

TREATMENT OF THERMAL FUELS IN THE HYDRO RISK CURVES

SECURITY AND RELIABILITY COUNCIL

Transpower (system operator) is consulting with stakeholders about how it treats thermal fuels within its hydro risk curves. The consultation period happens to coincide with this Security and Reliability Council (SRC) meeting, so presents an opportunity for the SRC to provide advice to the system operator on the proposal.

Note: This paper has been prepared for the purpose of the SRC. Content should not be interpreted as representing the views or policy of the Electricity Authority.

Treatment of thermal fuels in the hydro risk curves

Transpower, in its capacity as the system operator, is responsible for short- to –medium-term monitoring and forecasting of security of supply. The hydro risk curves (HRCs) are the framework that the system operator uses to monitor energy security up at a year out.

On 5 June 2018, the system operator released a consultation entitled *Thermal Fuel Limitations in the Hydro Risk Curves*. The system operator's consultation period runs until 6 July 2018.

As the SRC was already scheduled to meet on 22 June 2018, this presented an opportunity for the SRC to receive information from the system operator at a time when advice from the SRC could be especially influential. Accordingly, the SRC Chair agreed to include this topic as an agenda item for 22 June 2018.

Due to the timing of this opportunity, the SRC's secretariat has not had an opportunity to consider the system operator's proposal in detail. The secretariat will have considered the proposal before 22 June 2018 and will provide any observations or questions to the SRC at that time.

The system operator has provided a version of its consultation that has been customised for the SRC's consideration. That paper is appended to this cover paper.

Questions for the SRC to consider

The SRC may wish to consider the following questions.

- Q1. What further information, if any, does the SRC wish to have provided to it by the secretariat?**
- Q2. What advice, if any, does the SRC wish to provide to the Authority?**

Thermal Fuel Limitations in the Hydro Risk Curves

Security and Reliability Council – June 2018

Keeping the energy flowing



TRANSPOWER



IMPORTANT

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1 SUMMARY

In response to fuel supply information provided by Genesis Energy, and following consultation with stakeholders, we have recently reviewed our assumptions surrounding thermal fuel supply in the derivation of the Hydro Risk Curves (HRCs)¹.

After discussions with several key stakeholders, and an assessment of thermal fuel requirements in the HRCs in light of these discussions, we are proposing to:

1. **Make no changes to the current HRC input assumptions relevant to thermal fuel supply limitations assumed in modelling the supply risk assessment.** We believe there to be sufficient physical thermal fuel available, noting that in some instances the commercial arrangements for this fuel to be used for electricity generation are not in place. We have no reason to believe that these commercial arrangements could not be put in place should they be required.
2. **Include an additional validation step during each update to the HRCs which compares assumed thermal fuel consumption with available supply.** This validation would examine the assumed fuel burn and compare that with the available supply of coal and gas. If the validation finds there is a supply limitation, we would adjust the HRCs to reflect this restriction.

To carry out the additional validation step described above, additional information will be required from energy industry participants. We will be working with industry participants to discuss how these information requirements may be fulfilled.

We are currently consulting with industry on this proposal.

¹ <https://us4.campaign-archive.com/?u=6d27a102535914a56dd09cbf7&id=dbc0934571>

2 INTRODUCTION

Transpower in its role as system operator provides security of supply-related information to support the secure operation of the New Zealand power system, and related markets. Part of this is to present an accurate representation of the risk of energy shortage arising from a shortfall in primary energy (water for hydro generation or thermal fuel for thermal generation), generation availability, transmission availability, or any combination thereof via the HRCs.

The HRC Input Assumptions document² details the inputs and assumptions used in calculating the HRCs. The HRC Input Assumptions document states that unless there is a known *physical* limitation to a thermal generation plant's fuel supply, the HRC calculation will not assume any thermal fuel limitation. Our current assumption is contracted fuel limitations can be complemented with additional commercial arrangements – we assume participants can, and will, procure additional fuel should the need arise (for example, a low hydro inflow sequence).

In late 2017, Genesis Energy (Genesis) advised Transpower of their contracted fuel supply, noting challenges and risks to procuring additional fuel over and above presently contracted quantities. Following receipt of the advice from Genesis we consulted³ with stakeholders on whether the HRC input assumptions should be changed to include operational limitations to thermal fuel supply. We received 13 submissions in response to our invitation to comment. Feedback included a mixture of support and opposition to inclusion of thermal fuel limitations, with no consensus on whether input assumptions should be changed. Respondents identified that thermal fuel availability over and above firm contracted quantities was limited by price and operational considerations—specifically that additional fuel supplies can have long lead times. Some respondents noted that for the information to be used in the derivation of the HRCs, we would need to have sufficient confidence in its reliability.

Following the consultation, we decided operational limitations affecting thermal fuel availability should be accounted for in the HRCs⁴. We committed to a process of determining how thermal fuel limitations should be verified and accounted for, and began discussions with key energy industry stakeholders (including both electricity and gas industry participants). This document describes the results of that process and our proposed method for accounting for operational limitations to thermal fuel availability in the HRCs.

² <https://www.transpower.co.nz/sites/default/files/bulk-upload/documents/Hydro%20Risk%20Curve%20Assumptions.pdf>

³ <https://www.transpower.co.nz/sites/default/files/bulk-upload/documents/Security%20of%20Supply%20-%20HRC%20Assumption%20thermal%20fuel%20limitations%20-%20industry%20....pdf>

⁴ <https://us4.campaign-archive.com/?u=6d27a102535914a56dd09cbf7&id=dbc0934571>

3 PROPOSED CHANGES TO HRC INPUT ASSUMPTIONS

3.1 THERMAL FUEL AND OPERATIONAL LIMITATIONS

The current approach assumes unconstrained access to thermal fuel in the derivation of the HRCs. This assumption reflects the view that there is sufficient thermal fuel available, and no reason why this fuel could not be accessed, should it be required.

The information provided by Genesis prompted a review of this assumption, and we subsequently investigated the quantity of coal and gas that could be made available for electricity generation (including fuel that is not currently being used for electricity generation), and any reasons why this fuel may not be accessible.

Following this investigation, we found no reason to change the assumption – we are still confident there is sufficient physical thermal fuel available, noting that in some instances the commercial arrangements for this fuel to be used for electricity generation are not in place. We have no reason to believe that these commercial arrangements could not be put in place should they be required.

However, we acknowledge that physical and operational limitations to fuel supply can present with little warning, be it a sudden interruption, or a previously unknown limitation is uncovered during an event. In our current process, the HRCs do not present any contingency analysis to inform the market on the implications of sudden or unexpected fuel supply issues, nor do they provide the participants with any information on the risk associated with thermal fuel supply.

For these reasons, while we propose making no changes to the current HRC input assumptions relevant to thermal fuel and operational limitations as part of modelling the supply risk assessment, we propose including an additional validation step which compares assumed thermal fuel consumption with available supply each time we update the HRCs. We also propose to make the information used in the validation step available to participants so they can make their own assessment of thermal fuel supply risks.

This validation would examine the assumed fuel burn and compare that energy consumption with the available supply of coal and gas, based on information provided by the industry. If the validation determined that the HRC calculation has assumed consumption of fuel that is greater than the available supply, we would adjust the HRCs to reflect this restriction. This applies to all thermal fuel supply, and as such, if we received information that indicates diesel fuel supply differs to that which is currently assumed for Whirinaki, we would adjust the HRCs to reflect this.

We expect that regularly (at least monthly) gathering thermal fuel supply information will enable us, and participants, to have better visibility of future thermal fuel supply and manage the risk associated with thermal fuel supply more efficiently.

3.2 NEW INFORMATION TO BE GATHERED

Any updates to the HRCs requires objectively verifiable information about thermal fuel availability. Therefore, an important step in the process will be for relevant electricity and gas industry participants to provide thermal fuel storage and availability information to Transpower on a regular basis. We will work with participants to discuss how this information may be made available.

To carry out the validation step above we anticipate we will require the following information:

- Huntly coal stockpile (the final stockpile at Huntly), and aggregate delivery quantities
- Ahuroa gas storage
- Gas production station availability, including planned outages
- Gas transmission availability, including planned outages
- Non-electricity gas consumption

- Diesel storage and replacement rates
- Heat rates for conversion of thermal fuel into electricity.

Quality information is essential to the proposed validation step. If, for some reason, some information was not available, we propose to develop the validation step in such a way that we make the best estimate using the information we have available to us. We would ensure that this process is clearly explained in our HRC assumption document.

We will also need to be able to independently verify this information. We understand this information would reflect each participant's best estimates of thermal fuel supply and consumption at the time the information is provided. If applicable, at the same time we could also collect information about the certainty associated with the various datasets.

We would endeavour to publish all information received as part of our security of supply information on the Transpower website – however, in some circumstances we would aggregate, or omit, certain data sets if they were commercially sensitive.

3.3 CHANGES TO THE PROCESS FOR PRODUCING THE HRCs

We currently make updates to the HRCs monthly, or more often if required when new information necessitates a change. We propose implementing a two-stage process for producing the HRCs using the current model and the new information described in 3.2, outlined stepwise below. Steps 1 and 5 are the current process, while steps 2 through 4 form the new process.

1. **Make initial HRC calculation.** This is the same as the current process, using the HRC input assumptions as they are described in the assumptions document (i.e. no restriction to thermal fuel availability).
2. **Evaluate thermal fuel burn.** We will evaluate the rate of thermal fuel consumption in the derivation of the HRCs, assuming that coal is consumed first, and when exhausted will be substituted with gas where possible.
3. **Compare estimated thermal fuel burn with fuel availability.** Using the information described in 3.2, we will determine whether the quantities of coal and gas that are required to meet demand while minimising hydro fuel consumption are able to be supplied. We will continue to assume that market forces will enable procurement of fuel quantities over and above the contracted amounts.
4. *If there is a supply limitation:* **Adjust HRC modelling to account for the restriction.** A new HRC calculation will be completed accounting for the supply limitation.
5. **Publish the updated HRCs.**

By adding steps 2 – 4 to the process we can validate the core thermal fuel input assumptions to the HRC and will enable a better estimation of the level of energy supply risk.

3.4 CHANGES TO THE HRC INPUT ASSUMPTIONS DOCUMENT

We propose to reflect the changes to the HRC Input Assumptions document to reflect the changes to the process described above. At the same time, we will refine the current language to remove uncertainty. The proposed changes are shown below with additions underlined and deletions struck-through.

2.5 Thermal Fuel and Operational Limitations

To derive the HRCs it is necessary to assess the availability of thermal fuel for electricity generation. The HRCs have been based on the assumption that thermal fuel will, ~~in the most part,~~ not constrain the production of electricity, unless there are physical limitations that cannot ~~easily~~ be offset with commercial arrangements.

Specifically, thermal generating plant is assumed to be unconstrained by primary fuel or operational limitations with the following exceptions:

- *Whirinaki is constrained to a limit of 30 GWh of generation p.a.*

These assumptions are designed to reflect the limited fuel and available operating hours of the plant.

Where the HRC modelling assumes a rate of thermal fuel consumption that exceeds, in the reasonable opinion of the system operator, available fuel supply, these HRC input assumptions will be updated to account for the limitation.

Other than for the limitations described above, ~~The System Operator believes is comfortable that~~ thermal fuel supplies will not be limited in a way that impacts the HRC model (other than those described above), and therefore the shortage risk facing New Zealand.