ESCRI-SA Project Journey

Phase 2 – Path to Financial Close

A presentation for the ESCRI-SA Knowledge Sharing Reference Group, Meeting 1 – 6 February, 2018

In partnership with:

This activity received funding from ARENA as part of ARENA's Advancing Renewables Programme

Presentation outline

- Recap on project scope and objectives
- Revenue streams and commercial arrangements
- Tender process and contract award
- Regulatory treatment and financials
- Lesson learnt

Project scope and objectives

Scope: Nominal 30 MW, 8 MWh lithium-ion battery

1. Demonstrate that grid scale battery storage can effectively provide network reliability and security services alongside competitive energy market services

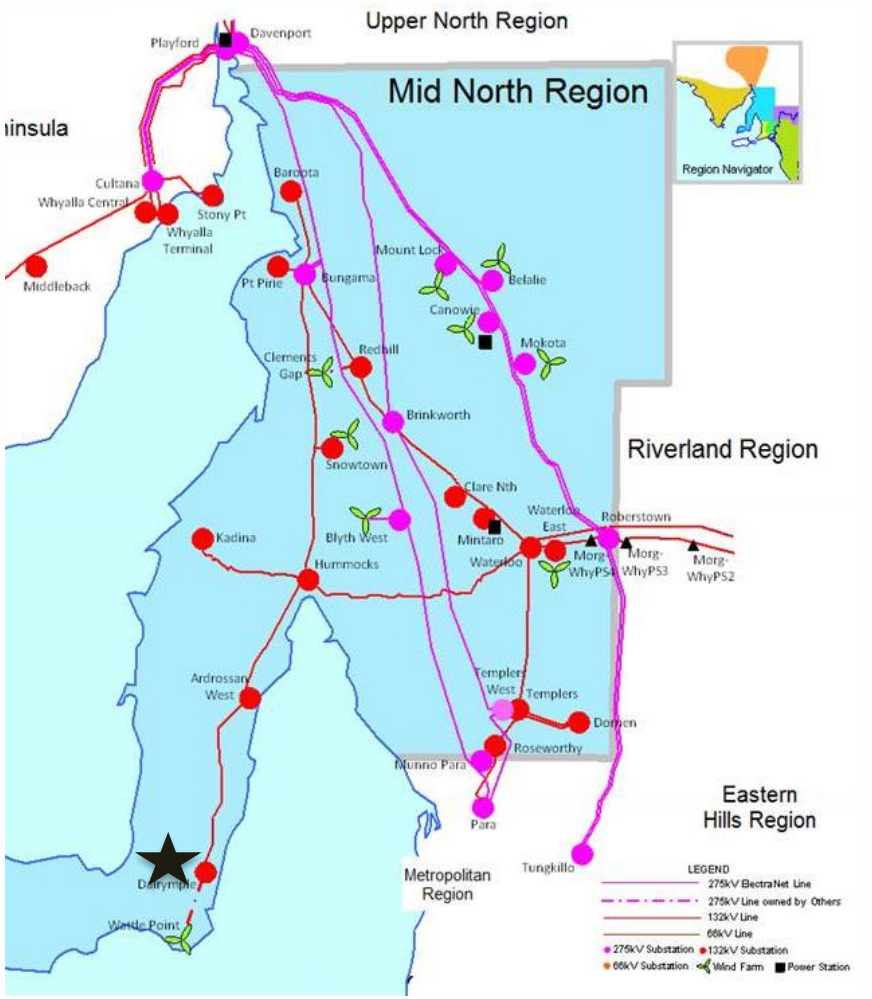
2. Demonstrate network ownership of battery storage and appropriate commercial separation of the provision of regulated services and competitive market services

3. Demonstrate islanded operation with 100% renewable generation following transmission outages

Location

Site selected to maximise value from BESS

- Connection at 33 kV at Dalrymple substation on Yorke Peninsula
- Opportunity to reduce expected unserved energy under islanding conditions (max demand is about 8 MW but on average need about 3 MW for 2 hours)
- Site is close to the 91 MW Wattle Point Wind Farm – provides opportunity for battery to support islanded operation with the wind farm and 2 MW of local rooftop solar, following network outages



BESS – Battery Energy Storage System

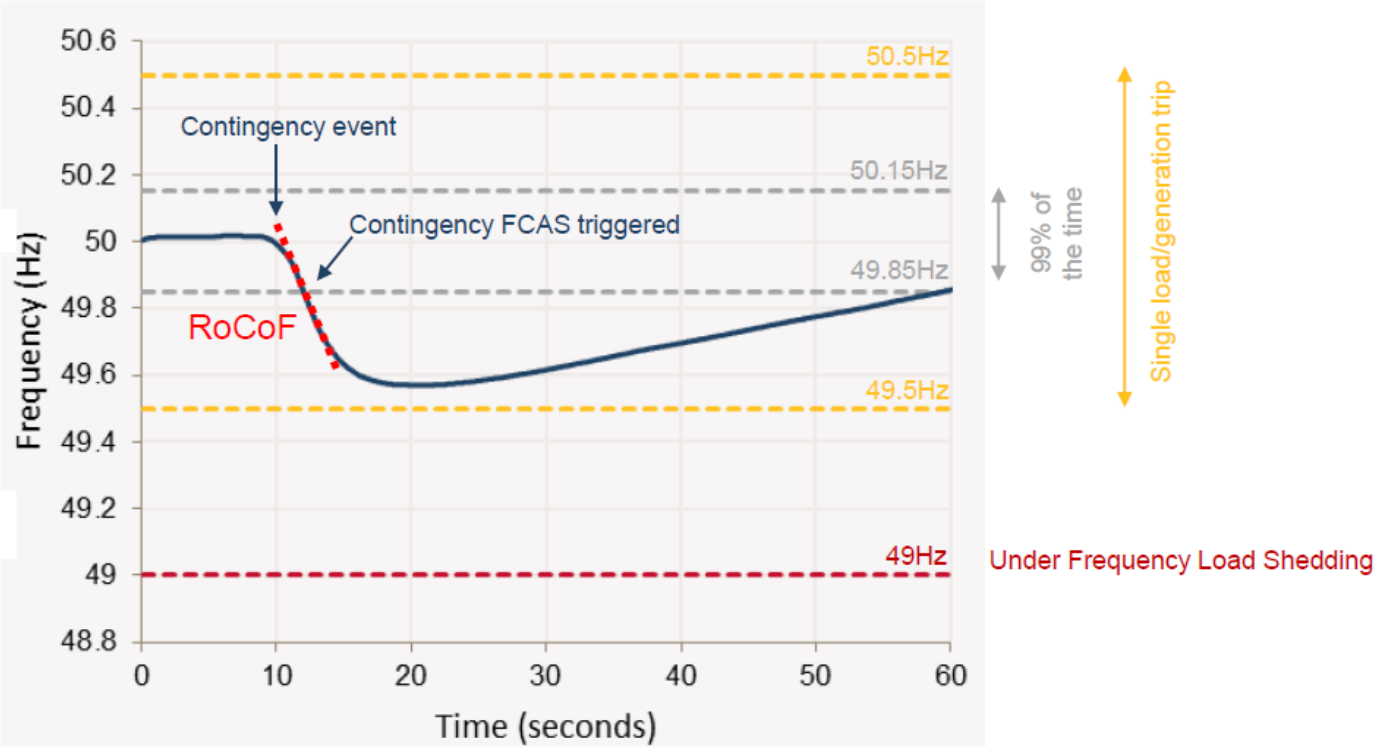
Revenue streams

Providing both regulated and competitive market services

Regulated services (ElectraNet)	Competitive market services (AGL Energy)
Fast frequency response Heywood Interconnector benefit[1]	Ancillary services revenue (FCAS)
Reduced unserved energy benefit	Market cap trading

1. Fast frequency response benefit arises from reducing Heywood Interconnector constraints that are limiting imports over the interconnector to manage high rates of change of frequency (the 3 Hz/s Rate of Change of Frequency (RoCoF) limit)

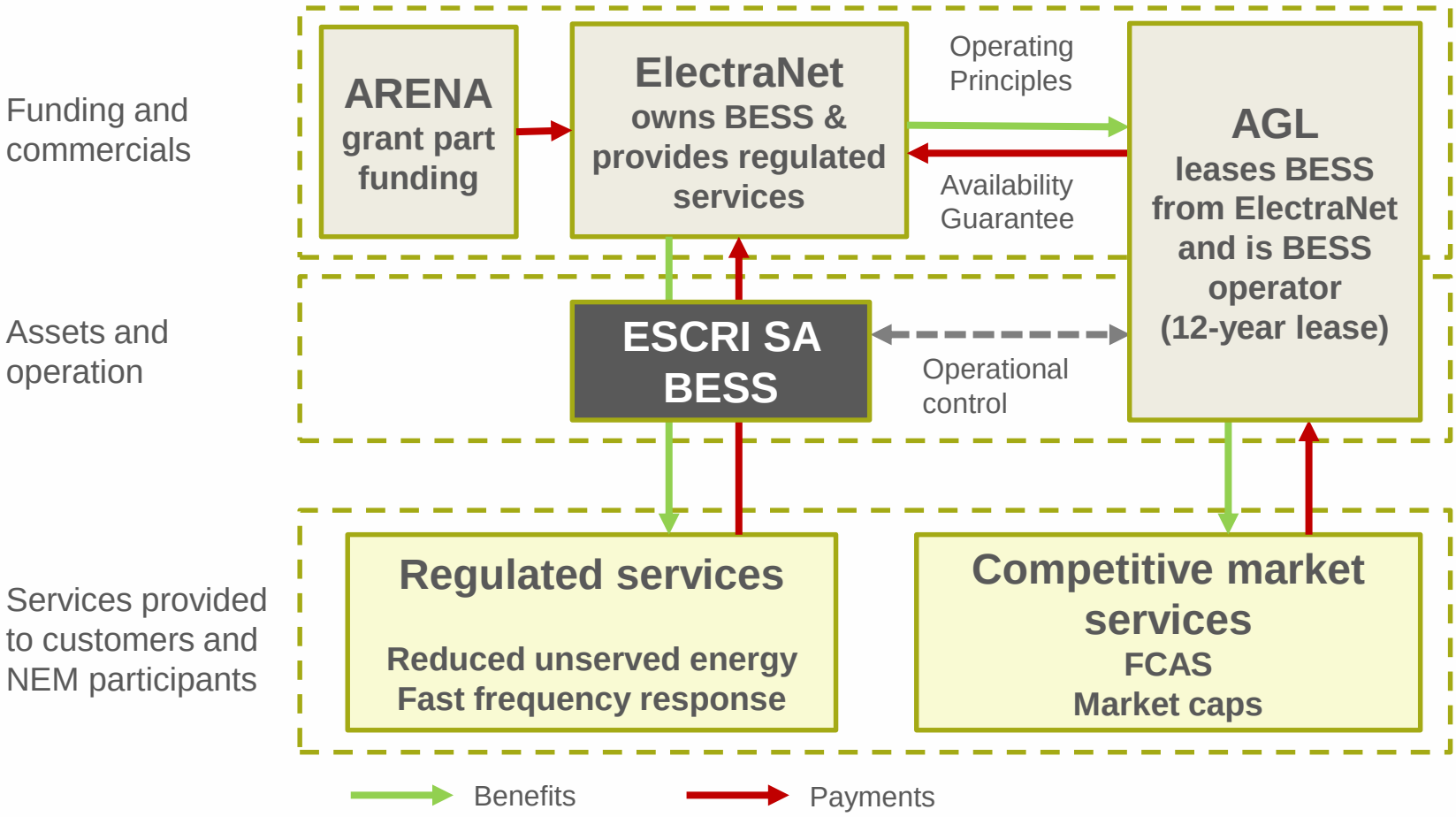
Fast frequency response



- Following an unexpected loss of generation/ load the resulting imbalance of supply and demand causes system frequency to fall/ rise
- If RoCoF is too high it could result in cascading trips of load or generation and emergency control schemes may not prevent system collapse
- Battery can provide fast injection of power to limit RoCoF

Commercial arrangements

Providing both regulated and competitive market services

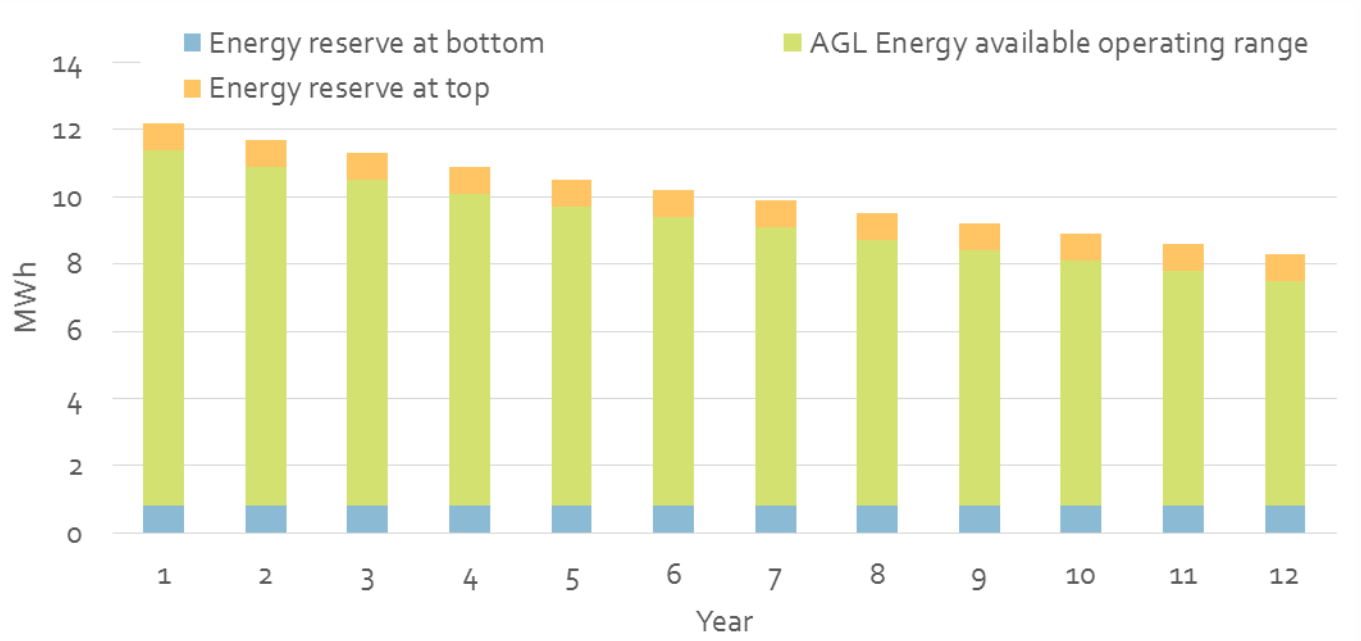


EPC/ D&C contract and 12-year maintenance agreement awarded to Consolidated Power Projects (CPP) following extensive procurement process

Operating principles

Battery Operating Agreement prioritises and protects regulated services

Level of charge at 33kV for non-regulated services	With Windfarm coordination	Without Windfarm coordination
Max allowable level of charge	X – 0.8 MWh	X
Min allowable level of charge	0.8 MWh	4.8 MWh



Tender process EPC contract

- 12 potential suppliers were included in a Selective Tender process in early 2017, based on an earlier worldwide Expression of Interest (EOI) conducted in 2015-16
- A shortlist of 4 suppliers was developed based on price and non-price selection criteria
- Formal fixed lump sum tenders were received from the 4 shortlisted suppliers in July 2017 resulting in selection of 2 preferred suppliers
- Selection of successful supplier was concluded in August 2017

Contract award

- Design and Construct contract and 12-year maintenance agreement was awarded to Consolidated Power Projects (CPP) on 21 September 2017 following extensive procurement process
- CPP is working with international power company ABB and battery provider Samsung to deliver the project

Regulatory treatment

- Acceptance of a service based approach to regulation
- Create a new battery registration category under the National Electricity Rules that picks up relevant generation registration and charging/ discharging requirements so AEMO can manage constraints in market systems
- Current requirement to register as a scheduled load as well as a scheduled generator raises TUOS implications, jurisdictional licensing obligations etc.
- AER approved cost allocation approach, but AER suggested further work is required to develop a more general cost allocation approach for assets providing both regulated and competitive energy market services

Regulated financials[1]

Benefits to regulated customers exceed costs

Estimated costs and benefits to regulated customers	PV ($m)
Prescribed costs of project (including operating costs)	(6.3)
Benefits of reduced unserved energy	5.3
Benefits of reduced interconnector constraints	8.2
Net benefits to customers	7.2

Capital cost allocation ($m nominal)	Cost allocation[2]
Total capital cost	**30.0**
ARENA grant funding	12.0
Capital cost offsets (in-kind contributions and R&D tax credits)	1.6
Non-regulated component (Battery operator lease)	10.6
Prescribed component	5.8

1. All figures approximate only
2. Direct attribution method applied

Lessons learned

- Each battery project appears to have its own set of unique challenges and there may be limited learnings for other projects
- Challenges have included…
  - regulatory treatment as discussed earlier
  - obtaining equipment models for evaluation of Generator Performance Standards
  - clarifying AEMO registration and metering requirements

Milestones

Key deliverable	Target date
Financial close and contract award	Completed 21 Sep 2017
Energisation of BESS	Mid-Mar 2018
Final commissioning of BESS	30 Apr 2018
Handover of operation to AGL Energy	1 May 2018
ARENA reporting and knowledge sharing period ends (two years)	29 May 2020

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Thank you

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