Rewiring Aotearoa submission on a proposed reliability obligation to manage dry-year risk

About Rewiring Aotearoa

Rewiring Aotearoa is an independent non-partisan non-profit, funded by New Zealand philanthropy. It is a registered charity working on energy, climate, and electrification research, advocacy, and supporting communities through the energy transition. The team consists of New Zealand energy, policy, and community outreach experts who have demonstrated experience both locally and internationally. We're always fighting for the New Zealanders who use the energy system, and our goal is to help build a low cost, low emissions, high resilience electrified economy for Aotearoa NZ.

Key messages

New Zealand's electricity market has failed to deliver sufficient contracted dry year risk cover and investment in secure supply. Rewiring Aotearoa strongly supports MBIE to put in place requirements to ensure sufficient dry year backup. This should be delivered through development of long term dry year firming contracts with centralised procurement of sufficient long term dry year investment to meet security standards.

However we do not support the Government's decision to lock in LNG imports as part of this solution - the LNG decision needs further analysis and should not be driving the scope or the design of the regulatory framework. The dry year regulatory framework should be designed to deliver the most cost effective and efficient dry year security solution for energy customers.[1]

As part of the Measures to strengthen the dry year regulatory framework the Electricity Authority will assess and can decide to introduce new standardised long-duration cover contracts to enable customers to manage risk. The Authority should prioritise delivering this action.

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[1] Whilst the details of the funding model for LNG importation is yet to be confirmed publicly, requiring gentailers to cover the cost would simply pass through the cost of a potentially inefficient dry year solution to consumers, pushing up electricity bills. Analysis by Sapere indicates that there are other lower cost dry year solutions. Sapere report: *From Faultlines to Resilience* https://drive.google.com/file/d/1l82-mJzlNrjTTDAct9RhalshXqedU8pN/view?usp=drive_link

A dry year security mechanism is needed that can underwrite physical investment, providing long term revenue certainty (for example over 10+ years) to support investment in sufficient dry year back-up projects. Projects should be selected through a competitive process to deliver the most cost effective dry year solution. Centralised procurement could be delivered via a regulated fund which contracts dry year cover (eg: the fund could be the counter party to a swaption) procured via a competitive process. Costs (which cover the risk that the project is not remunerated in a dry year) could be allocated to all purchasers (large customers that purchase via the wholesale electricity market and retailers) via a volumetric charge in the same way other security services are allocated (for example frequency keeping and voltage support).

We are concerned that the design of the proposed Reliability Obligation may be insufficient to deliver the long term revenue certainty required for physical investment in dry year solutions. The timing set out in the proposed reliability obligations (with investment triggers at five years, three years and within year) and reliance on individual purchasers facing the obligation may risk the following outcomes:

- incremental short term hedging solutions being preferred, which could show purchasers have met the obligation without investment
- a bias toward reliance on thermal fuels.

This means the proposed solution risks under investment in dry year security and may result in inefficient incremental dry year solutions being deployed.

Our preferred solution which involves centralised procurement of dry year back up would not need central management by Government in the same way a Strategic Reserve would. Clearly defined rules about when dry year solutions are dispatched relative to lake levels could be defined to avoid damaging existing investment signals outside of dry hydro periods.

How contracted renewable supply could deliver dry year back up

Contracted dry year back up does not need to be provided by dispatchable thermal generation. The least cost dry year solution could include renewable generation such as solar or wind generation and contracted demand response. All solutions should be able to compete to contribute to the most cost effective dry year solution.

The following points explaining how renewables can be used to firm dry years are taken from the Sapere Report - *From Faultlines to Resilience*, commissioned by Rewiring Aotearoa.[2]

The dry year problem does not emerge overnight, but rather low hydro inflows gradually appear over days, weeks and sometimes months. It is an energy shortfall, much more than a capacity shortfall. As a result, renewables can be used to 'firm' dry years, despite some of them (wind and solar) being intermittent.

There is no technological reason that prevents renewables providing dry year support. The requirement is simply that a sufficient amount of renewables are kept out of the market during non-dry years, and only released into the market when a dry year is starting to emerge. This is precisely the same role that gas and coal play today.

The perceived challenge with renewables is that the vast majority of their cost is up-front capital, with little or no 'fuel' cost. Thermal generation has lower capital cost, but much higher fuel costs. Having committed hundreds of millions to constructing a wind farm or solar farm, it appears counterintuitive to withhold that generation from the market in most years.

However, this paradigm – common in the sector - often fails to recognise that:

- Renewables as a dry-year solution is a question of economic attractiveness, not technological feasibility.
- It is essentially the same challenge faced by LNG or diesel, where up front capital is required ("north of a billion" for LNG), despite the risk that LNG may only rarely be needed to solve the dry year problem.

In many ways, renewables are a better way to solve the dry year problem:

- As a result of the high variable cost of LNG, diesel or coal in dry years (reflecting its scarcity), the incentive is to delay incurring these costs until it is clearer that hydro inflows are trending towards a 'dry year'.
- As a result of the near-zero variable cost of renewables, more precautionary use (i.e. releasing it into the market earlier) has little or no opportunity cost. Hence the price effect of dry years could be reduced, particularly in the early period of a dry year.

Contracted demand response could also play a key role in the design of a dry year solution and should also be considered as it has the benefit of utilising renewable generation outside of dry year sequences, but faces alternative challenges.

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[2] Sapere report: *From Faultlines to Resilience*
https://drive.google.com/file/d/1l82-mJzlNrjTTDAct9RhalshXqedU8pN/view?usp=drive_link

Worked example of renewable dry year cover

To provide an example of how this could work a 800MW wind farm at 40%[3] capacity factor, operating for 10 months could deliver 2.3TWh, meeting most conservative estimates of inflow deviations from average.

The windfarm could contract to provide dry year back up under a 25 year swaption style arrangement as follows:

- When its operation was triggered, the counterparty/s would enter into a contract for difference which would remunerate the windfarm at $310/MWh for its output in the dry year. This price approximates what an open-cycle gas plant would offer in using LNG (at a fuel cost of $28/GJ including carbon). If it operated for the full 10 months, the windfarm would earn around $690M from market revenues in the dry year.
- Assuming this arrangement was triggered once every 7 years, the residual revenue the wind farm owner would require in order to earn an 8% return on capital would be $1.7B. This could be spread over 25 years as an option fee of $160M per annum.
- If this is spread across all current electricity consumption (40TWh), this equates to $3.90/MWh.

There are currently sufficient renewable generation projects in the pipeline to provide firm energy, based on the Electricity Authority's generation pipeline data.[4]

The LNG investment decision requires transparent scrutiny

Rewiring Aotearoa does not support the Government urgently progressing procurement of an LNG import facility. This is because we think there are lower cost solutions to address the dry year problem that have not been adequately considered. The decision making process has not been analytically robust or transparent and has missed credible options.

Lower capital cost investment such as more diesel storage and conversion of existing gas peakers to run on gas or diesel would be a lower risk bridging solution to the near term dry year problem, with contracted renewables and demand response delivering the majority of dry year backup in the medium to long term.[5]

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[3] A conservative capacity factor could be assumed to define dry year energy supply from wind, to reflect the possibility of lower than average wind avoiding risk of under supply in a dry year.
[4] https://www.ea.govt.nz/data-and-insights/charts-and-dashboards/generation-investment-pipeline/
[5] Sapere report: *From Faultlines to Resilience* https://drive.google.com/file/d/1l82-mJzlNrjTTDAct9RhalshXqedU8pN/view?usp=drive_link

We agree with the Treasury and the Infrastructure Commission's advice to MBIE,[6] that recommends "allowing time for a fuller analysis of options and procurement." We think this should include greater market testing of other proposals and how the LNG decision interacts with decisions on the regulatory framework for dry year risk. In the context of this consultation the LNG decision should not be used as a reason to exclude options which could otherwise provide optimal outcomes for customers.

Response to a selection of questions

Q1. Do you agree with the analysis in this chapter of why New Zealand does not currently have sufficient dry-year firming? If not, where do you disagree?

Yes with changes. Contracted dry year back up does not need to be provided by firm dispatchable generation. The most cost effective dry year solution could include renewable generation such as solar and wind (which is only made available in dry periods) or contracted demand response and all of these options should be able to compete to deliver the most cost effective dry year solution. See section above on "How contracted renewable supply could deliver dry year back up".

Q2. What do you consider to be the principal remaining barriers to investment in additional dry year firming following the recent reforms to improve fuel adequacy (Government procurement of an LNG importation facility)?

We strongly disagree with the Government's rushed decision to force electricity users (via gentailer cost pass through) to pay for LNG imports. Analysis by Sapere suggests this may not be the most cost effective option to address the dry year problem.[7] It will force electricity users to take on significant costs and risk further costs, which is not in their best interests. A transparent process with sufficient and robust analysis should be undertaken to assess whether LNG imports are the best pathway for New Zealand and analyse who would be the beneficiaries of such an investment. We strongly support the advice the Infrastructure Commission provided MBIE, that was released under OIA that recommends "allowing time for a fuller analysis of options and procurement." See the section above "*The LNG investment decision requires transparent scrutiny*" for further details.

Renewable generation could play a key role in dry year firming with imported fuels utilised in existing thermal plant providing a short term bridge. Barriers to investment for dry-year projects exist due to a lack of revenue certainty. As we

[6] OIA26-TW13
[7] Sapere report: *From Faultlines to Resilience*
https://drive.google.com/file/d/1l82-mJzlNrjTTDAct9RhalshXqedU8pN/view?usp=drive_link

move to a highly renewable electricity system, dry year investment will provide generation primarily or solely during dry year periods. With high risk associated with revenue from dry year operation this makes dry year projects difficult to finance without contracted revenue certainty.

Q3. Do you agree that, despite the recent reforms to improve fuel adequacy, information, roles and tools, further measures are still needed to strengthen incentives to invest in dry-year firming? If not, please explain why not?

Yes. Development of firm-energy contracts that unlock dry-year investment is needed with centralised procurement of sufficient dry year back-up.

In response to questions regarding the design of the reliability obligation, including Q5, Q6, Q9, Q14, Q15, Q20, Q21, and Q24, please reference our "Key messages" section above which outlines our preferred solution which involves centralised procurement of dry year cover.