OFFICIAL

IN THE WAITANGI TRIBUNAL

WAI 3325
WAI 3262

IN THE MATTER AND	of the Treaty of Waitangi Act 1975
IN THE MATTER AND	of the Climate Change Priority Inquiry (Wai 3325)
IN THE MATTER	of a claim by Emily Tuhi-Ao Bailey on behalf of herself and Climate Justice Taranaki

---

SECOND STATEMENT OF EVIDENCE OF STEPHEN GOLDTHORPE

Dated: 4 November 2025

RECEIVED
Waitangi Tribunal
4 Nov 25
Ministry of Justice
WELLINGTON

BENNION LAW

Barristers and Solicitors
L1, 1 Ghuznee Street
PO Box 25433
Panama Street
Wellington 6011
Counsel: Tom Bennion / Emma Whiley / Kudrat
tom@bennion.co.nz / emma@bennion.co.nz / kudrat@bennion.co.nz

INTRODUCTION

1. My full name is Stephen Henry Goldthorpe. I am a retired energy systems analyst. My expertise is based on computer modelling of physical and chemical processes.

2. I have previously provided a statement on behalf of Climate Justice Taranaki to assess the impact on the adjacent marine environment of the emission of carbon dioxide (CO_2) from industrial activities in the Taranaki region.[1]

3. This statement provides my comments on the brief of evidence of Paul Stocks (Ministry of Business Innovation and Employment).[2]

Response to Paul Stocks

4. Mr Stock's evidence is largely a catalogue of MBIE programmes of work, highlighting the extent of consultation associated with those programmes.

5. In paragraphs [4.4] and [4.7], and again in [63.1] and [63.3], he asserts, regarding the use of natural gas for electricity generation:

> *[4.4] … This 'firming capacity' is essential for ensuring we can have a robust and secure renewables-based electricity system.*
>
> *[4.7] Natural gas is critical to delivering a secure and affordable supply of energy for New Zealanders …*
>
> *[63.1] Natural gas is critical to delivering a secure and affordable supply of energy for New Zealanders, and in the absence of significant further exploration activity the amount of gas produced will decline. Such a decline would have direct economic impact for those relying on gas as well as wider economic and social impacts from a loss of reliable electricity supply.*
>
> *[63.3] Gas from petroleum extraction and coal continue to play an important role in industrial processes and electricity generation. While New Zealand's electricity system is highly renewable, fossil fuelled generation is essential to provide firm and flexible generation during times of peak demand.*

6. I challenge these assertions that there is no alternative to the use of fossil fuel as part of New Zealand's electricity supply.

7. There are two security-of-supply issues which are conflated in Mr Stock's paragraph [4.4]. These are matching supply to demand daily and seasonally.

Daily demand matching

8. The day-night variability in demand for electricity, with morning and evening peak demands, can be addressed in several ways:

   a. Peaking gas turbines. These machines do not use gas in an efficient way, have high operating cost, and have low capital cost.

1 Statement of evidence dated 28 April 2025 (Wai 3325, #A63).
2 Wai 3325, #A122.

b. Hydroelectric generation. Existing hydro schemes that have flexibility in their flow regimes can be deployed in load-following mode, with water being conserved at night. This is a low-cost option, often using plant that has been fully depreciated.

c. Pumped storage. This would extend the load-following capabilities of hydro schemes, by using low-cost night electricity to pump water to the upper reservoir at night for use the next day. NZ has no pumped storage schemes at present.

d. Grid scale batteries. The advent of cheaper batteries has started to make it economic for large banks of batteries to be charged with low-cost base-load electricity at night and to deliver supply for the morning and evening peaks.

e. Demand management. Off-peak rates offered by electricity retailers can encourage smoothing of the daily electricity demand profiles.

9. Peaking gas turbines are just one tool in the electricity industry's toolbox. Their use could be phased out as natural gas supplies decline.

Seasonal demand matching

10. Electricity demand for space heating is higher in the winter than the summer. However. industrial and transport demands are less seasonally sensitive. Summer air conditioning tends to level the demand. In winter rain and wind boost electricity supplies. In New Zealand the spring snow melt tends to be stored in lakes for generation the following winter. In an average year the hydroelectric endowment largely accommodates seasonal variability.

11. However, in a "dry year"[3] additional electricity supply may be needed some years. Huntly power station was built with the capacity to address that need. Huntly needs a large stockpile of fuel in reserve. That stockpile of fuel could be torrefied (baked and stabilised) wood instead of coal. There is a scheme being discussed at present for Huntly to be ring-fenced as NZ's back-up generator to help with dry years and cope with major breakdowns of other generation sources.

12. An effect of Climate Change is increased frequency and severity of storms, resulting in uncertainty in the resources that supply hydro and wind generation and possible increased risk to infrastructure. Therefore, provision of more resilience in the electricity supply system is desirable.

13. If Huntly were to only be used on coal when it's needed as an emergency generator then the associated greenhouse gas emissions would be small compared with current coal use. At present, Huntly has to be part of the regular New Zealand power supply in order to earn enough money to cover its costs.

[3] The "exceptionally dry year" could more accurately be termed the "exceptionally cold year'.

14. The need for back-up generation capacity can also be addressed by building additional generation capacity, particularly geothermal and wind capacity, being resources with which New Zealand is particularly well endowed. Since the long-term energy plan is to double electricity use by 2050, there needs to be a planned programme of power plant construction.

The broken electricity market

15. Mr Stocks' evidence ignores the fundamental structural problem with marginal pricing in the New Zealand electricity market. For each half hour period, at each node of the electricity transmission grid, all generators are invited to bid in their available electricity generation capacity at a price. The grid operator, Transpower, then ranks those sources of electricity in a merit order by price and dispatches (instructs to operate) generation capacity sufficient to match the demand for that half hour period. That process determines the marginal price of electricity at each node, which is the price bid by the most expensive supply of electricity that has to be dispatched to meet the demand. Then all generators contributing power for that half hour period are paid the same marginal electricity price regardless of the price that they bid their capacity into the grid. That market arrangement results in low-cost generators, notably hydro generators, making vast profits for their shareholders. The largest single shareholder in the electricity industry is the Crown.

16. This electricity market structure has adverse effects:

    a. The retailers are charged the high marginal price for drawing electricity from a node, which they have to pass on to their customers. So, New Zealand's electricity supply is excessively expensive. For the domestic consumer, the high price for this essential service is a major economic strain. For energy intensive industries the high cost of electricity is forcing them to close down.

    b. The marginal generators are almost always the expensive gas or coal fired generation capacity. The other generators are incentivised to arrange their offerings to Transpower to ensure that the supply of low-cost power is limited so that the high-cost generator must run at the margin and the marginal price is maximised.

    c. The generators are incentivised to delay building additional generation capacity, notably geothermal and wind.

    d. Photovoltaic (PV) panels are expensive. So, PV farms have high capital cost but very low operating cost. PV farm operators would have to bid an uneconomically low price into the grid to ensure that they are always dispatched. The marginal pricing payments received for their output would be unrelated to the actual required economic return on their investment, making the business case for building a PV farm difficult to justify.

    e. The marginal pricing arrangement results in highly volatile electricity prices.

f. The existence of gas-fired generation operating at the margin is an essential feature of this highly profitable electricity market arrangement, which Mr Stocks, on behalf of the Crown, sees as “essential” and “critical”.

White and Orange hydrogen

17. The discussion of drilling for “White” and “Orange” hydrogen sounds my sceptical alarm bells. A brief look at the idea indicates that it is highly speculative research with no practical applications anywhere in the world. I have found a paper describing the idea in more detail, which I haven’t read yet. My initial view is “If it sounds too good to be true, then it probably is”

Carbon Capture and Storage

18. Mr Stocks’ discussion just concerns potential legislation without any explanation of what is to be legislated.

Steve Goldthorpe

____

Steve Goldthorpe