NZWEA
2022 AGM

Welcome

WIND – NEW ZEALAND'S ENERGY

new zealand wind energy association

Chair's Report

2022 AGM

Blair Walter, Chair, NZ Wind Energy Association
October 2022

Contents

- About NZWEA
- Board and CE
- Strategy
- Financial Performance
- International Trends

About NZWEA

- Established 1997
- An industry association
  - Promotes the development of wind as a reliable, sustainable, clean and commercially viable energy source
  - Policy & regulatory advocacy, public awareness and industry development
- Represents 65 members:
  - Generators and developers
  - Turbine manufacturers, equipment suppliers, consultants
  - Continued interest in in new memberships
  - Includes 4 leading offshore wind developers
- Utility scale generation
  - Also supporting smaller scale and community wind initiatives

NZWEA Board and CE

- Election for
  - Two members representing Corporates
  - Two representing Associates / Individuals
  - Strong interest in becoming a NZWEA director
- Newly elected members join
  - Blair Walter (Aurecon) – 1 year remaining
  - Chris More (Meridian Energy) – 1 year remaining
  - Todd Mead (Manawa) – 1 year remaining
  - Rose Divjak (DNV GL) – 1 year remaining
  - Paul Botha (Roaring40s Wind Power) - 1 year remaining
- Mark Ashby (4Sight Consulting) retiring as a board member
- CE Recruitment
  - Grenville retiring after 6 and a half years as a part-time CE
  - Given the outlook the Board has recognised the need for a full time CE
  - Recruitment has commenced

Acknowledging CE's Contribution

- NZWEA has been very fortunate to have a CE of Grenville's calibre and pedigree; he is the consummate professional leader
- He brought a sound understanding of the electricity market to NZWEA from his earlier role at Meridian Energy, and experience of navigating government agencies from his previous role as CE of Public Trust
- He has tirelessly chased and grown membership – especially hard work through the wind association austerity years of late 2010s – and as a result the association is now financially robust and growing
- He rolled up his sleeves and managed NZWEA with very little support and has instigated important new systems and procedures that will serve us for many years
- He repositioned the wind industry, putting together the pieces of the puzzle on climate change and the energy transformation, and making NZWEA an important voice in the national conversation rather than just a niche generation technology
- His CE reports and summaries of energy / wind industry activity have been highly valued by members and he has summarised a wide range of material into a digestible form
- Grenville has provided significant support and advice to members, whether it's helping navigating government agencies or sounding out issues

Strategic Focus

- Mission
  - Enabling development of NZ's exceptional wind resource as a reliable, sustainable, clean and commercially viable energy source
- Vision
  - Empowering New Zealand's sustainable energy future
- Objective - 20% wind by 2035
  - Wind increased from 5.5% to 6.4% of total generation - June 22 year
  - Installed capacity now 942 MW post Waipipi and Turitea North
  - Will increase to 1,264 MW with Turitea South, Harapaki, Kaiwera Downs
  - Mt Cass, Kapuni and Kaiwaikawe will add a further 190 MW
  - Offshore wind potential of 1 -2 GW
  - Other consented site and repowering potential +850 MW
  - Objective consistent Climate Change Commission demonstration pathway (19%)
  - CCC Tiwai stays scenario 25% by 2035
  - Grid scale solar likely to exceed previous predictions

Strategic Focus

- 3 key strategies:
  - Leveraging NZ's emission reduction imperative to enable the energy transition to renewables, particularly wind energy
  - Optimising wind energy's position and ensure the regulatory environment supports wind farm development
  - Expanding the opportunity for wind energy development to enable community and industrial projects including wind's integration with other technologies
- Progress across priority areas
  - Emissions reduction plan published and will support continued development of wind energy
  - Electricity sector recognised as key to lowering carbon emissions
  - Positive industry advocacy on resource management reforms
  - Need to recognise and prepare for significant growth – 0.6 to 6.0 GW
- Ongoing focus on health and safety programme
  - New challenges with wind farm construction underway

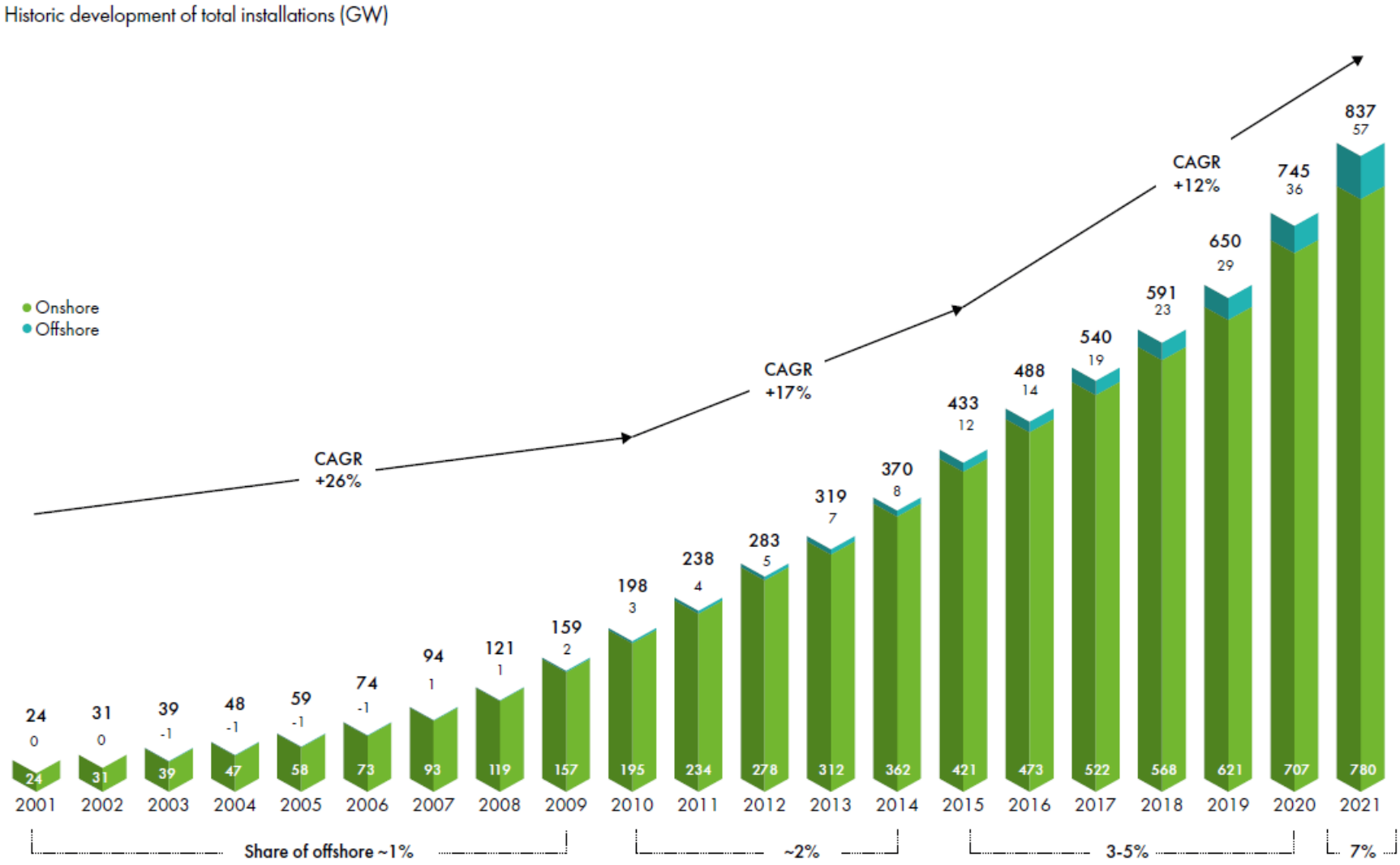
Financial Performance and Outlook

- Association has faced challenging times
  - Lack of development and Covid has impacted historic results
  - Strong recent wind investment and 2021 Conference key turning points
- 2022 Result
  - Deficit of $58k (previous year surplus $67k)
  - Change due to Wind Conference being delayed to August
  - Conference successful with June 2023 forecast performance much improved
  - Strong position as at October 2021- cash balance $213k and debtors $82k
  - Association positioned for membership growth
- Ability to invest in additional capacity
- NZ Outlook improved but risks remain
  - Speed of decarbonisation / timing of demand growth
  - Energy transition and ensuring security of supply
  - Resource management system reform outcomes
  - Global demand for wind energy may create supply challenges

International Trends

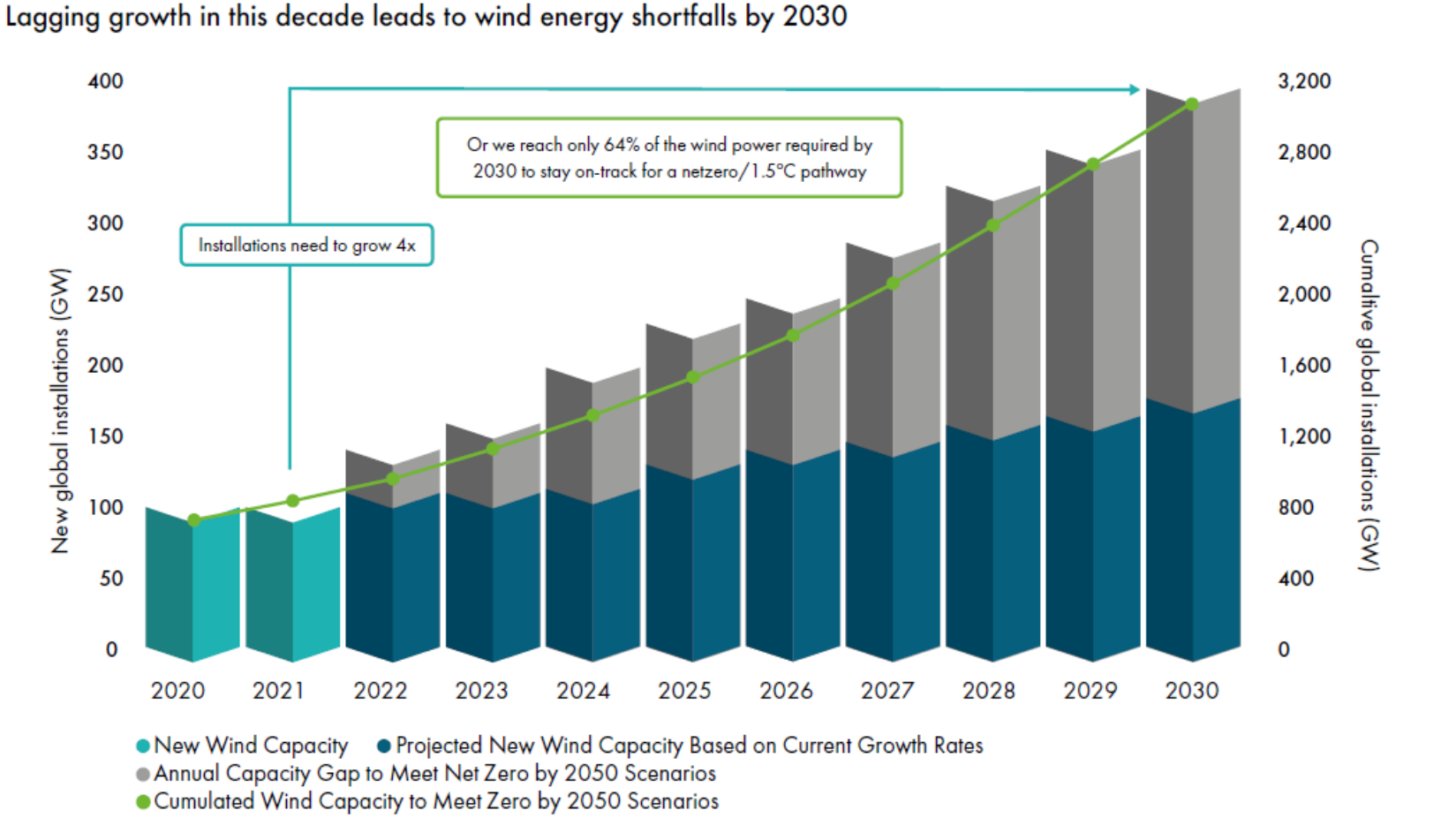
- Outlook positive
  - Technology, price and need for emission reductions
  - Transforming from subsidies to a purely commercial model
  - Offshore wind price breakthrough
- 2021 Cumulative wind capacity 837 GW
  - 94 GW new capacity
  - Onshore growth 73 GW to total 780 GW
  - Offshore growth 21 GW to total 57 GW
- Market Outlook
  - GWEC forecast 557 GW new capacity next 5 years
  - Offshore wind forecast 90GW of total
  - Growth 4x projected needed to stay on course for 1.5 degrees
- Energy Transition
  - Bloomberg NEF global energy transition investment 2021 $755b
  - Primarily renewable energy and electrified transport

Positive Global Growth



- Source: GWEC Annual Wind Report 2022

Offshore Wind – Projected growth



- Source: GWEC Annual Wind Report 2022

The declining cost of renewables*

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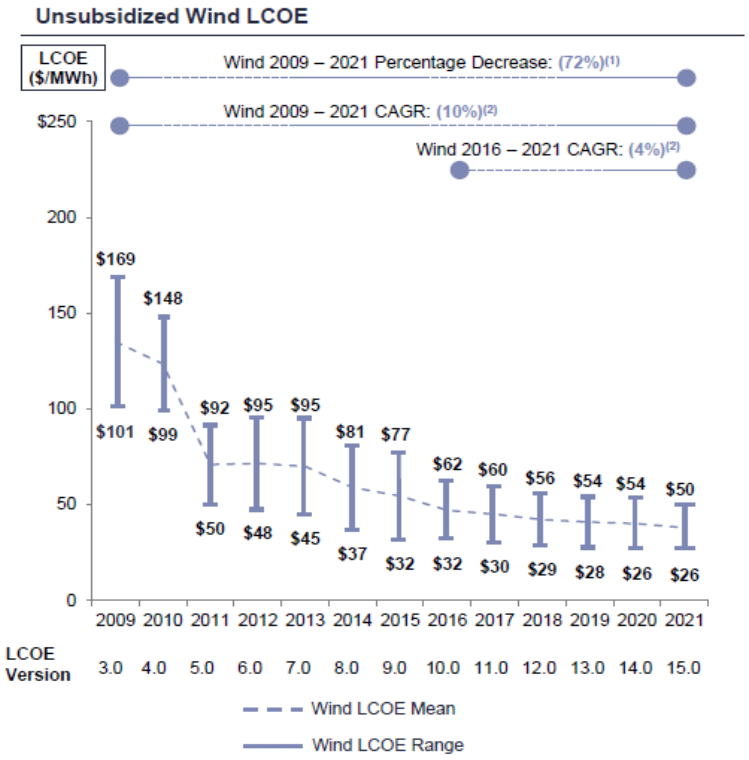
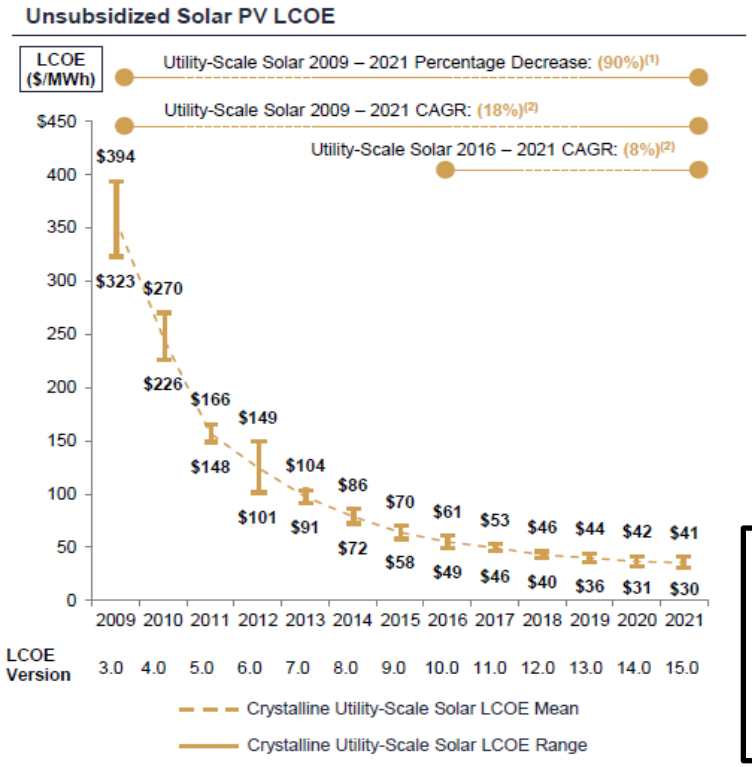
Levelized Cost of Energy Comparison—Historical Renewable Energy LCOE Declines

In light of material declines in the pricing of system components and improvements in efficiency, among other factors, wind and utility-scale solar PV have exhibited dramatic LCOE declines; however, as these industries have matured, the rates of decline have diminished





* Circa 40% increase in wind costs in last 18 months, not captured in these charts

LAZARD
Copyright 2021 Lazard

Source: Lazard estimates.
(1) Represents the average percentage decrease of the high end and low end of the LCOE range.
(2) Represents the average compounded annual rate of decline of the high end and low end of the LCOE range.

Lazard LCOE version 15

Australian Update

- Renewable energy was 29% of generation in 2021 (24% 2020)
  - Solar 11.7%,Wind 10% Hydro 6.1%
  - Grid scale solar 10,900 GWh (4.1%)
- AEMO ISP: BAU 74% renewables by 2050, step-change 94%
- Individual states setting high renewables targets: QLD 80%, VIC 95%
- Significant momentum in market and improving federal policy should assist investment
- Grid issues being addressed through strategic grid investments such as interconnectors and dedicated renewable energy zones
- Current challenges with supply chains and COVID-19 impacts driving wind costs up significantly, potentially 40% in last 18 months
- Offshore wind gaining momentum

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CE Report

2022 AGM

Grenville Gaskell, Chief Executive, NZ Wind Energy Association
October 2022

Contents

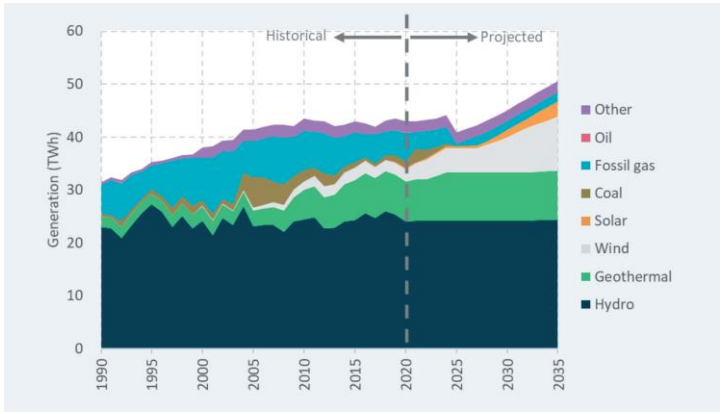
- NZ Development Update
- Offshore Wind
- Tiwai / NZ Battery
- Highlights
- Resource Management System
- Industry Training
- Areas of Focus
- Summary

NZ Development Update

- Turitea North 119 MW commissioned
- Installed capacity 942 MW (690 MW in 2020)
- 322 MW under construction
- Mt Cass (93 MW), Kaiwera Downs (phase 2 197 MW), Kapuni (24 MW), Kaiwaikawe (73 MW) Puketoi (159 MW) key prospects
- Future potential - Te Rere Hau (85 MW) and Tararua (72 MW) repowering and Kaimai (150 MW) to be consented
- New entrants for onshore and offshore development
- Community wind - Paekakariki the lead prospect but land access challenging

Growth Forecast	Total MW		No. New Wind Farms	1 Farm Every (Mths)
	2035	2050		
CCC - Demonstration pathway	2,900		17	10
CCC - Tiwai stays scenario	3,900		27	6
Transpower - Te Mauri Hiko		6,500	53	7

Waipipi Wind farm



Source: Climate Change Commission

Offshore Wind

Developer Feedback

- NZ's world class offshore wind resource attractive
- A level of certainty required to progress projects such as an exploration license
- Recognition of the importance of a collaborative and engaging approach with Iwi and of cumulative impacts

Progress

- Developers have establish NZ capability and announced potential projects 1- 2 GW
- Government commitment to developing a licensing regulatory regime by 2024
- Interim licensing arrangements by December 2022
- Government considering non-regulatory support levers
- Engagement with Transpower on grid development
- Studies underway – LiDAR, capability and environmental assessments
- Successful Offshore Wind Wānanga
- Consideration of offshore wind energy as an export opportunity

Tiwai and NZ Battery

Tiwai

- Supply agreement for 572 MW until 31 December 2024
- Stay or go Tiwai does not fundamentally change the longer term outlook for wind
- Clutha Upper Waitaki Lines upgrade completed - capacity now 1180 MW
- NZAS confirmed it wants to continue operations
  - Potential to offer demand response
  - High aluminium prices and a carbon hedge
- CCC modelling has wind at 2,700 MW (smelter goes) or 3,800 MW (stays) by 2035
- Meridian / Contact progressing Southern green hydrogen – shortlist of 2
  - In place of or in addition to Tiwai

NZ Battery Project

- Project positive for renewables
  - NZWEA supports developing dry year risk options
  - Supports renewables variability and creates additional demand
- Onslow one option also – hydrogen, biofuels and flexible geothermal
- Onslow phase 1 completed by end of year – premise not just dry year operation
- Minister has noted industry developments – including Huntly on biomass, hydrogen flexibility
- Has highlighted the fundamental importance of renewable energy storage

Some highlights…

- Investment in new builds and options development
  - Reports of heightened activity levels
- A positive wind energy conference
  - Venue at capacity
  - Re-introduction of specialist workshop well received
- Membership and financial position
- Emissions reduction budgets are here
- Government commitment to strengthening national direction
  - NPS REG - draft for consultation by end 2022
  - Positive response to industry position on resource management reforms
  - Potential to enable for small scale developments
- Health and Safety - a shared priority
- ETS reform
  - A cap on emissions and carbon price supporting renewables development
- Establishment of a wind PPA market supporting development
- NZ Battery Project (dry year options)
  - A solution essential to meeting the energy trilemma
- Transpower's new connection and net zero grid projects
- Engagement with Department of Conservation
  - Potential to ensure a nationally consistent approach to wind farm consenting

Areas of Focus…

- Health and safety
- Strengthen national direction to support renewables development
  - Resource management system reform
  - Offshore wind licensing / regulatory framework
  - Includes NPS Indigenous biodiversity and NES Freshwater revisions
- Electricity system transition challenges
  - Replacing the services fossil fuel generation provides
  - Market operations with a higher level of renewables
  - Managing renewables variability including DSM / tariff reform
- Supporting development of an integrated energy sector strategy
  - Domestic emissions reduction plus economic growth opportunity
  - Opportunity for wind to support green hydrogen
- Wind positioning and website development
- DoC relationship
- Wind farm technician programme fully implemented

RM System Reform

The Positives

- Recognition the RMA / NPS Renewable Electricity Generation are not effective
- Reform objectives – better enable development within limits, adapting to climate change and improving system efficiency and effectiveness
- Recognition of the need for a long term and integrated strategic approach with greater national direction and fewer plans

NZWEA and Industry Concerns

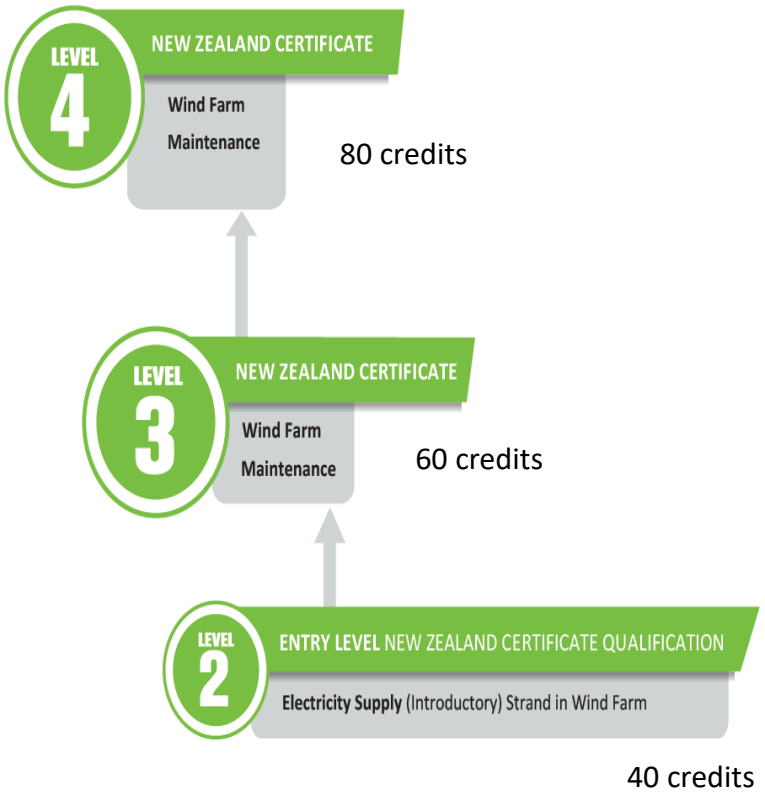
- Risk of inappropriately set environmental limits which are absolute in their application
- Number and nature of outcomes creates a natural tension that will require effective conflict resolution provisions
- Mis-alignment of environmental, energy and climate change targets and policies

Industry Engagement

- Unified programme of activity by major generators and NZWEA
- Included legal, environmental and market implications of restrictions on development
- Industry seeking a policy pathway that provides an exception to limits and strengthening outcomes relating to climate change
- Positive engagement with Ministers and Officials
- Draft Bills (November) and revised NPS-REG (December) will be the test of effectiveness

Industry Training

- Development of the Certificate in Wind Farm Maintenance
- 3 levels - combining mechanical, electrical and hydraulic competencies
- Developed with Connexis / Waihanga
- Level 3 (maintenance) and level 4 (Repair) NZQA approved
- Unit standards developed
- Learning and assessment resources being developed
- Registration of assessors underway
- Release of programmes
  - Level 3 programme - April 2022
  - Level 4 programme - July 2022
  - Level 2 programme - July 2022 / Feb 2023
- Key opportunity to future proofing technician capability



Summary

- Wind energy recognised as key to decarbonising the NZ energy sector
- Outlook exciting but there are risks to manage:
  - Demand growth / renewables transition and ensuring security of supply
  - Turbine and shipping cost pressures evident
  - Supply implications of European energy plan
  - Timely investment in a development pathway and ability to obtain consents
  - Transmission capacity and pricing
  - Rapid growth of grid scale solar
- Opportunities
  - Enhancing the environment to support onshore and offshore wind development
  - Consideration of a higher renewable electricity target as an export opportunity



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Thank you



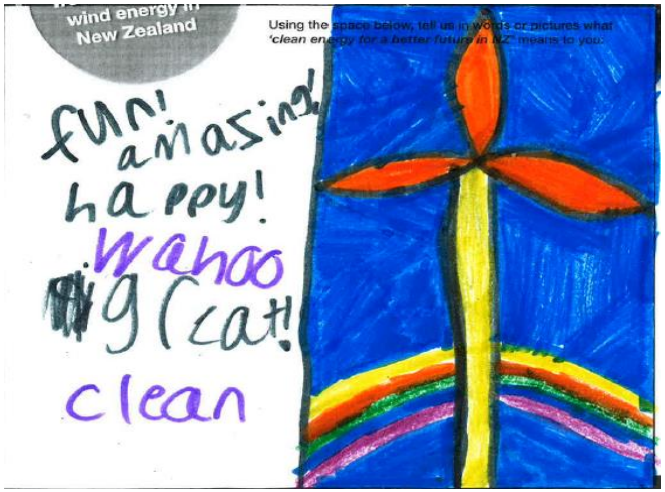
Previous year's slides

Summary

- Outlook - positive
  - Increased activity and investment
  - Zero Carbon Act
  - Wind recognised as essential to decarbonisation
  - Development of a wind PPA market
- But a number of risks to manage
  - Tiwai exit and timing of demand growth
  - RMA uncertainty – NPS Freshwater management, NPS indigenous biodiversity, strengthening NPS renewable electricity generation
  - Regulatory delays – transmission pricing
  - Sustaining health and safety performance
  - Ensuring technical skills to support growth
- International growth positive – NZ's second development wave underway
- Thank members for continued support

NZ Regulatory Landscape

- Zero Carbon Act live
  - Net Zero greenhouse gases by 2050
  - Except methane 24 - 47% below 2017
  - CCC's first 5 year budget submitted May 2021
- Multifaceted regulatory programme underway
  - Electricity Price Review ongoing
  - Accelerated Renewable Energy and Energy Efficiency Strategy
  - Electricity Authority work programme
  - RMA reform
  - NPS / NES Freshwater Management
  - Draft NPS Indigenous Biodiversity
  - ETS Reform Act and regulations
  - Transmission Pricing Methodology
  - Climate related financial disclosures



NZ development update

- 19 Windfarms, 690MW of installed capacity, around 60% grid connected
- Last build 2014 – around 5% of total generation
- Over 2,000MW of consented sites, not all will be built
  - Restrictive consents and need for transmission
- Growth restarted in 2019
  - Turitea and Waipipi committed
  - $740m investment, 1,300 GWh output
  - 180k homes or 580k EV’s

- Future options - Mt Cass (93MW), Harapaki (160MW), Taumatatotara
- Consent applications - Kaimai (100MW), Kapuni Green Hydrogen Project (16MW) and repowering Tararua 1 (72 MW)
- MEUG members’ tender to support new renewables development
  - Potential for over 700 GWh, subject to negotiation

A challenging investment environment but…

- Many uncertainties
  - Long term COVID-19 impacts
  - Demand - NZAS decision, NZ Refining, Norske Skog and NZ Steel reviews and slow demand growth
  - Transmission pricing effects – new builds and congestion charge
  - Changing generation / merit order dynamics
  - Ability of generators to gain consents and contract output
  - Industry transformation - digitalisation, decentralisation and decarbonisation
- Need to recognise the scale of new wind development required
  - Transpower forecasts a 10x increase in capacity - 0.6 to 6 GW by 2050
  - Finding and securing wind farm sites
  - Ensuring trained wind technicians available
  - Wind's alignment with Net Zero Grid Project
- But…an outstanding wind resource
  - Generation Stack update – 82 projects totalling 11,400 MW plus offshore potential

Areas of Focus…

- Industry training - NZ certificate in wind farm maintenance
- Wholesale market depth, products and duration
  - Better support independent generators
- Positioning of off-shore wind
  - A longer term option
- On-going regulatory risk
  - Impact of NPS / NES Freshwater Management
  - Draft NPS for indigenous biodiversity
- Information availability for all fuel types
  - Replicate hydro storage for gas and wind
- Real time pricing
  - Supports innovation and participation (dispatch-lite)