AMPYR

Unlocking medium duration storage for a renewable grid

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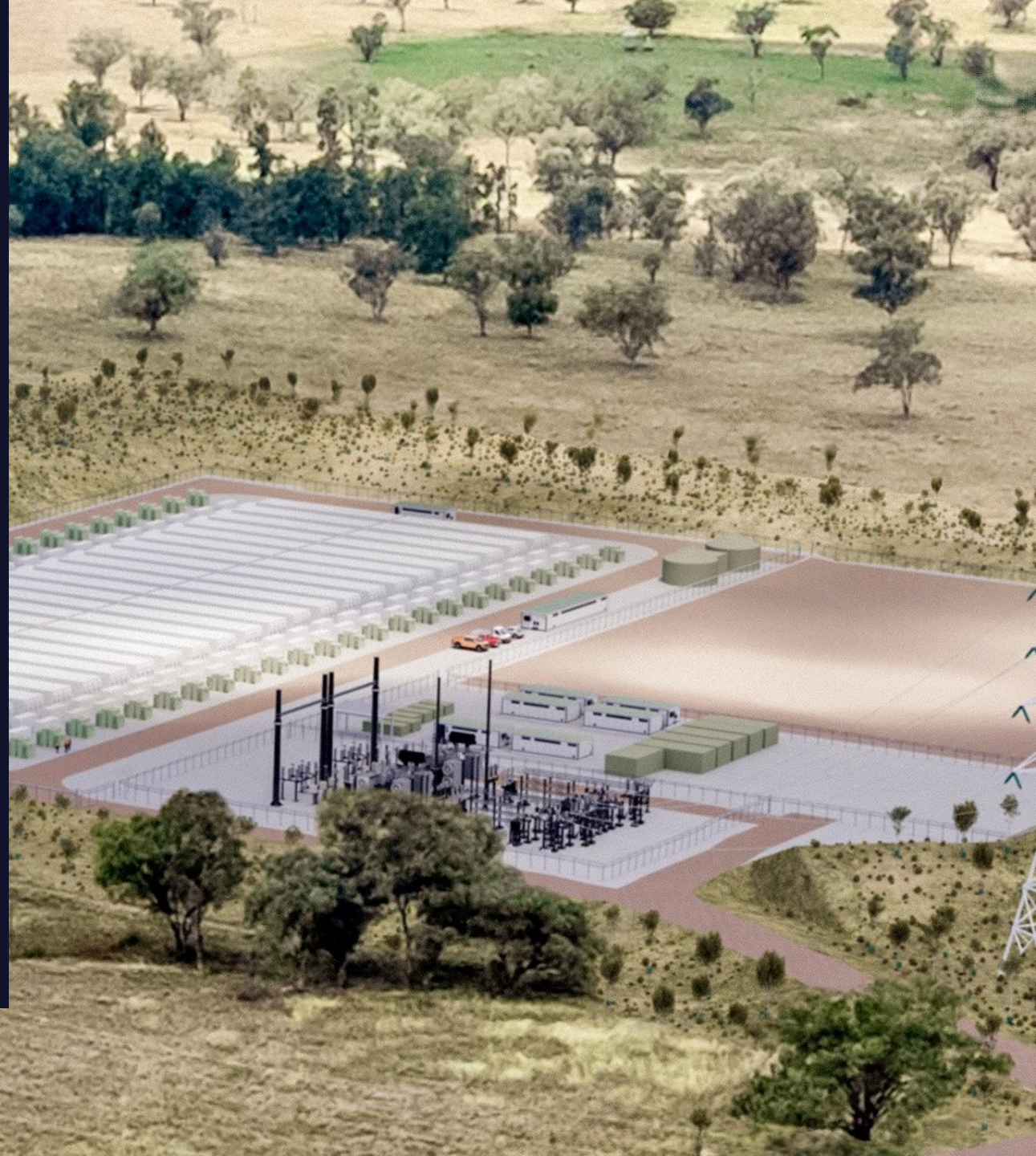
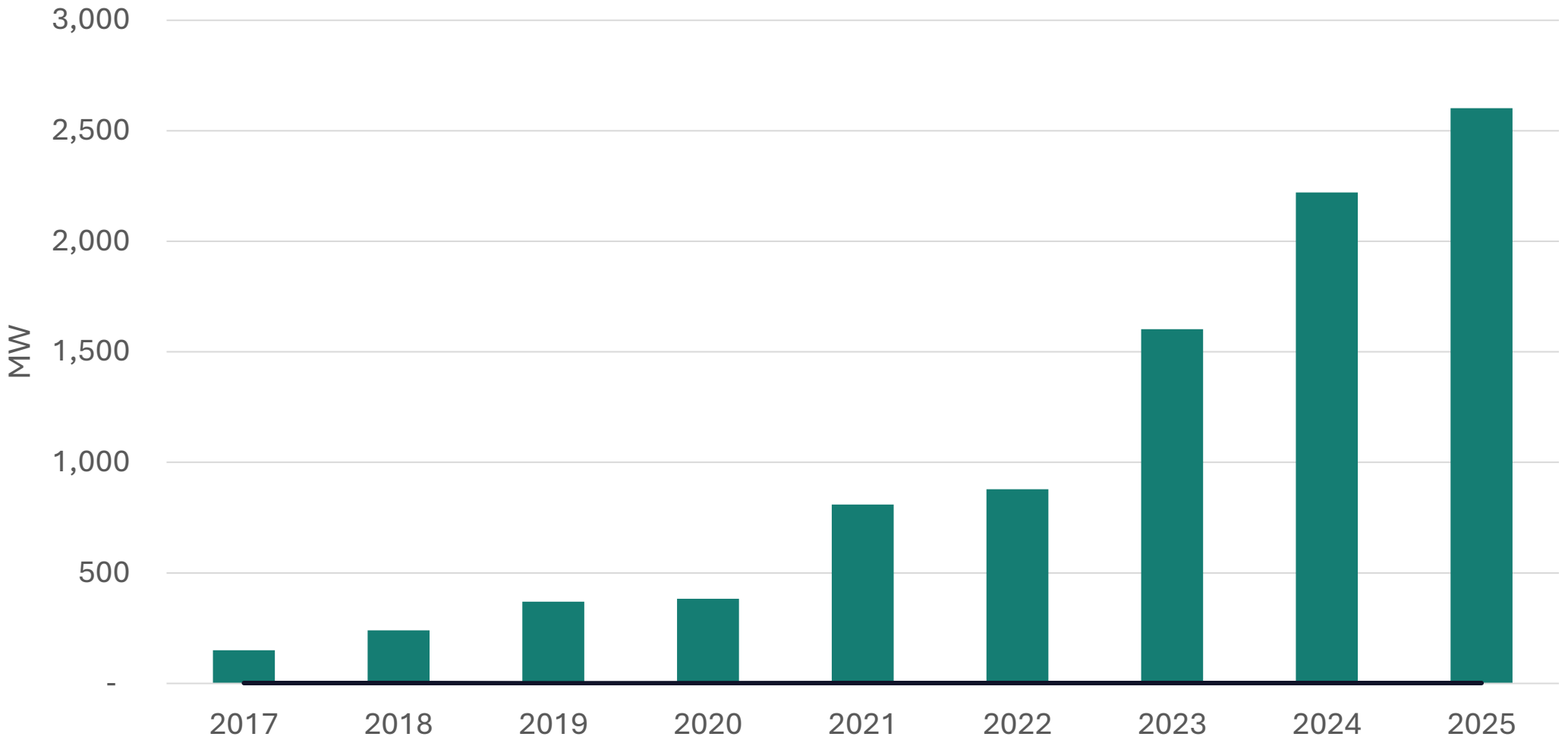


Storage – the big energy transition success story of this decade

Cumulative growth of commissioned large-scale BESS



Source: Clean Energy Council: Quarterly investment report: Large-scale renewable generation and storage, Q2 2025

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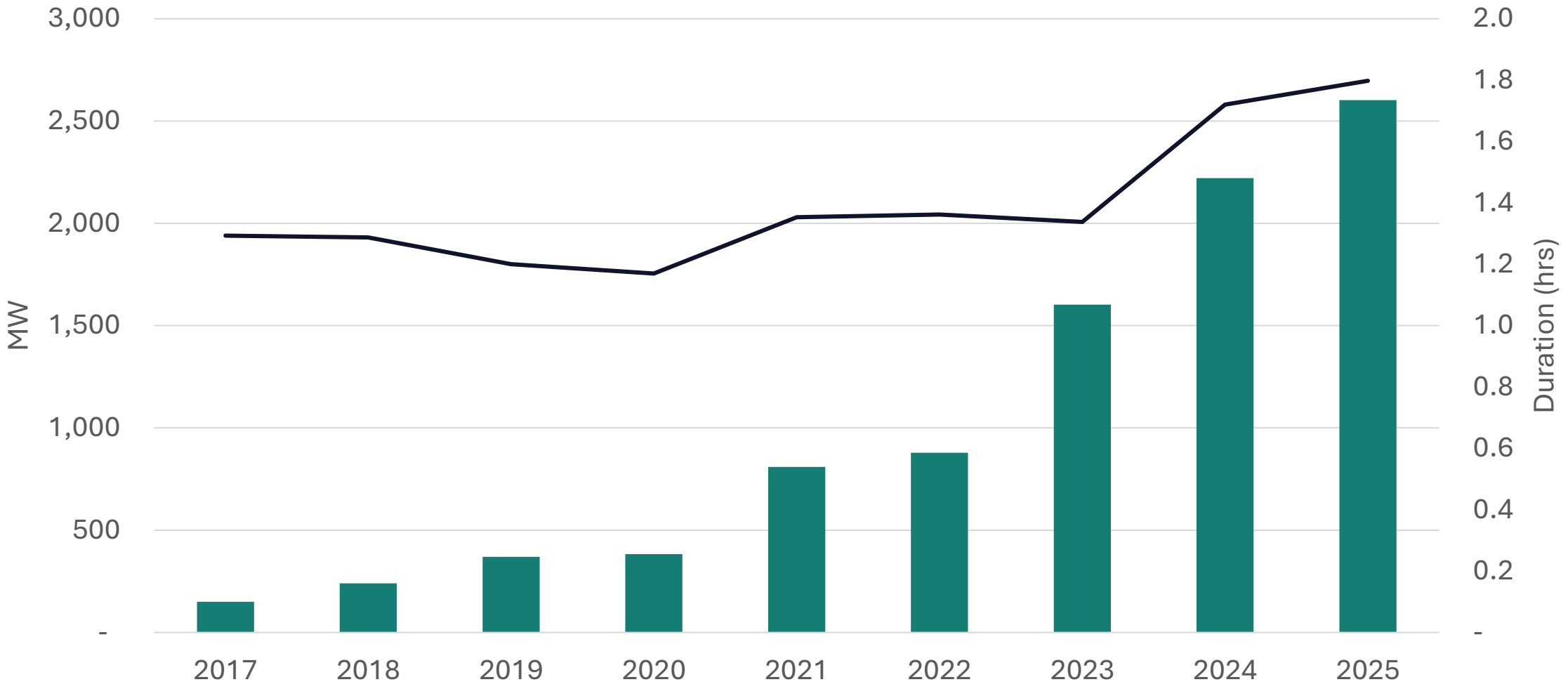

Source: Clean Energy Council: Quarterly investment report: Large-scale renewable generation and storage, Q2 2025

Short duration storage investments currently stack up

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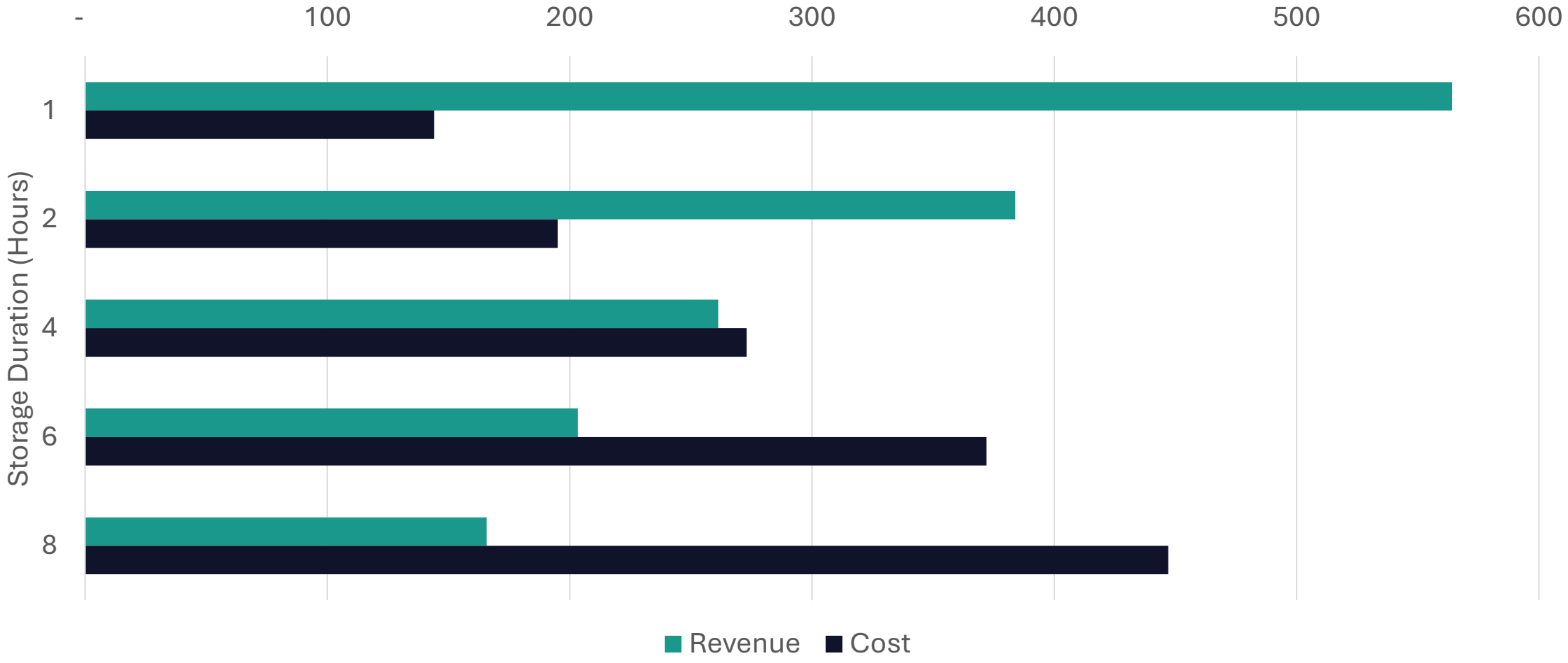
INDICATIVE ANALYSIS

Maximal spread

$/MWh



Source: AMPYR analysis of NSW historic 5-year spot market data; CSIRO 2024-25 Gen Cost

Bulabul BESS – Example 2h BESS

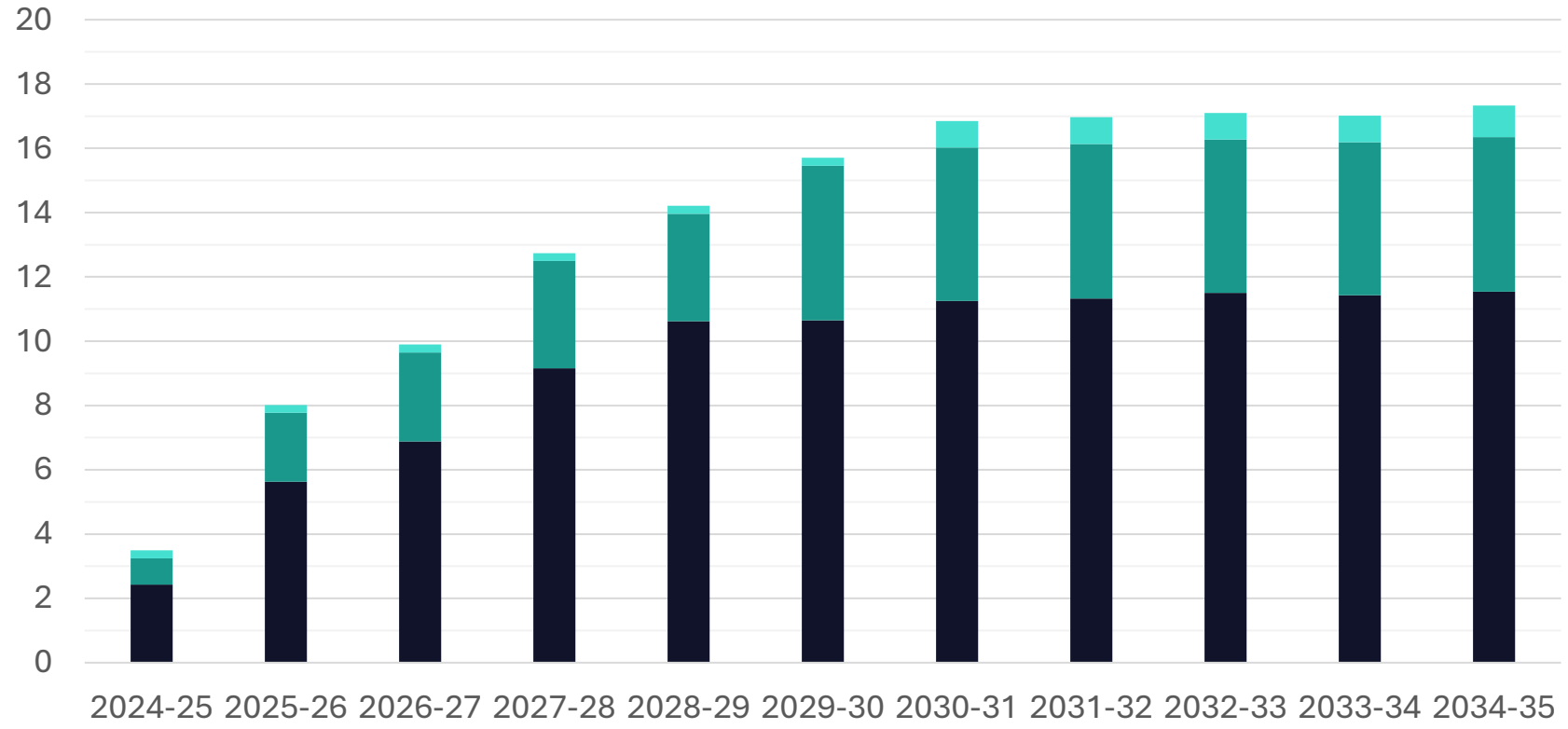
We need more medium duration storage than currently forecast

1. Only ~1/3 of ISP forecast is medium duration storage
2. More solar in the energy mix requires more longer duration storage, which will be beneficial for consumers
3. Medium duration storage helps to manage high-impact, low probability events
4. Medium duration storage can provide virtual transmission capacity in congested networks
5. Longer duration storage is a cost-effective way to displace gas in the energy mix
6. 24/7 firmed renewables will require even more medium to long duration storage

1. ISP projects a 5-fold growth of storage with medium duration making up 1/3 of this volume

Utility Scale Storage*

GW



Long-duration storage:
- Definition: >12 hours
- Average (2025-35): 30.8 hrs

Medium-duration storage
- Definition: 4-12 hours
- Average (2025-35): 6.7 hrs

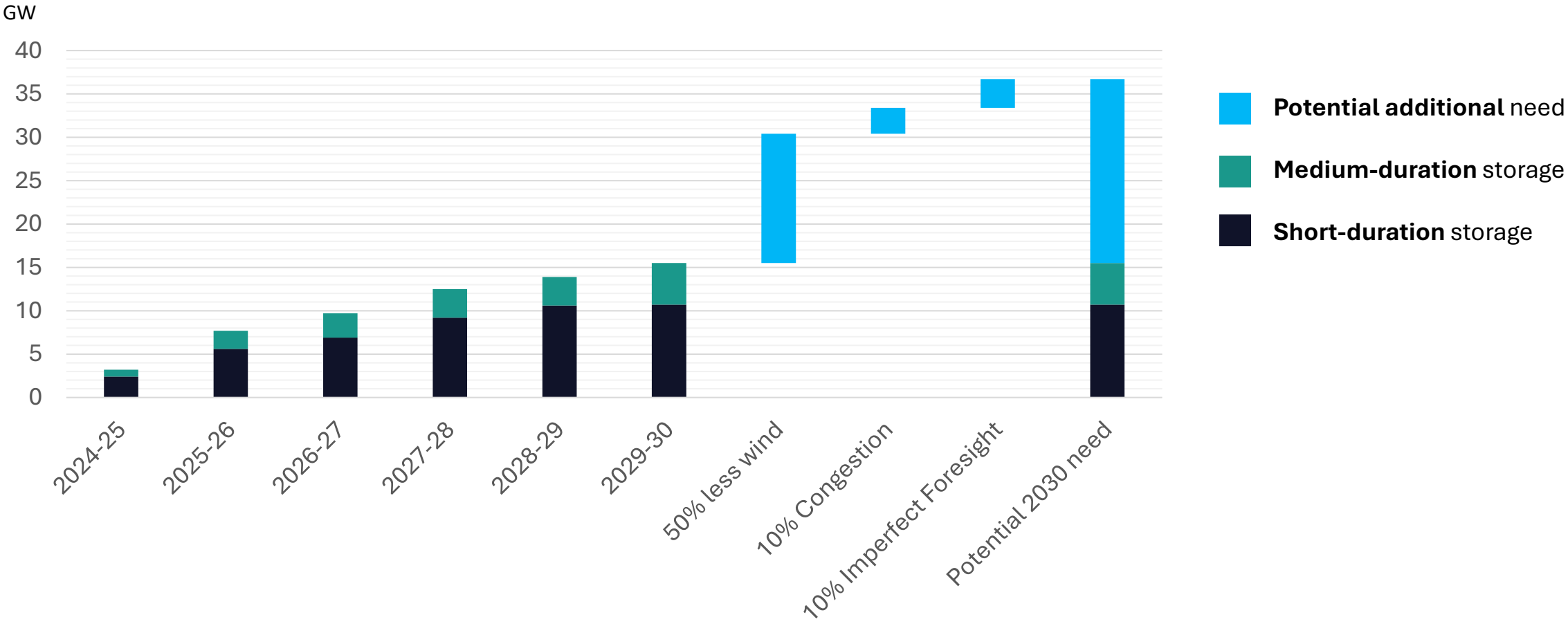
Short-duration storage
- Definition: < 4 hrs
- Average (2025-35): 1.6 hrs

* In the NEM; Excluding Snowy 2.0 and Borumba

Source: AEMO 2024 ISP, Step Change Scenario

2a. We may require more than double the forecast amount of storage, mainly to compensate for less wind with more solar

Utility Scale Storage*



Source: AEMO 2024 ISP, Step Change Scenario

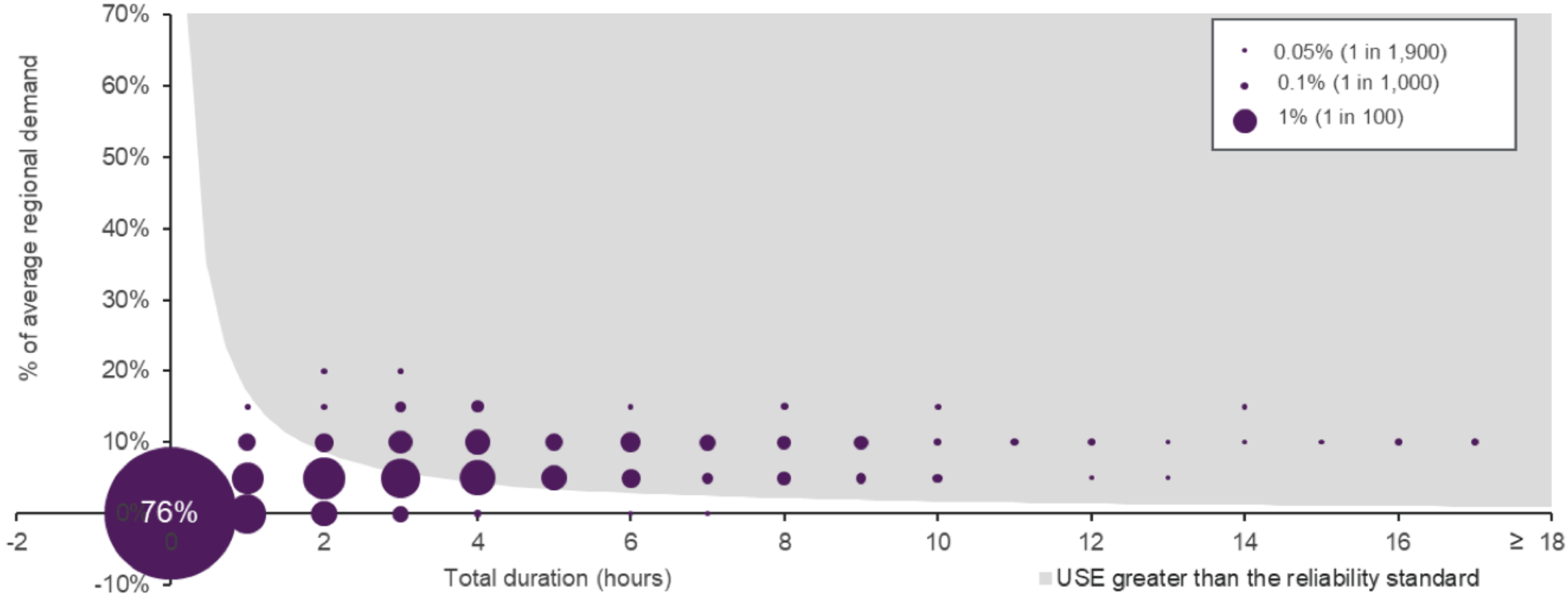
2b. PV plus BESS could lead to lower cost consumer outcomes in a high-cost of Wind plus REZ scenario

'Optimal' mix	Solar	Wind	BESS	System LCOE[2] $/MWh
Low[1] Wind/REZ cost	~60%	~40%	~2h	127
High[2] Wind/REZ Cost	~80%	~20%	~4h	116

1. Based on CSIRO 2023/24 GenCost and 2024 ISP assumptions, 2. Assuming wind plus REZ cost of 4,000 $/MW
Source: Ampyr analysis based on a simplified system model for NSW

3. Medium duration storage required to manage low probability, high impact events

Unserved Energy (USE) duration and depth*

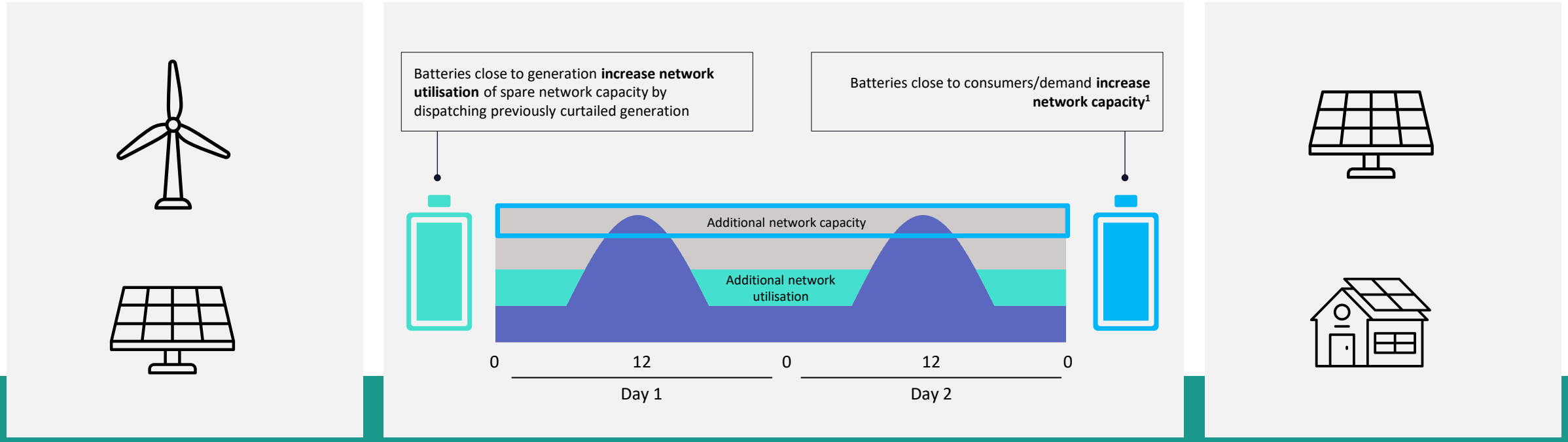


* Queensland example 2025-62 for committed and anticipated projects

Source: AEMO ESOO, Aug 2025, Fig 30

4a. Strategically located storage increases transmission utilisation and capacity

SCHEMATIC



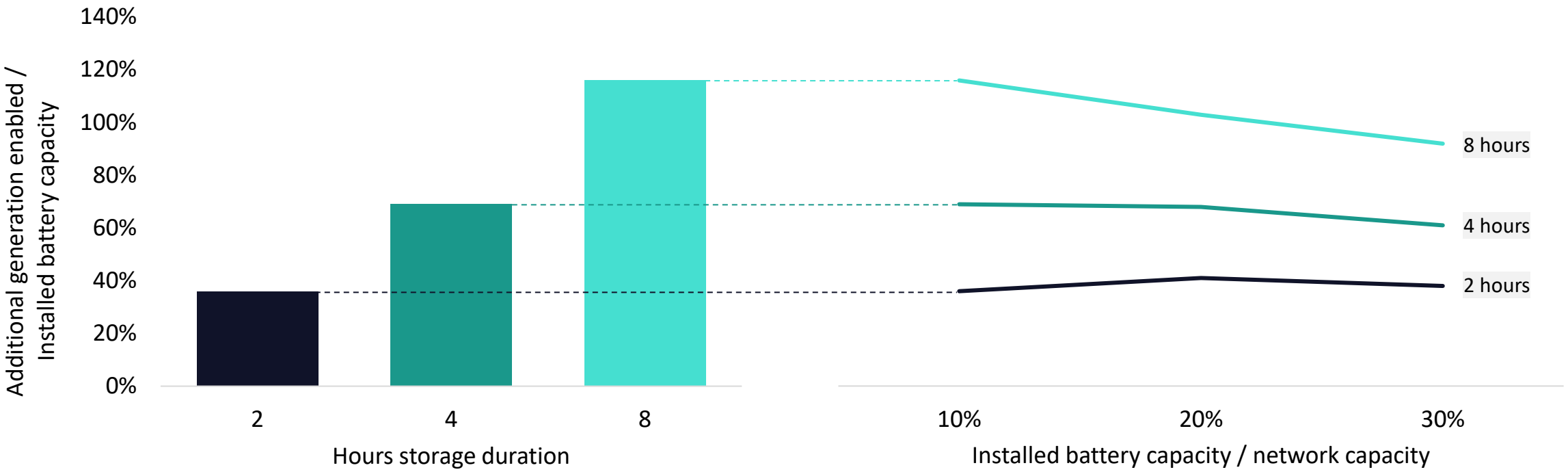
Large-scale generation → **Network** → **Consumer with CER**

1. Either through direct discharge during peak times or a System Integrity Protection Scheme (SIPS)

4b. Medium Duration storage can increase generation hosting capacity in congested networks

Batteries increase generation hosting capacity

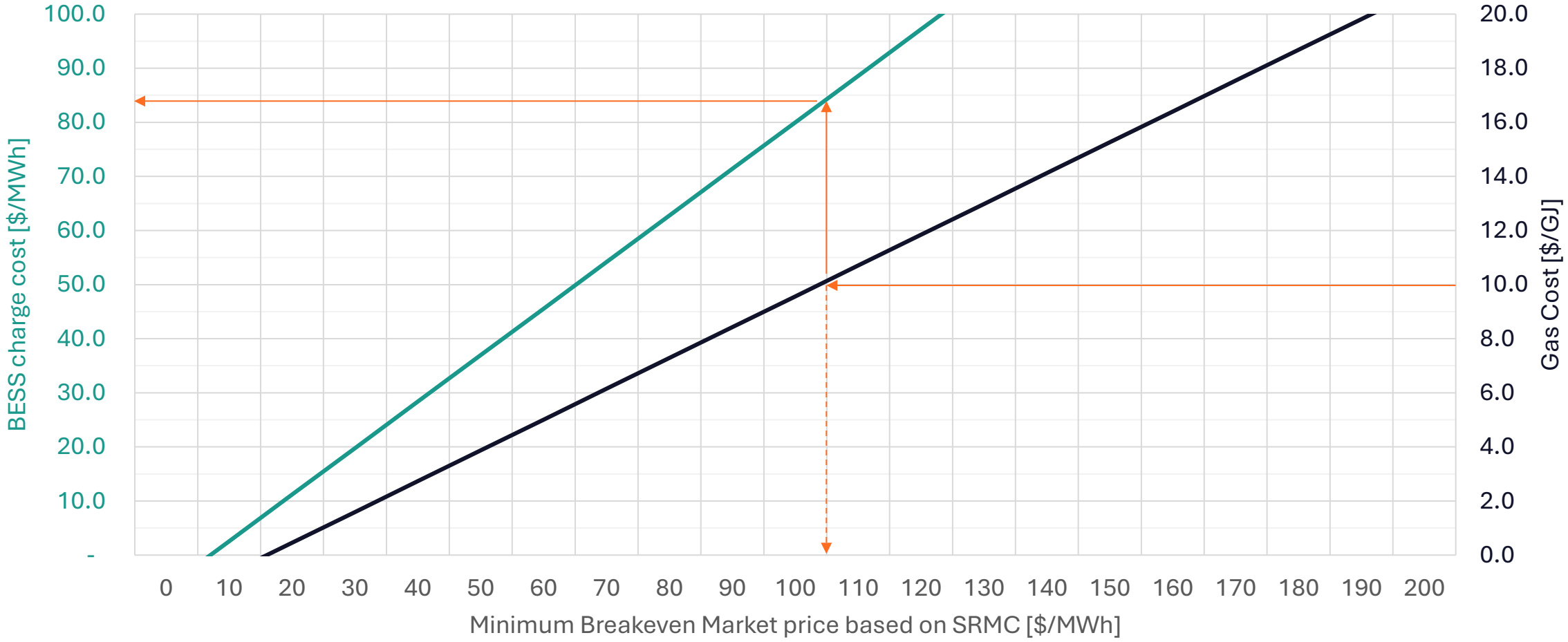
Hosting capacity declines as batteries grow



Source: AMPYR analysis for NSW REZ example with 3 GW network capacity and 5.8 GW installed generation pre battery deployment

5. Medium duration storage more competitive than gas

Breakeven analysis of Short Run Marginal Cost (SRMC) of BESS compared to GPG

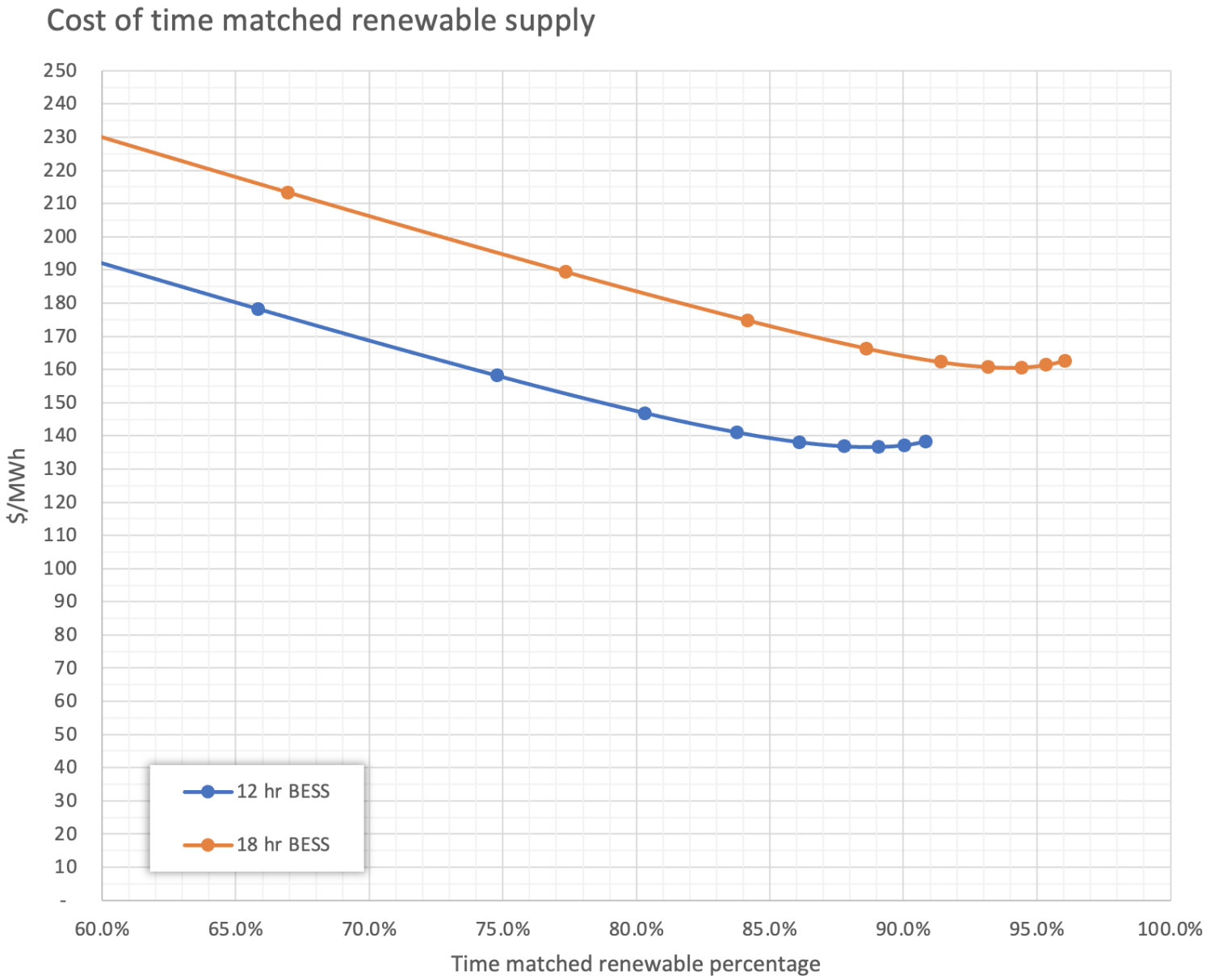


Source: AMPYR analysis of 2024-25 GenCost data, based on reciprocating gas engine with an efficiency of 41% compared to a BESS with a Round Trip Efficiency of 86%

6. Medium to long duration storage will also be required to offer time matched firm renewable supply

Key assumptions:

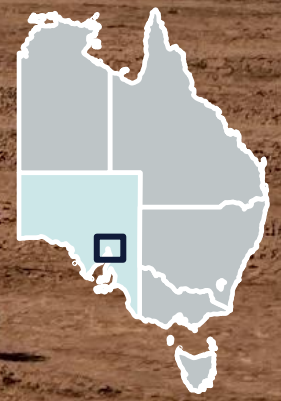
- Single trace solar profile
- Middle of the day shape: 20 $/MWh
- Project IRR: 10%
- 12 hr BESS: 4,572 $/kW
- 24 hr BESS: 8,064 $/kW
- Life: 20 years
- Firming cost: 260 $/MWh



Conclusion

- Short-duration batteries have already been pivotal in Australia's first phase of the renewable transition.
- More medium-duration storage than currently forecast will be critical to delivering a reliable, 24/7 renewable grid
- The technology exists and the capital is ready – the challenge now is to create clear, bankable pathways for medium-duration storage to scale. Pathways for this exist:
  - Existing support schemes, e.g. CIS, LD LTESA, SA FERM
  - NEM Review?
  - Future Market mechanism?
  - Firming reserve?

AMPYR Northern BESS
South Australia

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