

Providing a secure power system

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TRANSPOWER



Keeping the energy flowing

Transpower New Zealand Ltd The National Grid

Where are we at?

- The past decade has seen a number of changes
 - Generation technology
 - Demand
 - Transmission technology
 - Expectations
- Obvious changes can be tested but its more difficult to assess the effect of combined change, especially when they are slow and subtle.
- The System Operator has a programme of work to 'understand' the system.
- If we can understand the system then we can work with the industry to 'secure' the system .

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What is Secure?

- Stability
- Quality and reliability
- Economic cost
- Environment

AUFLS review

- Assumption, We have two AUFLS blocks that provides a safety net against rare and large events.
- Report has been completed and will be published on
- Industry meetings will be held to discuss and get feedback on the results.

Reserve review

- To follow the AUFLS review the SO is currently scoping a review of reserves.
- How is the system Responding to frequency events?
- Are the reserve products we have the right ones?
- 2013 will see a bi-pole control with the potential to enable national markets for reserve.
 - What are the issues and opportunities around this?

Inertia

- Assumption: We have a hydro system with lots of machines that provide a fast response.
 - Much of the thermal stock have governors locked at high outputs
 - Geothermal plant have little or no governor action
 - Wind is effectively zero inertia
- In reality we have less inertia and less governing force than we think.
- We need to consider what product options we have, and what markets or technical standards will best deliver these

Load models

- As we push the system harder and introduce embedded generation more accurate load models are required in order to understand:
 - How load responds to faults
 - transient stability and
 - requirements for reactive reserve.
- Traditionally load modelled as quantity and a pf or at best a %motor load + a % static load.
- Transpower is installing a number of power quality meters to start this process.

Fault ride through

- Studies have been done for the Electricity commission.
- Gerard Demler will discuss this further later today

Forecasting

- We must have certainty that we have the ability to meet the demands of consumers.
- Today, tomorrow, next week, winter/summer peak, next year. Each time frame has different definition of certainty.
 - Appropriate forecasting for each timeframe is vital.
 - A range of options and products.
 - Risk strategies create good or bad incentives
- Chris Otton will be talking more on this today

The plan..

	Commissioning		Scheduling (market)	DISPATCH	EVENTS	VOLT	FREQ	Med Term Plan
	Pre	Post						
Forecasting	X	X	<ul style="list-style-type: none"> ✓Day ahead ✓Week ahead ✓Embedded generation 	<ul style="list-style-type: none"> ✓Rate of change ✓Forecast Error ✓Embedded generation 	<ul style="list-style-type: none"> ✓Situational awareness ✓Embedded generation 			<ul style="list-style-type: none"> ✓ Summer /winter regional forums
Technical	<ul style="list-style-type: none"> ✓Model Validation ✓Connection compliance 	<ul style="list-style-type: none"> ✓ACS Testing ✓Connection compliance 		<ul style="list-style-type: none"> ✓ AGC 	<ul style="list-style-type: none"> ✓Generator ride through ✓AGC 	<ul style="list-style-type: none"> ✓ AGC ✓ Flicker ✓ Voltage support ✓ Harmonics ✓ Voltage requirements 	<ul style="list-style-type: none"> ✓ Over / under frequency ✓AOF Arming 	
Rules	<ul style="list-style-type: none"> ✓Connection compliance 	<ul style="list-style-type: none"> ✓Connection compliance 	<ul style="list-style-type: none"> ✓Must run Dispatch 	<ul style="list-style-type: none"> ✓ Accuracy requirements ✓ Must run dispatch 	<ul style="list-style-type: none"> ✓ Grid Emergencies ✓ Must run dispatch 		<ul style="list-style-type: none"> ✓SI Frequency Range 	
Operational	<ul style="list-style-type: none"> ✓Use of SPS 	<ul style="list-style-type: none"> ✓Use of SPS 			<ul style="list-style-type: none"> ✓ Restoration ✓ SFT Accuracy ✓ SRD – probabilistic ✓ Dispatch down eg flat line 	<ul style="list-style-type: none"> ✓ Voltage range 		
Pricing						<ul style="list-style-type: none"> ✓Cost allocation 		