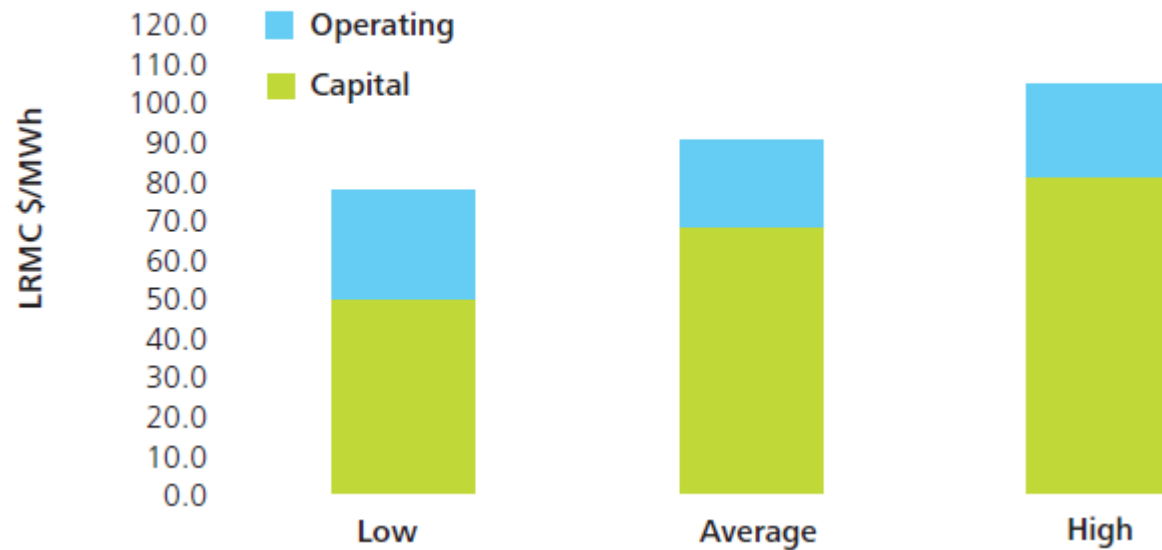
LRMC = breakeven electricity price required to set the NPV of future capital and operating costs to zero. Takes account of total production over time

- Sample representative of majority of installed MW capacity in NZ – not every project
- “LRMC – raw constructed cost” reflects actual constructed cost and operating cost as well as realised output
- We then adjusted the raw LRMC for factors considered in investment cases for wind such as avoided transmission revenue (where known) and GWAP/TWAP discount
- Based on 20 year economic life. Views can differ between developers

LRMC

The raw levelised cost of electricity delivered from New Zealand wind investment to date is \$78 to \$105 MWh

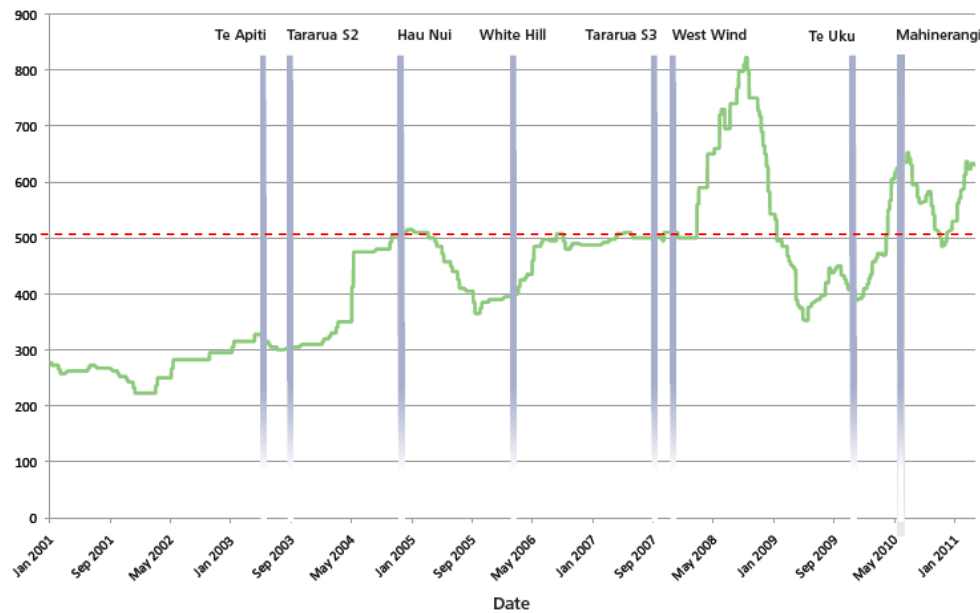
LRMC – Raw constructed cost



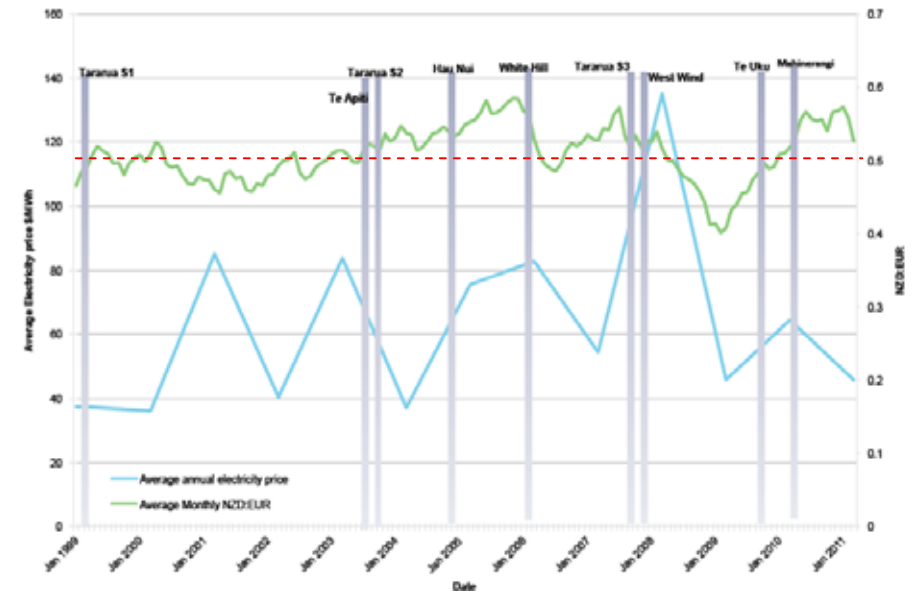
Investment considerations

Most investments have been made above NZD:EUR 1:0.5 and steel prices below €500/tonne

Hot Rolled Coil Price Index



Average Electricity Price v Euro



Other factors

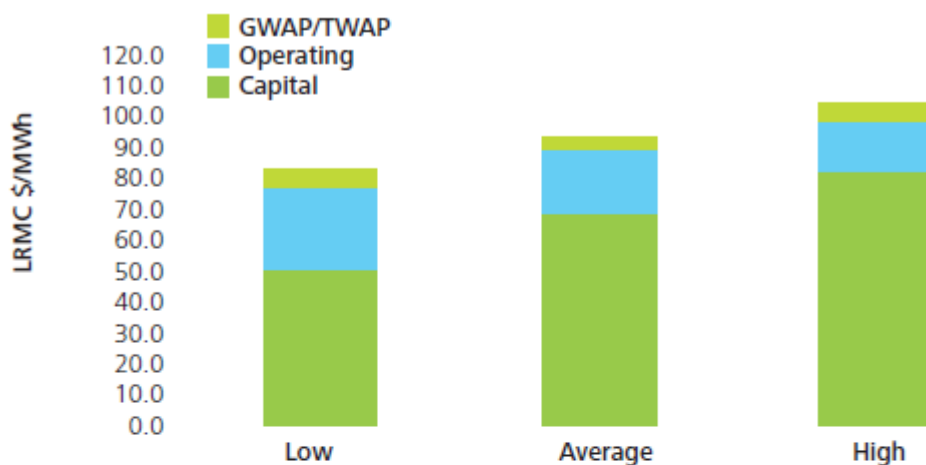
Developers consider a wide range of other factors in making wind investments in New Zealand

- Forward wholesale electricity price forecasts
- Terminal value
- Portfolio effects and benefits
- Tax benefits
- Hedge position/ retail book
- Intermittence

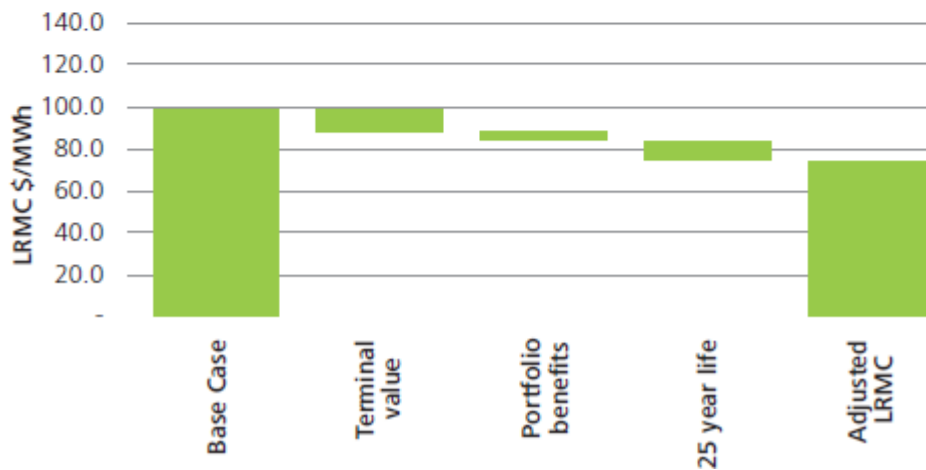
Other factors continued

... these can significantly affect the view of LRMC

LRMC – Adjusted for identifiable investment case factors

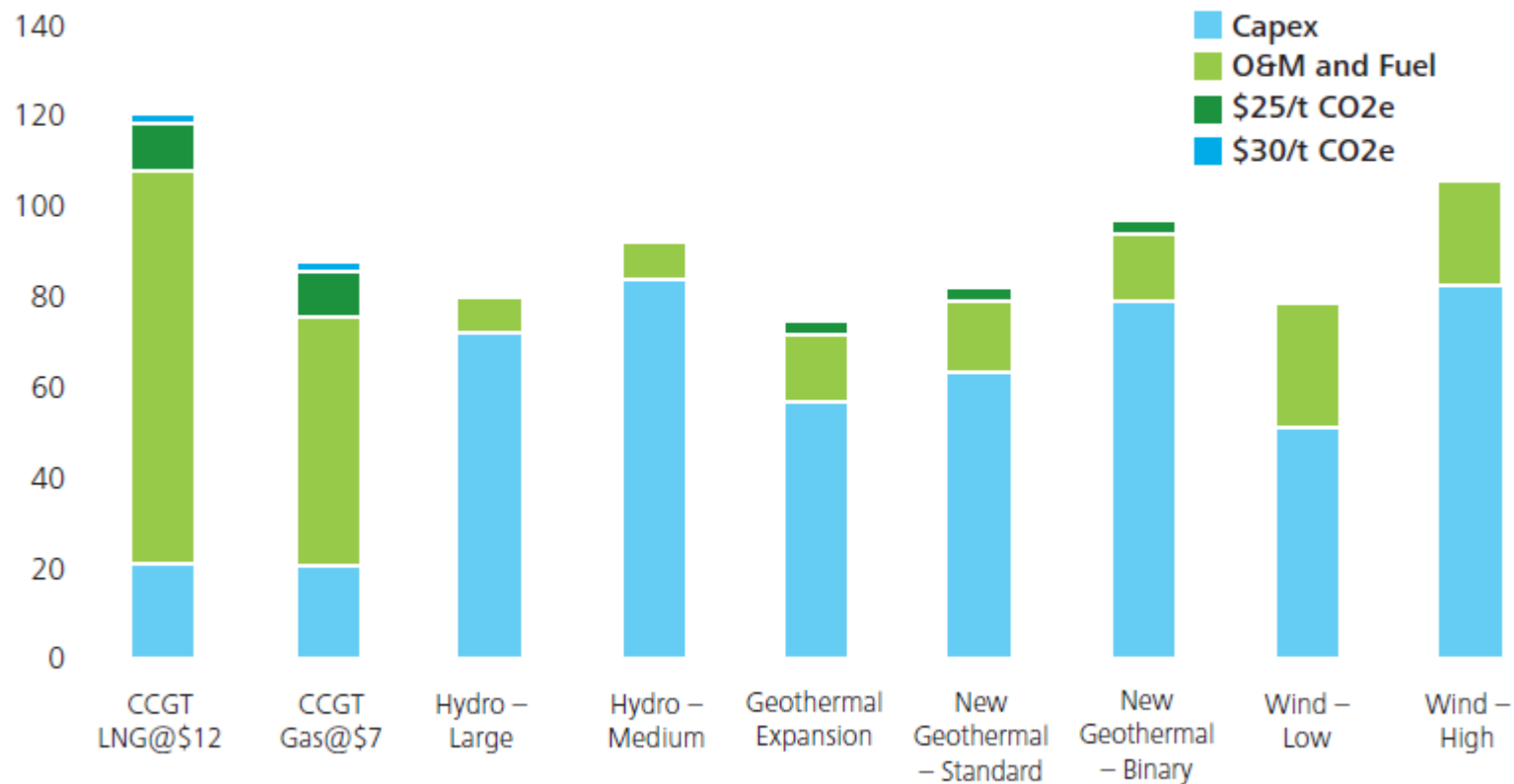


LRMC – Illustration of theoretical investment case adjustments



Other technologies

LRMC – 2010\$/MWh



Source: Meridian Energy, Deloitte analysis

Summary

Timing is everything

- Economic wind investment is highly dependent on exchange rates at the time of commitment
- Wind investment is inherently more risky in New Zealand
- The global wind market is heavily dependent on subsidies
- Factors other than LRMC can drive investment decisions
- Some wind investments have been committed based on assumptions that wholesale prices will rise to support the economics.

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