



# Small Scale Energy Storage Forum

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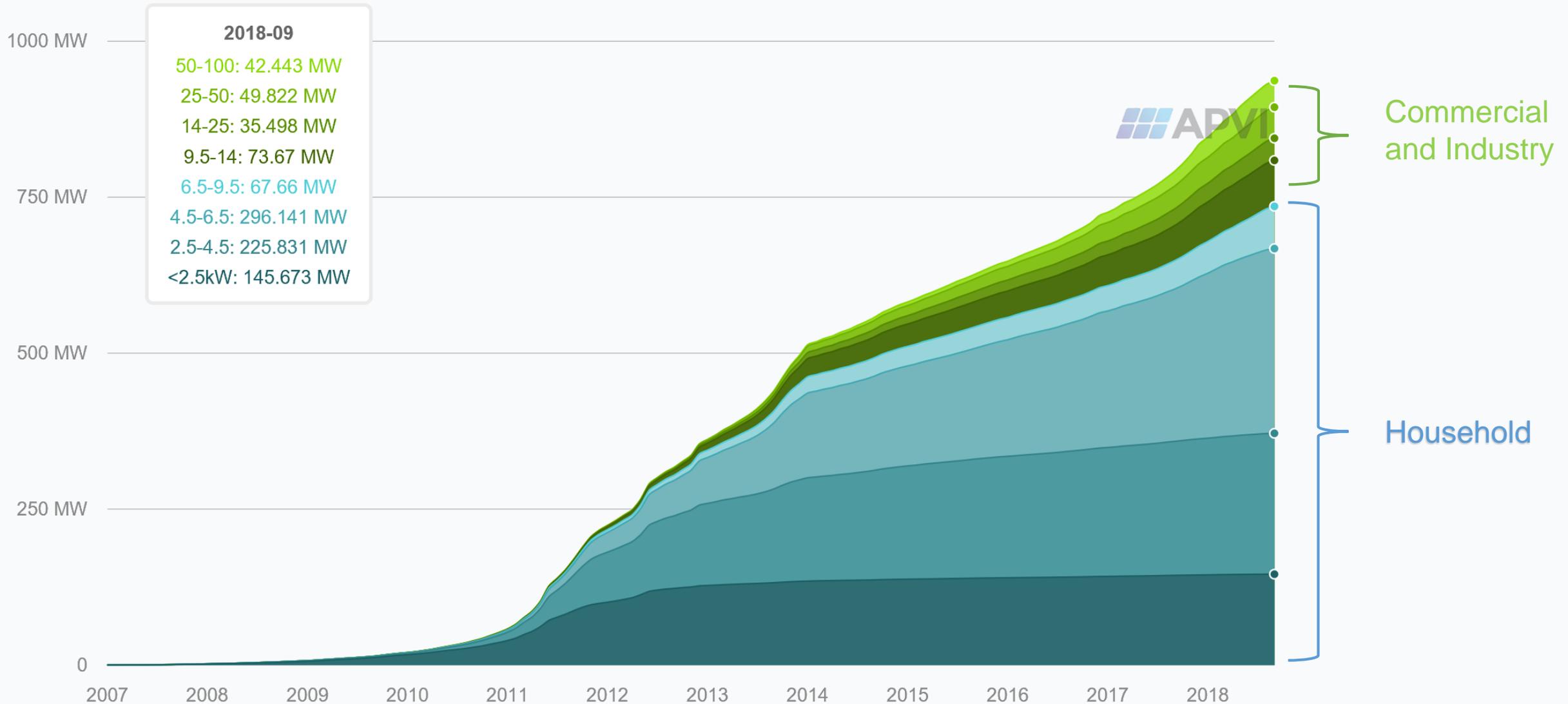
# SA's Energy Transition Snapshot

- One of the world's highest penetrations of renewable energy.
- 48% renewable energy generation in 2017/18.
  - 39% large scale wind (19 wind farms)
  - 9% rooftop solar PV (1 in 3 households)
- Up from less than 1% in the early 2000s
- Deployment accelerating – AEMO project 66% renewable energy generation in 2020/21
- A pipeline of large scale wind, solar and energy storage projects > 14GW / \$21B
- Continuing growth in rooftop solar
  - One of the most distributed grids globally



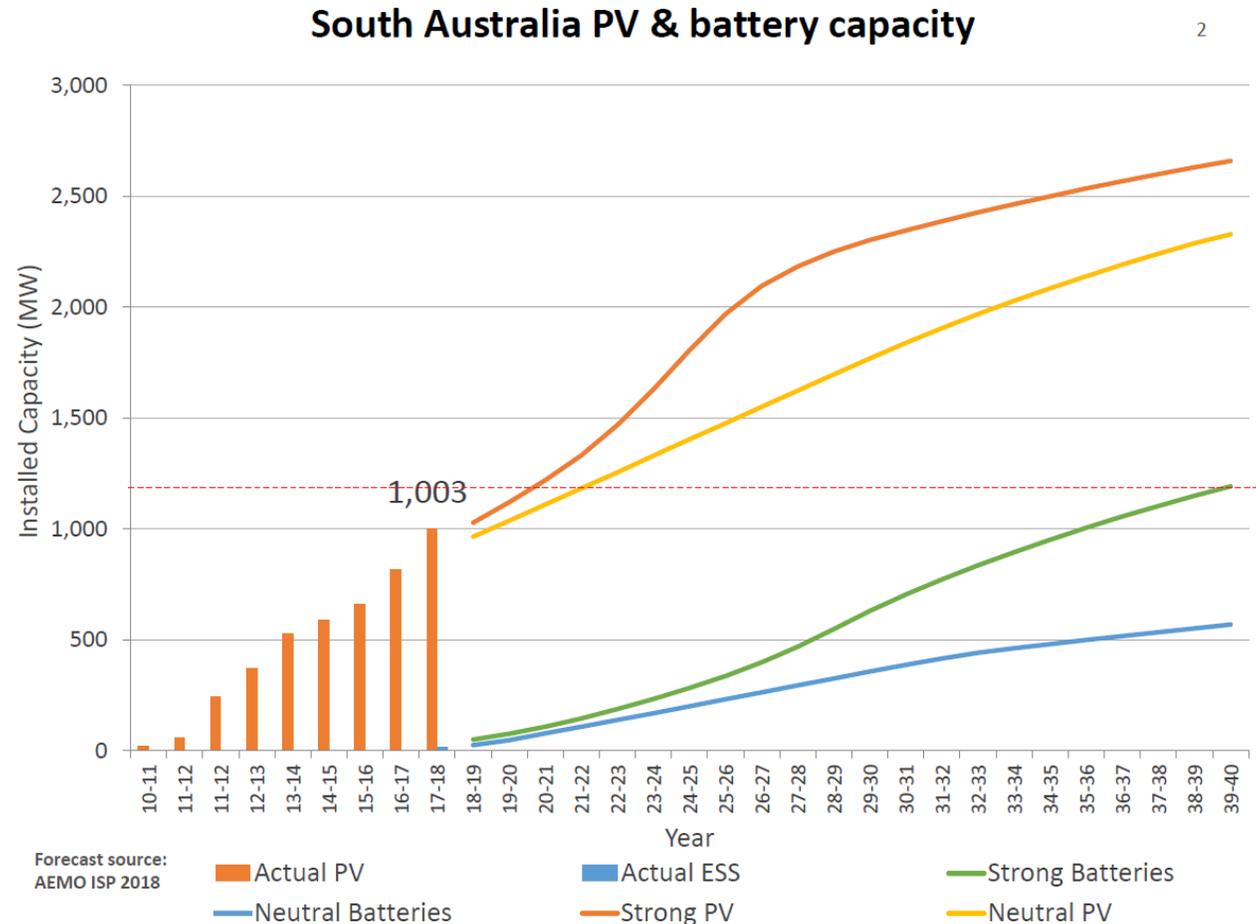


# SA rooftop solar PV: 0 to 1000MW in a decade



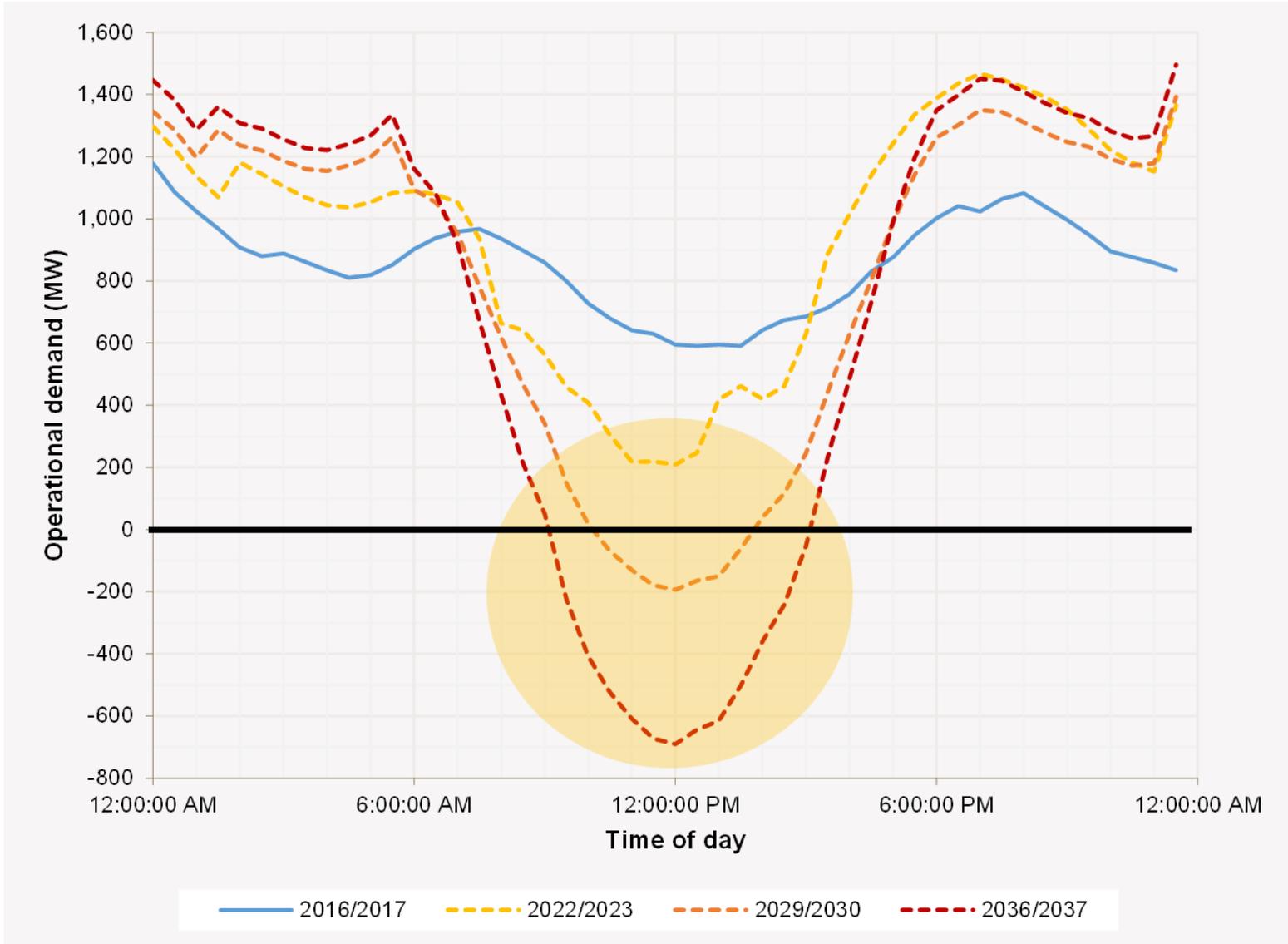
# SA – SOLAR PV GENERATION

- Since 2009, SA's total installed rooftop solar PV capacity has grown strongly.
- More than 30% of dwellings in SA now have rooftop solar PV systems installed.
- High Solar PV penetration may require changes to managing distribution systems in SA.





# Swan Curve?



# Home Battery Scheme



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- Deliver battery systems to 40,000 homes in South Australia
- \$100m in state government subsidies
- \$100m in CEFC loans
- Over 2500 subsidy applications conditionally approved
- Over 1700 batteries installed



Home  
Battery  
Scheme



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# World's Largest Virtual Power Plant

- **Comprising Tesla Powerwall batteries and solar PV systems on 50,000 SA homes**
- **Bundles the power generated from homes, to provide services to the network comparable to those provided by a large generator**
- **Phase I: 100 systems installed on SA housing trust homes**
- **Phase II: 1000 systems installed and demonstrate aggregation of the VPP with a program retailer**
- **Phase III: full-scale deployment of potentially 25,000 SA housing assets, 25,000 private homes**

# Grid Scale Storage Fund



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- **\$50 million fund to facilitate new grid scale storage technologies**
- **Designed to address the intermittency of South Australia's energy supply**
- **More than 50 proposals received**
- **Proposals included pumped hydro, hydrogen, thermal and battery storage**



# Interconnector between SA & NSW



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- Fast tracking a new interconnector between SA and NSW
- Preferred route between Robertstown in South Australia's Mid-North and Wagga Wagga in New South Wales through Buronga, north of Mildura
- Increased electricity exports from South Australia
- Downward pressure on wholesale electricity prices
- Residential customers to save \$66pa and small business customers \$132pa on their electricity bill

# \$11M Demand Management Trials



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- Grants of up to \$2.5 million available, with applicants expected to at least match the amount of grant funding being sought
- Reward consumers for managing their own demand
- Project proposals required to meet one of four outlined objectives:
  - Demand management incentives
  - Demand management marketplace
  - Distributed energy resource incentives
  - Network hosting capacity

# Renewable Technology Fund



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- First project funded – Hornsdale Power Reserve providing security services and generation capacity
- Gives additional system stability to South Australia
- Further projects funded from RTF include:
  - 1414 Degrees Thermal Storage facility
  - Hydrostor compressed air storage
  - Infigen Lake Bonney Battery
  - Tilt Renewables Snowtown Battery
  - Tesla Virtual Power Plant
  - Pumped Storage feasibility studies – Simec, Energy Australia, Altura and Rise Renewables

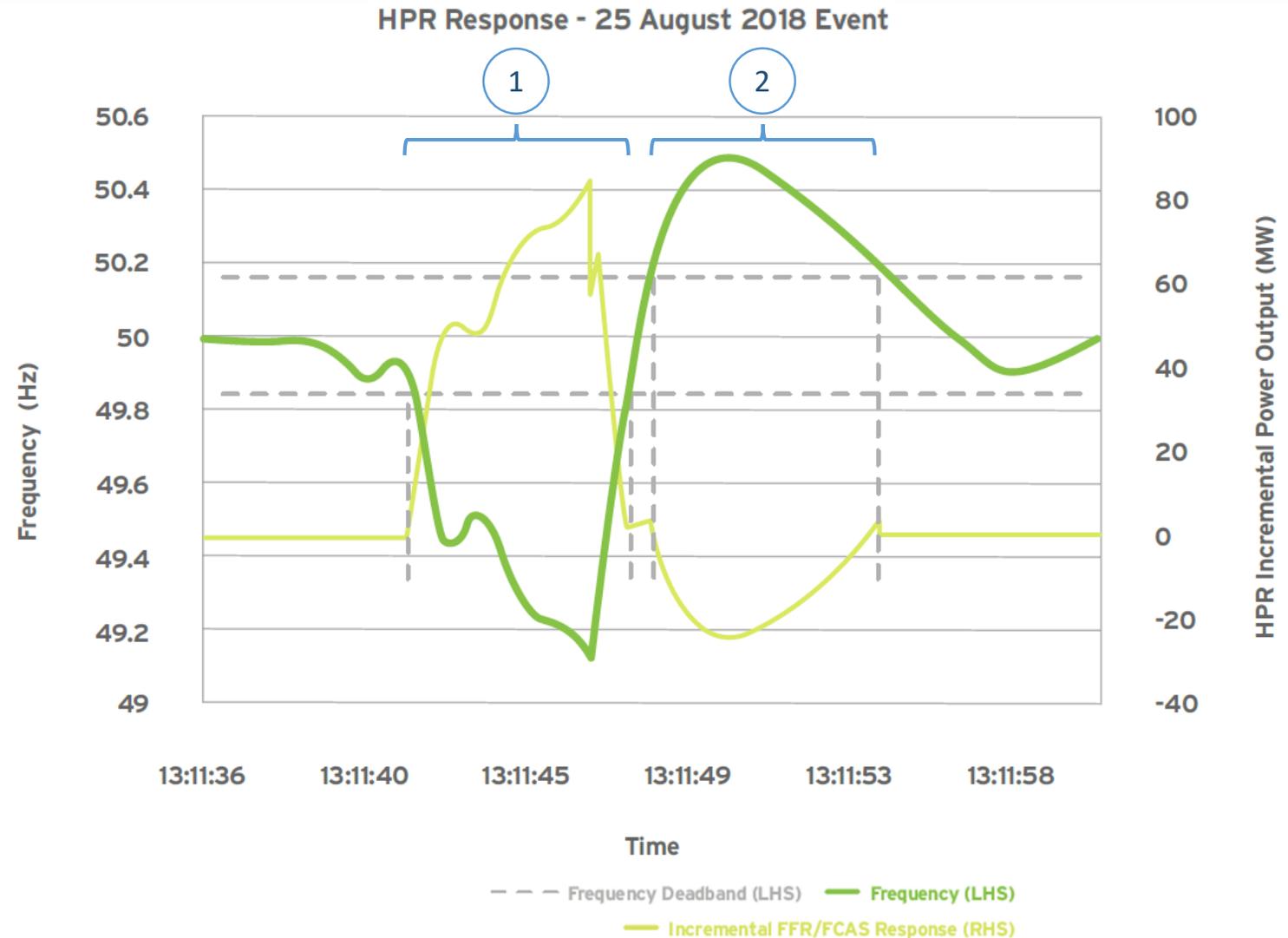
# Benefits of storage technology

## Fast Frequency Response

- First of its kind on the NEM
- Fast dispatch of active power in response to frequency disturbances (~ 100 ms)
- Slows RoCoF during contingency event and supports return to normal frequency band

### 25 August 2018 case study

1. Hornsdale Power Reserve (HPR) provides low frequency support to all connected mainland NEM regions
2. HPR provides high frequency support to the separated SA region



# Distributed Energy Resource (DER) Integration



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- AEMO analysis of major system events, including August 25, highlights the need to improve technical standards for DER.
  - Fault ride through
  - Grid support
  - Coordination and communication
  - Cyber security
- Issues with compliance with standards also highlighted
- Working with Standards Australia and stakeholders on updating AS 4777



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Technical Integration of  
Distributed Energy Resources

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April 2019

Improving DER capabilities to benefit consumers  
and the power system

A report and consultation paper

# Demand Response Capabilities for Selected Appliances

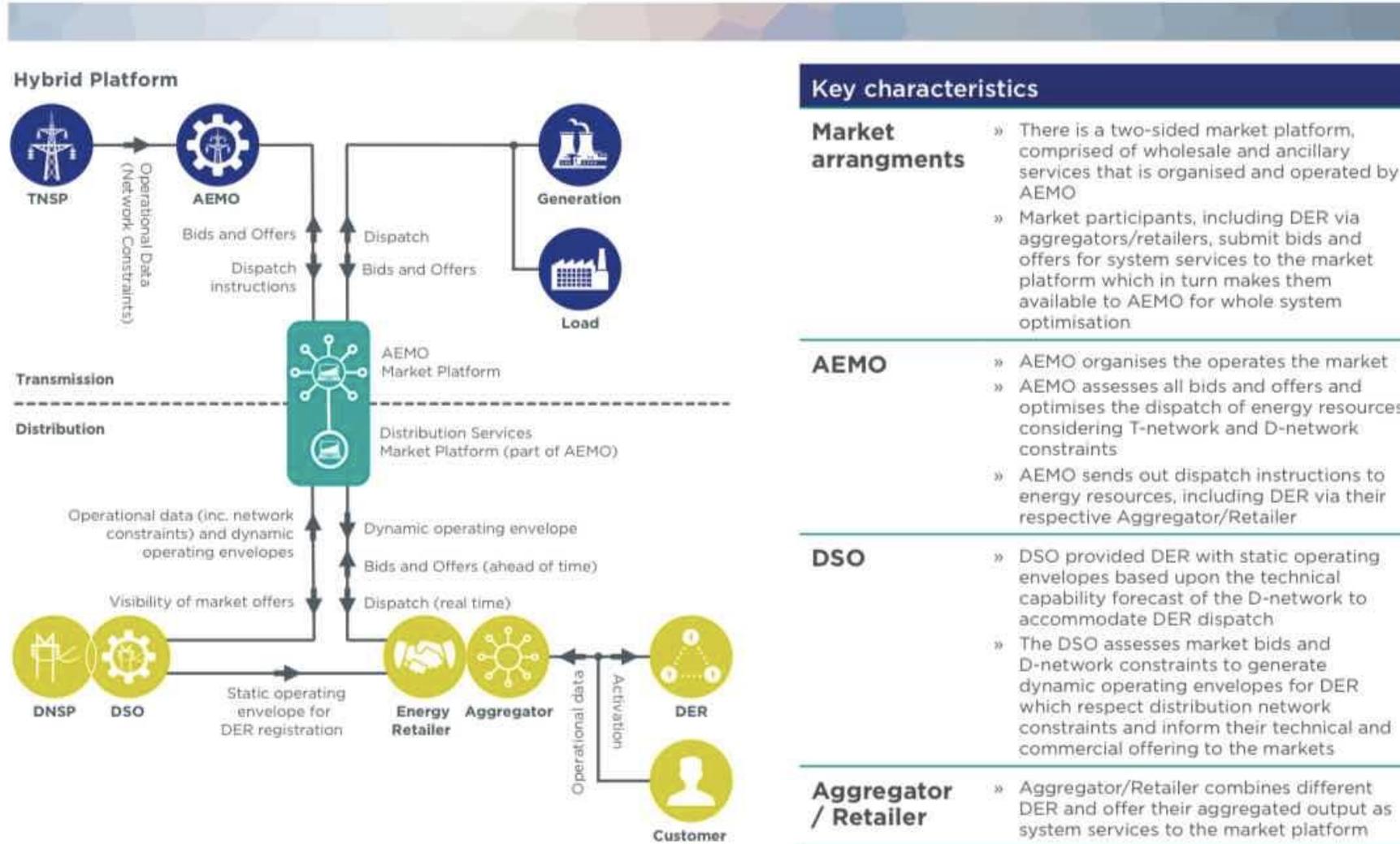
- South Australia is leading a COAG Energy Council Project proposing the mandating of Demand Response Modes (DRMs) under AS/NZS 4755 for air conditioners, pool pump controllers, electric storage water heaters and electric vehicle chargers.
- AS/NZS 4755 specifies a number of DRMs for each product type, such as minimum load off, operate at a reduced load, etc.
- In particular, the project is proposing that pool pump controllers, electric storage water heaters and electric vehicle chargers would need to comply with DRM4 – a ‘request load on’ function. Remote Agents/DRSPs could turn appliances on (for the duration of a DR event) and create load when there is a minimum demand issue.
- It will **not** be mandatory for customers to participate. The requirement is for the four appliances to comply with the DRMs for that product, as per AS/NZS 4755.
- Consultation closes 16 September 2019 – link [here](#) for further details/information.

# AEMO/ENA Open Energy Networks



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- Cost Reflective Pricing
  - Tariff Structure Statement includes 'solar sponge' Time of Use charging
- Low Voltage Management proposal
  - Essential enabler for integration, consistent with Open Energy TSO
- ARENA funded Advanced VPP Grid Integration project
  - LV constraints to DER via API

# National Electricity Market

- Ancillary Services Unbundling – July 2017
- 5 minute settlement – rewards fast response technology, commencing July 2021
- Wholesale Demand Response Mechanism – recent Draft Determination proposing July 2022
- Energy Security Board Post 2025 Market Design for the NEM

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