TRANSPOWER

Low Residual Situations - incorporating Emergency Reserve

Participants' Forum

12 November 2026

Agenda

Item	Description	Presenter
1	Intro and objectives of the session	Ben Priest Market Operations Manager
2	Emergency Reserve recap	Murray Henderson Principal Market Advisor
3	Emergency Reserve process overview	Tim Connolly Operations Manager Security
4	Scenario workshop	Murray Henderson
5	Close and next steps	Ben Priest

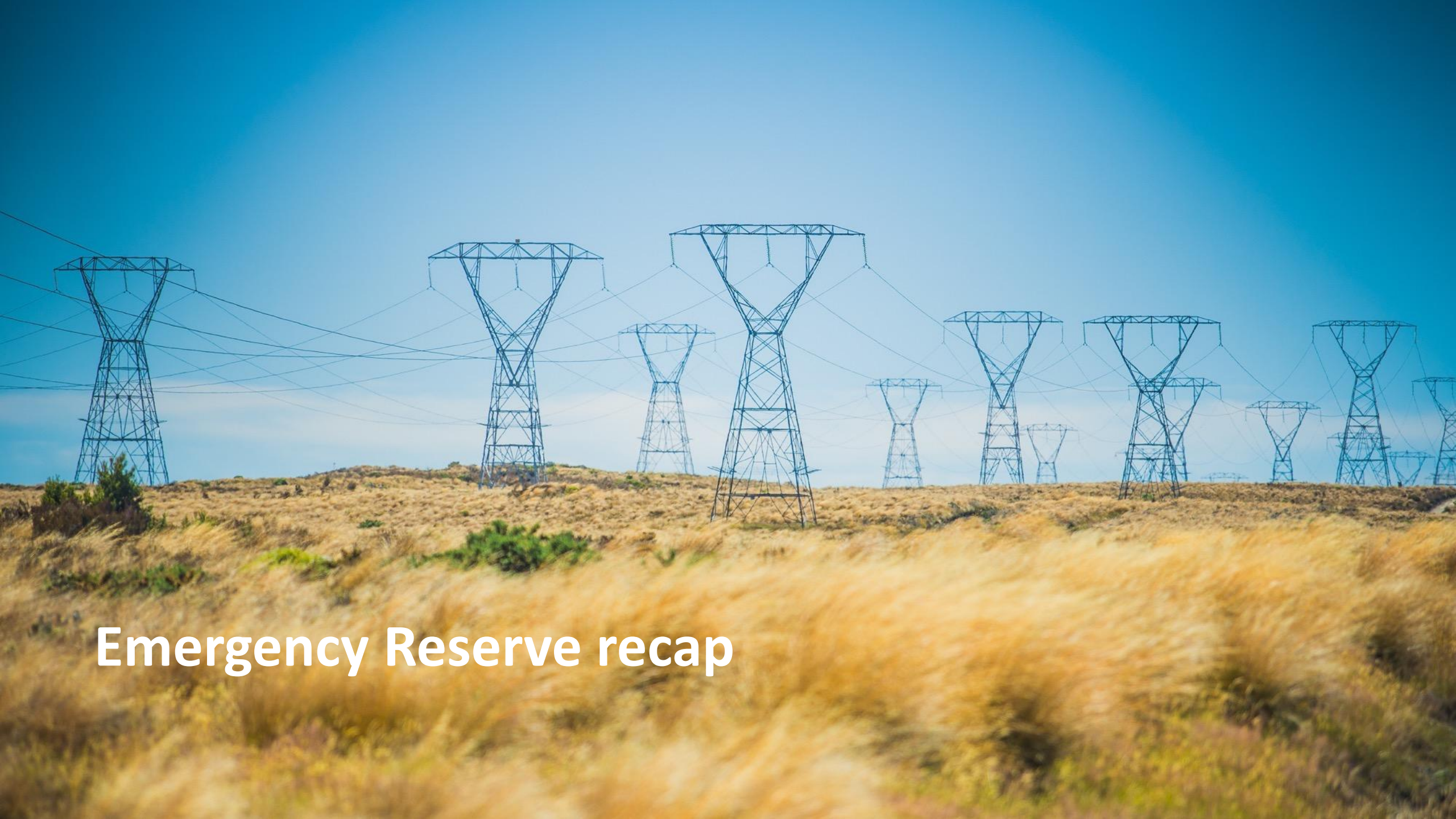
Objectives of the session

Gain an understanding of Emergency Reserve and how the scheme will work in practice.

We want participants to question the process - how would your organisation have responded as we talk through the scenarios?

Inform our decisions on key parameters.





Emergency Reserve recap

Emergency Reserve recap

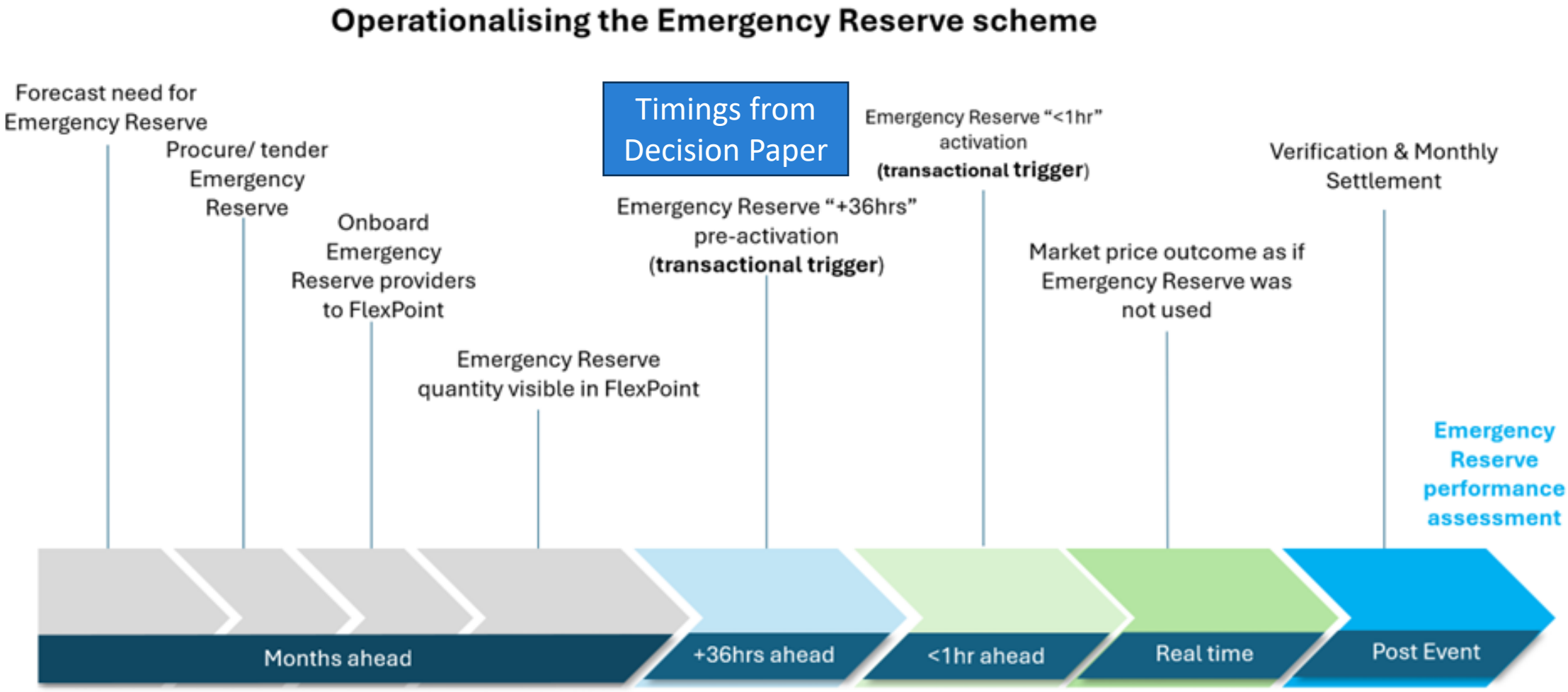
- Electricity Authority's ER objectives

Primary Objective	Promote system security and reliability, and minimise the likelihood and extent of uneconomic load shedding during infrequent periods when demand is high and inadequate supply is available from other sources
Secondary Objective	Build capability to provide demand flexibility more generally, through building organisational capability and investments in equipment.

- Which looks like:
  - a penultimate tool, in the form of 'additional resources' (most likely contracted demand response), for the SO to use to help coordinate forecast potential capacity shortfall events.
- ER Code Gazette 1 March 2026:
  - Creates ER ancillary service,
  - Purchasers pay,
  - Emergency management 'order'.

Decision paper is clear on *some* "Year 1 pragmatism"

Emergency Reserve recap



NB: scope for pragmatic 'initial' options as described in the Electricity Authority's decision paper.

Emergency Reserve recap – design challenges

- Code is already published.
- Funded for an MVP.
- Providers? Who? How many? Quantity?
- Balancing enabling more providers vs requiring more “Real Time” capabilities.
- Timing / achieving the desired Emergency Management Order.
- Likely low frequency of use / historic examples.
- Flexibility vs certainty in the Procurement Plan.
- NCC cognitive overload.
- Location.

Emergency Reserve recap - Emergency Management Order

Tech Code B – Emergencies:

6 Actions to be taken by the system operator in a grid emergency

(1) If an **unsupplied demand situation**, or insufficient generation and **frequency keeping** gives rise to a **grid emergency**, the **system operator** may, having regard to the priority below, if practicable, and regardless of whether a **formal notice** has been issued, do 1 or more of the following:

(a) request that a **generator** varies its **offer** and **dispatch** the **generator** in accordance with that **offer**, to ensure there is sufficient generation and **frequency keeping**:

(b) request that a **purchaser** or a **connected asset owner** reduce **demand**:

(c) require a **grid owner** to reconfigure the **grid**:

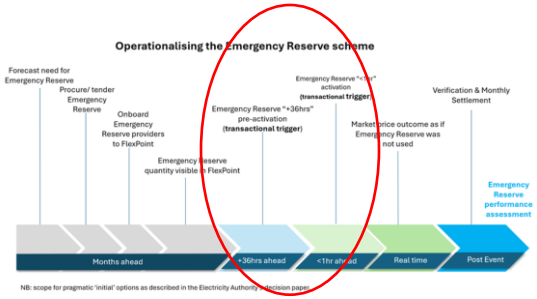
(ca) **activate emergency reserve**:

(d) require the **electrical disconnection** of **demand** in accordance with clause 7(20):

(e) take any other reasonable action to alleviate the **grid emergency**.

“plus” IR scarcity ‘converting’ IR to energy

Emergency Reserve recap – continuous monitoring for low residual situations and shortfalls



+12-36 hrs

Q1

PRE-ACTIVATION

Q2

CONTROLLABLE LOAD

EMERGENCY RESERVE

LOAD-SHEDDING

Q3

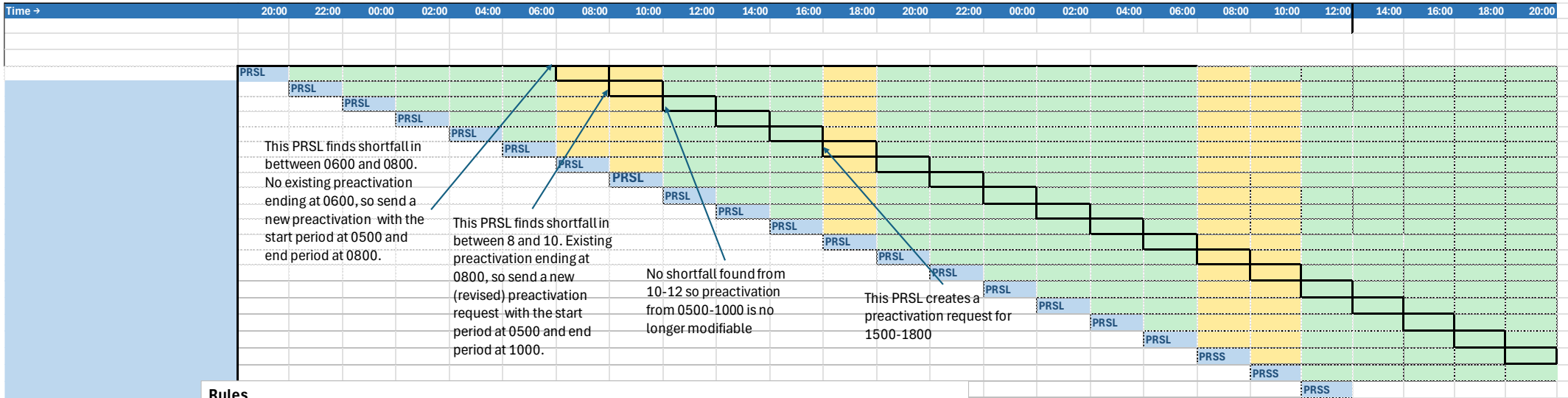
ACTIVATION

<1 hr



Emergency Reserve process overview

ER process overview – pre-activation trigger



Rules

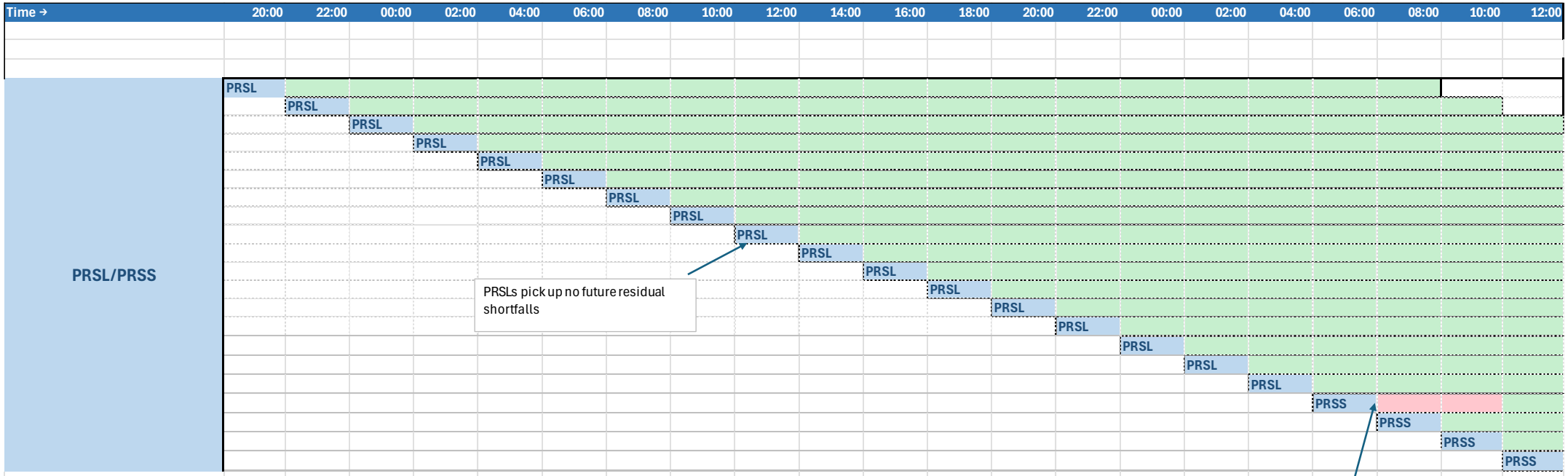
1. Preactivation detection is performed using approved or published automated PRSL schedules only.
2. A configurable PRSL lockout period is applied before preactivation assessment occurs. The lockout period is a system parameter. The expected value is 12 or 24 hours.
3. A Preactivation Event start time shall never be revised backwards once established.
4. Future forecast shortfalls are assessed within a Detection Window immediately following the lockout period. The Detection Window consists of four trading periods. The Detection Window size is configurable but is expected to align with the number of trading periods between PRSL publications.
5. A shortfall exists where the forecast island residual for a trading period within the Detection Window is less than the configured Preactivation Shortfall Threshold.
6. If a shortfall is detected within the Detection Window and no contiguous Preactivation Event exists, a new Preactivation Event shall be created. The event start time is calculated using a configurable start offset and the event end time is set to the end of the Detection Window. A Preactivation Request shall be generated.
7. If a shortfall is detected within the Detection Window and a contiguous Preactivation Event exists, the existing Preactivation Event shall be extended to the end of the Detection Window. The event end time shall be updated and a revised Preactivation Request shall be generated.

PREACTIVATION RULES

ER process overview – pre-activation trigger

- Market Services, NCC and FlexPoint Operators receive notifications.
- Event details are automatically sent from the Market System to FlexPoint.
- FlexPoint contacts and pre-activates **all** ER providers using their chosen communication method.
- Provider Responds:
  - Acknowledge receipt of the pre-activation,
  - Optionally reduce their available capacity if operational circumstances have changed,
  - If they do not respond, FlexPoint automatically retries according to configurable rules.
- Pre-activation Schedule Updates:
  - As providers respond, FlexPoint continually updates the available reserve schedule,
  - Schedule can be viewed in FlexPoint or the MOI.
- Pre-activations expire at the pre-activation end-time.

ER process overview – activation trigger



ACTIVATION rules

Rules

1. Activation detection is performed using approved or published PRSS schedules only.
2. The detection period is the second period of each schedule , i.e., if the schedule is run at 0633 the detection period is the 0700 trading period.
3. A shortfall exists where the forecast island residual for the detection window trading period is less than the configured Activation Shortfall Threshold
4. If a shortfall exists and there is not an existing activation event (one with a null end date), then activation event should be created with the start period the period in which the shortfall exists. An activation request should be made including the island (in which the shortfall occurred), the activation period in which the shortfall occured and the requested MW the MW required to get back up to the Activation Shortfall Threshold (ie the requested mw = threshold - island residual)
5. If a shortfall exists and there is an existing activation event (one with a null end date), then determine from the most recent activation request for that event whether the threshold-island residual in the detected trading period is greather than the requested MW in the activation request. If it is then make a new activation request for the new requested MW amount and activation period for this updated requested MW.

ER process overview – activation trigger

- Market System applies activation multiplier.
- Market Services, NCC and FlexPoint Operators receive notifications.
- Event details are automatically sent from the Market System to FlexPoint.
- FlexPoint selects which providers to activate using:
  - Required MW,
  - Island-specific merit order,
  - Contracted MW capacity (binary – no partial activation notifications),
  - Any capability information supplied during pre-activation,
  - Providers who acknowledged pre-activation are prioritised over those who did not.
- Providers acknowledge activation.
- RTDP adjusted for acknowledged MW.
- As providers respond, FlexPoint continually updates the emergency reserve schedule.
- Schedule can be viewed in FlexPoint or the MOI.

ER process overview – escalation

- Only ever one active activation event.
- If conditions worsen, the same activation event is used.
- Additional emergency reserve can be activated.
- Requested MW can only increase during an active event.
- New activation requests are issued to **further** providers when larger quantities are required.

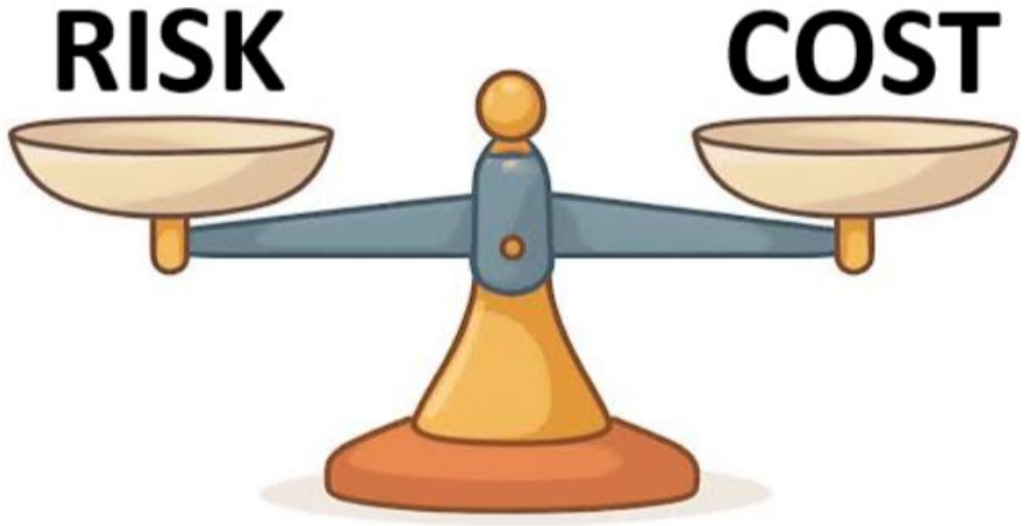
ER Process Overview – restoration

- Restoration is part of and concludes an activation event.
- Activation events have no pre-determined “end-time”.
- NCC Coordinator determines when emergency reserve is no longer needed (NOT automated).
  - Consistent with IL and LoS load restoration activities.
- NCC Coordinator initiates restoration:
  - Restoration instructions per provider are sent through FlexPoint,
  - Operators can monitor the restoration progress,
  - Provider acknowledgements are tracked,
  - Non-acknowledgements trigger retries and alerts to the ER operator (Not the NCC coordinator).
- An activation event completes once all providers have been instructed to restore.
- The timing of the instruction to restore is used to determine the Activation Event fee.



Scenario workshop – Emergency Reserve walk-through

Scenario workshop - insurance questionnaire



Q1 • How far in advance should pre-activations be sent?

Q2 • What residual should trigger ER pre-activation? (NI and SI)

Q3 • What residual should trigger ER activation? (NI and SI)

Scenario workshop - 36 hours to real time

Tuesday	WDS earlier in the day showed potential national shortfall for **Thursday** morning (two days time): -82 MW for the 07:30 trading period and -31 MW for the 08:00 trading period. High demand, low wind risks remained. 09:24: System Operator holds industry briefing on the situation. 20:00: PRSL indicated residual for 07:30 on **Thursday** to be 140 MW. 22:00: NRSL indicated low residual (but not shortfall) for **Thursday's** 07:30 (32 MW residual) and 08:00 (125 MW residual) trading periods. 23:08: Low Residual CAN issued.

Discuss in your groups:

*At 36 hours ahead of real time, the PRSL was showing national residual at 140 MW for **Thursday** morning.*

Should a pre-activation notification be triggered at this point?

What should the residual threshold be to trigger a pre-activation? <100 MW, <200 MW.. ?

Scenario workshop - 24 hours to real time

Wednesday	06:00: PRSL issued ~24 hours to real time for **Thursday's** 07:30 trading period, showing national residual at 146 MW. 08:24: Potential Shortfall and Low Residual CAN issued.

Discuss in your groups:

*At 24 hours ahead of real time, the PRSL was showing national residual at 146 MW for **Thursday** morning.*

Should a pre-activation notification be triggered at this point instead of at 36 hours ahead?

What should the residual threshold be to trigger a pre-activation? <100 MW, <200 MW… ?

What do you need to be doing at this stage to be prepared for potential activation?

Scenario workshop - 12 hours to real time

Wednesday	In response to the CAN, distribution businesses submitted difference bids for controllable load. A total of 134.2 MW was bid for the key **Thursday** 07:30 and 08:00 trading periods. 22:00: national residual schedule had improved to 204 MW and 237 MW for **Thursday's** 07:30 and 08:00 trading periods respectively.

Discuss in your groups:

*At 12 hours ahead of real time, the PRSL was showing national residual over 200 MW for **Thursday** morning.*

*This is the 'last point' that a pre-activation could be sent in advance of an activation on **Thursday** morning – is this the correct setting? Should it be sent earlier?*

What do you need to be doing at this stage to be prepared for potential activation?

Scenario workshop - real time

Thursday	Ahead of peak, at 06:43 Manapōuri unit G7 tripped removing 50 MW of supply. 07:00 schedules showed national residuals at 07:30 and 08:00 above 200 MW with some industrial demand response indicated in bids. 7:50:08 AM demand peaked at 7470 MW (instantaneously). Residual dropped to 81 MW in the 07:45 RTD schedule. The prepared GEN was not issued and controllable load did not need to be instructed off.

*Please read our paper, **Winter 2026 Industry coordination in low residual situations**, available on transpower.co.nz or email system.operator@transpower.co.nz*

Scenario workshop - real time hypothetical variation #1

Thursday	**06:00: large drop in forecast wind sees the PRSS residual for the 07:30 trading period drop to 15 MW.** Ahead of peak, at 06:43 Manapōuri unit G7 tripped removing 50 MW of supply. 07:00 schedules showed national residuals at 07:30 and 08:00 **at only 58 MW** with some industrial demand response indicated in bids.

Discuss in your groups:

The situation has changed and residuals are now well under 200 MW.

Should an ER activation be sent?

If an activation is sent at 07:05, what would you need to do to activate for the 07:30 trading period?

When providing their ER response, what if anything, should ER providers consider?

Scenario workshop - real time hypothetical variation #2

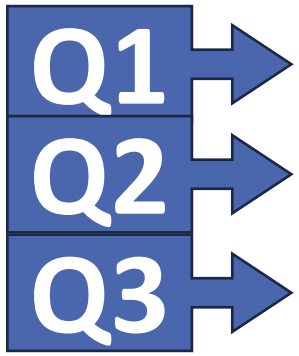
Thursday	Ahead of peak, at 06:43 Manapōuri unit G7 tripped removing 50 MW of supply. 07:00 schedules showed national residuals at 07:30 and 08:00 above 200 MW with some industrial demand response indicated in bids. **07:15 demand is higher than forecast, wind has dropped, IR shortfalls/scarcity are occurring.** **07:20 RTD residual is negative.** **07:21 frequency begins dropping – load shedding is instructed.** **07:28 load has been shed – system is stable.** **07:30 schedule shows very low residuals for 08:00.**

Discuss in your groups:

Should an ER activation be sent for 08:00?

How much near term risk of variance from the forecast should be avoided through the activation threshold setting?

Scenario workshop – your final answers



- How far in advance should pre-activations be sent?
- What residual should trigger ER pre-activation? (NI and SI)
- What residual should trigger ER activation? (NI and SI)

What are your final answers to the three questions?

How much ‘insurance’ do we need to buy on behalf of consumers?



Close and next steps

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End of 2026 – System Operator publishes forecast methodology and assessment for 2027.

End of 2026 – Authority approves Procurement Plan amendments.

Late January 2027 – procurement process begins.



Thank you

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