Commerce Commission Workshop
Transpower Asset Management
6 March 2017
Disclosure

This slide pack provides material on Transpower’s asset management journey.

It was developed to support a relatively informal workshop with Commerce Commission staff, consistent with Transpower’s “no surprises” approach to developing our RCP3 reset proposal.

We are happy for the material to be shared with interested parties, and to be used in support of the reset process.
1. Introduction

• Safety
• Objectives
• Format
• Attendees
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<th>Agenda</th>
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<tbody>
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<td>Simon Tucker</td>
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<td>Ross Parry</td>
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<td>RCP3 outlook (2020 to 2025)</td>
<td>Stephen Jay</td>
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<td>Morning Tea Break</td>
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<td>Asset management</td>
<td>Stephen Jones, Fiona Abbott, Jonathan Battson, Craig Bryant</td>
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<td>Information &amp; comms technology</td>
<td>Derrick Westenra</td>
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<td>6</td>
<td>Close</td>
<td>Ross Parry</td>
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2. Our Journey

This section sets the scene for development of our RCP3 proposal

- RCP1 > RCP2 > RCP3
- Service measures and targets
- Planning features
- Delivery pipeline
- Integration
Phases – transform, build, refine

Transformation – establishing new supporting BAU arrangements

Emphasis on bottom-up build of RCP3 plans, documents and evidence trail

Emphasis on documentation and refinement

Pre-submission engagement, finalisation, certification

Dec 2016

2016 ITP

Dec 2017

2017 ITP

2018 ITP

Submission

Keeping the energy flowing
Works planning and delivery

- The programming and planning function represents a shift in the business from few large projects to many smaller projects.
- Has provided a significant improvement in the stability of the forward works plan.
Works planning and delivery

Example: Tower Painting

- The TRIFR was close to 38 about a year ago. It is currently zero for the first time.
- “Causal vs Correlation” between planning and the TRIFR is unknown, but the general downward trend is an excellent result.
At March 2017…

- status = half-way through strategies/plans
- 15 year plans
- planning features embedding into BAU
- addressing key information and modelling needs
- modern asset planning tool to be deployed
- developing services thinking
- planning for January to June refinement period
Vision

- Planning features built into the business
- Not a point answer (transparent trade-offs)
- Link to price/revenue path
- No unrealistic plan detail
- Facilitates flexibility and agility
- Hybrid base E&D plan – right level of detail
- Listed projects for large reconductoring
- Asset health/risk incentive regime
Capital programme performance

- Strong RCP1 finish
- 2015/16 dip in output
- Restructure
- Programme stabilised
- Forecast ≈ allowance over RCP2
3. RCP3 outlook (2020 to 2025)

This section sets the scene for the RCP3 period

**Evolving Generation**
- Drivers:
  - Major transmission investments commissioned
  - Thermal plant closures
  - Investment uncertainty (T&I, transmission pricing, demand growth, carbon price)
  - Incremental development of large renewable resources commercially feasible
  - New and cheaper consumer technologies emerging, but not yet mainstream
  - Growing climate change concern

**Observations and Implications**
- Current load and load profiles remain roughly as now
- Incremental and just-in-time generation investment
- Increasing generation flexibility, especially inertia
- Tight security margins, closure exist buy time
- Risk of baby political concerns
- Our licence to operate

**Changing Load**
- Drivers:
  - Urbanisation and growth in population, economy and energy efficiency
  - Mainstream commercialisation of micro generation (especially PV, electric vehicles (EV), batteries and energy management systems)
  - Electrification of transport and heat
  - Strong carbon policies or price
  - Uncertain evolution of direct-connect industries

**Extensive Storage**
- Drivers:
  - Economic saturation of PV and other distributed generation, but...
  - Grid-delivered hydro and other renewables still economic
  - Batteries (in electric vehicles and static) and other storage widespread
  - Low carbon economy and climate change impacts

**Observations and Implications**
- Daily and winter peak demand profiles flatten
  - Still need the grid, but driven by energy as much as peak
  - Changes in how our assets are used
  - Uncertain physical grid asset and financial standing risk
  - Generation flexibility less valuable and intermittency less of a problem
RCP3 outlook (2020 to 2025)

<table>
<thead>
<tr>
<th>RCP2</th>
<th>RCP3</th>
<th>RCP4</th>
<th>.....and beyond</th>
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I Evolving generation

II Changing load

III Extensive storage

RCP3 at transition from TT State I to II:
- electric vehicles, photovoltaics, new tech – moving beyond niche
- end-users experience new network pricing
- urbanisation, Auckland development, reconductoring
- decarbonisation, electrification
- Tiwai on 12-month notice, Huntly committed to 2022
Strategic priorities

1. Reduce our costs and evolve our services to remain competitive.
2. Play an active role in shaping the industry's future.
3. Sustain our social licence to operate.
4. Match our infrastructure build to need over time.
5. Improve our asset management.
6. Develop our organisational effectiveness.
Grid Operating Model
Huntly & WUNI

Timing & sequencing
Build, contract or nudge?
SPS as part of solution?
Voltage and thermal?
Auckland

ATAP Final Indicative Package
Major Interventions ($200m+), all decades

- 825 New residents
- 472 New jobs
- 278 New dwellings required
- 137 Additional seniors over 65
- 52 Additional students
- 2 New teachers
- 2.5 New doctors
- 825 Equivalent to thirty nine Metropolis buildings every 12 months
- 17 or 3.5 Additional buses or trains filled
- 3 Every seven weeks filling an additional three motorway lanes in peak hours

Keeping the energy flowing
## Reconductoring

<table>
<thead>
<tr>
<th>Project</th>
<th>Timing</th>
<th>Cost (BC1+)</th>
<th>Base/Major</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>BPE-WIL (JFD-WIL)</td>
<td>2020</td>
<td>$50m</td>
<td>Major – Listed</td>
<td>Submission underway&lt;br&gt;Possible deferral or splitting of this section. Expensive and difficult conductor repairs.</td>
</tr>
<tr>
<td>BPE-WIL (BPE-JFD)</td>
<td>2022-2025</td>
<td>$117m</td>
<td>Major – Listed</td>
<td></td>
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<tr>
<td>BRK-SFD B</td>
<td>2022-2025</td>
<td>$71m</td>
<td>Major - Listed</td>
<td>May become an MCP – under investigation. Expensive and difficult conductor repairs.</td>
</tr>
<tr>
<td>OTA-WKM A&amp;B</td>
<td>2020</td>
<td>$16m</td>
<td>Base</td>
<td>Scope could grow to ~$30m&lt;br&gt;Urban line – very difficult to maintain</td>
</tr>
<tr>
<td>ALB-HEN A</td>
<td>2022</td>
<td>$19m</td>
<td>Base</td>
<td>Assumed full length at present. Less urban sections may be maintainable</td>
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<tr>
<td>ARA-WRK A</td>
<td>2023</td>
<td>$5m</td>
<td>Base</td>
<td>Full length assumed – only a short line</td>
</tr>
<tr>
<td>CST-NPL A</td>
<td>2022</td>
<td>$15m</td>
<td>Base</td>
<td>Highly corrosive – already bulges/defects</td>
</tr>
<tr>
<td>BOB-OTA A</td>
<td>2025</td>
<td>$32</td>
<td>Major</td>
<td>Urban line, high loads and system criticality</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$325m</strong></td>
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Outlook

- New strategies/plans – all assets by December
- Service levels engagement
- Tower painting – ramp up over RCP3
- SMS programme
- HVDC Pole 2 life extension
- Asbestos
Morning Tea Break

Please return to your seats by 10:30am
4. Asset Management

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<thead>
<tr>
<th></th>
<th>Asset management framework</th>
<th>Stephen Jones</th>
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<tbody>
<tr>
<td>A</td>
<td>Planning</td>
<td>Fiona Abbott</td>
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<tr>
<td>B</td>
<td>Risk tools</td>
<td>Fiona Abbott</td>
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<td>C</td>
<td>Asset health and criticality</td>
<td>Jonathan Battson</td>
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<td>D</td>
<td>Deliverability</td>
<td>Craig Bryant</td>
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<tr>
<td>E</td>
<td>Maintenance</td>
<td>Fiona Abbott</td>
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</tbody>
</table>
Asset management framework
Grid strategy documentation
Risk Based Decision Making

Risk Analysis

SQRA (ALE)

Control Strategy

DMF

Performance

Assets

Risk

Keeping the energy flowing
Asset health and criticality

AHI and Criticality in the asset planning decision framework:

• Health models help us understand probability of failure
• Criticality, or consequence of failure, is equally important
• This information helps us balance risk and expenditure
• Analysis not deterministic, next step is lots of investigation and judgement
# Asset Health Reporting

Overview of current asset health compared with the relevant asset class investment plan.

Assets in poor and very poor health are managed within 2-10 years dependent on asset class.

<table>
<thead>
<tr>
<th>Coverage of Asset Health models</th>
<th>Asset Group</th>
<th>Population Dec 2016</th>
<th>Assets not scored</th>
<th>Current Asset Health Score</th>
<th>R&amp;R for RCP2</th>
<th>R&amp;R 5yr Investment</th>
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<tbody>
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<td>R&amp;R rate % p.a.</td>
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<td></td>
<td>Conductors (km)</td>
<td>16526</td>
<td>0.0%</td>
<td>1-4 Good: 49.6%</td>
<td>2.4%</td>
<td>0.5% $225M</td>
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<td>&gt;4-5 Fair: 7.8%</td>
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<td>&gt;5-6 Poor: 17.0%</td>
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<td>&gt;6-7 Very poor: 11.9%</td>
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<td>&gt;7-8 Very poor: 10.7%</td>
<td>2.4%</td>
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<td></td>
<td>Tower coating</td>
<td>22729</td>
<td>0.7%</td>
<td>1-4 Good: 47.1%</td>
<td>1.4%</td>
<td>2.2% $184M</td>
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<td>&gt;4-5 Fair: 18.1%</td>
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<td>&gt;7-8 Very poor: 2.7%</td>
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<td>Tower foundations - other</td>
<td>1782</td>
<td>0.0%</td>
<td>1-4 Good: 9.8%</td>
<td>0.0%</td>
<td>0.2% $9M</td>
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<td>Tower foundations - grillage</td>
<td>1697</td>
<td>0.0%</td>
<td>1-4 Good: 8.4%</td>
<td>1.1%</td>
<td>3.5% $60M</td>
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<td>&gt;4-5 Fair: 16.8%</td>
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<td>Insulators</td>
<td>54849</td>
<td>4.3%</td>
<td>1-4 Good: 38.1%</td>
<td>2.0%</td>
<td>2.2% $29M</td>
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<td>&gt;7-8 Very poor: 4.6%</td>
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<td>Pole structures</td>
<td>14551</td>
<td>0.1%</td>
<td>1-4 Good: 56.0%</td>
<td>2.0%</td>
<td>1.4% $32M</td>
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<td>Stations</td>
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<td>R&amp;R rate % p.a.</td>
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<td>Instrument transformers</td>
<td>5871</td>
<td>0.4%</td>
<td>1-4 Good: 86.4%</td>
<td>0.6%</td>
<td>0.6% $16M</td>
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<td>Power transformers</td>
<td>360</td>
<td>88.1%</td>
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<td>0.8%</td>
<td>1.0% $87M</td>
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<td>Sec. Systems</td>
<td>Batteries &amp; Chargers</td>
<td>651</td>
<td>0.0%</td>
<td>1-4 Good: 40.6%</td>
<td>3.8%</td>
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**Green =** health will stay the same or improve with current investment rate

**Yellow =** health is at risk of declining faster than current investment rate

**Red =** health is declining faster than current investment rate
Deliverability

• Goals:
  – Understanding of resource needs across the period
  – Delivery models reshaped to meet needs of RCP3 period (flexibility, changing work mix, safety and capability)
  – Work programme not prematurely scheduled and locked down
  – Year 1 of RCP3 underway (avoid slow start)
Grid maintenance

• RCP2 proposal model complex, not fit for embedding
• Early RCP2 focus on service provider contracts:
  – Fixed and variable fee structure
  – Commitment to work volumes
  – Sharper pricing and better quality
• PM optimisation
• Developing new forecasting approach:
  – Maximo source information and supplemented by Asset Feedback and data
  – Relationships between capex and opex – whole of life and driven by strategy, key assumptions, benchmarking?
  – Focus on efficiency and risk based decision making
5. Information & Comms Technology (ICT)

- Implementing new approach for planning grid ICT
  - Framework used to support SOSPA refresh with EA
  - Extending across all ICT planning
  - Becoming BAU annual process
Grid ICT Plan Journey Map & Key Deliverables  Version 1.0

- Grid ICT Plan “View Points”
  - FY17/18 RCP2, RCP3, Major Projects
- Grid ICT Integrated Roadmap
- Grid ICT Change Initiatives
  - (200 Briefs)
- Gaps, Opportunities & Business Needs
- Capability & ICT Systems Change Storyboards
- ICT Systems Portfolio Assessment
  - (Technology LifeCycle)
- ICT Systems Portfolio Discovery
  - (80 Systems)

- Grid Outcome Strategy Map
  - (Target State)
- Grid Capability & Assessment Heatmap
  - (Current State)

- Problem Statement & Planning Objectives

- PAT (Grid GMs/CIO)
- Mgmt Advisory Team (L3)
- Business Owner Group
  - (25+)
- Business/IST Subject Matter Experts
  - (100+)
6. Close

- Service engagement underway
- 2017 ITP publishes August (using 50% build)
- Capex IM review in 2017
- Templates and identified programmes at end of 2017

- Assuming listed projects in RCP3
- Assuming non-deterministic AH output