

Before the Proposed Central Hawke's Bay District Plan Hearings Panel

Under the Resource Management Act 1991 (the Act)

In the matter of the Proposed Central Hawke's Bay District Plan –
Hearing Stream 7:
Energy, Infrastructure and Transport:

Between **Central Hawke's Bay District Council**
Local authority

And **Transpower New Zealand Limited**
Submitter 79 and Further Submitter FS18

Statement of evidence of Daniel Hamilton for Transpower New Zealand Limited

Dated 30 November 2022

1. Qualifications and Experience

- 1.1. My name is Daniel Hamilton.
- 1.2. For my qualifications and experience and other introductory comments, please refer to paragraphs 1.2 – 1.6 of my statement of evidence for Hearing Stream 5 (“Hearing 5 Evidence”), dated 24 August 2022. I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Consolidated Practice Note (2014), and I agree to comply with it.

2. Scope of Evidence

- 2.1. My evidence will address the following:
 - 2.1.1. A brief outline of the National Grid Framework and Transpower’s interests in Hearing Stream 7;
 - 2.1.2. The role of the National Grid within the electricity system; and
 - 2.1.3. Responses to outstanding matters relating to Hearing Stream 7 being the approach Transpower adopts in relation to the planning and development of the National Grid.
- 2.2. For the reasons outlined in the evidence of Ms Whitney (Independent Planning Witness), I concur with the recommended amendments outlined in the evidence of Ms Whitney.

3. The National Grid

- 3.1. As outlined in my evidence to Hearing Stream 5, Mr Dougall Campbell, the Environmental Policy and Planning Group Manager at Transpower, appeared at Hearing Stream 3 and provided evidence¹ on:
 - 3.1.1. Transpower and the National Grid;
 - 3.1.2. New Zealand’s Paris Commitment and Decarbonisation;
 - 3.1.3. Transpower’s assets within Central Hawke’s Bay District;

¹ Statement of Evidence in Chief of Dougall Campbell for Transpower New Zealand Limited, Dated 31 May 2022

3.1.4. Transpower's approach to National Grid Yards and Corridors and implementing the NPSET; and

3.1.5. The New Zealand Electricity Code of Practice for Safe Distances 34:2001 (NZECP34:2001)

3.2. The above evidence stands and is applicable to this hearing.

4. Relevance of Hearing Stream 7

4.1. Hearing Stream 7 is of relevance to Transpower as it is the hearing at which the primary National Grid specific definitions, policy framework and rules relating to the operation, maintenance, upgrade and development of the National Grid are addressed.

5. Role of the National Grid within the electricity system

5.1. The National Grid is nationally significant infrastructure. Transpower, whose main role is to ensure the delivery of a reliable and secure supply of electricity to New Zealand, has a fundamental role in the industry and in New Zealand's economy.

5.2. New Zealand has become increasingly dependent on electricity, which is an intrinsic part of living and working in the 21st century. Electricity accounts for about 24% of all energy used in New Zealand. Each year, \$5 billion of electricity is traded on the wholesale electricity market. Transpower, whose main role is to ensure the delivery of a reliable and secure supply of electricity to New Zealand, has a fundamental role in the industry and in New Zealand's economy.

5.3. The National Grid is an ever-developing system, responding to changing supply and demand patterns, growth, reliability and security needs. A key part of this is connecting new renewable energy generation to the National Grid. Transpower expects demand for electricity to increase over time as New Zealand transitions to a zero-carbon economy, and Transpower is uniquely placed to help enable that transition.

5.4. The National Grid will need to develop in the Central Hawke's Bay region in the future, to facilitate the construction of new generation and to account for the predicted increases in electrical loads. Transpower has seen record inquiries about new renewable energy generation throughout the Country in recent times. While not all of these will proceed, there is strong interest and demand to provide the needed new renewable energy, these range from wind, solar and hydro generation sources. Transpower often has limited to no say in where these will locate, but Transpower is

obligated to connect this generation to the National Grid and ensure it can be into the wider network.

- 5.5. Increased electrification is beginning to have a major impact on our ability to predict future grid requirements. This increase is influenced by many factors, such as the Government Initiative to Decarbonise Industry (GIDI). The Central Hawke's Bay region has many industries with considerable potential for decarbonising their businesses. The National Grid is an enabler to decarbonising.
- 5.6. Without the National Grid, communities across New Zealand would be dependent on locally generated electricity which would be more expensive and less reliable. In most areas of New Zealand, the locally generated electricity would simply be insufficient to meet demand. Due to this function, the National Grid plays a very important role in the sustainable management of natural and physical resources across the Central Hawke's Bay region.
- 5.7. In light of the significant benefits of the National Grid to both New Zealand and the Central Hawke's Bay region, it is important that the PDP recognises the role and strategic importance of the National Grid and provides for its effective operation, maintenance, upgrading, and development.
- 5.8. Given its extensive and linear nature, it is sometimes not possible (or practical) to completely avoid locating parts of the National Grid in environmentally sensitive areas such as outstanding natural landscapes (ONLs), areas of significant indigenous vegetation and areas of high natural character. While most maintenance activities are classified as permitted, there remain some activities that require consent under district plans. This can be problematic where Transpower assets are situated on, or span across, these same environmentally sensitive areas.
- 5.9. Should a new line need to be built then the selection of a new route would follow Transpower's Area, Corridor, Route and Easement/Designation methodology (the 'ACRE process'). Consideration is given to the location of the proposed infrastructure, with negative scoring being given to any special areas, such as significant indigenous biodiversity. While efforts are made to avoid these areas, in certain situations it may not be practicable (or even possible) given the sometimes large geographic extent of those areas and the fundamental need to 'connect Point A to Point B'.
- 5.10. Based on the above, it is critical that there is a planning framework in place that will enable development and other asset maintenance to occur efficiently. Transpower needs to respond to growth in generation and load, and also to new generation technologies. The size, nature and location of any future assets remains uncertain.

6. Planning and Development of the National Grid

6.1. A key outstanding matter relating to Hearing Stream 7 is the policy framework within the PDP to manage the planning and development of the National Grid. Ms Whitney has outlined in her evidence the relevant policy framework in the NPSET specific to planning and development of the National Grid. The following outlines the practical issues and processes Transpower considers and applies in relation to the operation, maintenance, upgrade and development of the National Grid.

Technical, Operational and Functional Requirements of the National Grid

6.2. The National Grid has special characteristics that affect its positioning and structural makeup. These characteristics include:

- The historical location, with lines needing to be constructed between generation sources and electrical load.
- The current location of these existing lines is unlikely to change as alternative routes would be difficult to find without creating significant impacts to adjacent environments and other properties.
- Transpower needs to respond to growth in generation and load, and also to new generation technologies. The size, nature and location of this remains uncertain. The requirement to connect these to the National Grid requires flexibility in the ability to plan, locate and construct infrastructure of a linear nature.
- The development and operation of the National Grid is planned in conjunction with local electricity distributors who operate local networks (i.e. Transpower needs to enable new ‘Grid Exit Points’ from the National Grid to feed local distribution networks as the demand on their networks grows). The future expansion of the Grid will be based around the growing urban zones and industrial loads in the Central Hawke’s Bay region, and the sub-grid of the local distributors.
- The operation, maintenance, development and upgrade of the National Grid can be significantly constrained by the adverse impacts of third party activities and development. Effects can include reverse sensitivity effects, as well as direct effects, all of which can compromise the National Grid. In some cases, it may not be immediately (or at all) apparent to a council or a developer that a proposal might impact on or compromise the National Grid. For example, Transpower has encountered situations where council officers appear to believe that if a development complies with NZECP34, there will be no effects on the National

Grid. That is not the case. As outlined in earlier hearing streams, issues also arise if a development restricts Transpower's ability to use an existing access track to access its infrastructure for maintenance, repair or upgrade.

- The perceived adverse environmental effects of the National Grid are often local, while the benefits often extend beyond that and benefit the wider region or nation.

- 6.3. The above characteristics have a key influence (and constraint) on how Transpower manages the National Grid. They also are a key influence in ensuring third party activities do not compromise the National Grid. As such I support the amendment sought in Ms Whitney's evidence² to remove the wording "To the extent reasonably possible" in relation to managing the effects of subdivision, use and development on network utilities. In my opinion given the national significance of the National Grid and constraints identified above, it is imperative the PDP has a strong directive to avoid adverse effects without the subjective qualifier "to the extent reasonably possible".

Upgrade and Development

- 6.4. The first stage in planning and development of the National Grid requires future planning, and should a need be demonstrated, the second stage is application of the site selection process. These two stages are addressed in turn.

Future National Grid Infrastructure and System Planning Within Central Hawke's Bay Region

- 6.5. Transpower undertakes a detailed analysis of the grid capacity annually and publishes this in its Transmission Planning Report³. Forecasting peak load is inherently uncertain, therefore it uses what is termed a prudent load forecast. This uses a 10 per cent probability of exceedance forecast of underlying demand for the first seven years of the forecast period, and for following years, an expected (or mean) rate of underlying growth. This report identifies development and enhancement works required on the grid. It should be noted here that, of course, this report cannot predict the timing or location of future grid connections.

- 6.6. Prudent forecast annual peak demand for the wider Central North Island region is currently 296 MW with a forecast increase to 472 MW in 2037, with peak demand forecast to grow by an average of 3.2 per cent per annum over the next 15 years.

² Evidence of Ms Whitney, 30 November 2022, para 7.29.

³ 2022 Transmission Planning Report https://tpow-corp-production.s3.ap-southeast-2.amazonaws.com/public/uncontrolled_docs/2022%20Transmission%20Planning%20Report.pdf?VersionId=v6h_P0Vwhmys9BEpp3OGicM1aj4Fr_OZ

- 6.7. Increased electrification however is beginning to have a major impact on Transpower's ability to predict future grid requirements. This is influenced by many factors, such as the Government Initiative to Decarbonise Industry (GIDI), existing coal users transitioning to electricity (or electricity and biofuels), and industry and residential users seeking new low carbon alternatives. Therefore, where increased electrification occurs at a grid exit point, the magnitude and timing of the peak load can be challenging to forecast.
- 6.8. The Central Hawke's Bay region has many industries (e.g agriculture, forestry, manufacturing, construction) with considerable potential for decarbonising their businesses. The National Grid is an enabler to decarbonising as industry can increase electricity demand, either by converting directly to electric heating or transport, or converting to biomass, which is often also paired with partially electrifying processes (such as heat pumps for low temperature heat).
- 6.9. Transpower estimates that demand for renewable energy will increase by 68% by 2025. Renewable energy will take many forms such as solar and wind (and we've recently started to see proposals for off-shore wind). The National Grid is the primary mode of moving this renewable energy from where it is generated to where it is needed.
- 6.10. In addition to the above, there is also the possibility of a pumped storage facility at Lake Onslow (the 'NZ Battery Project'). This project will have significant impacts on the National Grid, and the grid will require significant development and expansion to enable connection with sufficient transfer capacity to meet the project outcomes.
- 6.11. Future development of generation such as offshore windfarms or hydrogen production facilities could potentially require the National Grid to be located within the Coast to enable those developments. All endeavours will be made to avoid the Coast through the ACRE process (described in the following section of my evidence), however avoidance simply may not be possible in all cases.
- 6.12. In summary, the National Grid will need to develop in the Central Hawke's Bay region in the future. Consideration and facilitation of this development should be recognised and allowed for in the PDP.

Transpower's Process for Selecting the Location of New Transmission Lines

- 6.13. Policy 4 of the NPSET requires that when considering the environmental effects of new or major upgrades to the National Grid, decision makers must have regard to the extent to which any adverse effects have been avoided, remedied or mitigated by the

route, site and method selection. The following outlines how Transpower applies Policy 4.

- 6.14. When selecting the route of any new transmission line, Transpower follows the Area, Corridor, Route and Easement/Designation (the “**ACRE**” process). This section of my evidence briefly describes the ACRE process, outlining how landscape and other values factor into the process, but also how the constraints imposed by linear infrastructure are considered but cannot always be avoided.
- 6.15. Transpower developed the ACRE model to identify and secure the most suitable location for transmission infrastructure. ACRE was developed during the North Island Grid Upgrade Project (NIGUP), a 186 km long, 400 kV capable line between Whakamaru (near Taupo) and Brownhill (near Auckland), which was approved by a Board of Inquiry in 2009. The ACRE model is based on a progressive filtering approach, where increasing and more specialised detail is provided on environmental, property and engineering constraints throughout the process to enable the identification of a preferred route or site.
- 6.16. The key stages of the ACRE process are summarised below (these can be modified or combined, depending on the scale and nature of the project):
 - **A - Area** (identification of the wider study area within which the project might occur; undertaking constraints and opportunities mapping);
 - **C - Corridor** (identification and confirmation of alternative corridors, ranking and selection of preferred corridor);
 - **R - Route** (selection and evaluation of a route, or alternative routes, within the preferred corridor, consultation on one or more routes and confirmation of preferred route, following public consultation); and
 - **E - Easement/Designation** (identification and confirmation of the easement and designation centreline). There are two further process steps, referred to as “D” and “S”:
 - **D - Documentation** (preparation of full documentation for lodgement with councils); and
 - **S - Statutory Process** (lodgement of documents for statutory approvals under the RMA, board of inquiry/council hearings, Environment Court appeal process where relevant).
- 6.17. During the Area, Corridor, Route and Easement/Designation stages consideration is given to the location of the proposed infrastructure, with negative scoring being given to any special areas, such as significant indigenous biodiversity. While efforts are

made to avoid these areas, in certain situations it may not be practicable (or even possible) given the sometimes large geographic extent of those areas.

6.18. The ACRE process allows for a trade-off between a number of factors, with the intent of finding a preferred solution:

- It takes into account technical and operational requirements, such as the need to connect to existing assets, or maintain safety clearances;
- It demonstrates that adverse effects have been avoided through the site, route and method selection;
- Sensitive activities such as residential areas can be mapped, so that options which reduce effects on sensitive activities can be explored; and
- Town centres and other valued locations such as areas of high recreational value, ONLs, Maori land, ecological areas and areas of high natural character are also mapped, so they can be avoided if practicable.

6.19. Often it is not practicable to avoid effects on all identified values. For example:

- Avoidance of urban areas and sensitive activities can often deflect assets towards areas with greater landscape, natural character or recreational value (for example non-urban locations);
- Avoiding particular locations can also mean a National Grid line must take a longer route, impacting a greater number of people and values along that longer route, and costing more to develop, operate and maintain (that cost being borne by electricity users);
- Reducing the height of lines (to reduce their visibility) can mean that a greater number of support structures (towers or poles) are required in order to maintain safe (and regulated) ground-to-conductor clearances. Lower conductors can require greater vegetation clearance and/or earthworks, and more extensive access tracks for the greater number of support structures; and
- Undergrounding lines is often prohibitively expensive, and still requires earthworks and a clear corridor (including clear of vegetation and above-ground structures). Further, it can complicate maintenance and repairs.

6.20. I would support a framework which supports the ACRE process and recognises this process as a key tool for managing the effects of National Grid development, particularly given that it is not always possible to avoid effects. The ‘seek to avoid’ policy approach outlined in the evidence of Ms Whitney in my opinion provides an

appropriate policy framework to manage the effects of the planning and development of the National Grid.

7. CONCLUSION

7.1. In order to support the role and strategic importance of the National Grid, the PDP needs to provide for the Grid's effective operation, maintenance, upgrading, and development. This includes:

- Enabling the ongoing operation, inspection, maintenance and upgrading of the existing National Grid;
- Protecting the National Grid from the direct and indirect effects of land use, subdivision and development; and
- Enabling the planning and development of the National Grid in new locations in the future to meet New Zealand's electricity supply needs and recognising that avoiding all adverse effects is not always possible.



Daniel Hamilton

30 November 2022