

Before the Proposed Porirua District Plan Hearings Panel In Porirua

Under the Resource Management Act 1991 (the Act)

In the matter of the Proposed Porirua District Plan – Hearing Stream 1:
Over-arching matters, plan-wide structural issues,
definitions applying across more than one hearing
stream.

Between **Porirua City Council**
Local authority

And **Transpower New Zealand Limited**
Submitter 60 and Further Submitter FS04

Statement of evidence of Rebecca Eng for Transpower New Zealand Limited

Dated 10 September 2021

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1 Executive Summary

- 1.1 Transpower New Zealand Limited (“Transpower”) operates the National Grid, which transmits electricity throughout New Zealand. Within Porirua City, there are six high voltage National Grid transmission lines that are either 110 kilovolts (“kV”) or 220kV. The lines traverse approximately 38km in total within Porirua City’s jurisdiction. There is one substation. National Grid assets in Porirua City serve communities at local, regional and national levels.
- 1.2 The National Policy Statement on Electricity Transmission 2008 (“NPSET”) requires the National Grid to be appropriately recognised in the Proposed Porirua District Plan (the “Proposed Plan”). The Proposed Plan must give effect to the NPSET. This means that the Proposed Plan must include provisions to recognise and provide for the national significance of the National Grid, manage the effects of the National Grid, and also manage effects on the National Grid.
- 1.3 While a resilient National Grid remains at the heart of New Zealand’s energy future, climate change has become a central issue for governments globally and hence for Transpower as a responsible owner and operator of the National Grid on behalf of New Zealanders. In this role Transpower will play a critical role for New Zealand in meeting its zero carbon aspirations, by both investing in its existing assets and enabling connections to new sources of renewable energy.
- 1.4 Transpower wishes to see appropriate planning provisions included in the Proposed Plan to ensure that Transpower is able to develop, upgrade, operate, and maintain the National Grid to enable a sustainable, secure and reliable supply of electricity to Porirua City and nationally.
- 1.5 I have reviewed the evidence of **Ms Pauline Whitney** and concur with the position adopted by **Ms Whitney** in response to the s42A recommendations. Transpower anticipates producing further evidence for upcoming hearings that will (among other matters) provide details on the operation, maintenance, upgrading and development activities

- 1.6 that Transpower carries out in its roles as owner and operator of the National Grid, including the nature and scale of the infrastructure and the land use and development activities that can adversely affect it.

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2 Introduction

- 2.1 My full name is Rebecca Mary Eng. I am a Senior Environmental Planner at Transpower New Zealand Limited (“**Transpower**”), within the Environmental Regulatory Team. My team sits within Transpower’s Environmental Policy and Planning Group, whose responsibilities include:
- a Strategic planning. This is achieved through the development and implementation of Transpower’s strategic resource management policy at national, regional and local levels;
 - b Ensuring the protection of Transpower's network;
 - c Ensuring that all necessary environmental approvals are obtained for Transpower’s physical works; and
 - d Managing engagement with landowners and other parties who wish to undertake land use and development under or near the National Grid to ensure that Transpower’s assets are able to be operated, maintained, upgraded and developed.
- 2.2 I have been employed by Transpower for six years. My role involves leading Transpower’s resource management policy workstream including to ensure planning documents give effect to the National Policy Statement on Electricity Transmission 2008 (“**NPSET**”).
- 2.3 I have a Master of Resource and Environmental Planning from Massey University. I have over 18 years’ experience working as an environmental planner in New Zealand and the United Kingdom and I am a member (Intermediate) of the New Zealand Planning Institute. My relevant experience and qualifications are included in **Appendix A**.
- 2.4 I confirm that I am authorised to give this evidence on behalf of Transpower.
- 2.5 Although this matter is not before the Environment Court, I confirm that I have read the 'Code of Conduct for Expert Witnesses' contained in the Environment Court Consolidated Practice Note 2014. As I am employed by Transpower, I acknowledge I am not independent; however, I have

sought to comply with the Code of Conduct when preparing my written statement of evidence, and will do so when I give oral evidence before the Hearings Panel. In particular, unless I state otherwise, this evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

3 Scope of Evidence

3.1 My evidence will address the following:

- a Transpower and the National Grid;
- b Transpower's assets within Porirua City;
- c Transmission Tomorrow and Whakamana i Te Mauri Hiko; and
- d Conclusions.

4 Transpower and the National Grid

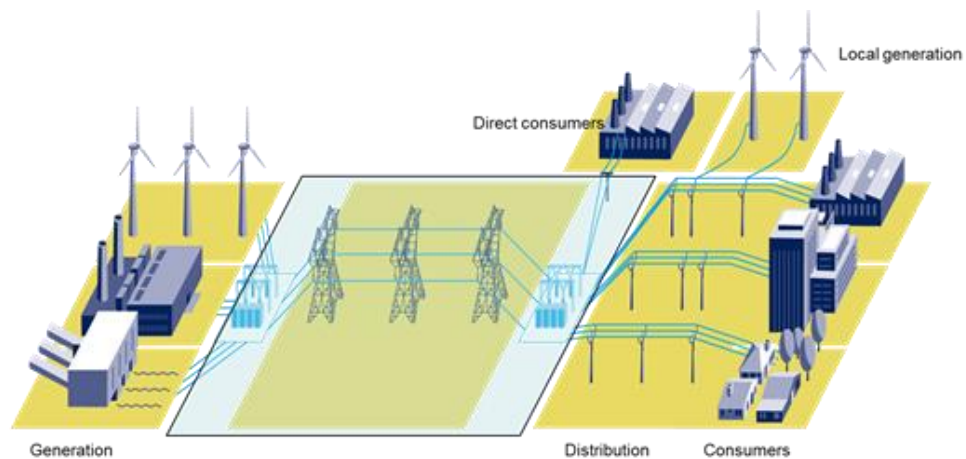
4.1 Transpower is a State-Owned Enterprise that plans, builds, maintains, owns and operates New Zealand's high voltage electricity transmission network – the National Grid (or “**the Grid**”). The Grid links generators to distribution companies and major industrial users. It extends from Kaikohe in the North Island to Tiwai in the South Island and carries electricity throughout New Zealand.

4.2 New Zealand has become increasingly dependent on electricity. It is an intrinsic part of living and working in the 21st century. Electricity now accounts for about 25% of all energy used in New Zealand. Each year, \$5 billion worth of electricity is traded on the wholesale electricity market. Transpower is responsible for ensuring the delivery of a reliable and secure supply of electricity to New Zealand, and has a fundamental role in the industry and in New Zealand's economy.

4.3 Transpower is not a generator of electricity and has no retail sales of electricity. It can be considered a 'freight company' for electricity, in that it carries bulk electrical energy from where it is generated by companies such as Contact Energy, Meridian and Genesis to the local lines distribution companies (e.g. Wellington Electricity in Porirua) and some

major users of electricity (e.g. Tiwai Point Aluminium Smelter, NZ Steel at Glenbrook and Marsden Point Oil Refinery).

- 4.4 As well as being the Grid Owner, Transpower also manages New Zealand's power system in real time. In its role as System Operator, Transpower operates the electricity market to ensure electricity transmitted through The Grid is delivered whenever and wherever it is needed, 24 hours a day, seven days a week.
- 4.5 Transpower plays a significant part in New Zealand's economy, with all major industries, cities and communities being reliant on a secure and reliable supply of electricity.



Source: Electricity Commission, *Electricity in New Zealand, 2009*

Figure 1: Electricity industry in New Zealand

- 4.6 As a State-Owned Enterprise, Transpower's principal objective is to operate as a successful business. It must operate within certain legislative constraints and report regularly to its shareholding Ministers. Transpower is required to deliver and operate a National Grid that meets the needs of users now and into the future.
- 4.7 One of Transpower's key objectives therefore is to maintain and develop the National Grid, which contributes to New Zealand's economic and social aspirations. This objective is reflected in the single objective in the NPSET, as outlined in **Ms Whitney's** evidence.

- 4.8 Prudent investment in The Grid (including for maintenance), long term transmission planning strategies, and developing technologies are crucial to ensure the most can be made from existing infrastructure. This will, in turn, help to limit the cost and environmental footprint of the National Grid for future generations. This is more critical than ever in the context of the Climate Change Response (Zero Carbon) Amendment Act 2019, which I expand on later in this evidence.

5 The National Grid Network

- 5.1 The National Grid comprises some 12,000-circuit km of transmission lines and more than 160 substations across the country. This is supported by a telecommunications network of some 300 telecommunication sites, which help link together and communicate with the components that make up the National Grid.
- 5.2 The Grid comprises a high voltage backbone which runs the length of the country and links major generation (such as the South Island hydro lakes) to major loads in the main cities (e.g. Wellington). The bulk of the Grid backbone was built around 60 years ago and comprises most of the 220kV lines throughout New Zealand, along with the High Voltage Direct Current (HVDC) link between the North and South Islands.
- 5.3 Connected to this Grid backbone are regional Grid lines (also owned or operated by Transpower) which connect smaller generation stations and supply regional communities. At a district and regional level, transmission lines link substation sites in order to get electricity to the main centres (e.g. the 110kV connection to Pāuatahanui substation which services the Porirua area) and to some smaller centres where the electricity load is then transferred to the local distribution networks.

6 Transpower's assets within Porirua City

- 6.1 The National Grid lines that traverse Porirua City's jurisdiction are as follows (all being overhead transmission lines on towers):
- a Bunnythorpe-Haywards (BPE-HAY) A 220kV;
 - b Bunnythorpe-Haywards (BPE-HAY) B 220kV;

- c Bunnythorpe-Wilton (BPE-WIL) A 220kV;
 - d Haywards-Judgeford (HAY-JFD) A 220kV;
 - e Haywards-Takapu Road (HAY-TKR) A 110kV; and
 - f Paekakariki-Takapu Road (PKK-TKR) A 110kV.
- 6.2 In addition to these transmission lines, Transpower also owns and operates Pāuatahanui substation, which is designated in the District Plan.
- 6.3 These assets are shown on the map in **Appendix B** to my evidence. National Grid transmission lines cover approximately 38km within Porirua City.
- 6.4 The Grid is an interlinked network. Electricity flows along transmission lines via lines supported by towers (pylons), poles or pi poles and can vary in any instant, depending on actual generation at power stations and the demand for electricity across New Zealand. In operating the electricity market as System Operator, Transpower uses real-time information about electricity use by consumers and electricity generation available from generators to balance electricity demand and supply, ensuring optimum performance of the network.
- 6.5 The National Grid provides connectivity between all sources of generation and consumers. Without the National Grid, consumers across New Zealand would be dependent on locally generated electricity which would be more expensive and less reliable. As such, the National Grid plays an important role in the sustainable management of natural and physical resources.

7 Transpower's projects in Porirua

- 7.1 Transpower is in the early stages of a project to protect Pāuatahanui substation from flood risk. The precise nature of the works is to be confirmed, but may include construction of a raised control room and raising other critical switchyard equipment, all within the boundary of the existing designation.

- 7.2 Transpower is in the process of reconductoring part of its BPE-WIL A 220kV transmission line (which runs from Bunnythorpe to Wilton). The section being reconductored is 28km long, between Wilton Substation and the “Judgeford Tee” site at 94A Mulhern Road, Judgeford, Porirua. Fifteen towers affected by the reconductoring on the BPE-WIL A transmission line are located within Porirua City. The conductor on this section of line is exposed to high winds, and high levels of salt in the air which has led to significant corrosion over its lifespan (nearing 40 years). Replacement of the conductors will ensure that this section of line continues to provide a reliable service within the Wellington region, and enable the flow of electricity provided by the HVDC link to move north and south.
- 7.3 In addition to the reconductoring, two new pi-poles (consisting of four individual steel poles) are required on the BPE-WIL A line, at the Judgeford Tee site. This is to provide a new undercrossing between two high voltage transmission lines that converge at the site (the BPE-WIL-A transmission line, and the HAY-JFD A 220kV transmission line). This work supports changes to flow of electricity between Haywards, Wilton and Linton substations. Resource consent for the new pi-poles has been sought under the Resource Management (National Environmental Standards for Electricity Transmission Activities) Regulations 2009 and granted by Porirua City Council in 2021. Works for installation of the pi-poles commenced on 6 September 2021 and are expected to take approximately one month.
- 7.4 Other than these projects, Transpower is carrying out business as usual maintenance works on its assets within Porirua, such as support structure foundation strengthening, vegetation trimming and clearance, and access track maintenance.

8 Transmission Tomorrow

- 8.1 Transpower’s 2016 publication “Transmission Tomorrow” (updated in 2018) sets out Transpower’s strategy for the future development of the Grid for the next 30 years and beyond. Transmission Tomorrow documents Transpower’s view that there is an enduring role for the National Grid. Transpower’s lines and substations will be required for

many years into the future to power the economy while enabling New Zealand's continued reliance on renewable forms of electricity generation, including from the South Island hydro lakes.

9 New Zealand's Paris Commitment and Decarbonisation

- 9.1 In early 2018, Transpower published its white paper "Te Mauri Hiko – Energy Futures" (Te Mauri Hiko). This project closely examined a range of electricity supply, demand and future technology scenarios and began exploring what will be required for New Zealand to maximise the potential of the energy opportunity it is facing, including meeting its Paris Climate Accord commitments. Greenhouse gas emission reduction targets were agreed by New Zealand at the 2016 Paris Climate Accord and have been translated into domestic climate policy via the Climate Change Response (Zero Carbon) Amendment Act 2019.
- 9.2 An updated Transmission Tomorrow was published in 2018. It underlined the need to decarbonise New Zealand's economy. Transmission Tomorrow sets out how Transpower will go about planning and the developing the transmission system as demand for electricity increases following electrification of the transport and process heat sectors, and as new renewable generation is added to the system.
- 9.3 Since then Transpower has released a further document "Whakamana i Te Mauri Hiko – Empowering our Energy Future" which sets out a blueprint for how New Zealand might get to a zero-carbon future. It is consistent with the findings of both the Interim Climate Change Committee and the Productivity Commission in that the greatest opportunities for emissions reductions outside of agriculture lie in the energy sector; specifically around increasing the proportion of renewable electricity in the system and the electrification of the emissions intensive transport and process heat sectors.
- 9.4 While a resilient National Grid remains at the heart of New Zealand's energy future, climate change has become a central issue for governments globally and hence Transpower as a responsible owner and operator of the National Grid on behalf of New Zealanders. Technology continues to advance rapidly. Electricity is increasingly positioned as an

energy source for whole economies, rather than just homes and some business processes.

- 9.5 As the economy electrifies in pursuit of the most cost efficient and renewable sources, the Whakamana i Te Mauri Hiko base case predicts that electricity demand is likely to more than double by 2050. Whakamana i Te Mauri Hiko suggests that meeting this projected demand will require significant and frequent investment in New Zealand's electricity generation portfolio over the coming 30 years, including new sources of resilient and reliable grid connected renewable generation.
- 9.6 National Grid connections to new sources of electricity generation and capacity increases (involving physical upgrades e.g. such as duplexing and thermal uprating) will be required across the transmission system to support demand growth driven by the electrification of transport and process heat. Transpower's current estimation is that around 60-70 new National Grid connections will be required in the next 15 years, with this trend continuing through to at least 2050. Simply put, New Zealand's electricity transmission system is the infrastructure on which our zero-carbon future will be built. Local authority policy statements and plans across the country need to provide an approval pathway to support this outcome.
- 9.7 This work supports Transpower's view that there will be an enduring role for the National Grid in the future, and the need to build new National Grid lines and substations to connect new, renewable generation sources to the electricity network.
- 9.8 In terms of a brief summary, the National Grid:
 - a Transports electricity across the country (connecting generation to consumers);
 - b Supports New Zealand's national and regional economic growth;
 - c Plays an essential role in maintaining reliability and security of supply of energy;

- d Provides a basis for investment decisions to be made by both suppliers and consumers of electricity;
- e Enables competition among suppliers and retailers of electricity, thereby providing the basis for competitively priced electricity;
- f Assists the development of new electricity generation technologies, including renewable energy, by providing access to markets;
- g Enables the electrification of transport and process heat, without which there is no way in which our Paris Agreement and net-zero carbon economy commitments can be met; and
- h Is predicted to play a key role in the decarbonisation of the economy.

10 Conclusions

- 10.1 The National Grid is critical to the social and economic wellbeing of Porirua City and our nation generally. It will also play a critical role in New Zealand's carbon zero commitment and mitigating the effects of climate change. This will necessitate the upgrade of existing, and construction of new, National Grid assets. As an infrastructure asset of national significance, the NPSET requires that the National Grid be recognised and provided for in the Proposed Plan.
- 10.2 Transpower's relief will ensure integrated management of activities through the District Plan to provide for sustainable development of both the National Grid infrastructure and other natural and physical resources, both of which are critical for the future development of Porirua City and New Zealand.

Rebecca Eng

10 September 2021

Appendix A Relevant Experience and Qualifications

1 Career Summary

- 1.1 Senior Environmental Planner, Transpower New Zealand Ltd: July 2015 – present
- 1.2 Principal Policy Analyst, Parks & Recreation Policy - Central, Auckland Council: January 2014 – July 2015
- 1.3 Senior Planner, Barker & Associates, Auckland: February 2012 – January 2014
- 1.4 Associate, RPS Group plc, London, United Kingdom: September 2006 – May 2011
- 1.5 Planner, Beca, Wellington & Tauranga: December 2002 – June 2006

2 Qualifications

- 2.1 Master of Resource & Environmental Planning, Massey University (2004)
- 2.2 Bachelor of Resource & Environmental Planning (First Class Hons)(Massey Scholar), Massey University (2002)

3 Affiliations

- 3.1 Intermediate Member of the New Zealand Planning Institute

Appendix B National Grid Assets within Porirua City

Transpower Assets

Porirua City

Legend

Territorial Land Authority

Boundary

NZ Roads

Highways

Transpower Assets

Cable Protection Zone

Overhead Fibre Cable

Underground Fibre Cables

Site

ACSTN

COMMS

HVDC

TEE

Transmission Line

0kV Overhead

11, 66kV Underground

11, 33, 66 kV Overhead

110kV Underground

110 kV Overhead

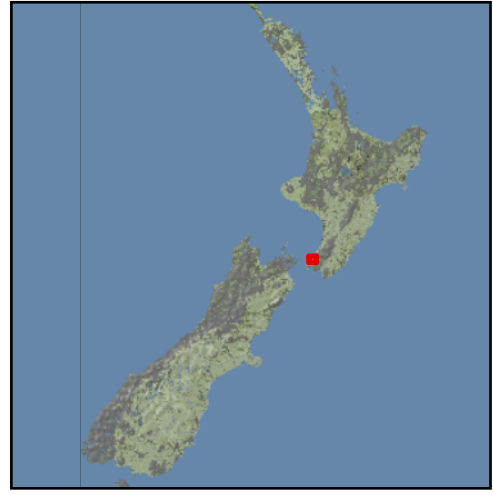
220kV Underground

220 kV Overhead

350 kV Overhead

350kV Submarine

400kV Overhead

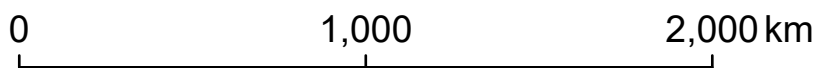


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