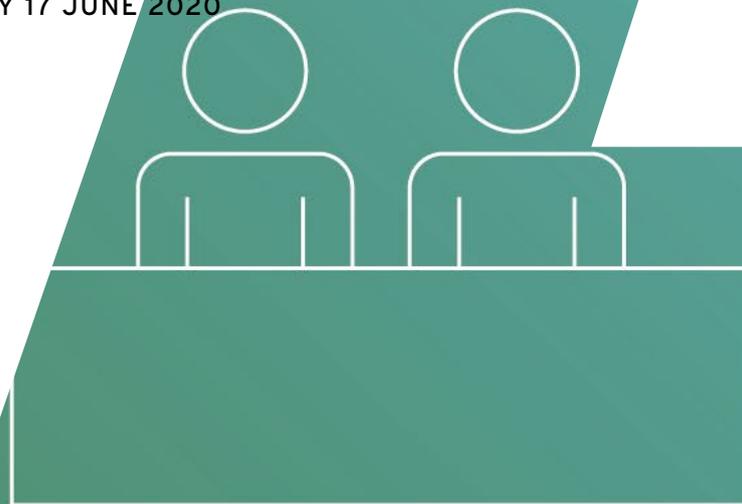


ARENA

# ARENA INSIGHTS WEBINAR KEEPING THE LIGHTS ON IN A SEPARATION EVENT: WHAT ROLE DID RENEWABLES PLAY?

PRESENTATION SUMMARY & KEY POINTS  
WEBINAR, WEDNESDAY 17 JUNE 2020



Australian Government  
Australian Renewable  
Energy Agency

Since 2012, the Australian Renewable Energy Agency (ARENA) has supported 538 projects with \$1.58 billion in grant funding, unlocking a total investment of almost \$5.96 billion in Australia's renewable energy industry. One of the greatest returns we have on this investment is a wealth of knowledge that can help shape new business models and key market reforms in the energy sector.

# INTRODUCTION

Sharing knowledge effectively to fast track industry development is central to ARENA's mandate.

Guided by this, we held a webinar to share lessons learned from the unplanned islanding of South Australia and part of Victoria's electricity grid in January and February 2020.

To summarise the islanding event<sup>1</sup>:

- › On 31 January 2020 the South Australian (SA) grid was separated from the Victorian grid when extreme weather resulted in a convective downburst which caused the collapse of a number of steel transmission towers on the Moorabool - Mortlake and Moorabool - Haunted Gully 500 kV lines.
- › Immediately after the incident the Mortlake Power Station generating units and the Alcoa Portland aluminium smelter remained connected to the South Australia region but disconnected from the rest of Victoria.
- › The islanding event lasted 17 days and a combination of factors kept the SA grid stable throughout the period.

ARENA would like to thank the presenters and panelists for sharing valuable insights, and the audience for their enthusiastic participation.

Links to the presentation, webinar recording and relevant reports are on our [Knowledge Bank](#).

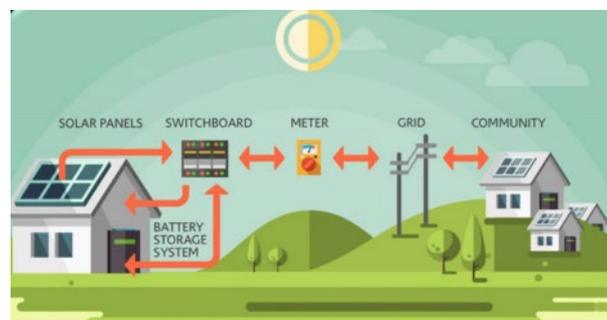
Find out more about the ARENA-funded projects involved in the event:



[Energy Storage for Commercial Renewable Integration](#)  
Electranet



[Lake Bonney Battery Energy Storage System](#)  
Infigen Energy



[Simply Energy Virtual Power Plant](#)  
Simply Energy

<sup>1</sup> AEMO (17 April 2020) *Preliminary Report - Victoria and South Australia Separation Event, 31 January 2020*

# AEMO PRESENTATION

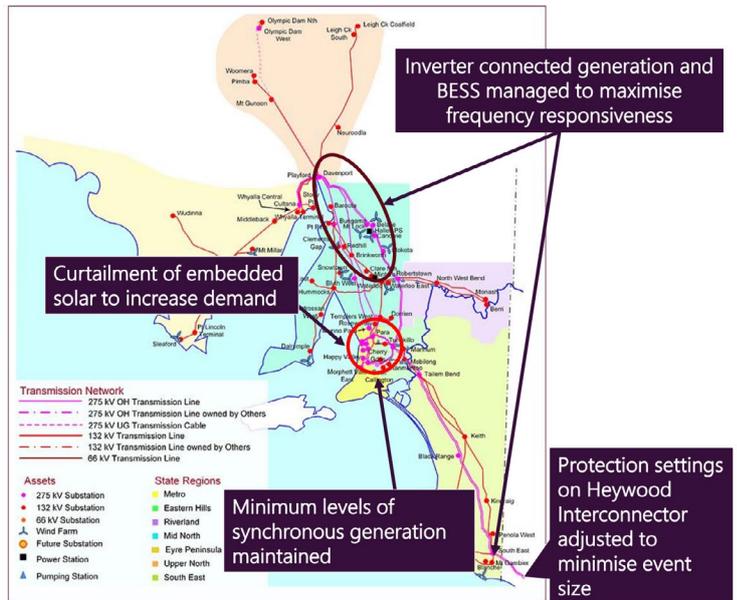
## OPERATION OF SOUTH AUSTRALIA AS AN ELECTRICAL ISLAND



**JAMES LINDLEY**  
GROUP MANAGER SYSTEMS CAPABILITY, AEMO

### Operational action taken

- Electricity demand required to be maintained to keep required combinations of synchronous generators online
- Inertia, fast frequency response and generation on the over-frequency generation shedding scheme optimised to limit rate of change of frequency following an event
- Protection on Heywood adjusted to protect SA from loss of Mortlake Portland Smelter event



Summary of the operational actions taken to keep the lights on in SA through the islanding event. Image credit: AEMO



### KEY TAKEAWAYS:

- SA has separated from the NEM before but what made this event unique was the physical damage to Victorian transmission towers and the continued connection of part of the South Western Victoria network to SA during the separation period. The time taken to repair and replace these towers prolonged the time it took to reconnect SA to the NEM.
- The Mortlake Power Station and the Portland aluminium smelter remained attached to the SA side of the NEM. AEMO made temporary emergency adjustments to protection systems to the Heywood Interconnector to support this operating arrangement.
- The rapid response of the three SA located large-scale battery storage systems (LSBS)<sup>2</sup> was proportionate to the size of the deviation of frequency events and contributed to AEMO's stable and secure operation of the SA system.
- SA has a number of renewable generators that form part of the over frequency generation tripping scheme. The emergency scheme only operates when frequency exceeds emergency limits as defined by the Frequency Operating Standards (FOS).
- Over the 17 days when demand dropped lower than what the synchronous generators need to operate and provide frequency services, AEMO worked with SAPN and system operators took non-market generation (such as larger distributed PV systems) offline to maintain enough demand on the system. Normally AEMO does not take action to curtail embedded non-market generation, so this was a unique collaboration.

<sup>2</sup> The Energy Storage for Commercial Renewable Integration (ESCRI) Battery, the Lake Bonney Battery Energy Storage System and the Hornsdale Power Reserve

# PANEL DISCUSSION

## KEEPING THE LIGHTS ON IN A SEPARATION EVENT: WHAT ROLE DID RENEWABLES PLAY?

ELECTRANET



**HUGO KLINGENBERG**

SENIOR MANAGER  
NETWORK DEVELOPMENT

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EXECUTIVE MANAGER  
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SIMPLY ENERGY



**RYAN WAVISH**

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SA POWER  
NETWORKS



**BRENDON HAMPTON**

MANAGER NETWORK  
STRATEGY

AEMO



**JAMES LINDLEY**

GROUP MANAGER  
SYSTEMS CAPABILITY



WATCH  
THE PANEL  
DISCUSSION

### PANEL Q&A KEY TAKEAWAYS:

- › There is continued value in sharing first-of-a-kind lessons to inform the clean energy transition.
- › The collaboration between renewable and conventional energy generators, SAPN, AEMO, ElectraNet and AusNet was integral to keeping the lights on for the 17 days SA was islanded.
- › LSBS demonstrated they can provide valuable, immediate support to an islanded grid. Infigen, ElectraNet and AEMO recommended that the range of LSBS response services in islanding mode should be considered in future operation strategies. The ability to contribute to system support could be shared across available LSBS and other appropriate sources. The technical working group that was established during the separation period showed that a better understanding of LSBS capabilities and response to particular system conditions could result in more effective use.
- › AEMO is reviewing requirements for the curtailment of inverter based generation (including wind farms) to ensure that power system security requirements can be met while reducing the consequences to participant's assets.
- › VPP providers below 1 MW are unable to register to provide Frequency Control Ancillary Services (FCAS) services. Simply Energy noted that if the registration minimum size was lowered they could have provided FCAS support. There were, however, standards<sup>3</sup> that prevented them from discharging.
- › More than 12,000 behind-the-metre batteries have been installed in the SA distribution network. This is equivalent to about 55 MW / 146 MWh of energy storage, which is comparable to the Hornsdale Power Reserve (100 MW / 129 MWh). It is anticipated that behind-the-metre storage will play a significant role in the future.
- › Market players are working together to prepare for the possibility of future islanding events. Changes to improve resilience and flexibility include the management of distributed solar PV (flexible outputs) and behind the metre batteries.

<sup>3</sup> AS/NZS 4777.2:2015 *Grid connection of energy systems via inverters. Part 2: Inverter requirements*

Further information is available at  
[arena.gov.au](http://arena.gov.au)

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**ARENAWIRE**



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