11 February 2019

Submissions
Electricity Authority
By email: submissions@ea.govt.nz

Review of regulatory settings for official conservation campaigns

Meridian appreciates the opportunity to provide feedback on the Electricity Authority's review of the regulatory settings for official conservation campaigns (OCCs). We have also provided a submission to the system operator on their associated review of the Security of Supply Forecasting and Information Policy (SOSFIP).

Meridian supports the system operator's proposal to include contingent storage in the derivation of the hydro risk curves (HRCs). Failing to include contingent storage presents an inaccurate picture of the actual risk of shortages in electricity supply and is likely to result in sub-optimal decision-making. Meridian has for a long time considered the inclusion of contingent storage in the HRCs to be necessary to promote the reliability and efficiency of the electricity industry for the long-term benefit of consumers. This change should ensure that the HRCs better reflect the actual risk of a supply shortage rather than, as currently, inaccurately estimate that risk based only on a sub-set of the total available hydro storage. The current HRCs, for example, are likely to lead to an OCC being called at a less than 10% risk of shortage (i.e. at a time when there is still a greater than 90% chance that there will not be a shortage).

Meridian supports the Authority's proposal to continue to use the 10% HRC as the trigger for beginning an OCC. With the proposed inclusion of contingent storage in the HRCs, the curves will become a better representation of the risk of shortage, aligned with most people's understanding of what the HRCs ought to represent. Any OCC start trigger more conservative than the 10% HRC could increase risk aversion, the likelihood of spill, and more use of thermal generation (and resulting emissions), and increased electricity cost for

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New Zealand consumers. It is also important to keep in mind that the HRCs are inherently conservative as a model and should not be made any more conservative.[1]

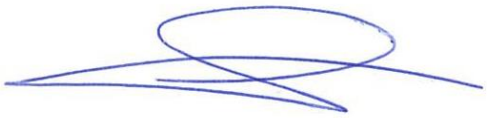
Meridian supports the Authority's proposed buffer and consider buffers to be a prudent part of the HRCs and proposed contingent storage release boundary, regardless of which options are progressed. A buffer should be applied:

- above the floor of the contingent storage release boundary (if a release boundary determined inclusive of contingent storage is the preferred option);
- above the 0 GWh line of the contingent storage release boundary (if a release boundary determined exclusive of contingent storage is the preferred option);
- above the 0 GWh line of the HRCs because at certain times of the year the 10% HRC is at or close to 0 GWh of storage.

Finally, Meridian supports the Authority's proposal that any OCC should only cease once there is 90% chance that no further OCC will occur within a fortnight. This proposal will avoid the potential adverse effects of an on-again-off-again OCC.

Please contact me if you have any queries regarding this submission.

Yours sincerely



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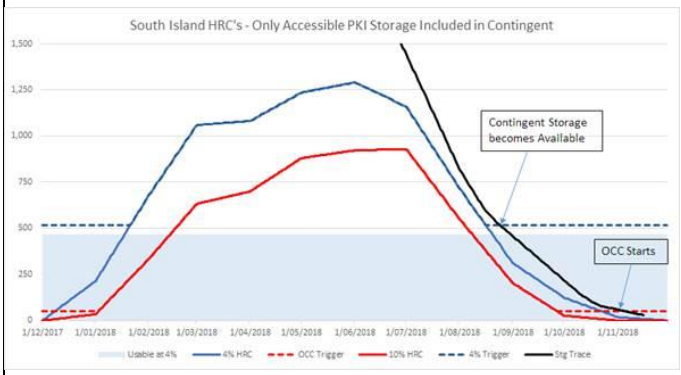
[1] The forward-looking model assumes that on any given day of the year, the inflows to hydro lakes from that point forward could follow any one of the historical inflow sequences for which records exist, stretching back to 1932. This creates over 80 scenarios of how the future may turn out, each with the same assumed probability of occurring. However, low hydro storage is reached after a period of low inflows. When the low historical inflow sequences are assumed to follow a recent run of low inflows, this can create a very long run of low inflows that is without precedent in the record of actually observed historical sequences. This inherent conservatism is increasingly marked as storage levels drop.

A. Responses to consultation questions

	Question	Response
1	Do you agree the 10% HRC, calculated inclusive of contingent storage, should be used to trigger the start of an OCC? If you disagree, please provide reasons.	Yes. The key purpose of the HRCs is to be a simple and clear 'line-in-the-sand' to determine the start of an OCC. For many years, the start trigger for an OCC has been the 10% HRC. This has been presented, somewhat inaccurately, as a 10% risk of shortage. In reality, the HRCs are currently more conservative – representing the risk of calling on contingent storage. This makes the risk of shortage at the 10% HRC less than 10%. With the proposed inclusion of contingent storage in the HRCs, they will become an accurate representation of the risk of shortage, aligned with most people's understanding of what the HRCs ought to represent. As noted in the covering letter of this submission, the HRCs are already inherently conservative as a model and should not be made any more conservative.
2.	Do you agree a buffer should be added to any HRC floor? Please provide reasons.	Yes, Meridian agrees that a buffer should be added to any HRC floor to avoid the risks identified by the Authority. Hydro lakes may be drawn down unevenly during a very low inflow sequence. Restrictions on draw down rates and transmission constraints could also mean that some hydro storage is not used to generate at the same rate as storage in other lakes. In addition, some generators may consider it prudent to retain minimum volumes of controlled storage to manage the operation of generation plant. There is also the potential for errors in measuring hydro storage. All of these factors may result in some hydro lakes having controlled storage while others do not. The absence of controlled storage in certain hydro lakes, coupled with an inability to access contingent storage (because not all lakes are empty) could have severe adverse consequences for the power system's capacity to meet demand. A buffer margin on top of the floor of total contingent storage available at the 4% HRC

		would (depending on the size of the buffer) go some way to mitigating the risk of adverse consequences when hydro storage is drawn down unevenly. The size of the buffer is important. We recommend a buffer of at least 100 GWh to account for measurement fluctuations in storage lakes. We suggest a buffer should also be applied above the bottom of all available storage to avoid the risk that an OCC is not called because the 10% HRC cannot be crossed due to uneven draw down of hydro storage. This 10% HRC floor could look like the dashed red line in the figure below:  Finally, as noted in our submission to the system operator, Meridian also considers a buffer to be necessary on the alternative contingent storage release trigger option – a release boundary determined exclusive of contingent storage and without the need for floors. For the same reasons noted above, the absence of a buffer could be an issue at certain times of the year when the 4% HRC trigger for release of contingent storage would be close to 0 GWh of storage. We share the Authority's concerns with the system operator's proposed alternative approach to buffers whereby the system operator exercises its discretion, as required, to determine whether overall hydro storage has fallen to the point where it equals contingent storage. A buffer is in our submission preferable to the reduced certainty, reduced transparency, and incentive to lobby that would result from the system operator's

		alternative.
3.	Do you agree a Code amendment putting in place a floor on the 10% HRC is necessary and desirable to avoid the infeasible solution described in paragraphs 3.14 to 3.20? If you disagree, please provide reasons.	Yes, we agree that a floor on the 10% HRC might be necessary in future to address the infeasibility described. Meridian has been granted resource consent to access Pūkaki contingent storage down to 515m above mean sea level at the "Alert" level (the 4% HRC). Due to engineering constraints, Meridian can currently only access contingent storage from 518m down to 516.4m above mean sea level (equivalent to 178 GWh) – i.e. we cannot access contingent storage between 516.4m and 515m (the remaining consented storage available at the "Alert" level) let alone access the further contingent storage between 515m and 513m that becomes available in the event of an OCC.
4.	Do you agree with our preferred potential change to the reserve supply determination? If you disagree, please provide reasons.	The reserve supply determination does not affect hydro storage managed by Meridian. However, the reserve supply determination should follow the same methodology for triggering the release of contingent storage in Lake Pūkaki, i.e. all currently available contingent storage should be triggered at the same time.
5.	Do you agree there are adverse effects on reliability of supply and market efficiency from the current arrangements for ending an OCC?	Yes, there is certainly the potential for adverse effects of the kind described in the paper.
6.	Do you agree with our proposed approach to addressing these adverse effects?	Yes, Meridian agrees that an OCC should cease once there is 90% chance that no further OCC will occur within a fortnight. The methodology proposed for determining the chance of a subsequent OCC uses historical inflows and appears to ignore forecast rainfall. While using a full two-week forecast would be unreliable, the first few days at least could be used to give a more accurate estimate. The Authority and system operator could consider a methodology that blends the forecast with historical inflows.

7.	Do you agree there should be two forms of OCC – a South Island-only OCC and a New Zealand-wide OCC? Please give reasons with your answer.	No, for the reasons given by the Authority in the paper, a South Island-only OCC is no longer necessary or desirable. We agree that: • there is now better transfer of energy from the North Island to the South Island; • a South Island-OCC may cause confusion and resentment among consumers; • normally there would be little difference in timing between the start of New Zealand-wide and South Island-only OCCs; and • a South Island-only OCC may be too rigid in its geographic scope. Meridian therefore supports a New Zealand wide OCC only. Meridian agrees with the suggestion that the Authority could retain the discretion to initiate sub-national OCCs on the advice of the system operator.
8.	Do you agree with the proposal's objective? If not, why not?	Yes.
9.	Do you agree the benefits of the proposed amendment outweigh its costs?	Yes.
10.	Do you agree the proposed amendment is preferable to the status quo and the alternatives? If you disagree, please explain your preferred option in terms consistent with the Authority's statutory objective in section 15 of the Electricity Industry Act 2010.	Yes.
11.	How far in advance of the start of winter 2019 (ie, 1 June 2019) would you need the proposed changes implemented to be of use in your operational decision-making for winter	Meridian does not need any particular notice period in advance of the proposed changes and we would be sceptical of any claims from others that significant notice periods might be required. The HRCs provide an estimate of electricity system risk and are constantly changing with

	2019?	revised supply and demand inputs or assumptions – the system operator has revised the HRCs over 60 times (often with little or no notice) since becoming responsible for the HRCs in 2011.
12.	Do you agree that the Authority's proposal complies with section 32(1) of the Electricity Industry Act 2010?	Yes.
13.	Do you agree with the Authority's assessment of the proposal against the Code amendment principles? Please give reasons if you do not.	Yes.
14.	Do you have any comments on the drafting of the proposed amendment?	Throughout the proposed drafting an assumption is made that separate New Zealand and South Island HRCs and OCCs will continue. As discussed in our response to Question 7, there are good reasons to consider having only New Zealand wide HRCs and OCCs in future. Under this option, there is no need for separate South Island provisions in the Code. Clause 9.32 of the Code also refers to "…the hydro risk curves, as that term is defined in the **security of supply forecasting and information policy**…". As noted in our submission to the system operator, Meridian recommends that the HRCs be renamed the 'Electricity Risk Curves'. The HRCs are the product of modelling the entire electricity system (including planned thermal generation availability, the mix of thermal and other generation supplying the system at any one time, and electricity demand) and actually show the risk of electricity shortage across the whole system, rather than merely that portion of supply that is provided by hydro generation. If the name "hydro risk curves" is changed in the SOSFIP, a consequential amendment to clause 9.32 of the Code will also be required.