## OUTAGE PROGRAMME OVERVIEW

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
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### January
- **1-10**: Pole 2 outage 780 MW transfer limit
- **11-15**: Pole 2 + 1 electrode outage 406 MW transfer limit
- **16-29**: Pole 2 testing 780 MW transfer limit

### February
- **1-15**: Pole 3 outage 500 MW transfer limit
- **16-20**: Pole 3 + 1 electrode outage 406 MW transfer limit
- **21-25**: Pole 3 testing 500 MW

### March
- **1-10**: Pole 3 outage 500 MW transfer limit
- **11-15**: Pole 3 + 1 electrode outage 406 MW transfer limit
- **16-20**: Pole 3 testing 500 MW

### April
- **1-10**: Pole 3 outage 500 MW transfer limit
- **11-15**: Pole 3 + 1 electrode outage 406 MW transfer limit
- **16-20**: Pole 3 testing 500 MW
GRID OWNER UPDATES

TRANSPOWER
PROJECT UPDATES

Reconductoring Project
Preparations continue to plan, with line crews now mobilising plant, materials and equipment to site for the commencement of reconductoring outage in January 2020. Low voltage lines owned by Wellington Electricity are now undergrounded and a 33kV line deviated.

There are no current issues that would impede the works.

Pole 2 VBE Upgrade
Equipment deliveries to site are complete. ABB representatives from Sweden were on site last week to complete the delivery inspections and finalise preparations for the installation work. On-site preparatory work is in progress.

Staged line tests planned for 8th December were cancelled due to weather. This will not result in another test being planned. We have enough information to assess Pole 2 performance.

Maintenance Works
On schedule for commencement in January.
POLE 2 SYSTEM TESTING

- Test window Mon 17th – Wed 26th Feb (10 days).

- CAN will be issued at the start of the Pole 2 10-day test window. We will also send a CAN when all system testing has been completed (at the end of the 10-day window, or sooner).
- A CAN will be issued if there is a test which may cause a disturbance on the system (i.e. a staged line fault).
- We will not send CANs each time Pole 2 is started or stopped.

- If testing is completed early the Grid Owner will return Pole 2 to service. Early starts to subsequent work are very unlikely as this would require re-planning and making resources available. This is difficult given the size of teams involved.
POLE 2 SYSTEM TESTING

During the pole 2 testing window:

- The Bi-pole will be limited to 780MW
- The Bi-pole will be treated as a Contingent Event
- Pole 2 will be offered and dispatched to accommodate required tests
- Pole 2 will not add capacity or market benefit
- Pole 2 will not alter the Bi-pole risk status
- All tests will be completed within the natural scheduled HVDC transfer
- CAN will be issued at the start and end of the window, not for individual tests
CONTINGENCY PLANNING

Recall times for emergency system security events
Clarification on previous information provided: the recall time for the Pole 2 outage is 22 days driven by the VBE upgrade (not 20 which was previously communicated)

- Worst case recall time for Pole 2:
  - 9th - 31st January 2020: 22 days driven by VBE Upgrade
  - 1 – 16th February 2020: 7 days driven by Reconductoring

- Worst case recall time for Pole 3:
  - 7 days driven by Reconductoring
ENERGY MARGINS

We are not forecasting security issues due to energy in normal operating conditions.

New Zealand Generation Balance (NZGB)
The latest NZGB report can be found on the NZGB website.
There are no anticipated Generation Balance (N-1) shortfalls.
There are Generation Balance (N-1-G) shortfalls in the reduced gas and no wind scenario. This can be viewed in the next slide. Note this has been updated since the issue of the December NZGB report.

Security of Supply
The latest Security of Supply information can be found on the Transpower website.
Recent large inflows have pushed storage levels in both islands to near full. Based on current storage, the risk of a Security of Supply situation eventuating during the HVDC, or being made worse by the HVDC outage is very low (even taking account of a restricted gas scenario).
NZGB ASSESSMENT – REDUCED GAS, NO WIND

- 540 MW less thermal generation across HVDC outage
- Wind 0% (less 110 MW)
- Further reduction of 200 MW during Ahuroa outage
- A number of generator outages during Ahuroa have been rescheduled

No N-1 shortfalls
N-1-G shortfalls:
10-12-Feb, 14-Feb and 7-Apr

Previously worst shortfall was -274 MW in Feb
REMINDERS

TRANSPOWER
INFORMATION PROVIDED AT OCTOBER 2019 BRIEFING
## COMMUNICATIONS - WHAT TO EXPECT

<table>
<thead>
<tr>
<th>Before Outage</th>
<th>Work programme schedule</th>
<th>Channel*</th>
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<tbody>
<tr>
<td>Outline scheduled work</td>
<td>CAN - 19 Dec 2019</td>
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<table>
<thead>
<tr>
<th>During outage</th>
<th>Work programme schedule</th>
<th>Channel*</th>
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<tbody>
<tr>
<td>First stage: Pole 2 &amp; VBE outages</td>
<td>7 Jan - 16 Feb 2020</td>
<td>CAN – 7 days prior to work start</td>
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<tr>
<td>Second stage: Testing of Pole 2</td>
<td>17 Feb – 26 Feb 2020</td>
<td>CAN – 7 days prior to work start</td>
</tr>
<tr>
<td>Third stage: Pole 3 outages</td>
<td>27 Feb - Apr 9 2020</td>
<td>CAN – 7 days prior to work start</td>
</tr>
<tr>
<td>Bi pole outages (4)</td>
<td>Sat Jan 18, Feb 1, Mar 7, Mar 21</td>
<td>CAN – 7 days prior to work start</td>
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<tr>
<td>Changes to outage schedule</td>
<td>CAN (as soon as possible)</td>
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<tr>
<td>Other assessment updates e.g. NZGB</td>
<td>CAN (as soon as possible)</td>
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Security of Supply ERC & Simulated Storage Trajectory Updates

Currently Monthly or more regular if required

Transpower Website (subscription e-mail also available)

If we see security concerns or there are material changes, we will call an industry briefing where time allows. All information will be available on the [dedicated webpage on Transpower’s website](#).
## COMMUNICATIONS - FROM REAL TIME OPERATIONS

<table>
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<tr>
<th>Time</th>
<th>Situation</th>
<th>Notice</th>
<th>Response</th>
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<tbody>
<tr>
<td>6 days out to real-time</td>
<td>Low residual &lt;200MW uncleared energy</td>
<td>Issue low Residual CAN</td>
<td>Request update / increase generation and reserve offers</td>
</tr>
<tr>
<td>6 days to 1 hour</td>
<td>Deficit energy or reserve</td>
<td>Warning Notice</td>
<td>• Request increase generation and reserve offers</td>
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<tr>
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<td>• request reduced demand</td>
</tr>
<tr>
<td>1 hour to real-time</td>
<td>Deficit energy or reserve</td>
<td>• Grid Emergency • Demand Allocation Notice</td>
<td>• Request increase generation and reserve offers</td>
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<tr>
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<td>• Instruct demand load shedding (DAN)</td>
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<td>• Reduce Security margins (AUFLS to cover CE)</td>
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<td>• Optimise Frequency Keeping, NMIR and FKC</td>
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CANs will be issued for changes to HVDC capacity or risk