Submission on the Energy Demand and Generation Scenarios (EDGS) 2023

Contact details

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Release of information

Please let us know if you would like any part of your submission to be kept confidential.

☐ I agree to be contacted by MBIE about any points I have raised or obtain more information about the content of my submission.

☒ I agree to having quotes from my submission included in the compiled list of next steps.

☐ I would like to be contacted before the release or use of my submission in the compiled list of next steps that will be published by MBIE after the consultation.

☐ I would like my submission (or identified parts of my submission) to be kept confidential, and **have stated below** my reasons and grounds under the Official Information Act that I believe apply, for consideration by MBIE.

I would like my submission (or identified parts of my submission) to be kept confidential because…
[Insert text]

[To check the boxes above: Double click on box, then select 'checked']

Responses to questions

Instructions for completing this submission template:

- Check relevant box by double clicking on the box, then select 'checked'
- Some questions have sub-parts
- Add any additional comments
- Respond to any or all questions as relevant

Introduction

1 a) Do you agree with the stated purpose of EDGS? (Please select one)

☒ Yes ☐ No ☐ Don't know

b) Why, or why not?

Planning for future demand will be critical to the successful transition of Aotearoa New Zealand to a carbon free economy and a potential exporter of power.

2 How do you use EDGS?

We refer to the forecasts of future electricity demand and generation supply and consider these alongside forecasts by other agencies and our own market intelligence to assess potential future market conditions.

There is useful information in the EDGS but we do not rely on them in isolation as we believe the most recent forecasts have understated both the volume of electricity that will be required in New Zealand in coming decades and the opportunities being explored by developers of new renewable generation.

The market is moving very quickly at the moment – which is why our answer to the next question is "annually".

3 a) Do you agree with the frequency of the EDGS? (Please select one)

☐ Yes ☒ No (please elaborate below) ☐ Don't know

b) If NO, how frequently do you think it should be?

☒ Annually ☐ Every two years ☐ Every three years ☐ Other (please specify)

Scenarios

4 Does the set of four scenarios adequately explore the potential future states that you think will be important? (Please select one)

☐ Yes ☒ No ☐ Don't know

5 a) Is each scenario's story internally consistent and coherent? (Please select one)

☐ Yes ☒ No ☐ Don't know

b) If NO, why not?

The Reference Scenario notes that trends continue at their current pace – the phrase "current pace" is ambiguous. Is this the current pace of the last ten years or the last one year

or somewhere in between? Recent changes have been so quick that what happened five years ago is no longer relevant e.g. electric vehicle sales have rapidly increased, green hydrogen production is about to commence and much more is being planned, offshore wind is being encouraged and is being explored by several developers, and Transpower had over 100 new generation enquiries in 2022.

6 a) Are there other aspects that should be considered in our scenario planning? (Please select one)

☒ Yes ☐ No ☐ Don't know

b) If YES, please write here:

Based on our understanding of the likely future demand for renewable electricity in Aotearoa New Zealand all four scenarios are pitched too low in terms of how they describe the influences on the potential demand for electricity.

We suggest there are greater risks to energy planning from having the scenarios underestimate electricity demand than there are from having them pitched at a higher level. It is easier to delay or not build new generation and transmission assets than it is to create these ahead of demand. However, it will be highly advantageous to have infrastructure ready when needed than to try and build it quickly when demand begins to exceed expectations.

The Constraint Scenario is highly unlikely and should ideally be removed. It should be replaced by a new Rapid Transition Scenario with much higher electricity demand and higher direct use of electricity. This new Rapid Transition Scenario would include widespread development of Power to X manufacturing including producing green hydrogen for use in heavy road transport, aviation (both for direct use and producing sustainable aviation fuel), marine transport (to produce green methanol or ammonia), manufacturing (as feedstock for urea and methanol production) and for energy storage (in hydrogen peaker plants, pumped hydro, molten salt, etc).

Some of these Power to X opportunities should also be included at lower levels in the wording of revised Reference, Growth and Innovation Scenarios.

Including large-scale Power to X manufacturing in the EDGS will enable Transpower to plan for it, and companies to move ahead with reasonable confidence that the sector's development is recognised and being enabled by the Government.

We note that there is a discussion of green hydrogen later in the consultation document. It should be integral to the EDGS and not what feels likes an "add-on" at the end of the document. We suggest you do not need to wait for the New Zealand Hydrogen Roadmap to be completed. Green hydrogen production and wider Power to X manufacturing should be part of the scenarios now.

Key assumptions

7 Do these assumptions align with the four scenario definitions? (Please select one)

☐ Yes ☐ No ☒ Don't know

8 a) Do you agree with these assumptions? (Please select one)

☐ Yes ☒ No ☐ Don't know

b) If NO, please explain or add any specific changes to the table provided below.

If you wish to provide alternative assumptions from those we have identified, please fill out the cells in the table below.

There need to be assumptions about the update of green hydrogen – for heavy road transport, aviation, marine and for use in industry. It is likely to be the single biggest new demand for electricity and has to be considered. The forecasts for aviation alone (as reported to MBIE by Castalia) are for over 60TWh of electricity by 2050.

The assumptions on demand-side-response also need to be increased for the Growth and Innovation scenarios to take into account the demand-response opportunity provided by green hydrogen production.

	Variable	Reference	Growth	Constraint	Innovation
General	Carbon price *(NZD / t CO_2-e)*				
	Crude oil price *(USD / barrel)*				
	Exchange rate *(NZD/USD)*				
	Real discount rate				
	GDP				
	Population				
Electricity generation	Gas availability for electricity generation[1]				
	Cost of wind generation				
	Cost of grid solar generation				
Technology uptake	Residential solar PV				
	Electric vehicles				
Electricity demand	Peak demand				
	Demand-side response				
Energy demand	Energy efficiency improvements				

[1] This is how much natural gas is available for electricity generation, not actual levels of usage

9 a) Do you agree with these process heat assumptions? (Please select one)

☐ Yes ☐ No ☒ Don't know

b) If NO, why not?

10 What mix of electricity and biomass should we be assuming for process heat fuel-switching in each of our scenarios? Please fill out the table supplied below.

Please fill in what percentages of electricity and biomass you think should be used for process heat in each scenario.

Fuel type	Reference	Growth	Constraint	Innovation
Electricity	100%	100%	100%	100%
Biomass	0%	0%	0%	0%

11 What do you think we should be assuming for the **future activity** of large energy users involved in specific industry process heat applications in each of our scenarios?

There should be recognition of the opportunities for New Zealand to transition both methanol and ammonia-urea production to Power to X manufacturing using green hydrogen as a key feedstock. This process is already underway by Ballance Agri-Nutrients. Methanex has also announced it is exploring the use of green hydrogen, and FirstGas is planning to convert the gas network to a blend of green hydrogen and fossil gas.

12 What do you think we should be assuming for the **closure** of large energy users involved in specific industry process heat applications in each of our scenarios?

Based on what we are seeing at the moment Tiwai Point is likely to stay, Ballance Agri-Nutrients has begun the transition to utilising green hydrogen and Methanex has also announced its interest in being supplied with green hydrogen.

The scenarios should certainly include these industries staying in New Zealand – with the higher scenarios showing them expanding. Local production of urea can replace imported urea while there will be large new demand for green methanol for shipping.

13 a) Do you agree with our approach to the possible closure of Tiwai Point? (Please select one)

☐ Yes ☐ No ☒ Don't know

b) If NO, why not?

Generation stack

14 What timeline do you believe we should use for the **refurbishment** of existing plants?

As soon as practicable.

15 What timeline do you believe we should use for the **retirement** of existing plants?

As soon as practicable.

16 a) Do you feel your views on the refurbishment or retirement of plants would be affected by scenario? (Please select one)

☐ Yes ☐ No ☒ Don't know

b) If YES, please provide details.

17 If you know of any additional plants that need to be considered, please provide information below.

Don't know.

18 a) Do you agree with our definition of potential plants? (Please select one)

☐ Yes ☒ No ☐ Don't know

b) If NO, why not?

There are at least five offshore wind developers who have plans to develop projects. These projects should be considered as potential plants and replace the two generic plants noted in the Appendix.

We note your comments on offshore wind but suggest that the projects are larger and more likely than suggested.

19 a) Do you agree with what we have presented in Table 4 in Appendix A of the Consultation document around generic plants? (Please select one)

☐ Yes ☒ No ☐ Don't know

b) If you have amendments or additional information, please provide details below.

As noted, proposed offshore wind projects should be treated as potential plants.

20 a) Given the information presented in the Generation stack section and Appendix A of the Consultation document, are there any other generation types that we are missing from our generation stack? (Please select one)

☒ Yes ☐ No ☐ Don't know

b) If YES, please specify.

Both wave and tidal generation are missing – but are at best only "potential" plants and many years away.

Views on new and emerging technologies

21 How do you envision the cost for new technologies changing in coming years?

Despite the recent increase in costs following the Covid pandemic the long-term downward trend in costs for many technologies such as solar and wind generation (including offshore wind) is expected to continue. Green hydrogen production costs are also trending downwards and efficiencies in using hydrogen are increasing.

Most forecasts made 10-15 years ago underestimated the cost reductions and efficiency improvement in these technologies. With the massive support for renewable energy development being made by many Governments including the USA and the EU investments

in technology improvements is only going to increase. The costs per MW of these technologies will continue decreasing.

22 What do you think the uptake will be like for these new technologies?

The increasing investment will enable ongoing cost reductions higher than what MBIE is likely to include in the scenarios. The outcome will be that the current scenarios underestimate the rate of development and the growth in demand for these technologies. Uptake will be greater and faster than MBIE has previously forecasted. This supports our argument that the scenarios should be upgraded to higher levels of demand for electricity.

23 How do you believe New Zealand's green hydrogen industry will develop between now and 2050? What role will hydrogen taken in our electricity system in this time?

New Zealand's green hydrogen sector will develop massively between now and 2050. The key opportunities are already well known:

- As a direct fuel for heavy road transport and aviation
- As a feedstock for green fuels such as ammonia or methanol for shipping, and sustainable aviation fuel for aircraft
- As a feedstock for producing industrial chemicals including methanol, ammonia and urea fertiliser
- As a medium to long term energy store (either hydrogen or a derivative product such as ammonia) that can be used to help balance the electricity system

We note that these opportunities involve production for domestic markets (albeit in part to supply international shipping and aviation transiting through New Zealand). There is potential for export of green hydrogen to occur but this is less likely than the domestic opportunities outlined above.

Green hydrogen will become the major consumer of renewable electricity in New Zealand. By 2050 the demand from both aviation and shipping for green hydrogen or derivatives will be at last as much as New Zealand's total current electricity generation.

Green hydrogen has a critical role to play in balancing the future electricity system - which will become increasingly challenging due to the increasing proportion of the market that will be serviced by variable renewable generation such as wind and solar. There are three roles green hydrogen will play to achieve this:

- Green hydrogen production will provide large scale demand response capabilities. Production can be turned up or down very rapidly.
- Green hydrogen production can effectively harness variable renewable generation which might otherwise be curtailed. This will provide additional revenue for generators and help to underpin the viability of new generation projects.
- As already noted above green hydrogen (or its derivatives) can be stored for long period of time without losing energy. Green hydrogen is also a scalable energy store – from small scale storage in tanks to grid scale storage (potentially in geological formations such as depleted gas fields).

The expected growth in green hydrogen production will also play a key role in seeding the development of new generation projects in New Zealand.

It was noted earlier in this submission that the opportunity for green hydrogen and related derivatives (Power to X) should form part of the scenarios modelled by MBIE.

Next steps

24	Which of the below products would you find MOST beneficial? Please rank them from 1 (most beneficial) to 4 (least beneficial).
	3 **Electricity Generation Investment Opportunities Report** 4 **Energy Outlook** 1 **Generation Stack Report** 2 **Levelised Cost of Electricity Generation (LCOE)** [To edit the rankings above: right click on the field "1, 2, 3 or 4", then select 'Update Field']

Additional feedback

25	Do you have any additional feedback that you would like to provide on the EDGS or the options we have proposed? If yes, please provide below.
	We wish to reinforce the real and major risks from the scenarios being pitched too low. This flows into both Transpower's planning and the Commerce Commission's assessment processes. The most recent EDGS were pitched too low in terms of overall future electricity demand and disregarded trends in the wider energy markets and what needs to be done to achieve net zero by 2050. The flow on effect is that the electricity grid will not have sufficient capacity in the right places which in turn will constrain the development of new generation and the development of new uses for renewable electricity. The outcome will be that New Zealand will not achieve its decarbonisation targets and net zero by 2050.

Thank you for completing this submission template, we appreciate you taking the time. We will use your feedback to inform our modelling for EDGS 2023 and will refine the draft assumptions based on feedback received through consultation.