

Operating Price Responsive Load in the NEM

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Scope of Presentation

Existing tools to optimise the dispatch of DSP in the NEM

- Non-Scheduled Price responsive Load
- Scheduled Load
- Ancillary Services Load
- Not covered, but parallel issues for Non-scheduled price responsive generation

Just to be clear....

POTENTIAL DSP MARKET

DSP TYPE	Consumer	Retailer	DNISP	TNSP	NEMMCO	Environment
Load shifting	More competitive Tariffs	Lower hedging costs	Deferred Augs.	Deferred Augs.		
Load curtailment	More competitive Tariffs	Lower hedging costs	Network Support: Deferred Augs.	Network Support: Deferred Augs.	Ancillary services & Reserve Trader	Marginally reduced emissions
Small generation	New Income source	Lower hedging costs	Network Support: Deferred Augs.	Network Support: Deferred Augs.	Ancillary services & Reserve Trader	
Appliance efficiency	Reduced energy consumption					Reduced emissions, e.g VEET certs

- You can use the Wholesale Market dispatch processes to lower wholesale market costs or sell ancillary services
- NEMMCO does not do detailed planning and management of the networks

Some High level Market Design Points....

The NEM is a competitive spot *MARKET*,

- NEMMCO does *not* buy & sell electricity at fixed tariffs
- Participants are exposed to spot prices that fluctuate with current supply/demand conditions
 - Outside of peak times, prices are usually low because there is surplus capacity offering to sell more
- Price Stability can be achieved by bilateral instruments outside of NEMMCO by finding another participant with an offsetting risk
- Frequency Control Ancillary Services are also a *market*
 - These prices are usually very low, because, with the increased level of interconnection NEMMCO doesn't usually have to buy much

Some High level Market Design Points....

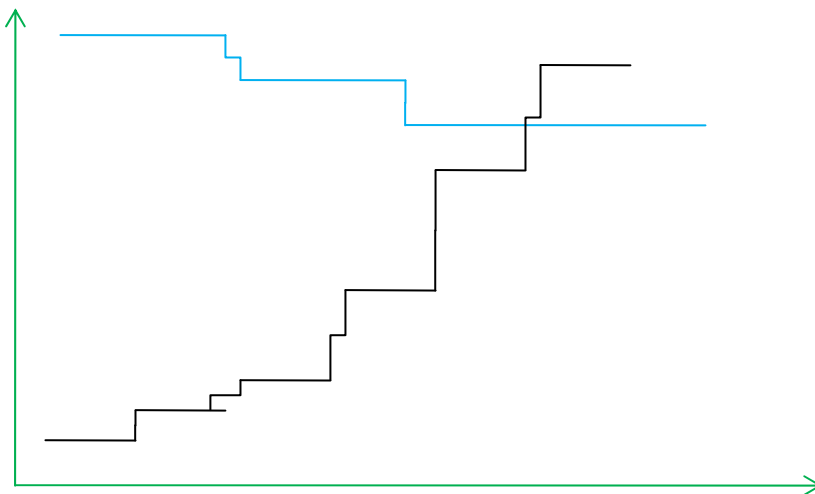
The NEM has a *single pass pricing mechanism*

- NEMMCO sets price on the current 5 minute supply/demand condition
 - There is no “day-ahead price”
- NEMMCO provides no price or dispatch certainty ahead of real-time
 - You may get this by finding a participant with an offsetting short-term position
- NEMMCO provides price and dispatch forecasts to assist, these are non-binding
 - Many power system events are inherently unpredictable.
- The market is *self-commitment*
 - There is no “startup payment uplift”: participants take their own risks, trading their own costs against forecasts of energy price

Some High level Market Design Points....

The market design is *two-sided*

- Bid Demand and Offered Supply are brought together, dispatched and priced
- *Scheduled* load/generation provides a structured bid/offer
 - Are dispatched consistent with that and, if marginal, will set price
- *Non-Scheduled* generation is estimated by NEMMCO and offered at floor price
- *Non-Scheduled* load is estimated by NEMMCO and bid at VoLL



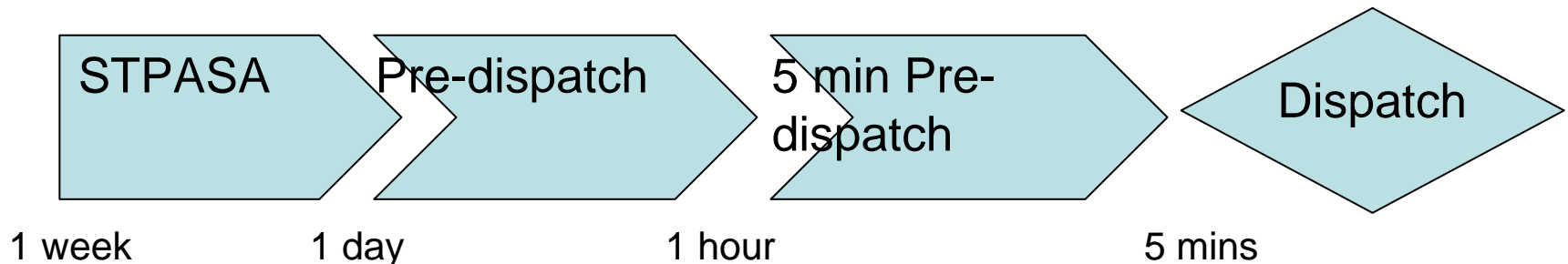
Registering & Classifying a load

So, you have a load?

- A person registers as a “Customer” in the category of “Market Customer”
- They can then classify a “Market Load”
 - Using MSATS to become Financially Responsible (FRMP) for that load
- Can then just operate the load as a non-scheduled load, OR
- *may* request NEMMCO to classify the Market load as a *Scheduled Load*, and/or
- *may* request NEMMCO to classify the Market load as a *Ancillary Service Load*
- Even if your load is responsive to price, there is no obligation to classify it as Scheduled or Ancillary Service.
 - This is unlike generators, who are obligated to become scheduled if >30MW

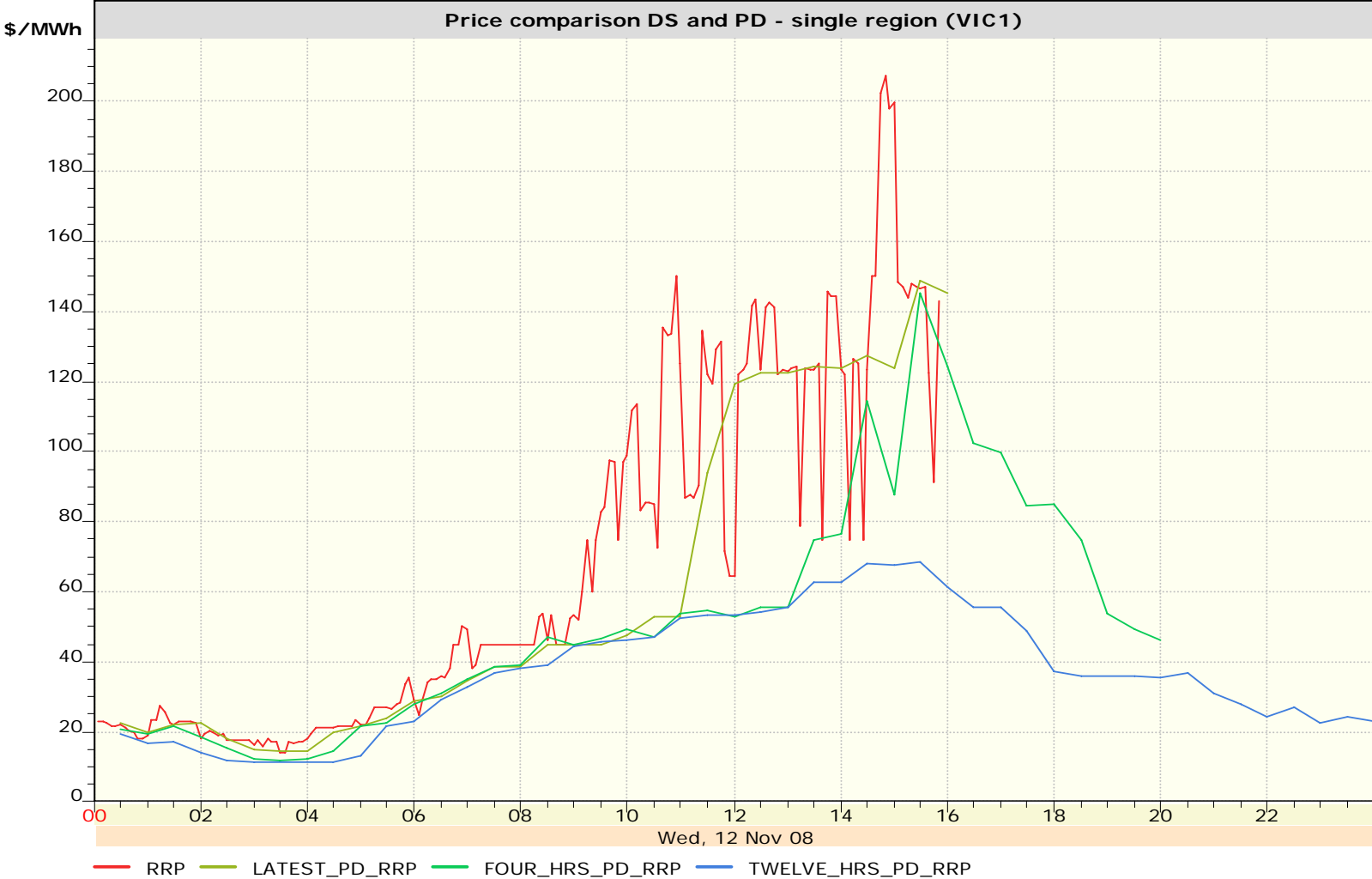
Predispatch forecasting

To optimise your dispatch, you need to anticipate the future



- Whilst NEMMCO doesn't guarantee prices in advance, we do our best to predict
- Load is forecast, and scheduled participants' bids are optimised against this in various timeframes.
- All available information is inputted, and the same calculation occurs in predispatch as occurs in dispatch, resulting in a forecast price, which, were all those inputs to remain constant, would become the dispatch price
- Scheduled participants change their behaviour in response to forecasts, so the process is iterative. Pre-dispatch republished every 30 mins, then every 5 min
- Predispatch Sensitivities are also published: the range of credible variation

Predispatch forecasting



Price-Responsive, Non-Scheduled Load

Most DSP is like this

- You do nothing special with your load, just shut it down when you anticipate high prices, and restore it when you think prices will fall
- No mandatory administrative costs. As long as there is interval metering, you should be able to avoid high pool prices.
 - If you'd avoided highest 1% of prices in Qld in 07/08, you would have paid \$37.28/MWh, not \$52.34/MWh, i.e. 29% saving
- You need to set up your own response to price capability
 - NEMMCO cant send you dispatch instructions
 - You can't use Fast-Start-Inflexibility-Profile
- If the amount of such load is material, it causes an error in pre-dispatch load forecasting, causing difficulties for all the market, and can make dispatch and pricing more volatile

Scheduled Load

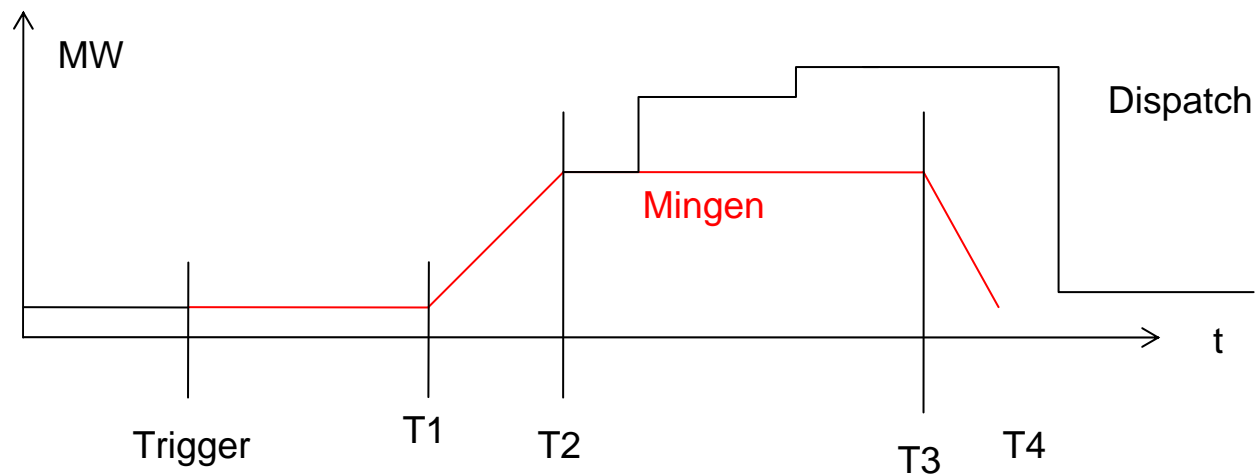
Be Dispatched like a large generator

- Submit prices at which you wish to be switched off in MW bands (“normally on” load)
- Receive dispatch instructions when the price crosses these bands
- Need to set up a communications channel to send telemetered (4 sec) consumption information, and receive dispatch targets
- Need to submit bids, and comply with dispatch targets (subject to thresholds of conformance).
- If the market is marginal on your bid, you will set price and be dispatched mid-way through that bid.
 - If this causes you a compliance problem, you will need to rebid to ensure you get sent a dispatch target within the range you can conform to
 - Read “Treatment of Dispatchable Loads in the NEM”
 - <http://www.nemmco.com.au/powersystemops/140-0070.pdf>

The Fast-Start-Inflexibility Profile

For use by participants with temporal or quantisation constraints

- Allows a participant to receive a “trigger” instruction, and be scheduled beyond a “mingen” level for a minimum period.
- Largely a tool to assist compliance and rebidding management
- Allow the load to “trigger” when price exceeds a threshold, then (if necessary) a delay to respond, then a minimum operation level until the load chooses to rebid

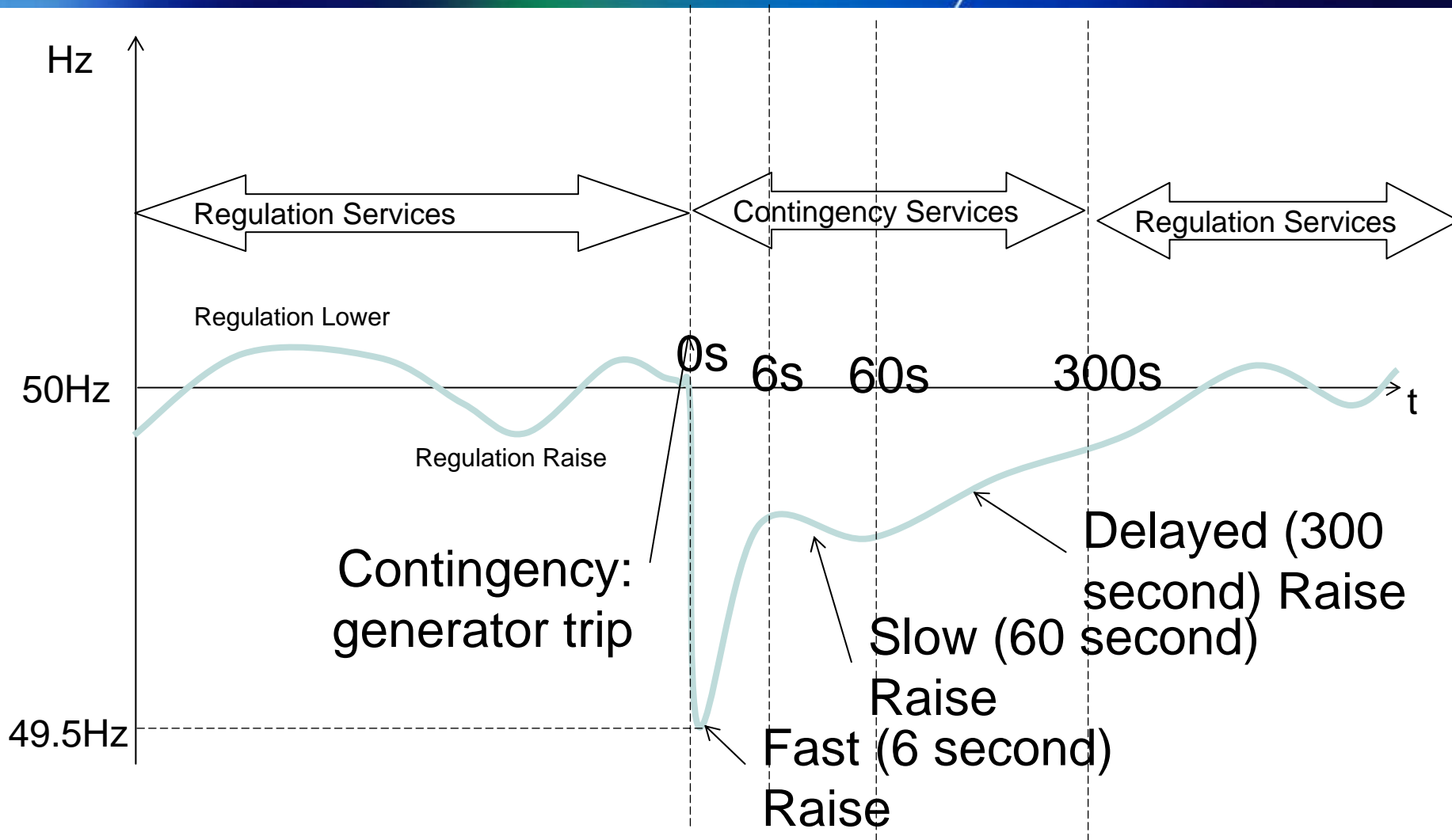


The Scheduled Load category is not popular

The market could be improved if it were used more

- The PASA and predispach processes know about the amount of responsive load
 - Better price forecasting for all, better reserves forecasting for NEMMCO
- Dispatch also knows about the load
 - Can set price with it and lower volatility
 - Resolves potential oscillatory problems for large, non-scheduled load
- There is a cost in the comms channel
 - Can NEMMCO do something to lower costs further?
- Perhaps large responsive loads, like generation, should be obligated to be scheduled?
 - The obligation may, paradoxically, most assist the group of participants affected by it!

8 Ancillary Services Markets



Ancillary Services Loads

NEMMCO operates 8 real-time ancillary services markets

- Fast, controllable loads are an excellent technology for the contingency raise services
- Providers must have the capability to shutdown the dispatched amount of service in the defined timeframe should a low frequency occur
- Providers are paid when “enabled” i.e. ready to provide the service, whether or not it happens
- VicPower Trading earned \$18.1m on 23 July 2008 for its ancillary service load
 - (That was a very exceptional day! See AER website, \$5,000 reports)
- You don't need to be a scheduled load, but you must have fast metering capable of auditing performance
 - And you need to bid and keep them up to date