

# ENERGY SECURITY AND RELIABILITY IN THE NATIONAL ELECTRICITY MARKET

28 March 2017

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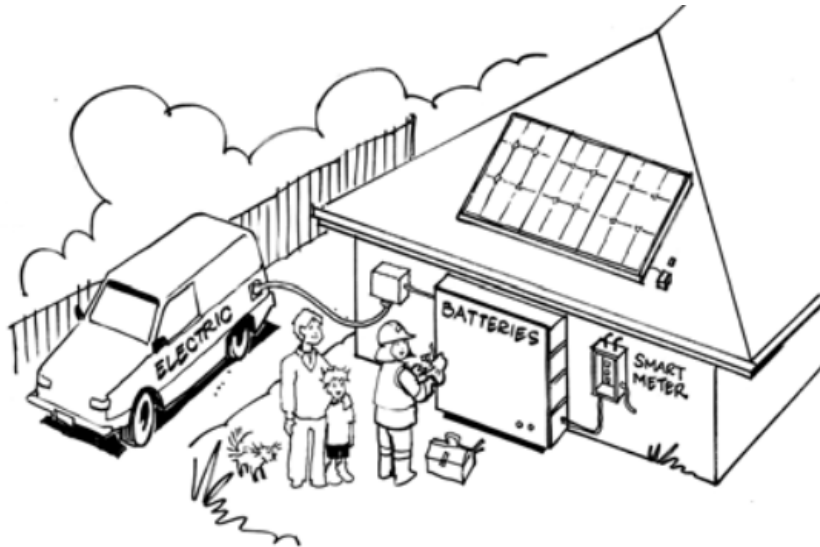
- Operating the grid with NEM rules and framework
- Research new technologies
- Support the evolving grid

## 28 SEPTEMBER 2016 – SA BLACK SYSTEM EVENT



# SEQUENCE OF EVENTS

Cause	Effect	Potential disruptor
Tornadoes	Tower collapse line faults	Stronger towers
Tower collapse line faults	Grid voltage dips	Increased SA system strength
Grid voltage dips	Wind farm ride-throughs	-
Pre-set ride-through limits	Wind farm output reduction	Changes to wind farm control settings
Wind farm output reduction	Increase in Heywood flow	Very fast response local reserve supply
Increase in Heywood flow	Loss of VIC-SA synchronism	Lower pre-event flow (more headroom)
Loss of VIC-SA synchronism	Heywood interconnector trip	Back-to-back DC link at Heywood
Heywood interconnector trip	SA supply deficit (50%)	New concept fast load shedding scheme
SA supply deficit (50%)	SA frequency fall	-
Low SA system inertia	Very fast SA frequency fall	Increased SA system inertia
Very fast SA frequency fall	Ineffective UFLS	Faster smarter frequency control scheme
Ineffective UFLS	Fast system collapse	Smart grid islanding scheme
Fast system collapse	Black system – all supply lost	-



Grid connected equipment eg batteries and solar PV

- Better access to data on grid connected equipment
  - Recommendations to ESCOSA on new wind farm standards
- Visibility of behind-the-meter data necessary to maintain system security



## PM calls energy crisis talks amid blackout fears

Adam Gartrell, James Massola, Nick O'Malley

Malcolm Turnbull has called crisis talks with east coast gas com-

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### Gas majors called to fix 'energy crisis'

Mark Ladlow and Angela Macdonald-Smith

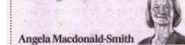
ing gas producers are scrambling to come up with solutions to a looming domestic gas shortage to avoid potential restrictions on LNG exports as Prime Minister Malcolm Turnbull called an urgent meeting to resolve the national "energy crisis".

Senior executives of ExxonMobil, Shell, Santos and Origin – as well as heads of the three LNG ventures in Queensland, APLNG, GLNG and QLLNG – will meet Mr Turnbull and Energy Minister Josh Frydenberg next week to resolve gas shortages in the eastern states which are flowing into potential electricity shortages by the end of next year, pushing up electricity prices for business and households.

market, assuming that allows that to happen increase production from existing fields, we can develop new fields or

### Could gas swaps solve this market train crash?

Drilling down



Gas swap deals have emerged as one of the few potential immediate – if complex – solutions to the "train crash" coming to bear in the east coast gas market.

Certainly, the claims of east coast gas producers that they still have gas to sell are sounding very hollow when buyer after buyer recounts experiences of being unable to even get quotes on

going short.

EnergyQuest principal Graeme Bettine suggests a sort of arrangement that would see retailer AGL Energy, for example, cut a deal with a Queensland LNG customer – say Sinopec – that would result in a cargo's worth of LNG redirected instead as gas to the Wullumbilla hub in Queensland.

AGL, which has declared it is "out of gas" for this winter, would in effect be buying the LNG from Sinopec, but taking it in the form of gas delivered in the local market. Of course such a deal would be horrendously difficult to negotiate, especially without damaging the commerciality of the LNG export project which needs to maximise gas

## PM tackles gas crisis

ENERGY

The spotlight on Australia's domestic gas supply issues will further intensify next week, with major energy producers set to face Prime Minister Malcolm Turnbull. A day after he warned the country was facing an "energy crisis", the PM on Friday put gas companies "on notice" to explain how they are going to secure future supplies.

He has summoned the oil and gas producers to a round-table meeting to discuss the eastern state gas shortages that have provoked strong concerns from businesses over spiralling energy prices.

Top executives from ExxonMobil, Shell, Santos, Origin Energy and from the three export-focused liquefied natural gas projects in Queensland are expected to attend.

ports jumped 49 per cent in 2016 to 45.2 million tonnes, and hit a monthly record in January 2017 as Queensland plants ramped up production. However, the focus on overseas customers has resulted in significant gas production being diverted to the LNG plants, resulting in local shortages that drive up domestic prices.

At the same time, governments in NSW, Victoria and the Northern Territory have banned fresh oil and gas exploration after pressure from farming and green groups.

AEMO has estimated a shortfall in domestic gas-powered electricity generation as early as the summer of 2018/19.

Earlier this week, a report by energy consultancy EnergyQuest warned of further supply risk with the Queensland gas export projects likely to have insufficient reserves to deliver on contracts.

"While there is some investment underway in new east coast gas supply, it is nowhere near sufficient and this reinfor-

205 petajoules of gas by 2025 as output eases in the Gippsland, Otway and Nass basins.

The federal government has urged state governments to remove barriers to gas exploration, but the Mr Turnbull did not rule out measures such as reserving a certain percentage of gas for domestic use.

In January the Queensland government released land for gas exploration that could only be used for future domestic use – a decision that has been lauded by federal Energy Minister Josh Frydenberg.

The onus is on the industry to come up with solutions to address the domestic supply crisis, the minister has said.

The issue is likely to attract more debate when industry and government officials meet at a domestic gas outlook conference next week in Sydney.

- Government action on secure access to affordable gas
- Revised forward projections of gas supply from gas producers
- Speedy implementation of gas market reforms



Distributed generation

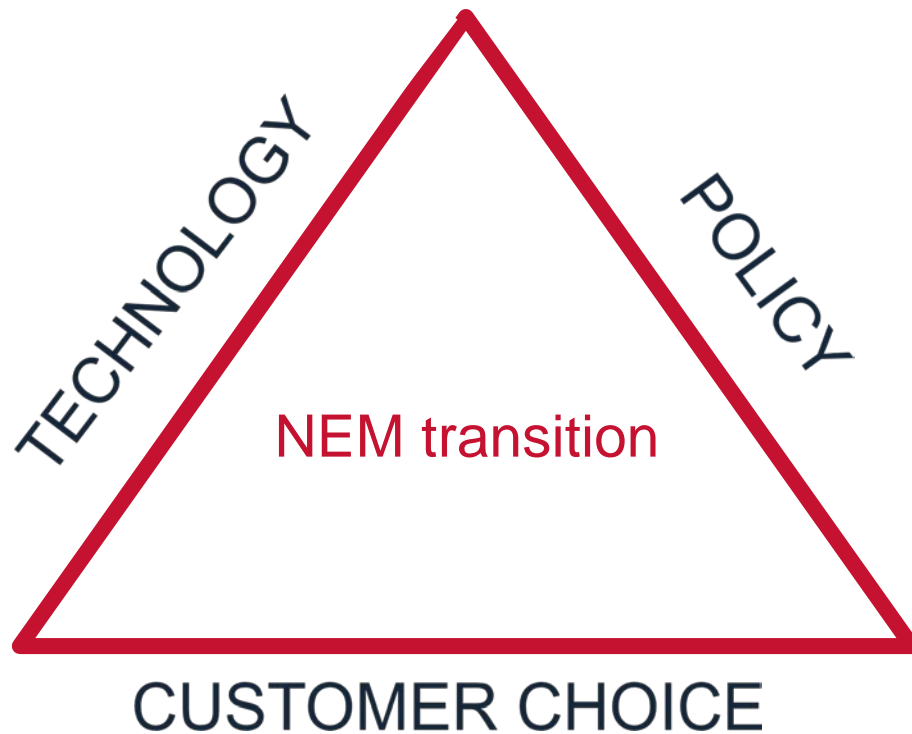
- New technologies and distributed generation proliferating the market
- Set an agenda which encourages competition, efficient investment
- Delivers a secure, safe and reliable supply of electricity



Hornsdale Wind Farm

- To gain a deeper understanding of new technologies
- To identify efficient, strategic and innovative investment
- To meet changing consumer requirements and expectations
- Eg. Hornsdale Stage 2 wind farm





- Market and regulatory processes must keep pace
- Review of The Reliability and Emergency Reserve Trader and Lack of Reserve framework in the rules

- Strategy for next summer
  - Secure additional (currently under-utilised) generation.
  - Make use of other options: SA network generators, battery, demand side contracts, etc.
  - Lock in plans with all stakeholders, including government agencies
  
- Future Power System Security program
  - Frequency management
  - System strength
  - Availability of information
  - Ways to manage extreme power system conditions

THANK YOU

The bottom of the slide features a decorative graphic consisting of multiple thin, parallel lines that form a series of overlapping, wavy patterns. These lines are rendered in a light orange or yellow color, contrasting with the darker red background. The overall effect is a sense of movement and fluidity.