

Clutha Upper Waitaki Lines Project – Invitation to Comment

NZ Wind Energy Association Submission

May 2020



Transpower

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Introduction

1. The New Zealand Wind Energy Association (NZWEA) welcomes the opportunity to provide comments on progressing the Clutha Upper Waitaki Lines Project (CUWLP).
2. In June 2010, the NZWEA wrote to the Electricity Commission in support of Transpower's Lower South Island Renewables Investment Proposal on the basis the project enabled the potential connection of new renewable generation and would assist with security of supply in the Lower South Island.
3. In the CUWLP invitation to comment document Transpower notes there are a number of factors in seeking industry view on whether to proceed with the project at this time. They include:
 - The lead time lag to complete the grid upgrade should the Tiwai Aluminium Smelter close or materially reduce demand.
 - That current transmission constraints disincentivise any potential renewable generation developments in the lower South Island.
 - Increasing the transmission capacity for southward power flow during periods where there is low generation in the Otago–Southland region.
 - That two CUWLP sections are ready to be developed, with a pre-set regulatory pathway, which would support New Zealand's infrastructure investment economic response to the COVID-19 pandemic.
4. The Association's purpose is to promote the development of wind as a reliable, sustainable, clean and commercially viable energy source and in this submission NZWEA's focus is on the effects of the CUWLP in enabling a strong grid that supports renewables development.
5. The Association also considers the wider opportunity for strategic grid investment as a key component of New Zealand's economic recovery package and the opportunity to bring forward investment that enables a low-carbon future.
6. NZWEA supports progressing CUWLP as the project facilitates the development of renewable energy in the lower South Island and economic recovery.

Executive Summary

7. NZWEA notes that the decarbonisation of the energy sector is forecast to result in significant growth in electricity demand enabled by renewables development, predominately wind energy.
8. The Otago-Southland region contains an excellent wind resource including two consented wind farms identified as having high potential for development.

9. NZWEA considers a strong grid, with open access that avoids congestion and constraints, fosters competition and ensures lowest cost development options can be progressed to the benefit of end consumers.
10. The Association also recognises the need for infrastructure spend, in support of a COVID-19 economic recovery package and that investment prioritisation should include applying a climate change lens.
11. NZWEA supports the proposed investment in progressing the two further sections of CUWLP as the project:
 - Facilitates the development of a valuable renewable electricity generation resource in the Otago-Southland region including two consented wind farms.
 - Provides economic stimulus and employment.
 - Removes a constraint for renewable generation to flow north and for southward transfer at times of low hydro generation.
 - Is considered by Transpower as one of 7 major interconnection upgrades required to build a low carbon infrastructure and is “shovel ready” for development.
12. Progressing CUWLP now will reduce necessary spending in the future while creating new jobs, reducing emissions and building an economy resilient to climate change impacts.
13. The Association notes that under the current transmission pricing methodology (TPM) the cost of CUWLP is treated as an interconnection charge to load customers.
14. Adding cost to load customers at a time of economic hardship is unfortunate particularly when the Electricity Authority has confirmed a new transmission pricing methodology will be introduced which shares costs more widely.
15. The Association would therefore like to see consideration given to an alternative funding mechanism which could be by way of deferred charging until the revised TPM is introduced or preferably the project being considered as part of the Government’s COVID-19 economic recovery infrastructure package supporting the energy sector.
16. The concept of an energy sector climate support package could be extended to advance the designation and design of several of the other 10-15 large grid upgrade projects identified by Transpower, particularly those required over the 2020-2025 period.
17. The sustained level of infrastructure development in the electricity sector, to support New Zealand’s net zero carbon goal, requires planning with a strong sense of implementation urgency. Proceeding with CUWLP today enables delivery of one more essential component.

Electricity Sector Outlook

18. Recent reports by the Productivity Commission ¹, Interim Climate Change Committee (ICCC) ² and Transpower ³ have highlighted the essential role renewable electricity generation has in meeting the Government’s target of net zero emissions for greenhouse gases, other than biogenic methane (The Zero Carbon Act) by 2050 and the aspirational goal of having 100% of our electricity produced from renewable sources by 2035 in an average hydrology year.
19. Transpower in its most recent update Whakamana i Te Mauri Hiko ⁴ provides further analysis of the electricity demand growth trajectory and the scope of investment required

¹ Productivity Commission, Low-emissions Economy Report, August 2018.

² ICCC Accelerated Electrification Report, April 2019.

³ Transpower, Te Mauri Hiko White Paper, March 2018.

⁴ Transpower, Whakamana i Te Mauri Hiko, Empowering our Energy Future, March 2020.

with the forecast base case “accelerated electrification” increase in electricity generation of 68% by 2050 to 70TWh.

20. While a reduction in the growth outlook from the previous Te Mauri Hiko Report issued in 2018, there is now broad consistency with the assumptions and modelling from the ICCC, MBIE and Productivity Commission.
21. In addition to enabling emissions reduction through electrification Whakamana i Te Mauri Hiko also highlights that a renewables future has significant consumer affordable benefits with the Report forecasting that the average household energy bill is expected to decline by 27% in real terms by 2035.

Role of Renewables and Wind Energy

22. Future electrification is dependent on the development of renewable electricity from both low-emissions and cost advantage perspectives.
23. Increases in geothermal, but particularly wind and solar, generation are the predominant source of new electricity supply.
24. The cost of wind energy has significantly reduced due to the investment in technological improvements and economies of scale from wider deployment. New Zealand has clearly benefited from these trends. In addition, New Zealand has been uniquely advantaged in having an excellent wind resource and a high level of flexible hydro generation to lower the cost of supporting wind’s variability.
25. Wind energy is generally regarded as having the lowest long run marginal cost of new generation in New Zealand and in most other geographies.
26. In addition to Whakamana i Te Mauri Hiko, wind energy is therefore widely regarded as key to meeting New Zealand’s climate change aspirations as well as supporting the energy trifecta. As the ICCC stated: ⁵

The modelling suggests wind will be the dominant form of new renewable generation out to 2035. This is because New Zealand has an abundance of quality wind-farm sites, and wind is the lowest-cost form of new generation.

27. The ICCC further noted the need to provide for the development of wind generation at scale:

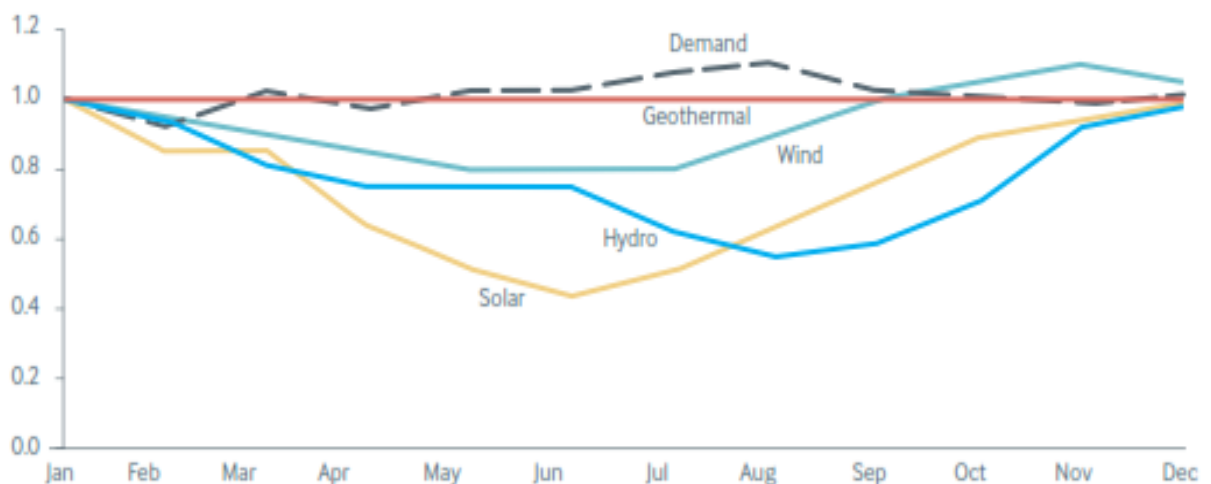
New wind generation (and its associated transmission and distribution infrastructure) will play a vital role in achieving emissions reductions. The modelling indicates that around 2,600 MW would be built in an accelerated electrification future – four times more than is currently in the system.

28. Wind generation, on a seasonal ⁶ and annual basis is consistent, but it does vary over short periods of time. Over 50% of wind’s annual generation is in the all-important second and third quarters when demand is highest and impact most felt when there is a dry year hydro shortage.
29. Transpower’s presentation at the 2019 Wind Energy Conference ⁷ included the following graph which highlights the seasonal generation profile of renewables:

⁵ ICCC Accelerated Electrification Report, section 6.2.

⁶ Quarterly averages over 5 years to end 2019 – March 23%, June 25%, September 26%, December 26%.

⁷ What’s Transpower doing to prepare for our energy future, Stephen Jay. http://www.windenergy.org.nz/store/doc/What-Transpowers-doing-to-prepare-for-our-energy-future_Stephen-Jay-Transpower.pdf



30. As more wind farms are built in geographical locations subject to different weather patterns variability will further reduce. Wind is therefore ideally placed to work with existing hydro generation and contribute to meeting New Zealand’s energy needs for the peak winter demand period.
31. The future replacement of thermal generation with renewables is expected to enable a significant growth in demand without price increases. As Credit Suisse noted in their 2018 Report: ⁸

Normally, prospective demand growth should elicit a boost in valuations – but in this case we believe risk may be skewing towards lower electricity prices. On our assessment of cost for new wind projects, we see a strong risk the long run price outlook will decline even if carbon prices rise. Price will remain the most important driver of sector valuations (as opposed to generation volume growth or new project NPVs).

32. The importance of additional wind generation and, particularly wind generation dispersed across New Zealand in different regions, along with the flexibility of hydro generation to support variability and peak demand is key to achieving the energy trilemma of an affordable, secure and climate friendly electricity system.

Renewable Electricity Generation Opportunities in the Lower South Island

33. The Otago-Southland region has an excellent wind resource which was documented in the Economic Wind Resource Study undertaken by Connell Wagner in 2008. That study identified 3,780MW of tranche 1 sites that have a high wind speed and more favourable wind regime or more favourable construction cost.
34. There are currently two consented wind farm developments in the region - Kaiwera Downs (240 MW) and Mahinerangi stage 2 (160MW).
35. The 2020 Wind Generation Stack Update Report ⁹ identified 2,125 MW of wind generation in the Otago-Southland region. The Report noted that the objective of the study was to identify projects greater than 100 MW and that the actual potential is likely to be greater than identified.

⁸ Credit Suisse NZ Electricity Generators: Decarbonisation beckons – but at what price? August 2018 summary.

⁹ Ministry of Business, Innovation and Employment, Wind Generation Stack Update prepared by Roaring40s Wind Power, March 2020.

36. The Wind Generation Stack Update also sought to identify the best wind farm prospects to deliver 2,500 MW of new generation between 2020 and 2030. A total of 16 sites were identified which included both Kaiwera Downs and Mahinerangi stage 2.
37. While uncertainty over the continued operation of the Tiwai smelter will potentially limit wind development in the short term without a transmission upgrade, longer term demand growth is forecast to require new wind farm development in the region.
38. The development of consented and potential wind farms in the Otago-Southland region will therefore be an important contributor to New Zealand low-emissions energy future.

Importance of a Strong Transmission Infrastructure

39. NZWEA considers a strong grid with open access that avoids congestion and constraints fosters competition and ensures lowest cost development options can be progressed to the benefit of end consumers.
40. A strong grid also supports efficient power flows for existing generation and limits regional pricing variations.
41. It is also widely recognised that a flexible power grid is needed to support the variability of renewables. The Global Wind Energy Council recently issued a statement¹⁰ calling for action to ensure that adequate investment flows towards critical infrastructure, including power systems and grid infrastructure.
42. The Australian renewable energy development experience highlights the importance of ensuring well planned grid investment:
 - Once the Renewable Energy Target was implemented a development and construction boom started which has lasted the last few years. The Australian Energy Market Operator (AEMO) was quickly overwhelmed with the large volume of connection applications it received and this caused significant delays to projects achieving financial close through lack of resources.
 - A large number of wind and solar projects were constructed in a short period which highlighted significant system strength issues in the grid and forced AEMO to make some rule changes and require projects to provide synchronous condensers (very old technology) in areas where system strength was an issue. This also delayed registration of projects under construction and contributed to some of the contractor insolvency issues that were experienced as contractors had typically accepted the risk of completing grid connections.
 - The Transmission Network Service Providers (TNSP's) have progressed a number of network augmentation projects to increase capacity on the network and assist with system strength issues such as new interstate connectors and augmentations such as the north-west Victoria which has seen a lot of new generation in a weak part of the network. However, the approvals process for these regulated assets has been very slow and could have been advanced ahead of the renewables build out with more foresight
 - The TNSPs and state governments have started to become more proactive in strategic grid investment with the major TNSPs now progressing plans for Renewable Energy Zones: significant transmission hubs in strategic locations with good resources but limited network to allow bulk new renewables to connect to the grid
43. Australia is a cautionary example of what can happen when renewables development outpaces transmission upgrades.

¹⁰ GWEC Statement wind power a cornerstone of the global economic recovery - <https://gwec.net/wp-content/uploads/2020/05/Untitled-design-41.png>.

44. Transpower's Whakamana i Te Mauri Hiko Report forecasts nearly 60% of New Zealand's total energy requirements will be from electricity in 2050, up from 25%. Such an increased level of dependence on electricity requires a strong and resilient national transmission infrastructure.
45. The expected increase in wind and solar generation combined with hydro's variability and dry year risk, means the grid must be able to accommodate highly variable power flows which can vary significantly north to south and south to north depending on hydrology.
46. The challenge is to ensure investment occurs in a timeframe that supports demand growth and new investment in power stations.

The Opportunity to Prepare for New Zealand's Low-emissions Future

47. The call for infrastructure spend, in support of a COVID-19 economic recovery package, to be assessed with a future focused climate change lens is widespread.
48. In a letter to the Hon James Shaw the Chair of the Climate Change Commission ¹¹ noted that an economic stimulus package can either speed up or stall progress on climate change. The Chair offered several principles for the Government to use in decisions to help deliver an economic recovery that keeps New Zealand on track to achieve climate change goals. The principles include considering how stimulus investments can deliver long-term climate benefits and to bring forward transformational climate change investments that need to happen anyway.
49. The Commission noted that the Government will achieve multiple wins if the investments it makes in the coming months can reduce necessary spending in the future while creating new jobs, reducing emissions and building an economy resilient to climate change impacts. Accelerating these essential investments will improve cumulative gains to the economy, society, and the environment.
50. NZWEA supports the view that accelerated economic recovery infrastructure spend should also assist New Zealand's transition to a low-emissions economy.
51. In the energy sector the key areas of opportunity are in the electrification of the transport and industrial heat sectors to reduce fossil fuel use, further promoting energy efficiency and developing critical energy sector infrastructure such as the transmission grid to ensure future preparedness.

Timing of Investment in the Transmission Grid

52. Whakamana i Te Mauri Hiko includes details of investment in transmission and expected timeframes which recognise forecast increases in demand and North Island thermal retirements.
53. The level of investment proposed is significant including that by 2035 approximately 40 new power stations and 10-15 large grid upgrade projects will be required.
54. The forecast work programme will require design and designation and has been staged by Transpower to optimise investment timeframes to minimise end consumer cost.
55. Transpower has advised that the completion of the second tranche of CUWLP is ready to go because of funding provided by Meridian and Contact to complete enabling activities.
56. The CUWLP has been identified as one of 7 major interconnection upgrades required by Transpower and therefore is a "shovel ready" project that brings forward a key investment necessary to support the need for a significant increase in renewable generation irrespective of the Tiwai Smelter decision on whether to continue operations.

¹¹ Letter from Rod Carr, Chair Climate Change Commission, 7 April 2020.

57. NZWEA considers the opportunity to progress construction of transmission enhancements that supports both New Zealand's economic recovery and future proofs essential energy sector infrastructure has merit.
58. The timing of CUWLP, in the Association's view, should therefore be considered both on a probabalistic basis of a Tiwai exit or load reduction and advancing infrastructure investment that supports economic recovery and a low carbon future.
59. The Association also considers that consideration should be given to advancing designation and design of transmission infrastructure identified as required to ensure the grid can support the forecast growth in electricity demand as this meets the test of accelerating essential investments that will improve cumulative gains to the economy, society, and the environment.

Cost of CUWLP

60. Transpower has noted that Meridian and Contact have provided funding of \$10m which has enabled work to advance the second tranche of CUWLP to the point where the project if commenced shortly can be completed by winter 2023.
61. Under the current transmission pricing methodology the cost of phase 2, estimated at \$92m, would be recovered by way of an annual interconnection charge of \$4.6m to load customers.
62. Under proposed transmission pricing with, a benefits based charge, Meridian and Contact would be required to share the cost of the project in addition to the \$5m that each company has already paid for preliminary works which are being treated as "customer contributions" and therefore not included in transmission charges.
63. The cost of CUWLP would also be expected to be shared by any new generation built in the Otago-Southland region.
64. Adding cost to load customers at a time of economic hardship is unfortunate particularly when the Electricity Authority has confirmed a new transmission pricing methodology will be introduced which allocates costs more widely.
65. The Association would therefore like to see consideration given to an alternative funding mechanism which could be by way of deferred charging until the revised TPM is introduced or the project being considered as part of the Government's COVID-19 economic recovery infrastructure package.
66. NZWEA also notes that advancing designation and design of transmission infrastructure, identified as required to ensure the grid can support the forecast growth in electricity demand, could be included as part of an COVID-19 economic recovery infrastructure for the energy sector.

Assessment of CUWLP

67. Completing the second tranche of CUWLP was approved by the Electricity Commission in 2010 after extensive consultation.
68. Transpower has assessed dispatch benefits of avoiding transmission constraints should the electricity generation be able to be transported north. In situations where the load at Tiwai is reduced the benefit is shown to exceed capital and operating and maintenance costs of completing the two sections.
69. Transpower has noted that there are issues with the southward power flow during periods where there is low generation in the Otago-Southland region and it appears that these have not been included in the calculation of benefits.
70. The Association considers there are longer-term efficiency benefits from enabling low cost renewable generation developments in Otago-Southland. The Wind Farm Stack Update

has assessed the two consented wind farms in the region, Kaiwera Downs and Mahinerangi stage 2 in the 2020 as key wind farms for development in the period between 2020 and 2030.

71. There are also associated benefits in terms of emissions reduction from the displacement of thermal generation.
72. It is noted that should Tiwai reduce load or cease operations the benefits of CUWLP are clear and these have been identified in Transpower's consultation document.
73. NZWEA supports the proposed investment in progressing the two further sections of CUWLP as the project:
 - Supports the development of a valuable renewable electricity generation resource in the Otago-Southland region including two consented wind farms.
 - Provides economic stimulus and employment.
 - Improves grid resilience and removes a constraint for renewable generation to flow north and for southward transfer at times of low hydro generation.
 - Is considered one of the one of 7 major interconnection upgrades and is "shovel ready" for development.
74. As noted above the Association would like to see CUWLP implementation and progressing designation and design of other major interconnection projects considered as part of the Government's plans for economic recovery following the COVID-19 pandemic.

About the NZ Wind Energy Association (NZWEA)

- The NZWEA is an industry association that promotes the development of wind as a reliable, sustainable, clean and commercially viable energy source
- We aim to fairly represent wind energy to the public, Government and energy sector
- Our members are involved in the wind energy sector and include electricity generators, wind farm developers, lines companies, turbine manufacturers, consulting organisations and other providers of services to the wind sector
- By being a member of NZWEA you are assisting the development of wind energy in New Zealand and helping to reduce our greenhouse gas emissions to meet climate change targets.

The Association's strategy focuses on three key areas:

- 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.

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