

meridian

## Investor and Analyst Day

# Wind Energy – Powering New Zealand's Renewable Future

8 December , 2010

# Disclaimer



- » **This presentation may contain projections or forward-looking statements regarding a variety of items. Such forward-looking statements are based upon current expectations and involve risks and uncertainties**
- » **Actual results may differ materially from those stated in any forward-looking statement based on a number of important factors and risks**
- » **Although Management may indicate and believe that the assumptions underlying the forward-looking statements are reasonable, any of the assumptions could prove inaccurate or incorrect and, therefore, there can be no assurance that the results contemplated in the forward-looking statements will be realised**
- » **Furthermore, while all reasonable care has been taken in compiling this presentation, Meridian cannot guarantee it is free from errors**

# Meridian Energy



- » **New Zealand's largest electricity generator, supplying one third of the nation's power**
- » **Our customer load is split between RTANZ Tiwai Point facility (40%) and 200,000 customers - Business & Rural customers (35%), Residential (23%) and Powershop (2%)**
- » **We generate our New Zealand electricity from:**
  - » **Hydro (93%)**
  - » **Wind (7%)**
- » **Internationally we have generation in Australia, USA (solar) and Antarctica**
- » **We have a strong portfolio of generation options at various stages of development**
- » **We own businesses providing innovative retailing, smart metering, demand management, distributed generation, and energy efficiency services**



# Meridian's strategy



## Improve our commercial performance

Improving and sustaining the profitability of our business by optimising and co-ordinating our generation, wholesale and retail operations

## Grow value through the development of renewables

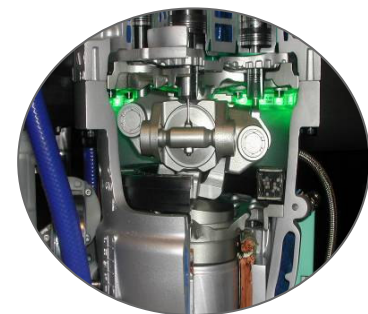
Having the best renewable generation portfolio in Australasia by securing renewable energy development options and building generation assets that create long-term value

## Lift our customer game

Delivering a profitable, differentiated offering to customers that transforms the way they think about, buy and consume electricity

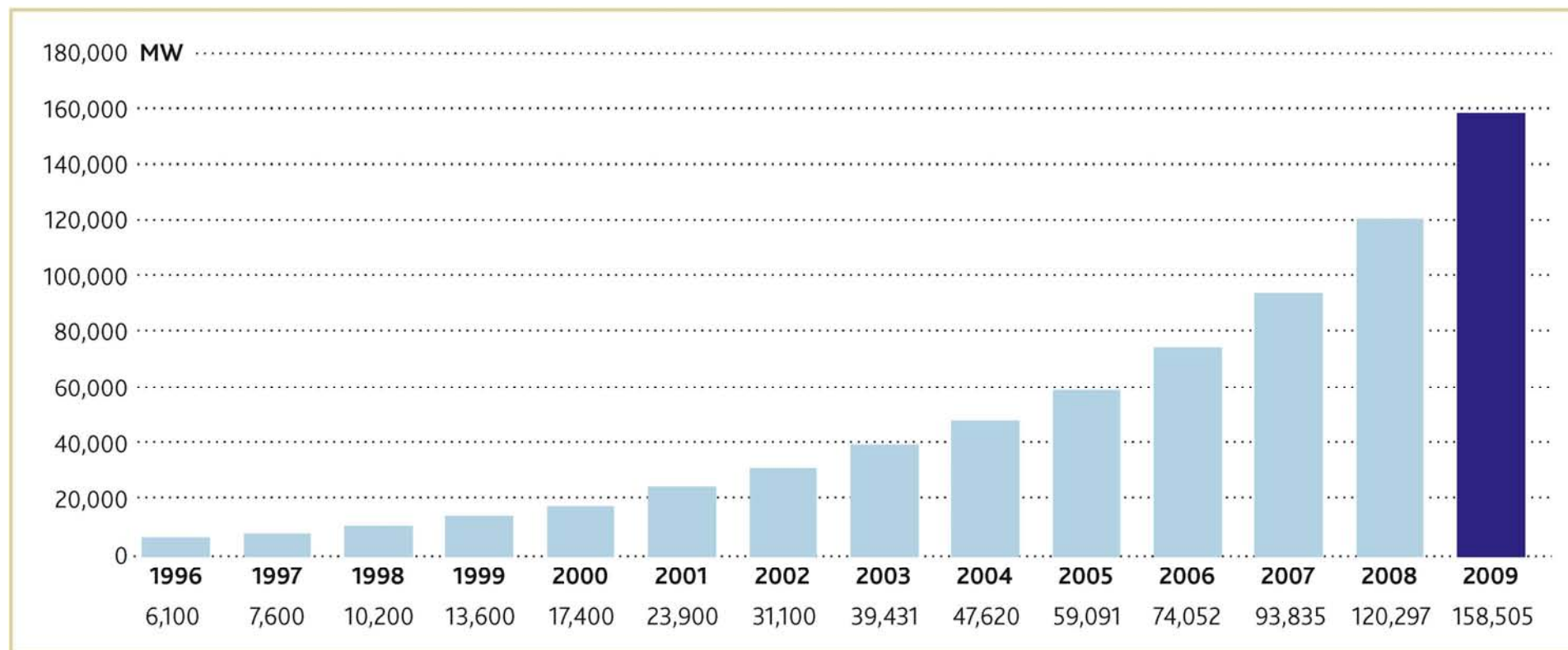
## Innovate to create value

Being a leader in the adoption and commercialisation of new renewable energy technologies and solutions to create and capture future value



# Global growth in wind energy >25% CAGR

## GLOBAL CUMULATIVE INSTALLED CAPACITY 1996-2009

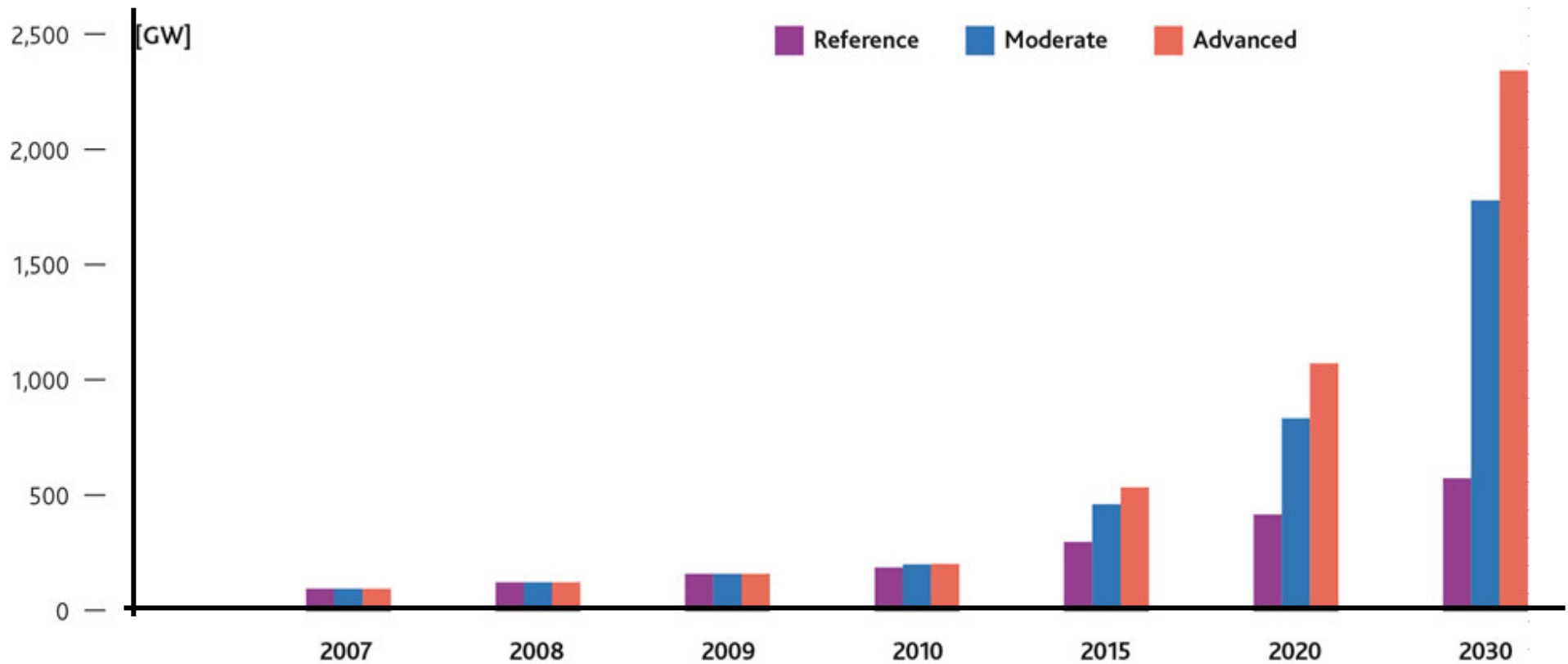


Source: GWEO 2010

...which is expected to continue



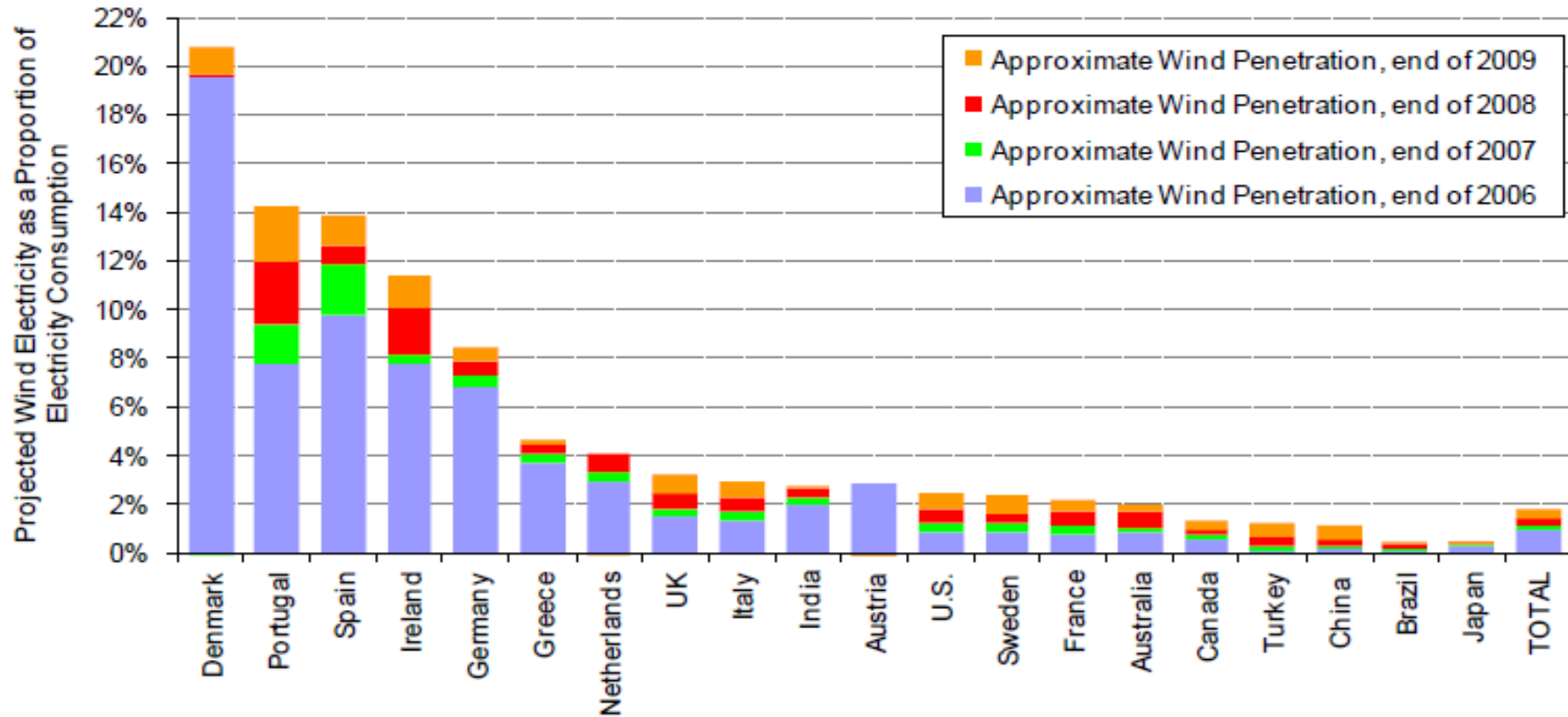
## Global Cumulative Wind Power Capacity



Source: GWEO 2010



# Significant wind penetration is possible and proven



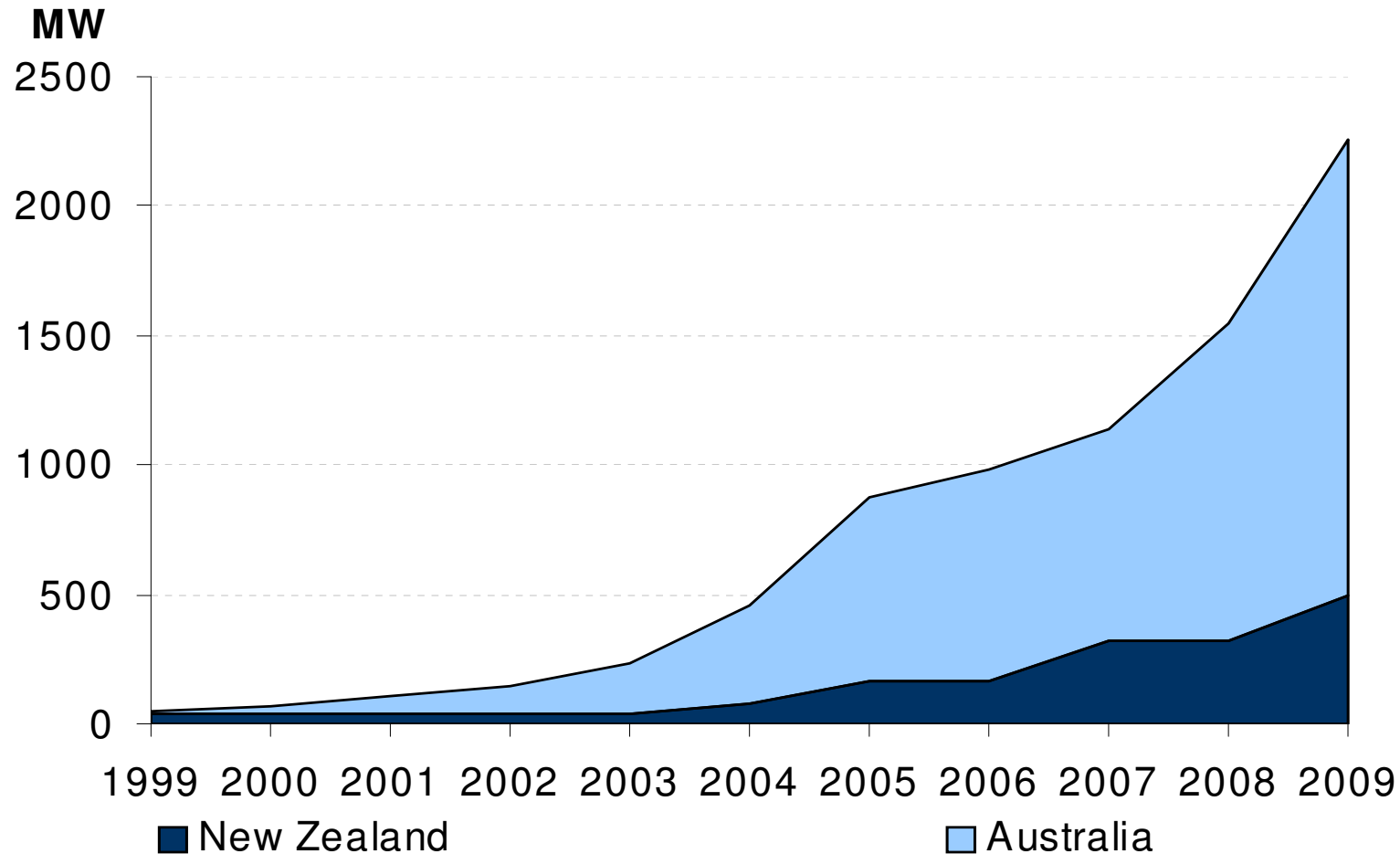
Source: Berkeley Lab estimates based on data from BTM Consult and elsewhere

» New Zealand current has 4% wind penetration (GWh basis)

# Wind power capacity is growing rapidly in both Australia and New Zealand



**Cumulative Wind Power Capacity in Australia and New Zealand 1999-2009**



Source: Global Wind Energy Council

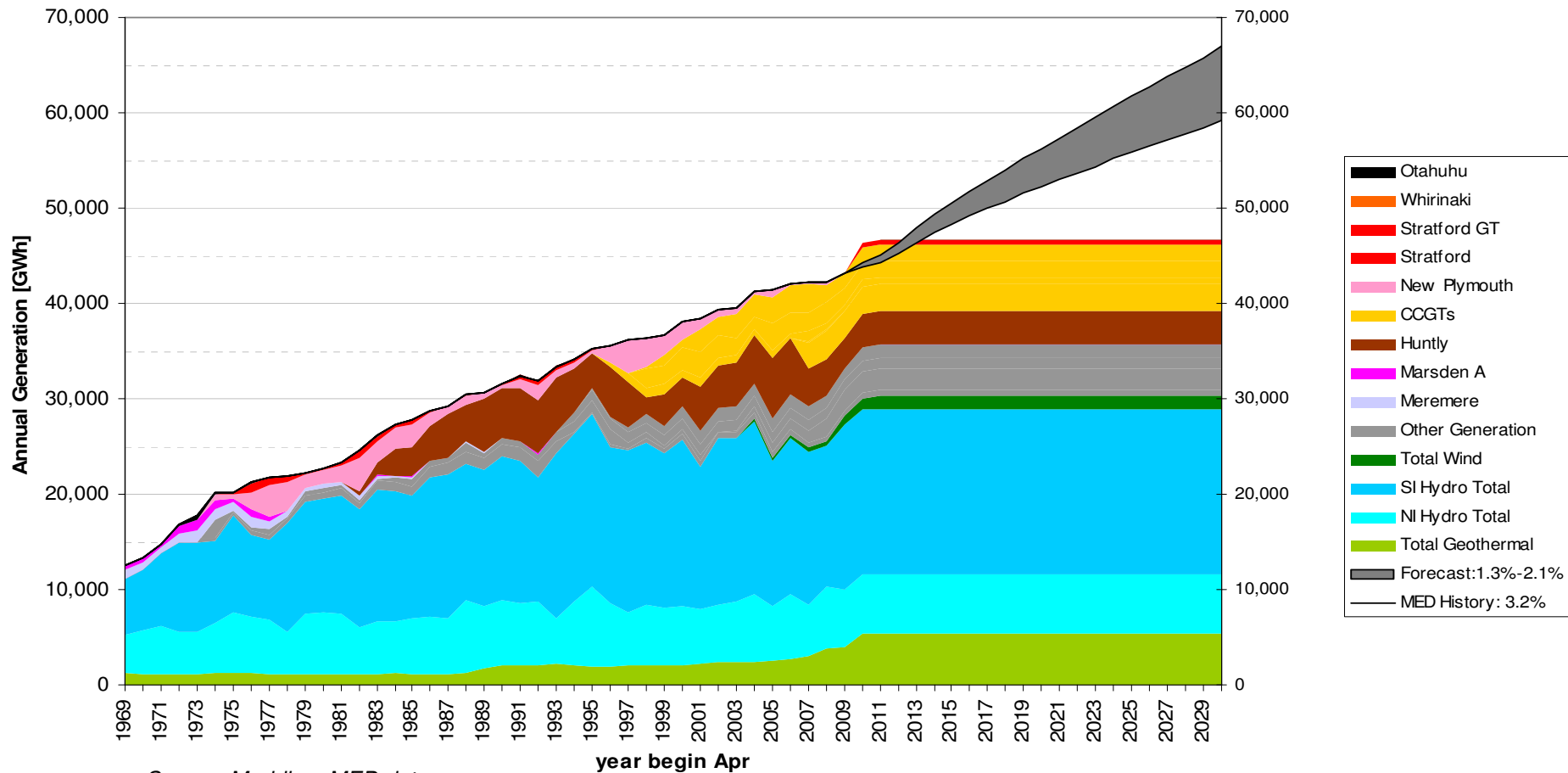


# Wind is becoming an increasingly relevant component of New Zealand's energy mix



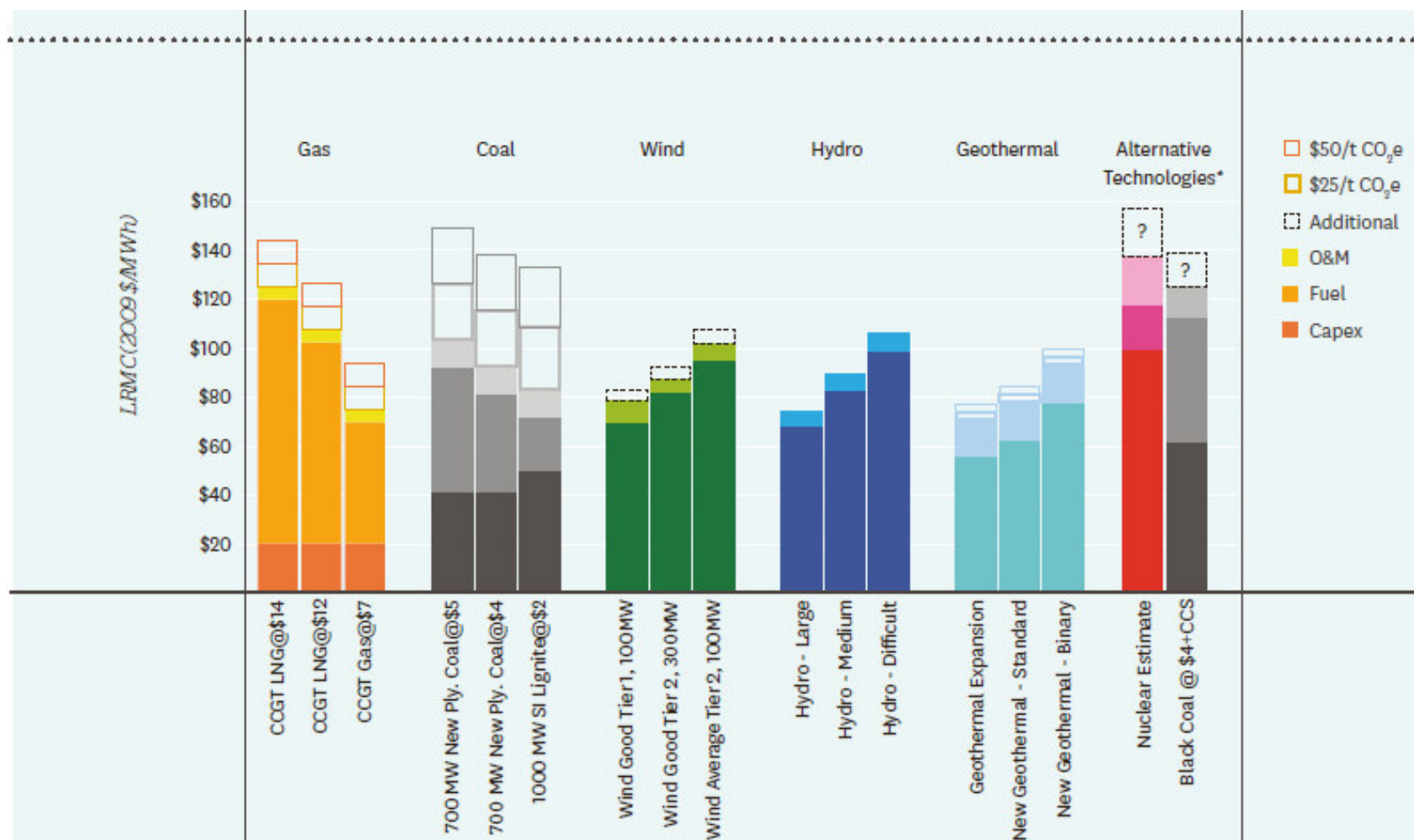
## New Zealand Electricity Generation History & Forecast

*Annual Generation in New Zealand - 1969 to 2009 plus Forecast Committed Generation to 2030*



Source: Meridian, MED data

# Competitiveness of “typical” generation technologies showing unit costs components



Source: Meridian, Options Choices Decisions 2009

# Significant wind penetration is possible in the New Zealand electricity system



- » **System cost of wind is driven by**
  - » additional generation capacity required for when the wind does not blow
  - » the opportunity cost of maintaining additional operational reserves due to the inability to accurately forecast wind output
- » **Investigations\* have identified at least 20% of New Zealand's generation can be installed with no major system implications**
- » **At wind energy penetration levels in excess of 20% the additional system cost is estimated to be \$5-10/MWh**
  - » Much lower costs than overseas markets
  - » Large scale hydro and high capacity factors of wind are a differentiator

*\*Research undertaken by Professor Goran Strbac, Imperial College London  
<http://www.meridianenergy.co.nz/AboutUs/News/Economic+virtues+of+future+wind+generation.htm>*

# Wind development – challenges and opportunities

## » **Challenges**

- » Consenting – Potential for higher barriers (cumulative or regional effects)
- » Market demand – Post GFC demand growth has flattened
- » FX rates – Volatility of NZD/USD and NZD/EUR affects purchasing cost of turbines and timing of investment decisions
- » Availability of capital to fund new projects
- » Competition with other project developers

## » **Opportunities**

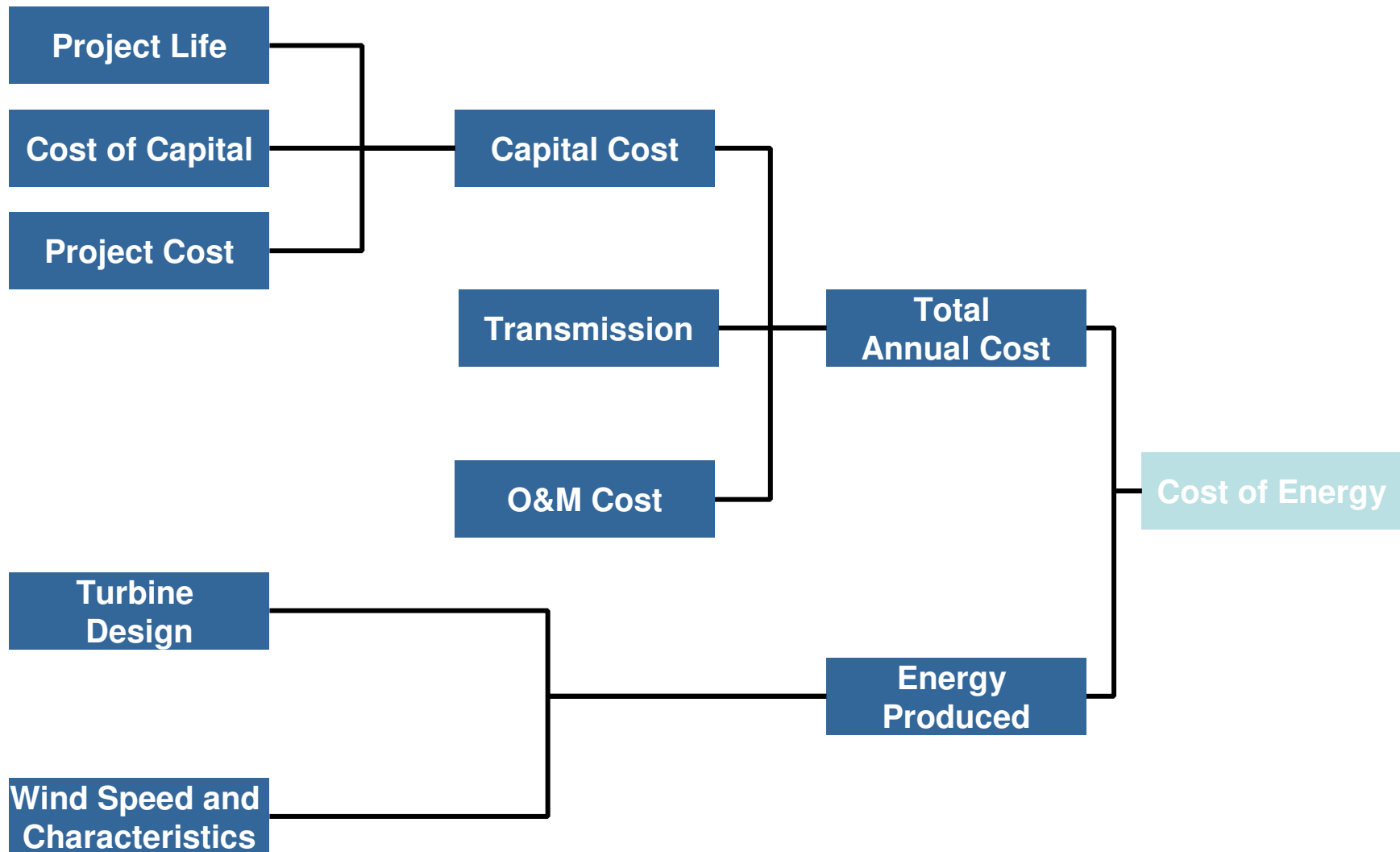
- » Plant Retirement – Huntly decommissioning
- » Carbon Costs – Influences long run price path and has implications for thermal refurbishments
- » Growing wind manufacturing base globally creates new procurement options

# Commercial investment criteria

- » **Fully costed DCF based evaluation, using revenue scenarios and risk analysis around key drivers**
- » **Inclusion of project contingencies based on experience and risk covering construction and operations**
- » **Value enhancing investment**
- » **Explicit consideration of terminal and portfolio benefits above first life return**
- » **Corporate WACC**

Assumptions	Key driver
Turbine cost	Effectiveness of supplier relationship and negotiations
Civil costs	Experience and completeness of geotechnical, design and/or quantity estimation
Balance of Plant	Level of design, degree of procurement and cost estimation activity
Transmission and Connection	Completeness of design
Yield	Matching turbine selection to site characteristics
Operations and Maintenance	Technology lifecycle performance, insource vs outsource
Life	Wind characteristics, turbine design, maintenance approach

## Drivers of cost of energy from a wind farm





# Longer term drivers of wind turbine costs

- » **Technology improvements**
  - » Direct drive – efficiency and weight
  - » Reliability and efficiency – control systems, component design
  - » Grid integration, power quality
- » **Economies of scale**
  - » Turbine size(2.3MW – 3MW - ??)
  - » Manufacturing
- » **New sources of low cost manufacture**
  - » Asia (especially China) – quality and performance is improving rapidly

# Meridian's wind development strategy

- » **Develop a variety of options**
  - » Geographic diversity
  - » Connection – grid vs embedded
  - » Scale
  
- » **Identify ways to reduce costs and improve yield**
  - » Build relationships with turbine suppliers
  - » Access to technical intellectual property
  - » Smart yield assessments and modelling
  - » Smart site identification and layouts
  - » Optimised infrastructure
  
- » **Partner with key stakeholders**
  - » Iwi
  - » Lines companies

We believe we are successful because we focus on the following areas



- » **Insightful wind prospect identification**
- » **Deep understanding of resource and technology fit**
- » **Lifetime value based assessment of technology**
- » **Aspire to excellence in stakeholder and community engagement**
- » **Comprehensive and complete approach to consenting**
- » **High quality project execution**
- » **Establishing enduring relationship with new communities**

**‘Standardising the bespoke’**

# Developing a wind project is a complex integration of issues



- » **The Site**
- » **Resource**
- » **Consent**
- » **Transmission**
- » **Lifecycle costs**
- » **Operations**

**All are integrated, value is created through focus on integration of the whole package**

# Meridian has a significant track record in developing wind projects



- » **Competitive strengths across key wind development processes (find, evaluate, design, consent, procure and construct)**
- » **Hydro competitive strength is in access to the resource (stakeholder relationships and consenting processes)**

Project	Type	Capacity (MW)	Status
Te Apiti	Wind	91	• Commissioned Oct 2004
Wattle Point (Australia)	Wind	91	• Commissioned Apr 2005 (sold)
White Hill	Wind	58	• Commissioned June 2007
West Wind	Wind	143	• Commissioned March 2009
Ross Island (Antarctica)	Wind	1	• Commissioned Feb 2010
Te Uku	Wind	65	• Construction (first power Dec 2010)
North Bank Tunnel	Hydro	260	• Pre feasibility study complete
Manapouri Discharge	Hydro	110 (peaking)	• Implemented July 2010

## Meridian is exporting this capability offshore

- » **Primary focus on Australia**
  - » Existing knowledge of market through prior investments (Southern Hydro) and development experience
  - » Established beachhead business with one operating, one construction and one advanced permitted development project
  - » Ability to leverage NZ competencies
- » **Secondary focus on future renewables (solar)**
  - » Potential addition to wind led development future
  - » Utilises a number of common capabilities that underpin wind development
  - » Rate of return exceeds of cost of capital
  - » Deployment in other geographies Meridian operates in, with significant potential in Australia
  - » Significant technology improvements can be made



# Future offshore focus

- » **Australia**
  - » CEO appointed, expanding team
  - » Executing Macarthur wind farm (440MW)
  - » Developing Mt Mercer wind farm (130MW)
  - » Developing additional greenfield wind farm options
- » **Expanding US option portfolio**
  - » Appointed Chairman
  - » Developing solar project options
- » **Investigating solar growth in the region**
  - » Pacific Islands
  - » Australia

# Portfolio management

- » **Wind and hydro form a complimentary renewable generation partnership**
- » **The fast start nature of hydro allows us to respond to the intermittent nature of wind**
- » **An increasingly strong transmission grid enables these synergies to work effectively**
- » **As our wind portfolio increases we have greater diversification offsetting some of the momentary fluctuations in wind**
- » **We are bringing wind forecasting more and more into our generation portfolio optimisation**
- » **Although we are unable to predict wind output down to the minute we have a good understanding of wind conditions out to a week and make decisions around hydro generation volume targets with that knowledge**

## Wind asset management is a current area of focus

- » **Meridian has a strong track record in hydro asset management**
  - » Condition monitoring and reliability engineering
  - » Extracting additional value from assets through O&M practices
- » **We are transitioning this capability to Wind**
  - » Currently OEM provided services
- » **Philosophy is to self manage asset risk and improve decision making around investment and performance tradeoffs**
- » **Maximise fleet economies of scale**
- » **Significant savings and optimisation benefits expected**

# Meridian has an extensive forward development plan in wind



- » **Significant pipeline of well developed, commercially attractive projects**
- » **Table below excludes other generation technologies in Meridian's pipeline**

Development Project	Type	Capacity (MW)	Status
Macarthur (VIC)	Wind	440*	• Permitted, closing finance
Mt Mercer (VIC)	Wind	130	• Permitted, procurement underway
Mill Creek (Wellington)	Wind	71	• Environment Court
Maungaharuru (Hawkes Bay)	Wind	94	• Consent purchase complete
Hurunui (Nth Canterbury)	Wind	76	• Community Consultation
Hayes (Otago)	Wind	>300	• Environment Court
Pouto (Nth Auckland)	Wind	>300	• Evaluation
Project X	Wind	54	• Evaluation
Gumfields (Northland)	Wind	80	• Evaluation (DoC Concession)
Windy Peak (Wairarapa)	Wind	100	• Evaluation

\* Total project MW, equity MW is 220MW