ESCRI-SA Dalrymple BESS Reflections on the impact

ESCRI-SA Knowledge Sharing Reference Group

16 September 2020

In partnership with:

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

Outline

- Perspectives from:
  - ElectraNet
  - AGL
  - Worley/Advisian
  - ARENA

Perspectives from ElectraNet

- Reflection on the WHY and how things have played out
  - Ownership & commercial model
  - Broad range of services
  - Challenging the business
- International stakeholders are surprised to learn about the range of functions the BESS is performing in real life
- One of the first BESS to be registered in the NEM – very transparent approach has assisted AEMO in developing registration procedures for utility scale battery technology

Perspectives from ElectraNet

- Headline innovation leadership has included:
  - development of a first-of-its-kind commercial model to support the provision of regulated reliability and security services by a Network Service Provider (ElectraNet) alongside competitive market services (AGL), challenging perceived limitations to network ownership of battery energy storage technologies
  - navigating the market registration, licencing and connection processes for the first time paving the way for others to follow
  - largest autonomous regional micro-grid development to date co-optimised for both grid-connected and islanded operation with 100% renewables allowing seamless transition between the two operating modes (for both planned and unplanned islanding)
- Also provides pre-emptive emergency response as part of the SA System Integrity Protection Scheme, providing fast power injection into the network following a significant loss of generation to help prevent a major loss of supply to customers

Innovation Awards

Energy Networks Australia:
2019 Industry Innovation Award

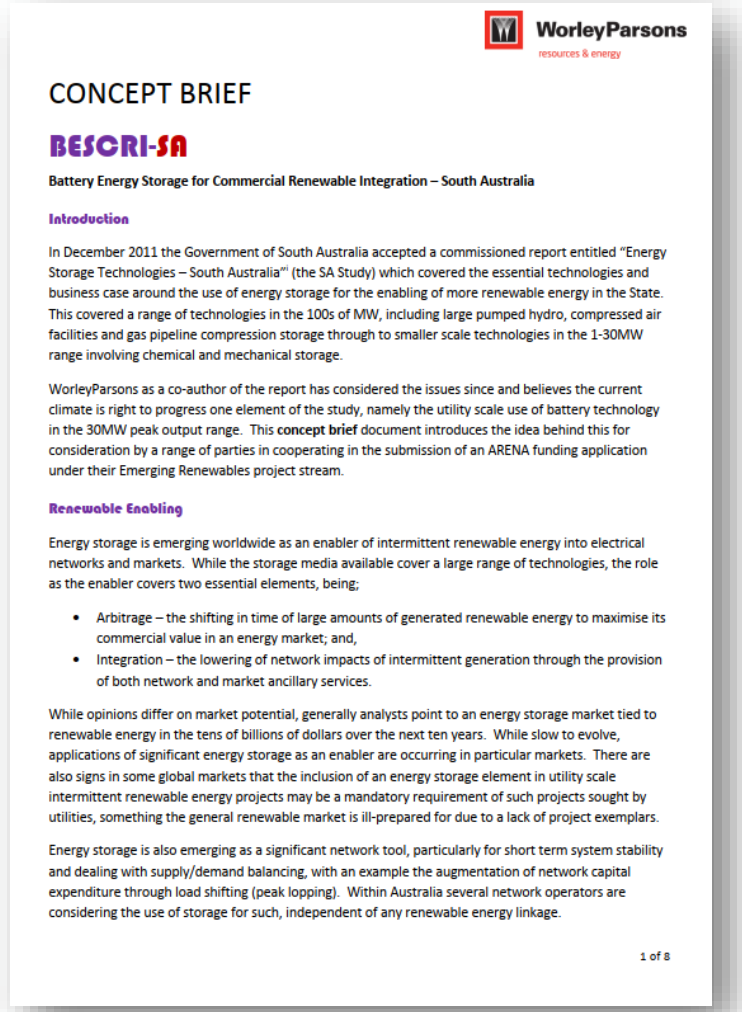
South Australian Premier's Award: 2019 Energy Sector – Transformational Innovation

Perspectives from AGL

- First Stage of ESCRI investigated smaller capacity with longer storage time
- Second Stage embraced larger capacity (30MW) and shorter storage (20min)
- Expected more revenue from FCAS than Arbitrage – This has proved correct
- How will future revenue streams for batteries change – mandatory PFC, new markets?
- Technical challenges and learnings from islanding Wattle Point wind farm with BESS

Perspectives from Worley/Advisian

- Concept floated in August 2013 with AGL, then ElectraNet
- Targeting the demonstration of utility scale energy storage for the integration of variable renewables
  - Target budget of $25-30M
  - COD around August 2016
- Originally covered any energy storage technology other than large scale hydro
- Have had various roles – and has been great to watch the project develop and succeed



WorleyParsons
resources & energy

CONCEPT BRIEF

BESCRI-SA

Battery Energy Storage for Commercial Renewable Integration – South Australia

Introduction

In December 2011 the Government of South Australia accepted a commissioned report entitled "Energy Storage Technologies – South Australia"[i] (the SA Study) which covered the essential technologies and business case around the use of energy storage for the enabling of more renewable energy in the State. This covered a range of technologies in the 100s of MW, including large pumped hydro, compressed air facilities and gas pipeline compression storage through to smaller scale technologies in the 1-30MW range involving chemical and mechanical storage.

WorleyParsons as a co-author of the report has considered the issues since and believes the current climate is right to progress one element of the study, namely the utility scale use of battery technology in the 30MW peak output range. This **concept brief** document introduces the idea behind this for consideration by a range of parties in cooperating in the submission of an ARENA funding application under their Emerging Renewables project stream.

Renewable Enabling

Energy storage is emerging worldwide as an enabler of intermittent renewable energy into electrical networks and markets. While the storage media available cover a large range of technologies, the role as the enabler covers two essential elements, being;

- Arbitrage – the shifting in time of large amounts of generated renewable energy to maximise its commercial value in an energy market; and,
- Integration – the lowering of network impacts of intermittent generation through the provision of both network and market ancillary services.

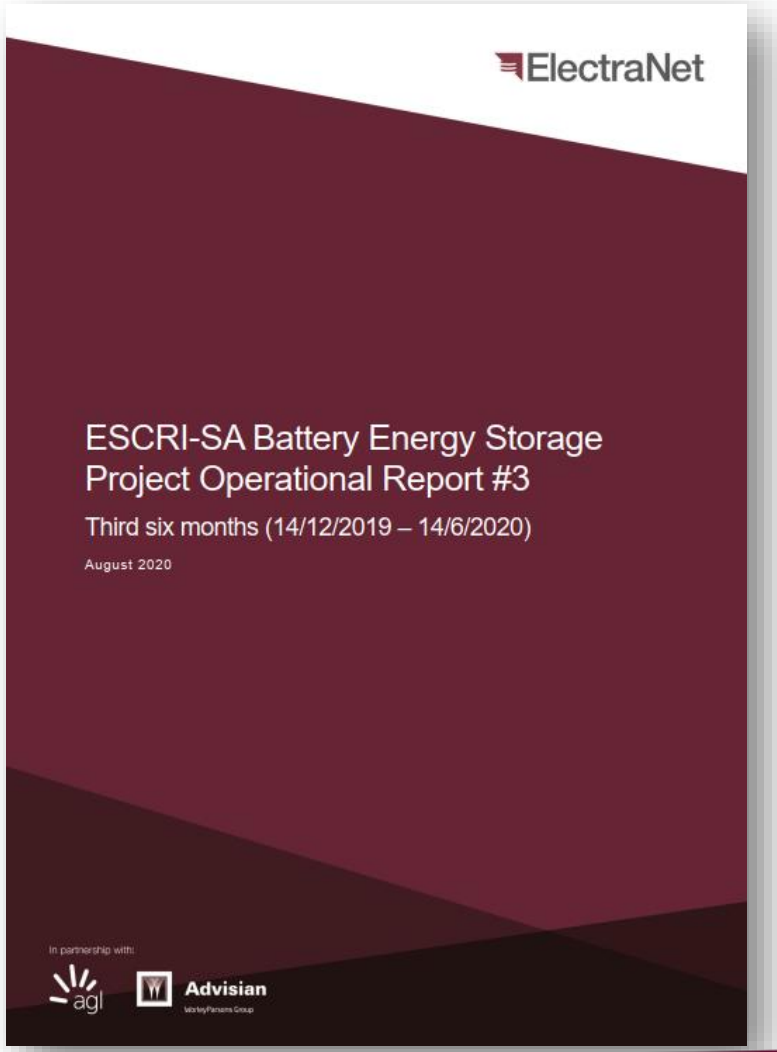
While opinions differ on market potential, generally analysts point to an energy storage market tied to renewable energy in the tens of billions of dollars over the next ten years. While slow to evolve, applications of significant energy storage as an enabler are occurring in particular markets. There are also signs in some global markets that the inclusion of an energy storage element in utility scale intermittent renewable energy projects may be a mandatory requirement of such projects sought by utilities, something the general renewable market is ill-prepared for due to a lack of project exemplars.

Energy storage is also emerging as a significant network tool, particularly for short term system stability and dealing with supply/demand balancing, with an example the augmentation of network capital expenditure through load shifting (peak lopping). Within Australia several network operators are considering the use of storage for such, independent of any renewable energy linkage.

1 of 8

Perspectives from Worley/Advisian

- The latest AEMO ISP paints an even more complicated view of the future
- We still have a long way to go to optimise the role of energy storage in the NEM
  - 2020 statement of opportunities mentions storage (mostly around pumped hydro)
  - The technical capability and effectiveness of batteries (and inverter coupled plant) still needs progression/consideration
  - I think the lessons from ESCRI need to be carefully considered and acted on



Dalrymple North

ESCRI-SA Battery Energy Storage System (BESS)

ElectraNet

Thank you

ElectraNet Pty Limited
PO Box 7096, Hutt Street Post Office
Adelaide, South Australia 5000

P +61 8 8404 7966 or 1800 243 853 (Toll Free)
F +61 8 8404 7956 W electranet.com.au

ABN 41 094 482 416 ACN 094 482 416

In partnership with:

agl

ARENA
Australian Government
Australian Renewable Energy Agency

Advisian
WorleyParsons Group

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