TRANSPOWER

ELECTRICITY AUTHORITY
TE MANA HIKO

Joint Industry Briefing:

Electricity Authority's Review of official conservation campaigns

Transpower's Review of the security of supply forecasting and information policy

20 December 2018

COMPETITION • RELIABILITY • EFFICIENCY

Overview

This presentation describes aspects of our joint projects to review the regulatory settings for official conservation campaigns (OCCs) and calculations for hydro risk curves.

	Topic	Presenter	Minutes
Session 1: **12:30 – 1:30 pm**	Introduction	Authority	5
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	Project scope & next steps	Authority	15
	Inclusion of contingent storage	System operator	20
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	OCC stop triggers	Authority	20
	Accessing contingent storage	System operator & Authority	30
	Geographic application of OCCs	Authority	15
	Key messages	System operator & Authority	10

Introductions

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Background – Security of supply

- Transpower is required by the Act to…
  - provide security of supply information
  - manage security of supply emergencies
- But very strong linkages to Authority work
- Main purpose it to provide objective and transparent information to industry on security of supply
- Governed by…

The Code

The Code sets out the duties and responsibilities that apply to industry participants and the Authority.

Part 7	System operator	Part 7 relates to the system operator. It includes provisions relating to the system operator's principal performance obligations, and to security of supply and emergency management.
Part 9	Security of supply	Part 9 relates to security of supply. It includes provisions relating to system operator rolling outage plans, and participant rolling outage plans, urgent temporary grid reconfigurations and customer compensation schemes.

Security of Supply Policies

We use several policies to manage the Security of Supply process.

Emergency Management Policy ›

The Emergency Management Policy (EMP) sets out the steps that we will take, as a reasonable and prudent operator, during an extended emergency.

Rolling Outage Plans ›

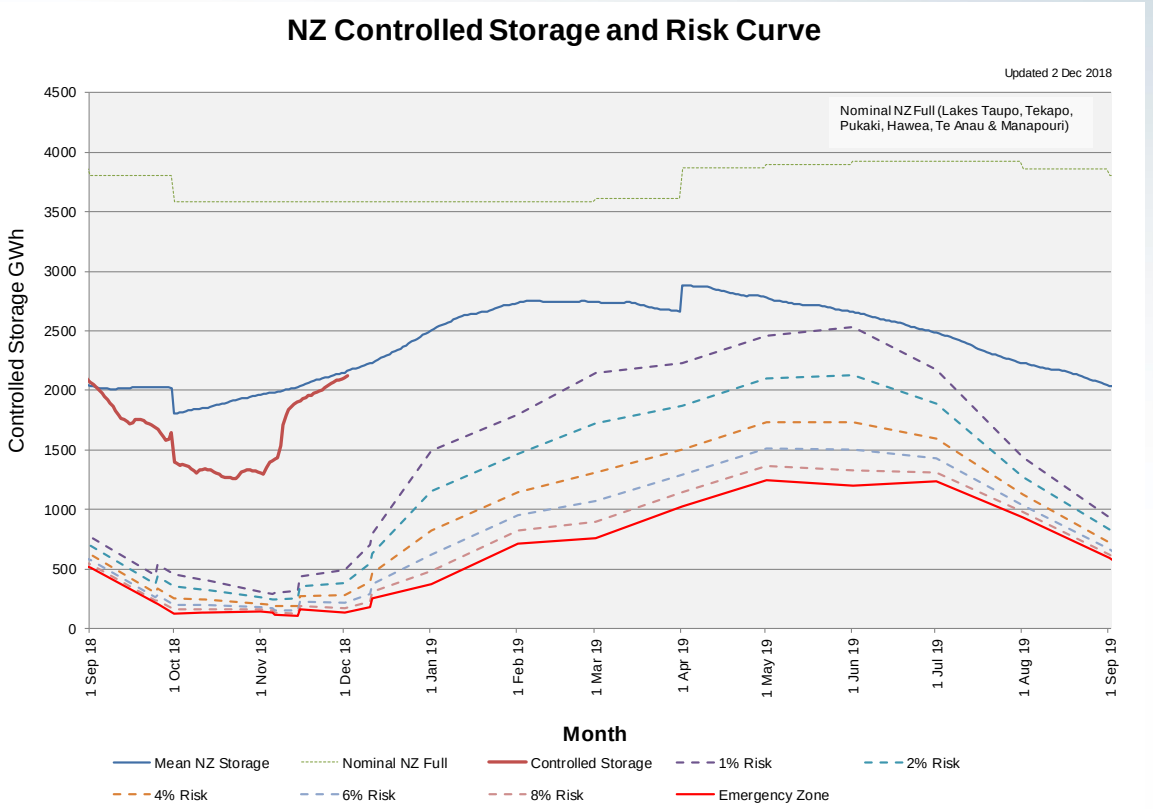
We have prepared and published a Rolling Outage Plan and provided links to all approved participant plans.

Security of Supply Forecasting and Information Policy ›

One of the functions of the system operator, specified in the Code, is to prepare and publish a Security of Supply Forecasting and Information Policy.

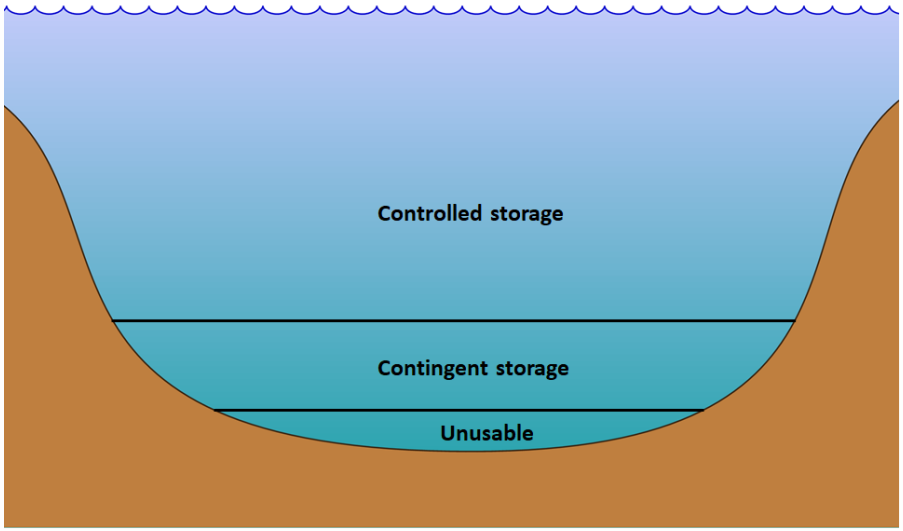
Background – Hydro risk curves

- The HRCs are key indicators of shortage risk
- Objective
- May not necessarily represent reality
- Assume history is a good predicter of the future
- Purpose:
  - Inform industry of risk
  - Trigger for OCC
- Do not include contingent storage



Background – Contingent storage

- Storage reserved for periods of high shortage risk



Lake	Contingent storage
Hawea	68 GWh accessible at 4% HRC.
Tekapo	220 GWh of *controlled* storage is classified as contingent between October and March inclusive. Accessible at 4% HRC.
Pukaki	Notionally 546 GWh, 330 GWh accessible at 'Alert', 216 GWh accessible at 216 GWh. Currently only 178 GWh is *available* due to physical constraints.

Background – Recent history

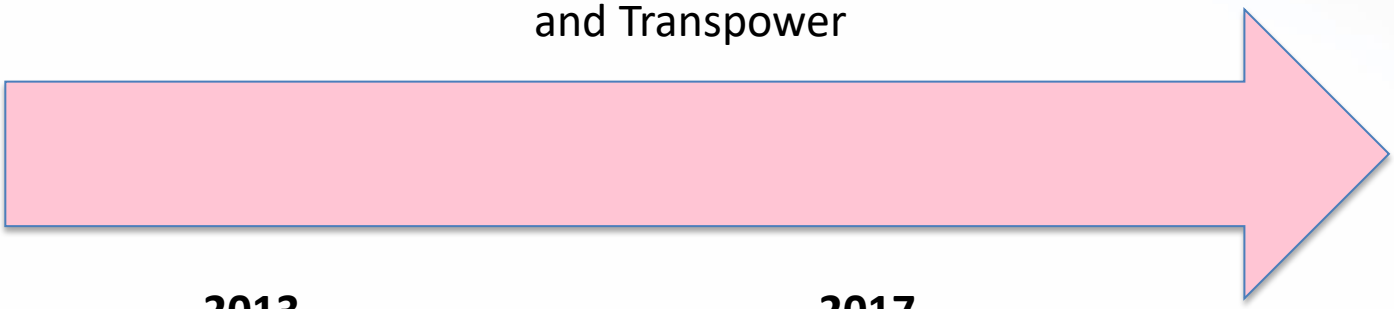
2012/13
SOSFIP reviewed

2013
Pukaki consent given

2014
SRC advice to Authority and Transpower

2017
Security of supply event

2018
Current review



Project scope

- Review of SOSFIP is primarily to do with inclusion (or exclusion) of contingent storage from the derivation of the HRCs
- However, *if* contingent storage is included, it changes the basis on when an OCC is triggered
    - Therefore, we recommended early in the process that the scope include an Electricity Authority review of Part 9
- Review not only focuses on *if* contingent storage be included, but also, if it is include *how* should it be included
    - This is important as it has an impact on both electricity industry participants, but also overseers of water resources (i.e. regional councils)

The legislative and regulatory instruments that might change are:

- clause 9.23 of the Code
- most of the Security of Supply Forecasting and Information Policy (SOSFIP)
- the reserve supply determination.

Most of the potential changes relate directly or indirectly to the option to include contingent storage in the hydro risk curves.

Summary of key messages

Transpower:

- We believe contingent storage should be accounted for in HRCs
- This will always bring complexity but we have proposed a workable solution
- We believe benefits of change outweigh additional complexity

The Authority is proposing to:

- keep the OCC start trigger at the 10% HRC despite the inclusion of contingent storage
- make provision for a floor with a buffer for the OCC start trigger
- have OCCs end when there is ≥90% of no repeat OCC within a fortnight
- implement changes in early June
- This suite of changes (including the system operator's proposals) is designed to improve reliability and efficiency

What do these changes mean for you?

1. 10% should more accurately represent the risk of shortage
2. OCC will be triggered at a lower level
3. Points at where contingent storage is accessed will change

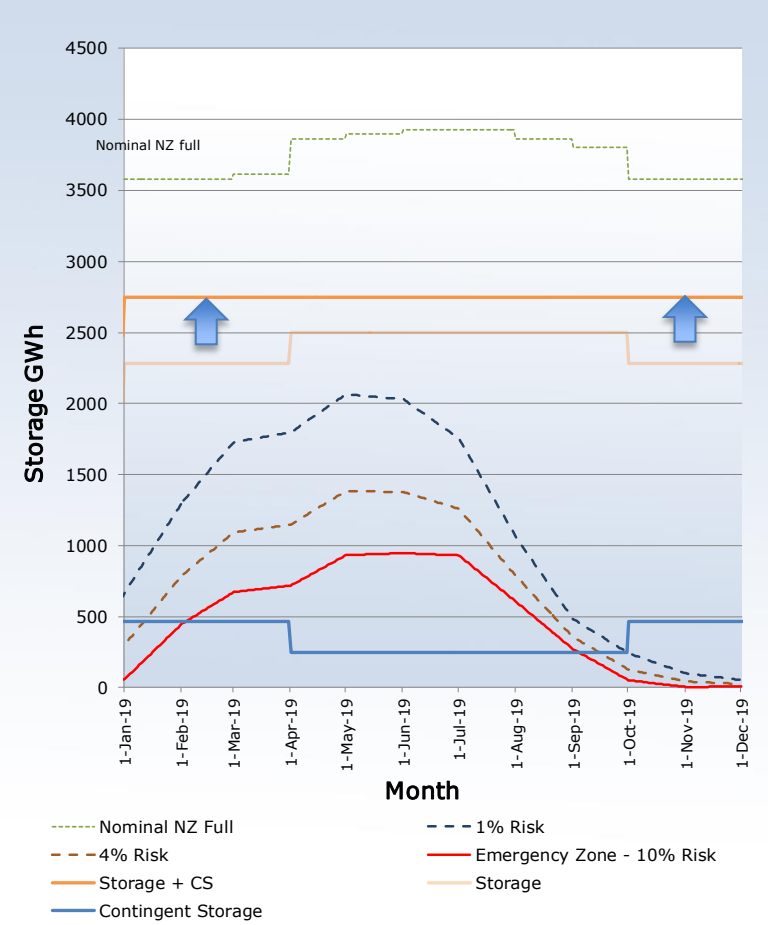
Next steps

- Consultation closes **5pm on Monday 4th of February**
- Once the consultations close, Transpower and the Authority will:
  - consider submissions
  - coordinate with each other to finalise recommendations to the Authority Board.
- The Authority Board will receive recommendations from both project teams and make one decision for the entire suite of proposed changes. Once the Board has made a decision:
  - Decision papers will be published in early May
  - Implementation could be early June, but we are seeking submissions on deliberately delaying implementation until after Winter 2019

Questions?

- Any questions about project scope and timing?

Inclusion of contingent storage



- Notionally a simple exercise
- Just add to contingent storage onto actual storage value?
- But policy needs to be robust to...
  - All foreseeable situations
  - All types of storage and access conditions
- And, is the trigger for an OCC still appropriate?

Afternoon tea

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OCC start trigger – background

The system operator has an obligation to start and manage OCCs. The system operator must start an OCC:

- When actual hydro storage (excluding contingent hydro storage) is less than the 10% hydro risk curve (HRC) and is projected to remain so for at least one week; or
- On a date agreed with us

The 10% HRC represents a 10% risk of running out of non-contingent hydro storage, under a range of assumptions:

- Rolling outages do not exist
- The market behaves to minimise the use of hydro-generation
- Historical inflows are the best predictor we have of future inflows

OCC start trigger – considerations

Key questions for the project:

- If it is desirable to instead measure risk inclusive of contingent hydro storage:
  - should OCCs be started at the 10% HRC or some other figure? (such as 6% or 8%)
  - should OCCs also be able to start when a minimum GWh level (“floor”) is breached?
- If a floor is appropriate, should it be set equal to the GWh of contingent hydro storage linked to the declaration of an OCC, or something higher?

Key considerations:

- The decision about the appropriate percentage of risk needs to balance:
  - The costs to consumers of starting OCCs earlier than necessary
  - The costs to consumers of starting OCCs too late to avoid rolling outages
- It is imperative that OCCs can be started and that contingent storage not be rendered inaccessible. Floors can achieve this but:
  - create a more complicated and confusing set of arrangements
  - could create ‘pinch-points’ in the operation of the power system and market behaviour.

OCC start trigger – considerations

Table 1: Estimated weeks of OCC from its start to start of rolling outages (using 50% HRC trigger)

Savings rate	HRC used to trigger OCC	Weeks from OCC start to 50% HRC — assuming 1% inflow probability[6]	Weeks from OCC start to 50% HRC — assuming 5% inflow probability[7]	Weeks from OCC start to 50% HRC — assuming 10% inflow probability[8]
0%	10% exclusive (status quo)[9]	4	6	7
	10% inclusive (proposed)[10]	3.5	5.75	6
2.5%	10% exclusive	4.25	7	8.25
	10% inclusive	3.75	6	7
5%	10% exclusive	4.5	8	9.25
	10% exclusive	4	7	8
7.5%	10% exclusive	**4.75**	9.5	10.25
	10% inclusive	**4.25**	8.75	9
10%	10% exclusive	5	11	11.5
	10% inclusive	4.5	9.75	10

OCC start trigger – recommendation

For start triggers, the proposed change would mean the system operator must start an OCC when storage in the hydro lakes is equal to or less than the greater of—

- a) the 10% HRC
- b) the combination of:
  - i. any contingent storage available only in the event of an OCC, plus
  - ii. any gigawatt hour buffer of controlled storage determined in accordance with the Security of Supply Forecasting and Information Policy (SOSFIP).

This is different to the current situation, where only (a) is used.

NB: The system operator and the Authority can still agree to start an OCC on a different date.

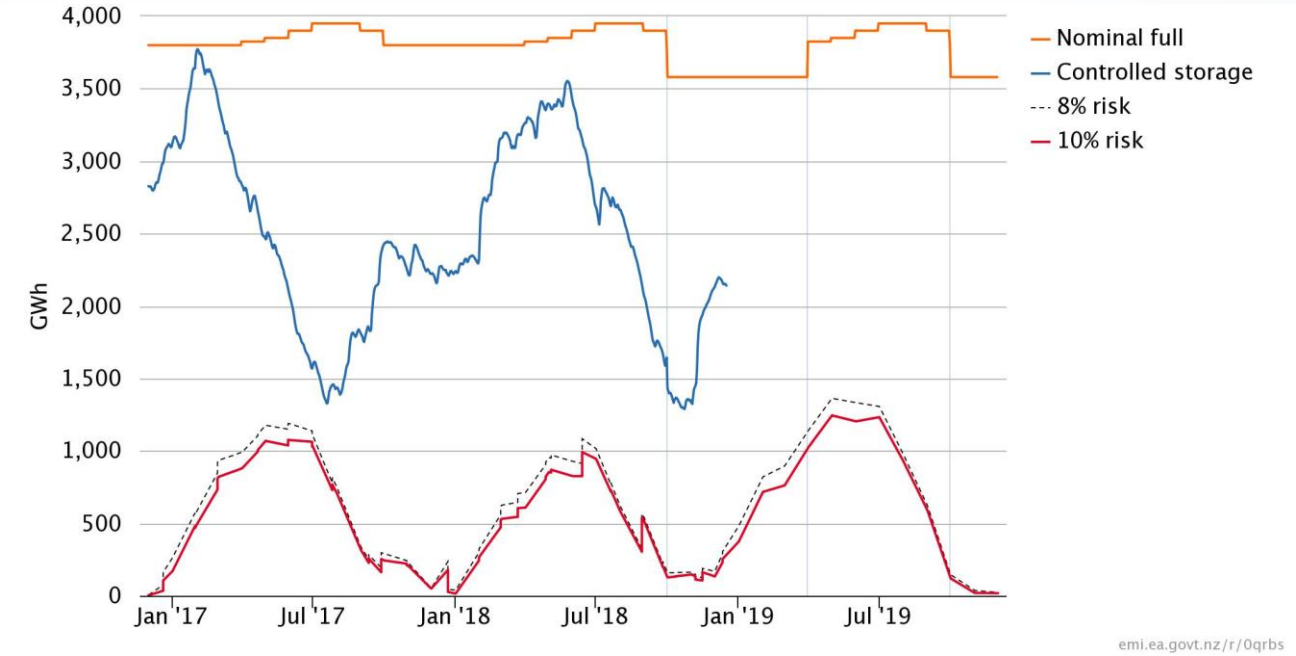
OCC start trigger – questions

Any questions on the OCC start trigger?

OCC stop trigger – background

The system operator must stop an OCC:

- When actual hydro storage (excluding contingent hydro storage) is greater than the 8% hydro risk curve (HRC); or
- On a date agreed with us



OCC stop trigger – considerations

Key question for the project:

- Should OCCs be stopped at the 8% HRC, or some other measure?

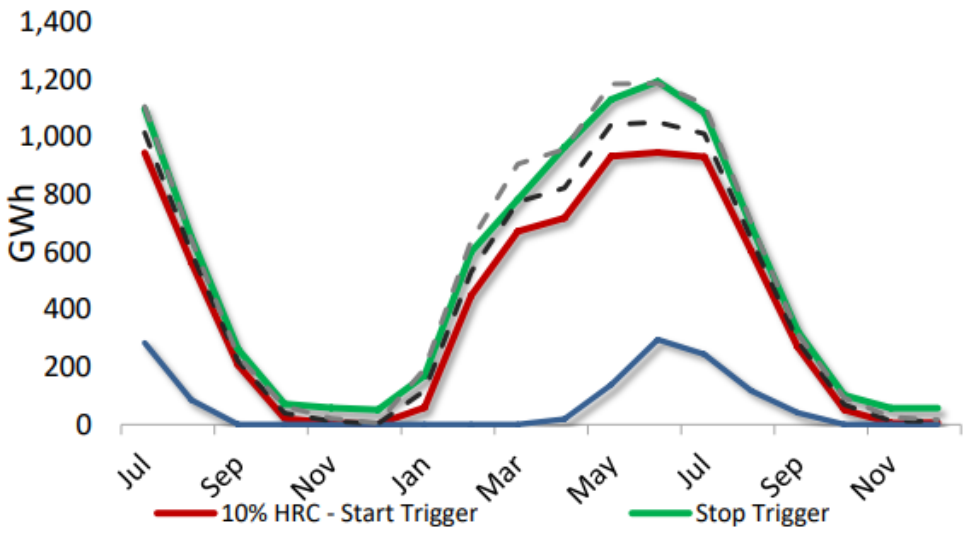
Key considerations:

- The decision about the appropriate stop-trigger needs to balance:
  - The costs to consumers of continuing OCCs longer than necessary
  - The risk of confusion to consumers caused by ending an OCC so quickly that another OCC starts shortly afterwards

OCC stop trigger – considerations cont.

To be able to balance those risks, the trigger must be a measure of the risk of another OCC starting

Figure 6: Proposed OCC end trigger compared with 6% HRC, 8% HRC, 10% HRC



Source: Electricity Authority

We would prefer that measurement of risk is as accurate as possible and predictable for stakeholders. But up-to-date inputs are the enemy of predictability!

OCC stop trigger – recommendation

The system operator would have to stop an OCC when there is a ≥90% chance of actual hydro storage remaining above the start-trigger for two weeks, based on best estimates of demand and supply (which likely means recently-observed supply and demand).

The system operator could use an instrument like its simulated storage trajectories to make that prediction.

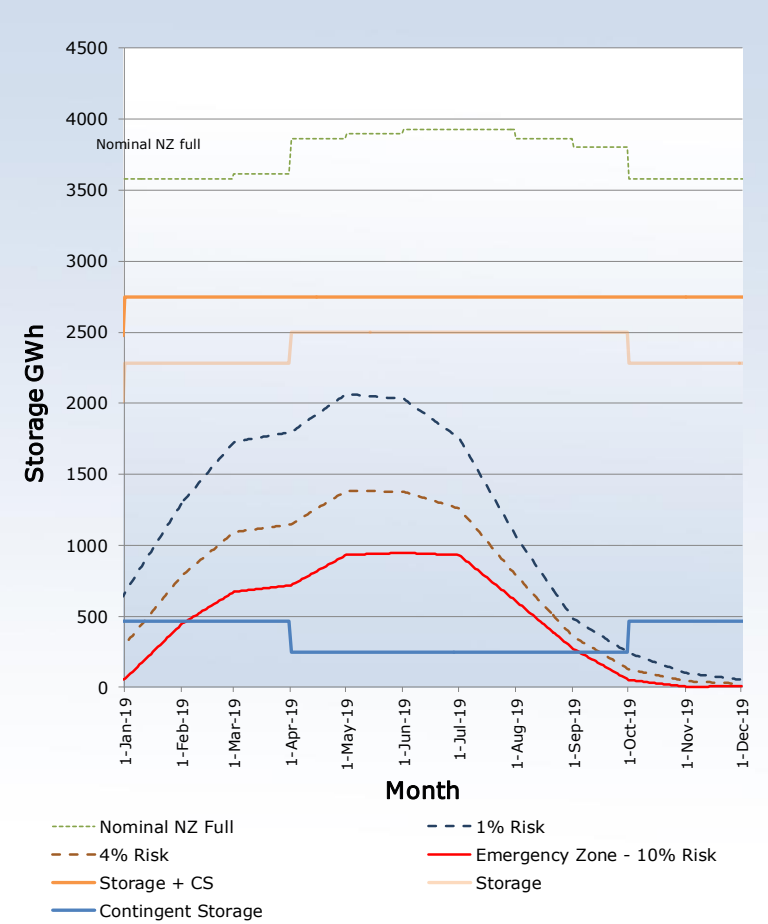
NB: The system operator and the Authority can still agree to stop an OCC on a different date.

OCC stop-trigger – questions

Any questions on the OCC stop trigger?

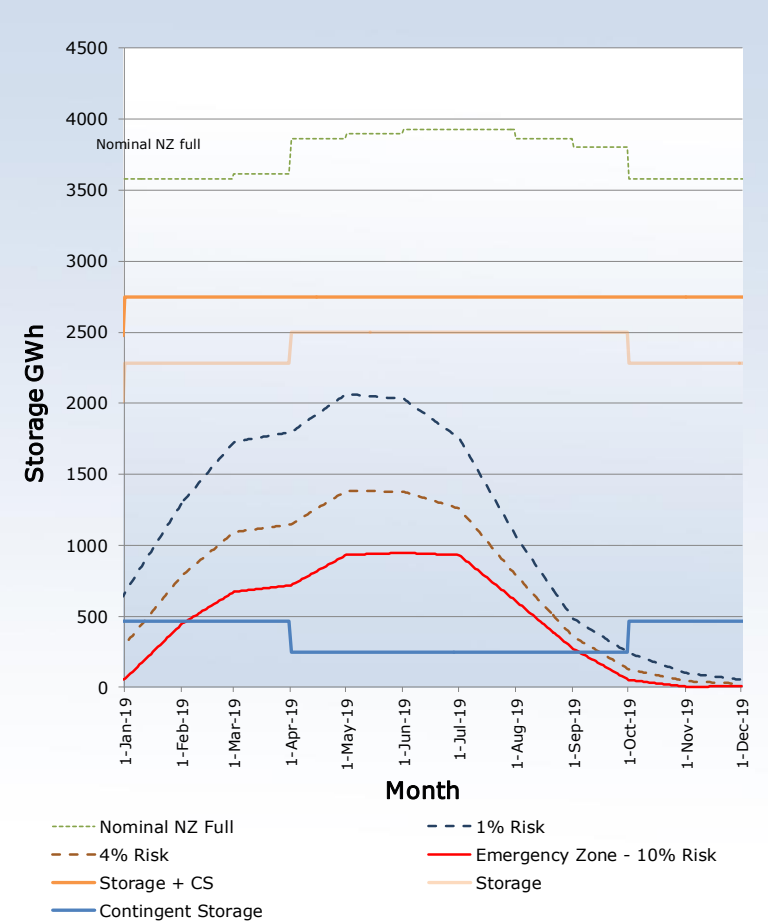
Access to contingent storage – complicating factors

- Contingent storage being linked to HRCs inherently causes challenges
  - If we include storage all the time…
  - Or if we include it when it becomes available…
- Practical considerations:
  - How much to include?
  - Allowances required to accommodate for dynamics at very low lake levels?



Access to contingent storage – making it work

- Ideally we include contingent storage
  - at all times, and
  - when determining contingent storage access
- We could exclude contingent storage when determining access
  - Similar outcome to current arrangements
- Both options are workable



Access to contingent storage – background

The Electricity Industry Act 2010 empowers the Authority to make and rescind a reserve supply determination.

- When activated, it enables access to contingent hydro storage in lakes Tekapo and Hāwea (because they have resource consents that refer to the Electricity Commission and its reserve energy scheme)
- The reserve supply determination is currently set to activate when the system operator sets a risk meter to either Alert or Emergency

Access to contingent storage – considerations

- We would prefer not to be involved in directing when generation resources should or should not be made available. However, failing to make any reserve supply determination would effectively revoke resource access.
- That would be a material reduction in reliability enjoyed by consumers.
- We are seeking to give effect to what we think the consenting authorities intended when they granted the relevant resource consents.
- We think the fundamental outcome they wanted was a Crown-approved expert to decide when power shortages were looming but not already underway.

Access to contingent storage – recommendation

- We prefer to link the reserve supply determination to a system operator instrument that is derived from the greater of the Alert boundary (inclusive of contingent storage) and a floor (with buffers as appropriate).

Access to contingent storage – questions

Any questions on access to contingent storage?

Geographic application of OCCs – background

At the time OCCs were legislated for, the power system had considerably less ability to transfer electricity to the South Island. This partly explains why OCCs can be run for either:

- all of New Zealand; or
- the South Island only

As such, the system operator maintains HRCs and risk meters for all of New Zealand, and for the South Island only.

If a South Island-only OCC were run:

- only South Island consumers would be asked to conserve power
- only South Island consumers would be eligible for $10.50/ICP/week payments under the customer compensation scheme

Geographic application of OCCs - discussion

Key questions for the project:

- Is it desirable to run an OCC for some subset of New Zealand?
- If so, what subset? South Island only? The South Island plus the lower-North Island?
- Regardless, what lakes should be counted when determining whether an OCC should start/stop?

Key considerations:

- More complicated arrangements may produce more confusion and resentment with the public
- More complicated arrangements may be able to produce more efficient outcomes, as the benefits of electricity savings differ by location and time-of-day. But those differences are less pronounced due to changes in the power system between 2011 and 2018
- Flexible arrangements can better cater for unusual situations
- The extent to which arrangements lead to inefficient market behaviour

This is a discussion – no Code amendments are being proposed at this time

Geographic application of OCCs - questions

Any questions on the geographic application of OCCs?

KEY MESSAGES: Transpower

- We believe contingent storage should be accounted for in HRCs
- But this will always bring complexity
  - But we have proposed a workable solution
- We believe benefits of change outweigh additional complexity

- **Consultation closes 5pm Monday 4 February**
- Late submissions **will not** be considered

KEY MESSAGES: Authority

- The Authority is proposing to:
  - keep the OCC start trigger at the 10% HRC despite the inclusion of contingent storage
  - make provision for a floor with a buffer for the OCC start trigger
  - have OCCs end when there is ≥90% of no repeat OCC within a fortnight
  - implement changes in early June
- The Authority is also asking what regions OCCs should apply to
- This suite of changes (including the system operator's proposals) is designed to improve reliability and efficiency

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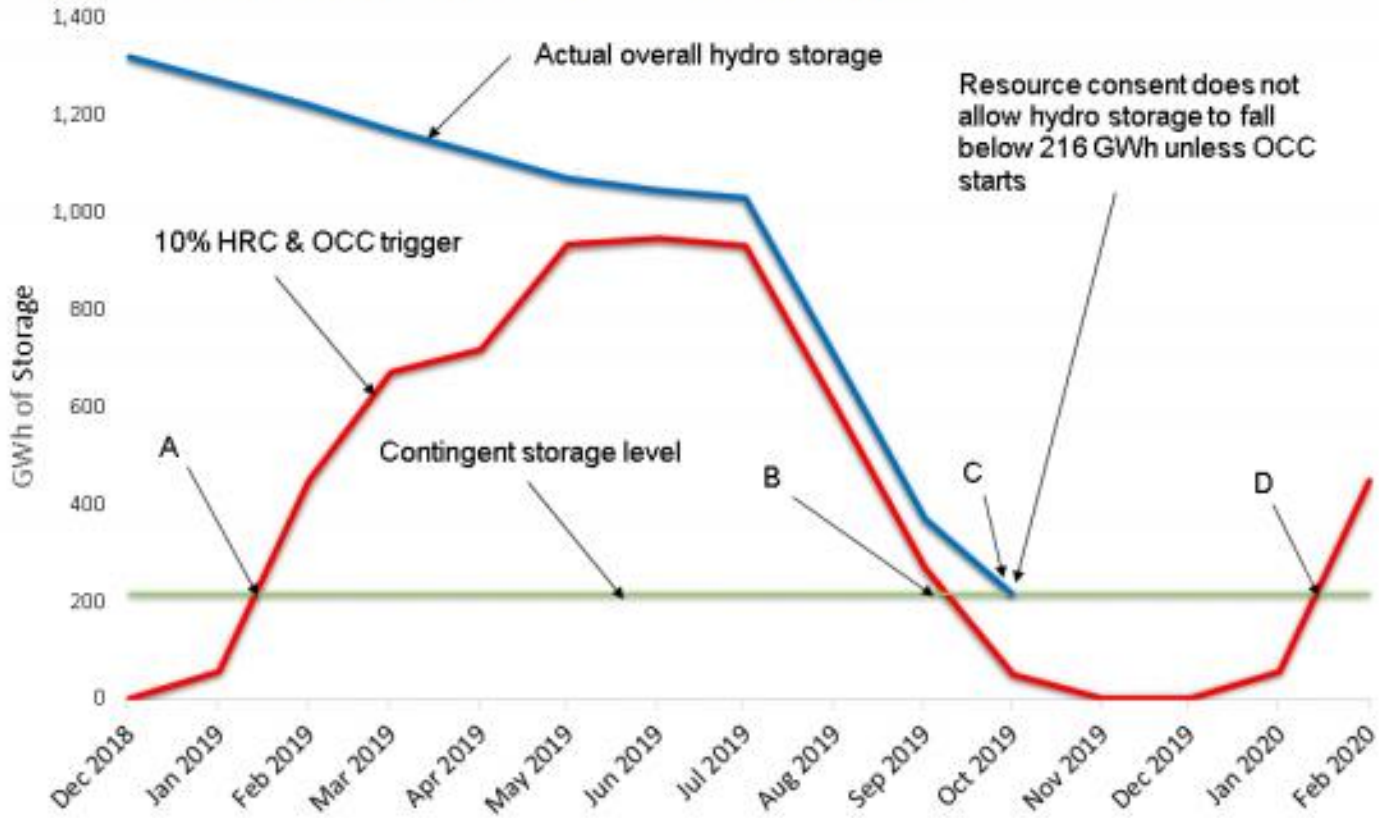
QUESTIONS?

ANNEX

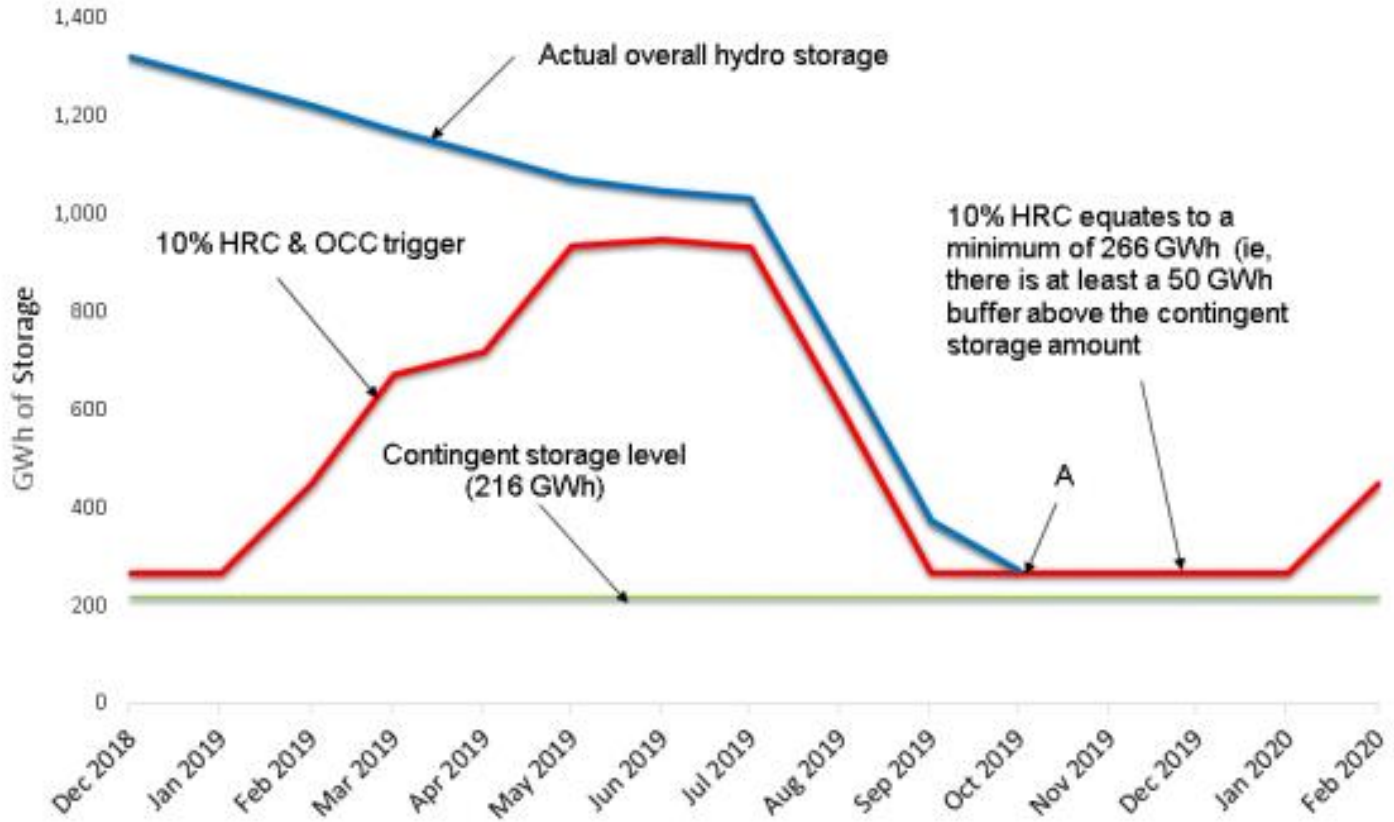
Figure 2: Example of when 10% HRC cannot trigger an OCC



Source: Electricity Authority

ANNEX

Figure 3: Example of buffer added to HRC floor



Source: Electricity Authority

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Appendix D Some background on the reserve supply determination

D.1 The Electricity Commission operated a reserve energy scheme. At the time, the Government wanted the Electricity Commission to contract for reserve energy (electricity generation or demand response) to provide security of supply that was additional to that provided by the electricity market. The Electricity Commission was to use this contracting for reserve as a primary mechanism for ensuring security of supply in a 1-in-60 dry year.

D.2 Under the reserve energy scheme, the Electricity Commission established a trigger point for dispatching reserve energy from the Whirinaki power station to help preserve hydro storage.

D.3 Initially, this trigger point was when hydro storage fell below the level required to ensure no demand restraint (either voluntary or forced rationing) was required in a 1-in-60 dry year, with all non-hydro supply fully committed.[29] The Electricity Commission then changed the trigger point to refer to a 1-in-74 dry year.[30] Subsequently, the Electricity Commission adopted the 4% HRC as the trigger point for dispatching Whirinaki reserve generation.[31]

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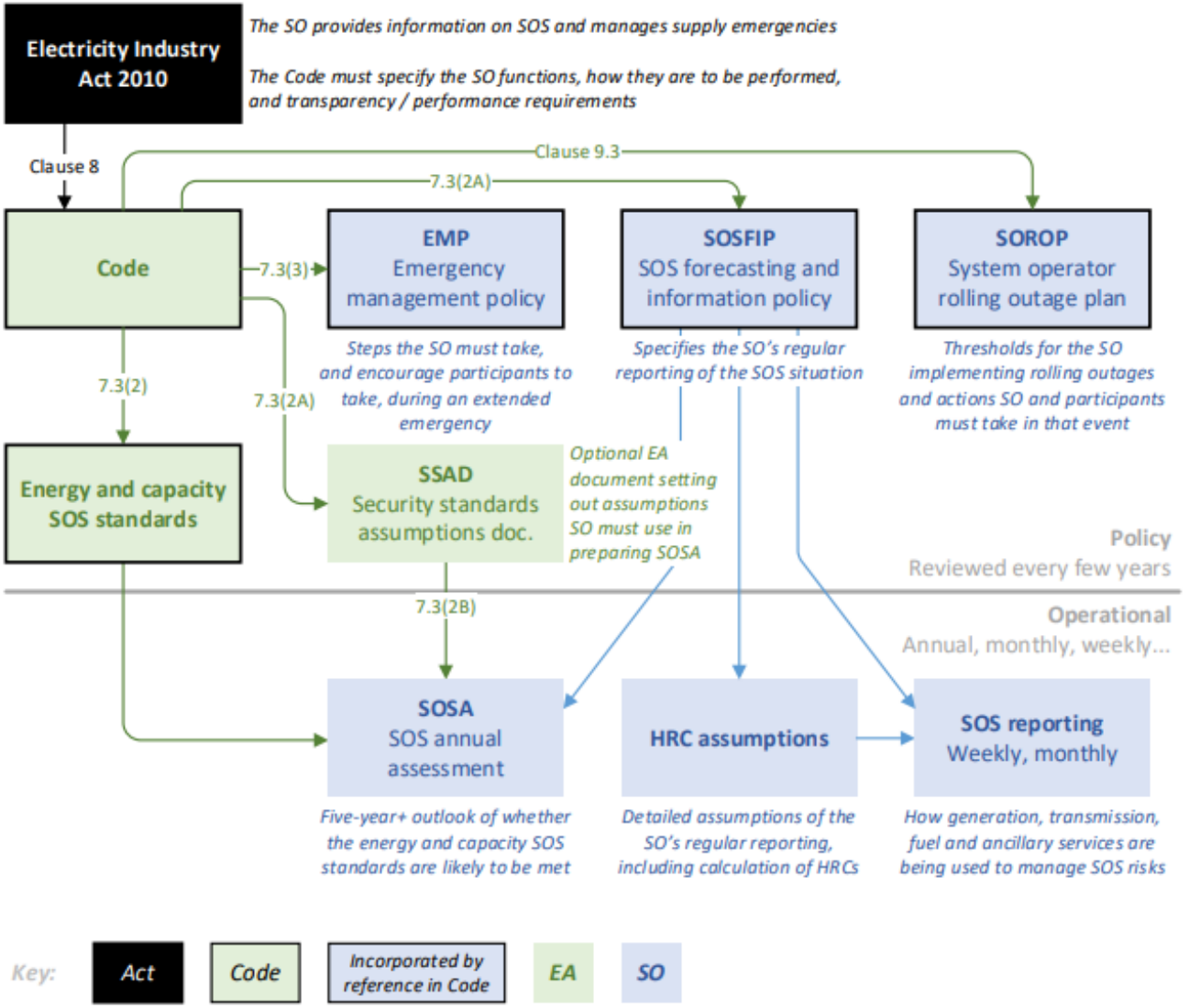

Figure 1: Security of supply key document inter-relationships

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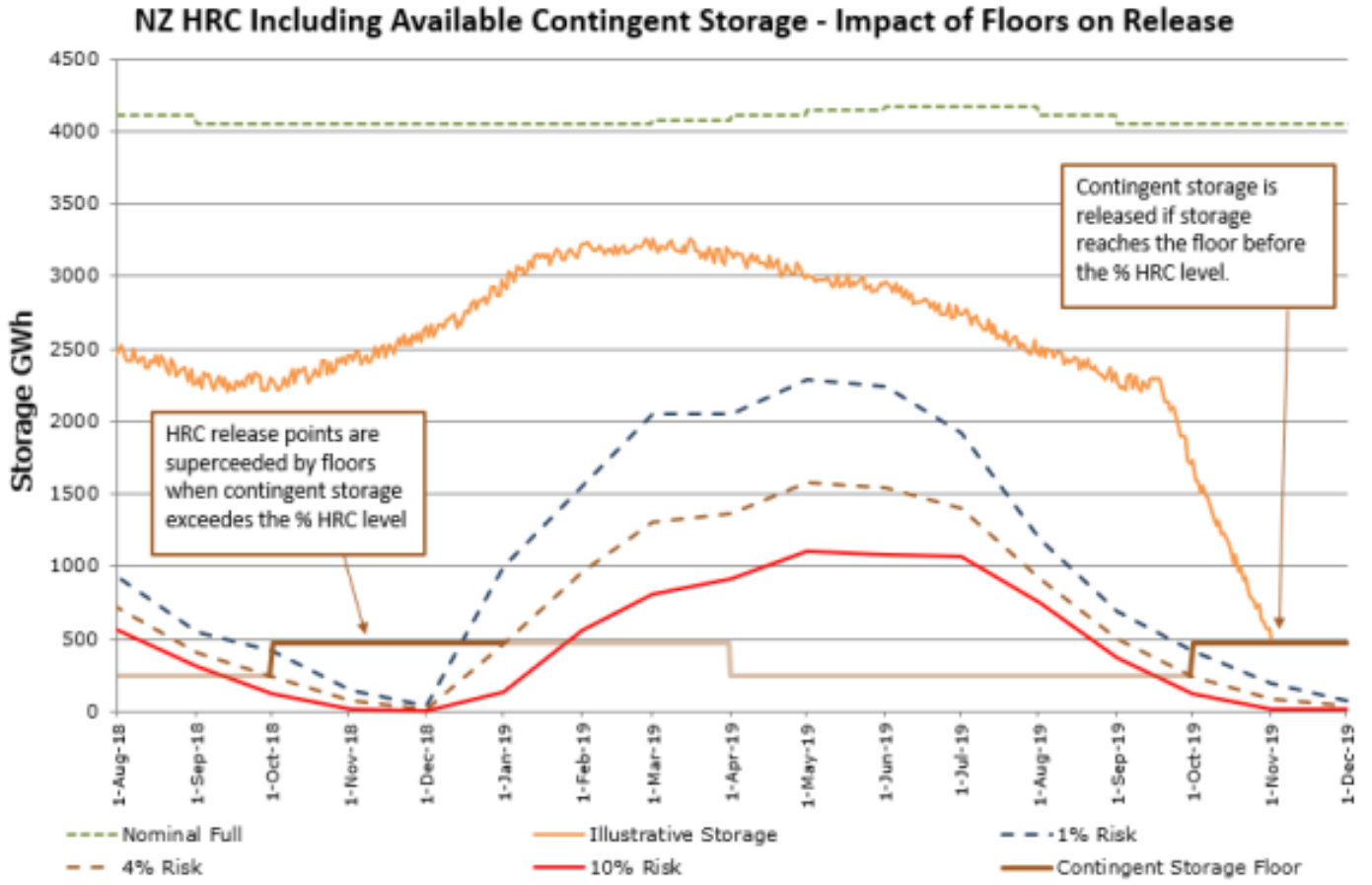

Figure 4: NZ Actual Controlled Storage and Risk Curves - Including Contingent Storage and Floors Example

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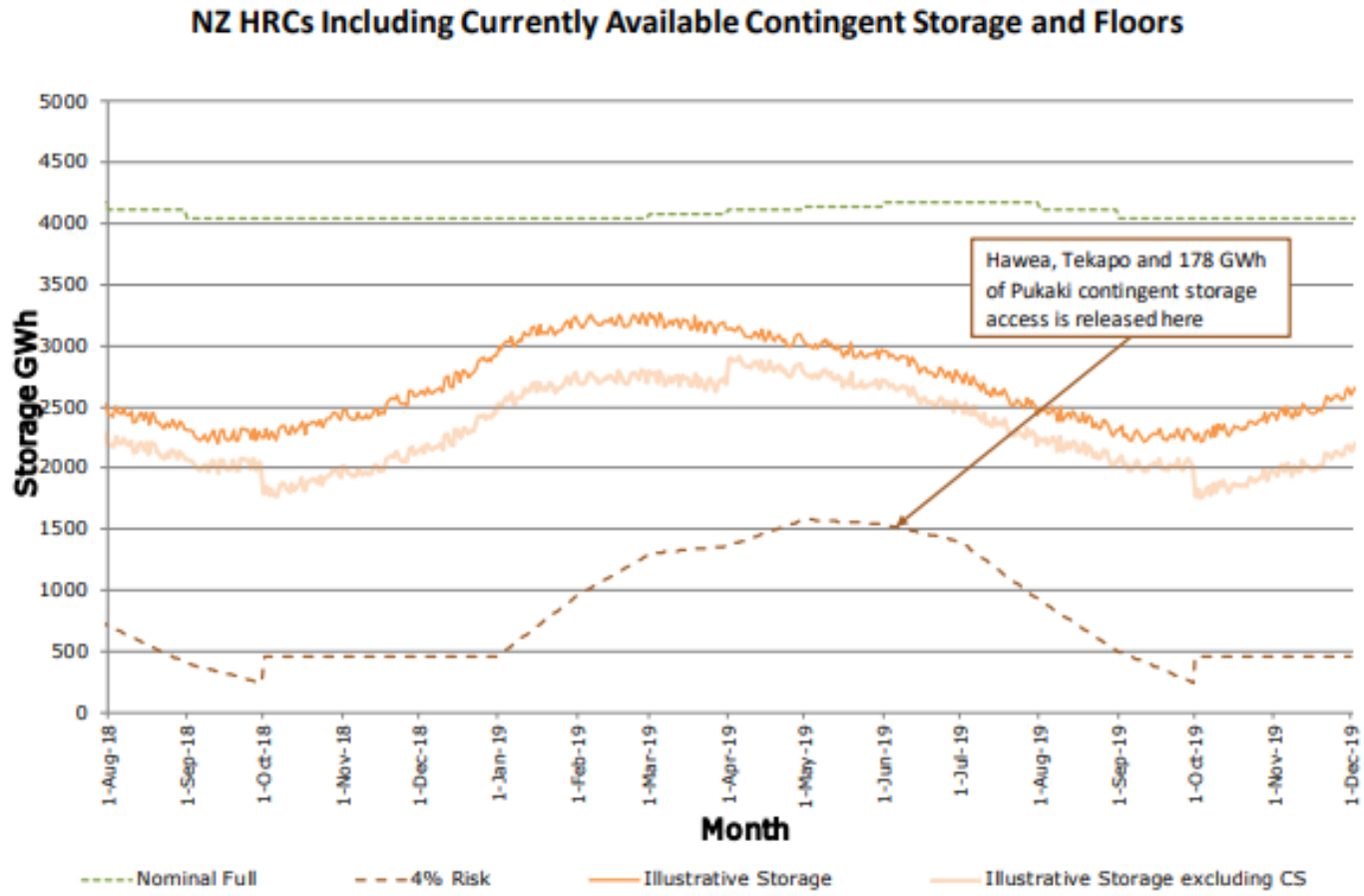

Figure 5: NZ Actual Controlled Storage and Risk Curves - Including Contingent Storage and Floors (currently available contingent storage)

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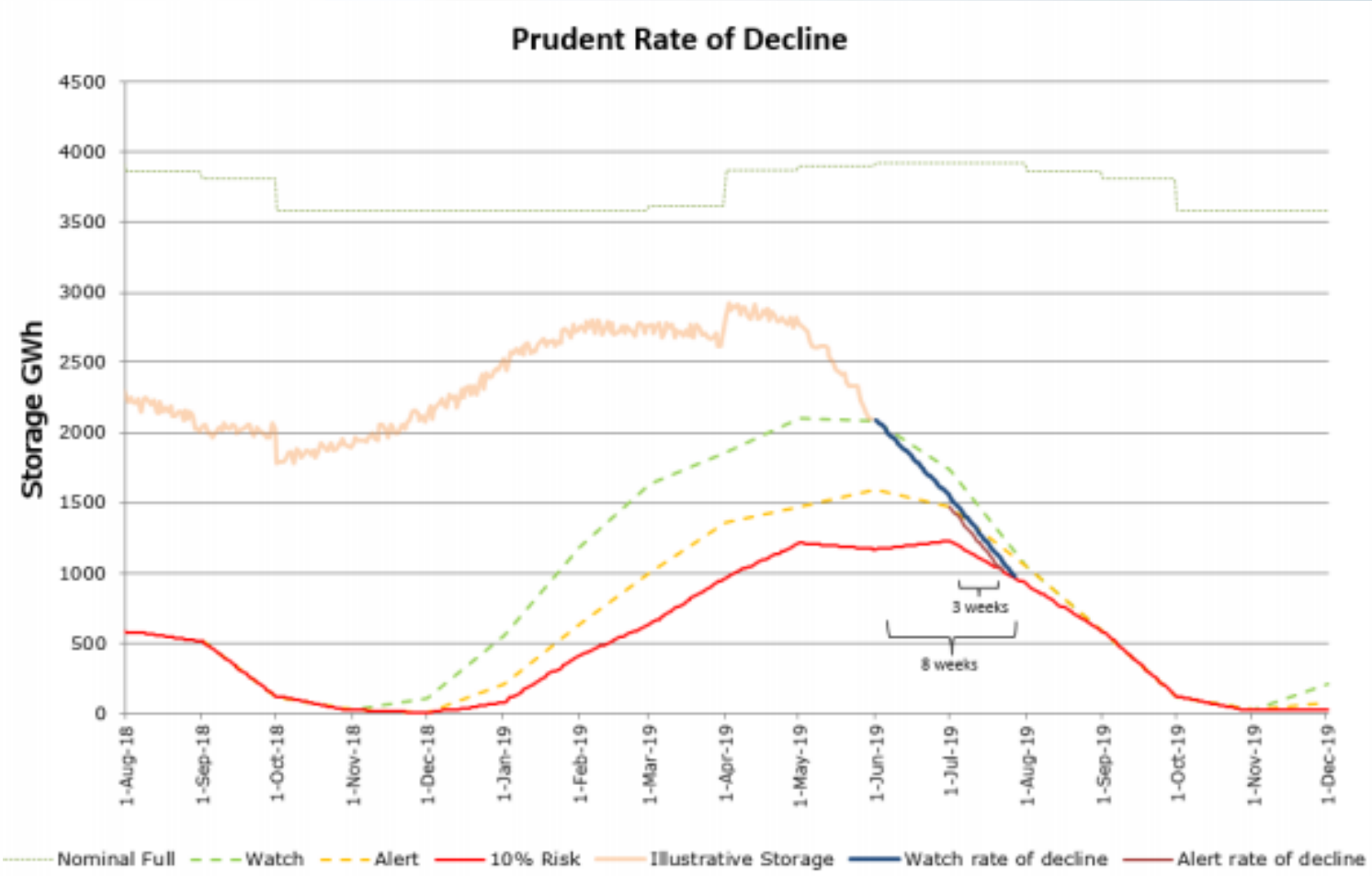

Figure 8: Watch and Alert status determined using a rate of decline *approach*