

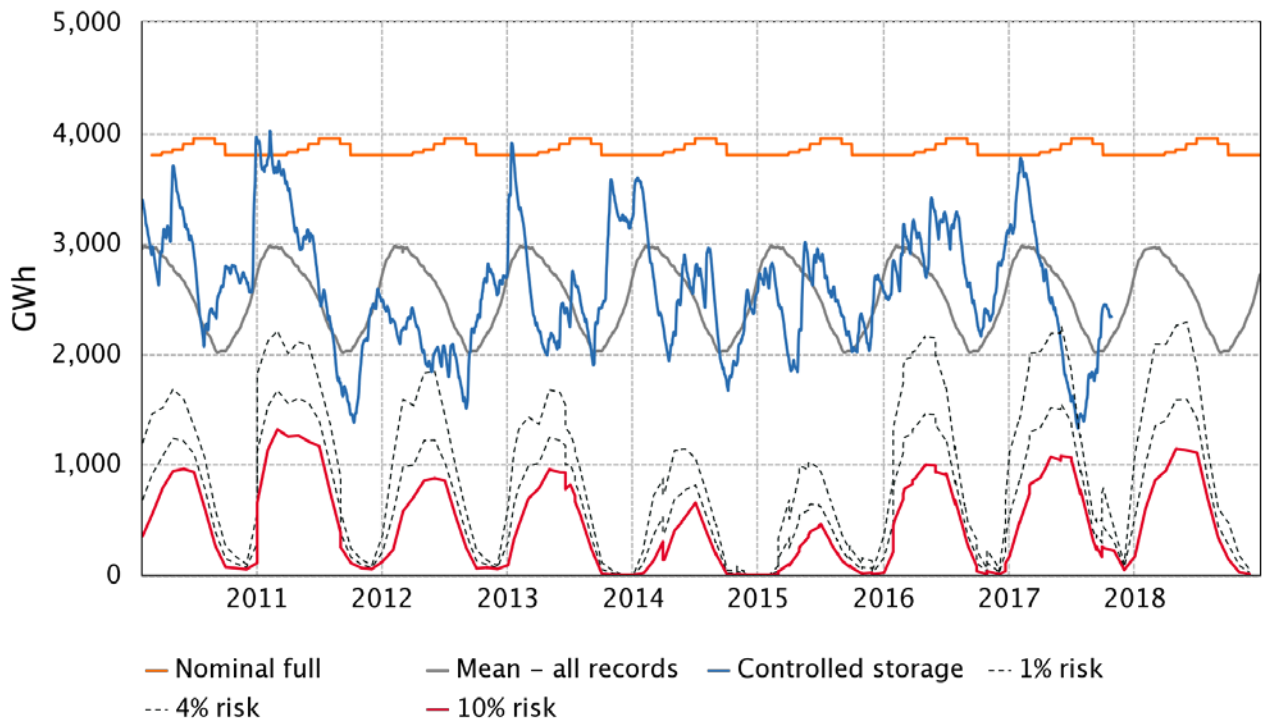
The system operator's summary of winter 2017: events, lessons and next steps.

26 October 2017

Background

The Security and Reliability Council (SRC) functions under the Electricity Industry Act 2010 (Act) include providing advice to the Electricity Authority (Authority) on security of supply matters. As discussed at the 28 July 2017 SRC meeting and illustrated in Figure 1 below, winter 2017 saw South Island hydro lakes drawn down to lower than usual levels.

Figure 1: Controlled storage and hydro risk curves since 1 February 2010



emi.ea.govt.nz/r/4qald

The system operator has prepared a summary of winter 2017 and the events, lessons and next steps that arose. This paper is attached as an appendix to this paper. Representatives from the system operator will attend the 6 November 2017 SRC meeting to be available to answer any questions from the SRC.

The Authority's market monitoring team is preparing a review of winter 2017. The system operator's summary and the SRC's advice in relation to the summary will be valuable inputs for the Authority's review.

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?

Date:	6 October 2017
To:	Members of the Security and Reliability Council
From:	John Clarke, GM System Operations
Subject:	Dry Winter 2017

Purpose

The purpose of this paper is to update the Security and Reliability Council on the high-level outcomes of the 2017 dry winter. This paper outlines:

- the events that unfolded this winter;
- the key actions taken to help successfully navigate the situation and some observations about how the winter played out;
- what we learned from the experience; and
- what we plan to do in the next 6-18 months to ensure that lessons are captured and improvements made for future situations

Background

Since 2010, Transpower, in its role as system operator, has had codified obligations to monitor, report and (if required) manage security of supply situations.

Our key measure for assessing security of supply risk is comparing hydro storage against the Hydro Risk Curves (HRCs). We have four status levels that represent various different levels of risk:

Status	Storage compared to the HRCs	Actions
Normal	Storage is above the 1%* HRC	Weekly reporting
Watch	Storage is between the 1% and 4% HRC	Daily reporting
Alert	Storage is between the 4% and 10% HRC	Additional preparation activities
Emergency	Storage is below the 10% HRC	Emergency action taken eg official conservation campaign and rolling outages

* % chance of unavoidably running out of controlled storage

In winter 2017, we came very close to crossing the 4% threshold into “Alert” status for the first time since Transpower took over responsibility for security of supply.

2017 was a dry winter

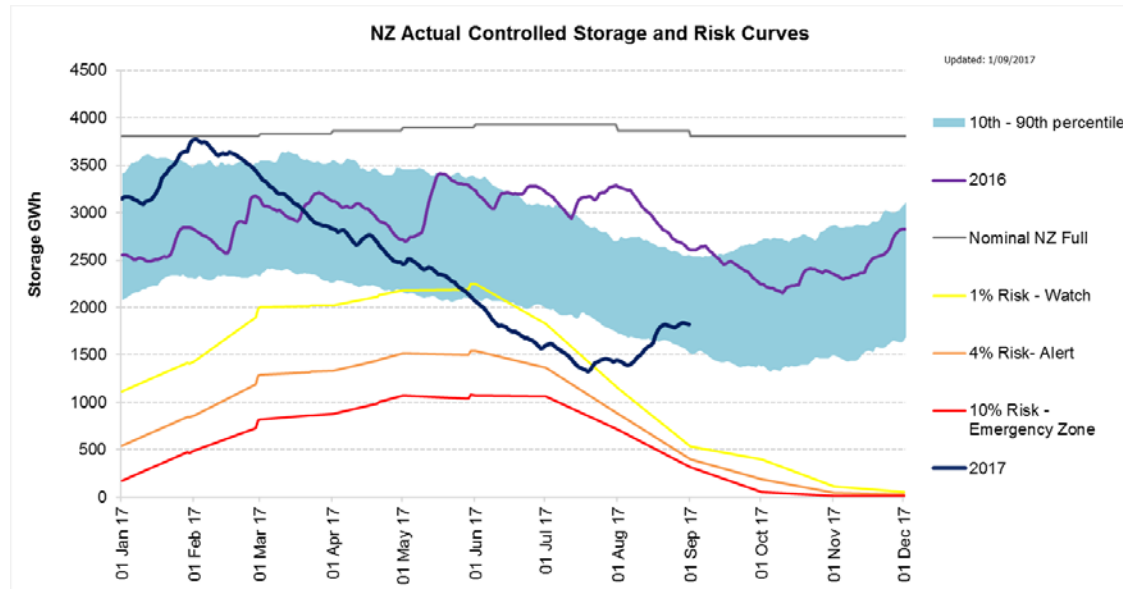
In 2017, South Island hydro lakes experienced very low inflows and storage levels. The months of March through to July were the driest the South Island has been since records started.

The worst risk status reached was ‘Watch’ (between 1% and 4% risk) in late May. We were very close to moving to ‘Alert’ in June.

By early July we were making preparations to implement an Official Conversation Campaign (OCC) if the risk continued to worsen.

However, by mid July, high rainfall meant the risk began to plateau and then decrease rapidly¹, removing the need for an OCC. The risk status returned to normal on 25 July and we began to close out our dry winter planning activities and monitoring from early August.

The graph below provides a helpful visual representation of how this played out;



Actions taken to manage the situation

The unique nature of the 2017 inflows and the impact on New Zealand's hydrology situation saw the situation develop relatively quickly from "Normal" status in early May to almost reaching "Alert" status by mid-June, with potential for an OCC to be required in early August. Transpower convened a dry winter planning team who worked under tight timeframes to ensure the situation was managed appropriately. A timetable of the actions taken is provided in Appendix 1. These included:

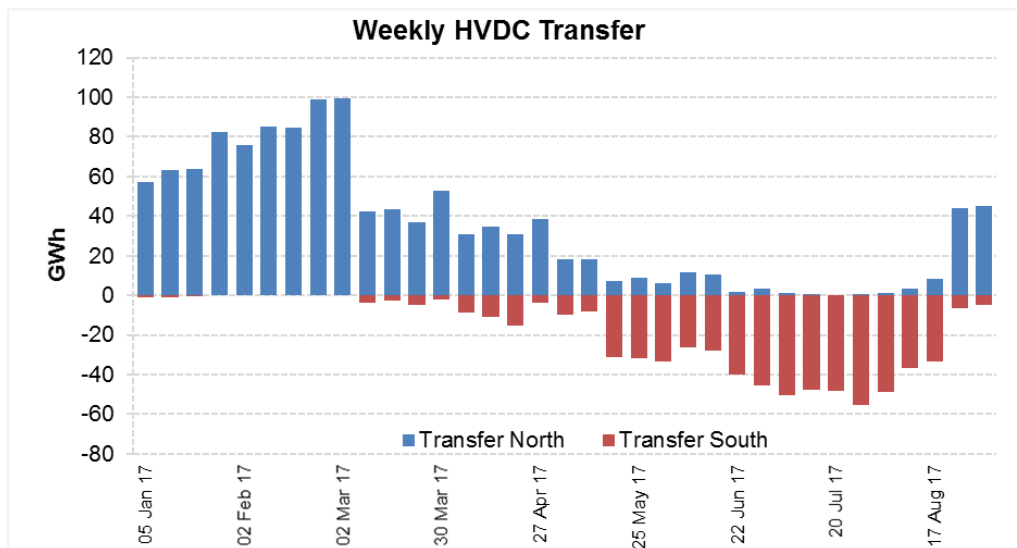
- Initiating increased monitoring and reporting of information to industry
- Engaging regularly with industry through face-to-face dialogue and industry-wide teleconferences
- Monitoring grid outages that could impact water conservation efforts in case deferral was required
- Implementing changes to grid assets and operation to facilitate greater transmission capacity
- Working with distribution companies to ensure their rolling outage plans were up-to-date in case the situation reached critical levels
- Preparing for an OCC, including applying, and obtaining approval, for campaign funding (\$1.9m, approved by the Electricity Authority board).

Some key observations

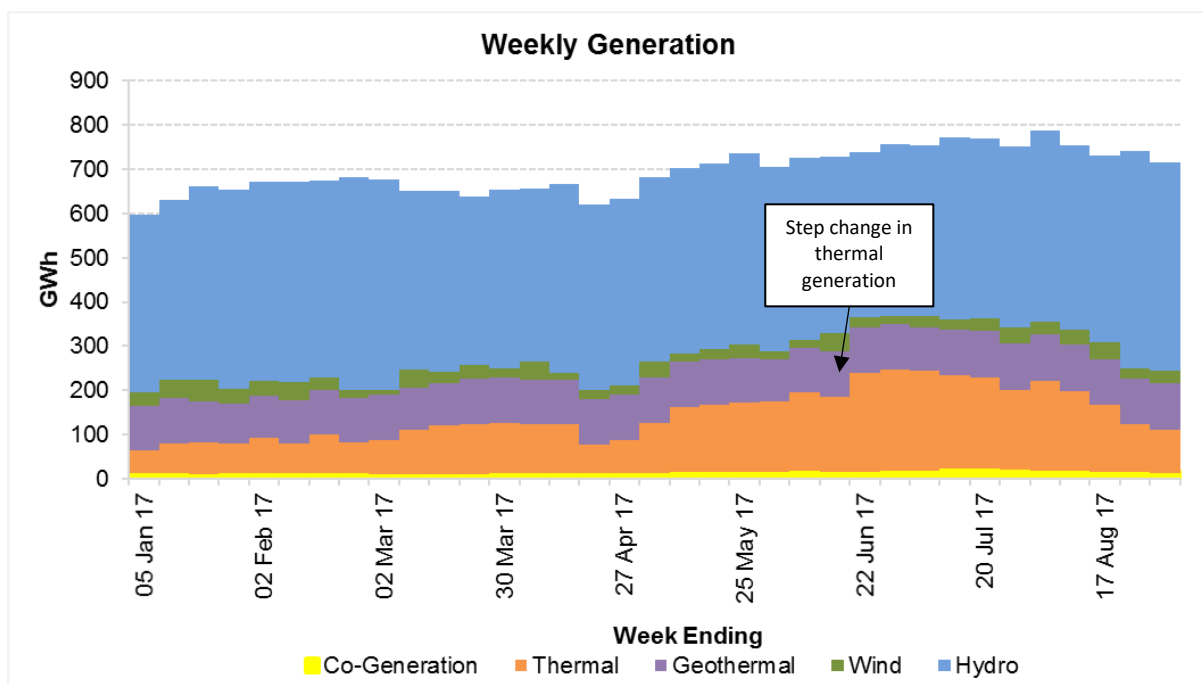
Compared to the most recent dry winter in 2008, we observed very few grid constraints - a reflection of the grid investment made since that time.

¹ In fact, since storage began recovering in August, inflows into the South Island have been the 9th *wettest* since records began in 1931 – just goes to show how volatile inflows can be.

We also saw very high south transfer on the HVDC to conserve hydro storage, reaching a peak of 670 MW. This is higher than anything we have seen in recent years and was made possible by the HVDC upgrades undertaken since 2013.



We observed a clear market response to the situation around mid-June where a significant step-change in thermal generation utilisation occurred.



We were also faced with some challenging policy issues over the period which required analysis and determinations to be made under urgency. These included whether our treatment of contingent storage should be changed and consideration of whether a South Island only vs Whole of New Zealand OCC should be undertaken.

What were the key learnings?

Overall, the existing framework and policies worked well to ensure the 2017 dry winter was managed successfully. However, there were some key learnings and recommended improvements to assist with management of future scenarios. Transpower and the Authority have developed these into a work programme to be delivered in a staged approach over the next 6-18 months. These learnings can be categorised into three key themes:

1. Robust framework

- A clear and stable regulatory framework provides certainty to the market and enables the industry to respond effectively. We should ideally avoid making changes to this framework under urgency, but it is helpful to understand the circumstances under which it might be appropriate to do so.

2. Clear processes and responsibilities

- Robust and well-understood processes and guidelines are key to ensuring we can respond appropriately during high pressure situations.
- Good collaboration between all stakeholders (Transpower, the Electricity Authority and industry) is key to successful management of developing situations.
- We need to capture our knowledge and experiences effectively so we can apply them in future winters (mindful that this may not occur again for several years).

3. Timely and accurate communication

- Communication channels and timeframes need to be clear and well planned in advance.
- The balance between precision and timeliness needs to be understood and communicated to stakeholders (ie is timely information more valuable than 100% precise)
- What do industry need to know? How would they like to receive this information?

What is the plan from here?

Transpower is working closely with the Authority on a work programme to ensure the learnings from the 2017 winter are captured and reflected in the regulatory framework, as well as our internal processes. This work includes:

- Refinement of our communications plans
- Knowledge management of dry winter experience and learnings (including formalisation and documentation of processes and procedures)
- Review of engineering assessment policies and processes
- OCC planning (including funding application and procurement plan refinement)
- Rolling outage planning
- Review treatment of contingent storage
- Review definition of controlled storage
- Review publication timeframes
- Review annual assessment prescriptions and assumptions

Concluding comments

In 2017, New Zealand faced one of the most challenging inflow sequences on record. Through the positive collaboration of all parties involved, the situation was managed effectively, without resorting to emergency measures. Transpower and the Authority have identified some policy and process improvements we could make to improve management of future dry winter situations and we have developed a work programme to consider these. In doing so, we need to be mindful of future landscape changes (such as less thermal generation and increased renewables).

Appendix

Date	Milestone	Status
5-12 May	Early industry discussions	Normal
12 May	Briefed Minister	
18 May	Commenced daily reporting	
Mid-May	Formed Dry Winter Planning Group	
22 May	Crossed 1% HRC – South Island	Watch (SI) Normal (NZ)
27 May	Crossed 1% HRC – New Zealand	Watch (SI) Watch (NZ)
1-8 June	Contingent storage discussions initiated	
6 June	Crossed 2% HRC – South Island	
14 June	Industry teleconference – Contingent storage	
23 June	Further Dry Winter planning information published	
27 June	Official Conservation Campaign funding application	
28 June	Contingent storage decision published Hydro risk curves published Crossed 2% HRC – New Zealand	
5 July	Further funding application details provided	
6 July	Industry teleconference - Engineering assessments Variable line rating applied	
7 July	Funding application approved	

20 July	Crossed 2% HRC – South Island Crossed 1% HRC – New Zealand	Watch (SI)
		Normal (NZ)
25 July	Crossed 1% HRC – South Island	Normal (SI)
		Normal (NZ)
2 August	Began close out of dry winter planning activities and monitoring	