

REGULATING OFF-THE-GRID

STAND-ALONE POWER SYSTEMS IN AUSTRALIA

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AEMC

Agenda

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1. WHAT WE DO
 2. STAND-ALONE POWER SYSTEMS – WHAT ARE THEY?
 3. SAPS AS AN INCREASINGLY VIABLE ALTERNATIVE TO GRID SUPPLY
 4. BARRIERS TO REALISING THE BENEFITS OF SAPS
 5. AEMC SAPS REVIEW
 6. TWO ILLUSTRATIVE SAPS SERVICE DELIVERY MODELS
 7. CONCLUSION
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What we do

The Australian Energy Market Commission makes and amends the:



National Electricity
Rules



National Gas
Rules

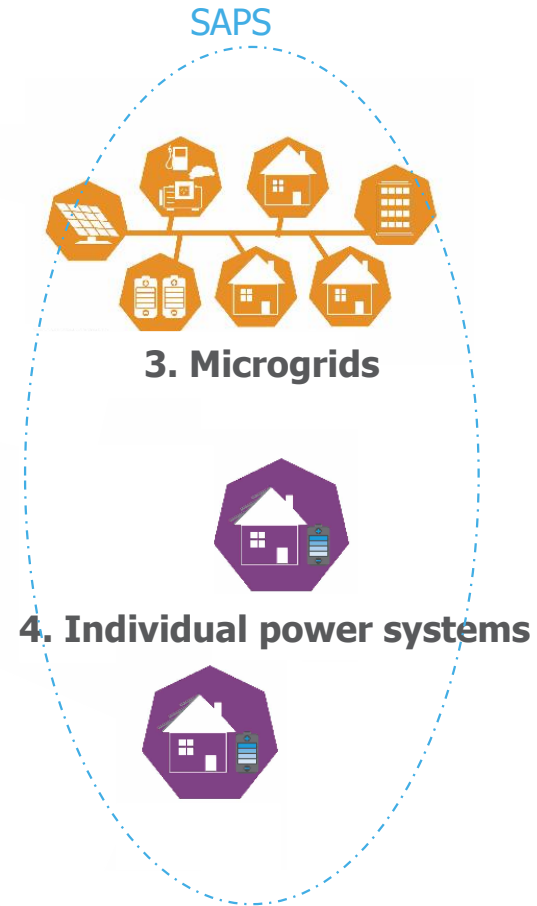
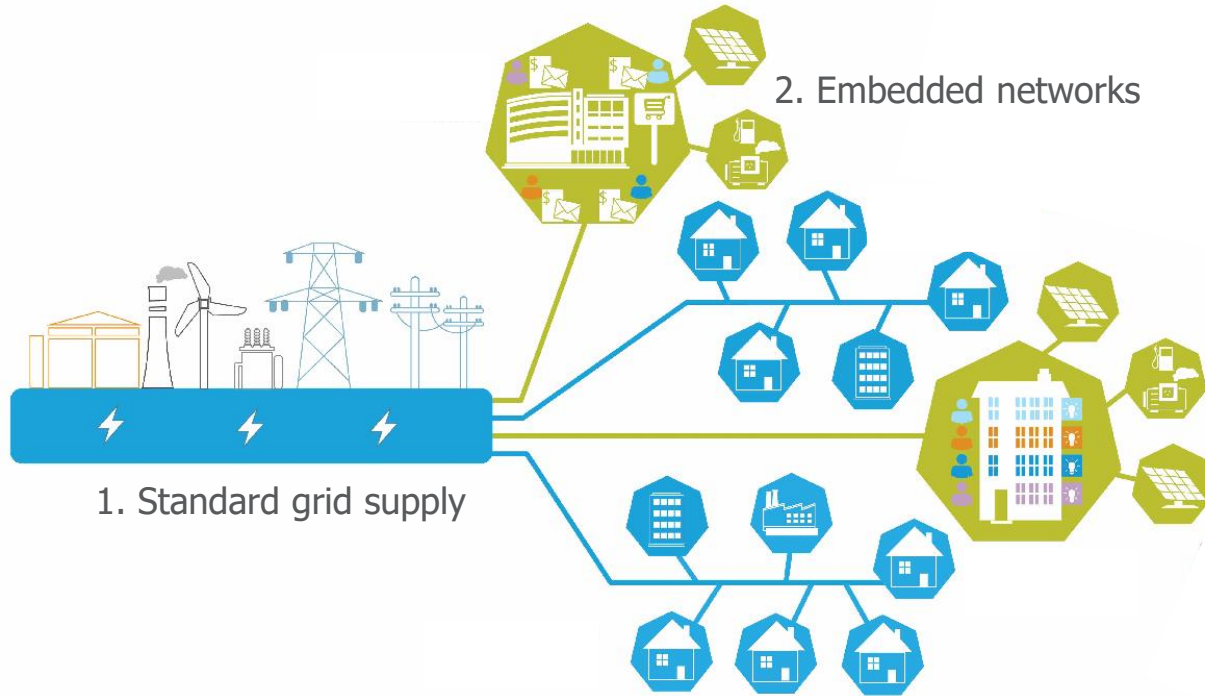


National Energy
Retail Rules



We also
provide market
development
advice to
governments

Four potential models of electricity supply



Typical configuration of a standalone power system

Existing network connection

Solar PV Panels

Batteries and inverter

Backup diesel generator



SPS Type	SPS 40
30 min Maximum Demand (Amps/Phase)	32
PV Nominal Output (kW)	18
Usable Battery Capacity (kWh @ 20 hour discharge rate)	80
Diesel Generator (kW) Prime Rating	24

Other examples of standalone power systems

1. SAPS supplying bore pump,
Mt Isa QLD



2. SAPS supplying a town, Boulia
QLD



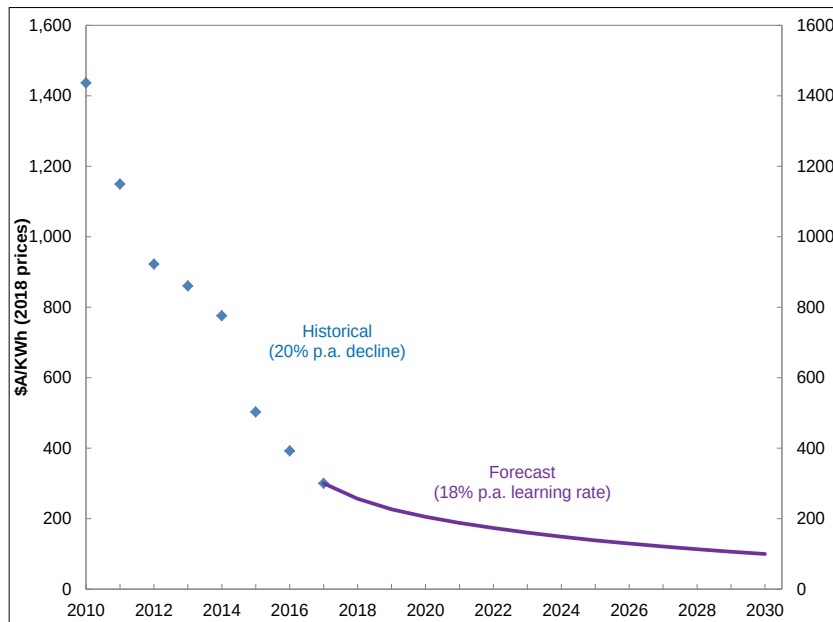
3. SAPS supplying individual
customer, NZ



Falling costs of SAPS

The increasing viability of SAPS as a cost effective electricity supply model is driven by the falling costs of distributed energy resources, especially **battery storage**

Capital cost of lithium-ion batteries

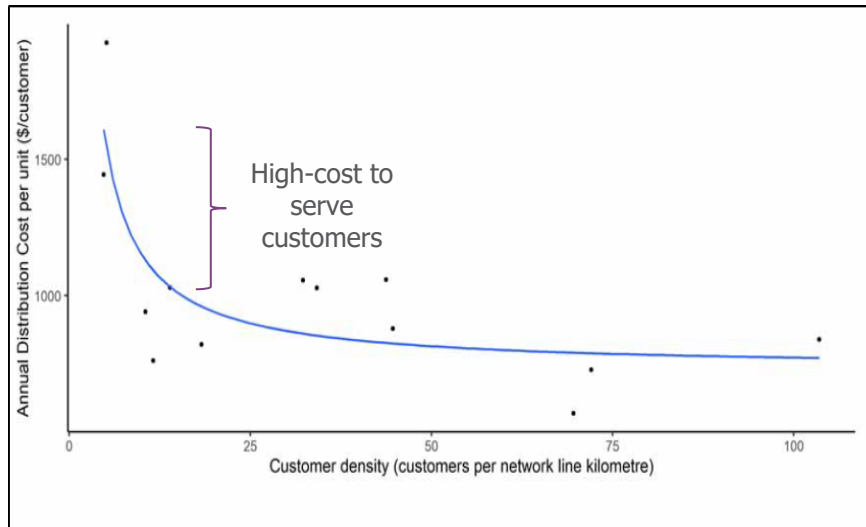


Source: BloombergNEF (2018)

Candidate sites - Primarily remote and regional areas (1)

The falling cost of SAPS may drive their adoption in areas of low customer density, which exhibit higher than average costs to serve and lower than average service reliability

Customer density and distribution cost-to-serve (2011-2017)

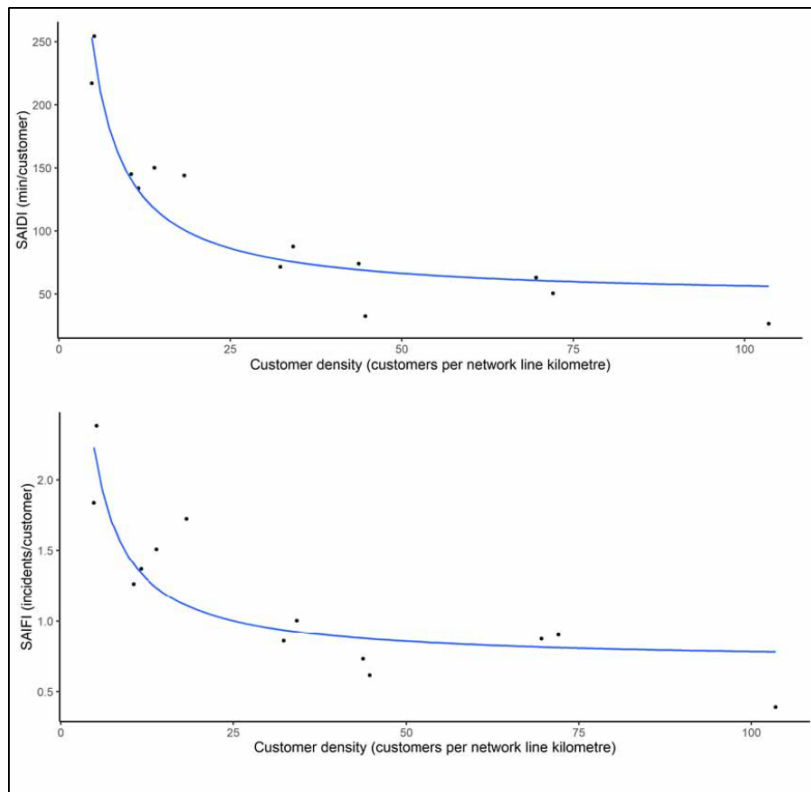


- Generally, cost-to-serve is inversely related to customer density (# customers/km of network line)
- In Australia, distribution network areas with lower than average customer densities ie regional and remote areas - tend to have a higher than average annual cost-to-serve

Candidate sites - Primarily remote and regional areas (2)

- For grid-connected customers, there is also a clear relationship between customer density and reliability of electricity supply
- Distribution networks with lower customer density tend to exhibit poorer reliability outcomes
- In Australia, network areas with lower customer densities tend to be associated with longer average system interruptions and with more frequent service interruptions

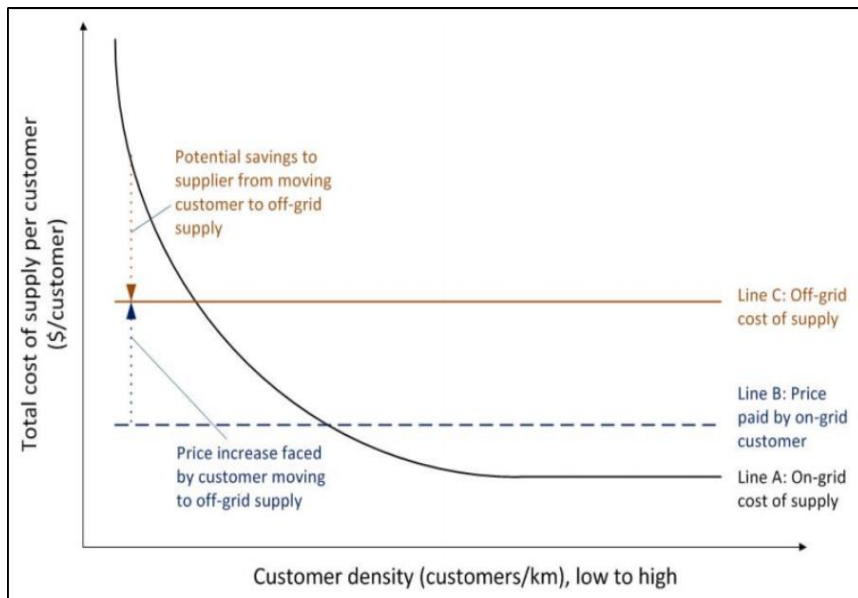
Customer density and network reliability (2011-2017)



Barriers to provision of SAPS by the **competitive market**

Uniform distribution tariffs provide no incentive to customers to move off-grid

Stylized example of barriers to uptake of a SAPS



While customers are generally free to move to off-grid supply at any time, they are unlikely to do so unless provided with the appropriate incentives.

If the price of off-grid supply exceeds the (cross-subsidized) price of grid supply, a grid-connected customer has no financial incentive to move off-grid.

Instead, these customers are likely to retain their grid connection even where a SAPS solution would provide a more cost effective alternative.

Barriers to provision of SAPS by **network businesses**

The application of existing regulatory frameworks to SAPS may be inhibited by earlier assumptions regarding the “connectedness” of the assets necessary to supply electricity to customers

- Regulatory frameworks traditionally designed on understanding that generation and transmission/distribution systems are connected to each other to form the integrated electricity system
- The application of these frameworks to isolated systems is therefore not straightforward
- In Australia
 - the national electricity law and rules only apply to the “interconnected” national system
 - in certain states and territories, the rules and laws that provide customer protections only apply to customers supplied via the “interconnected” national electricity system

Overview of the AEMC's SAPS review



- **Priority 1:** Recommended changes to national laws and rules to enable the local DNSP to offer SAPS to existing grid-connected customers where efficient
- Final report published May 2019

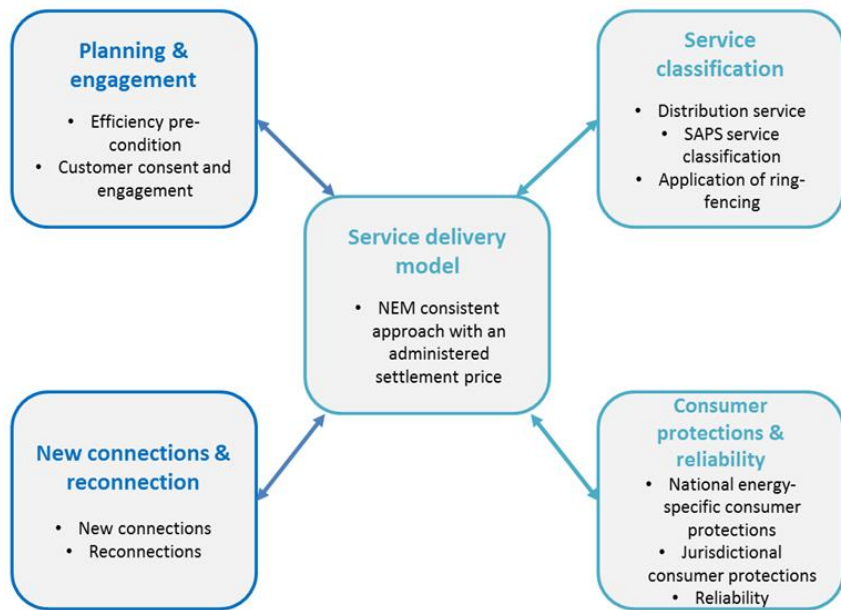


- **Priority 2:** Recommendations for whether and how SAPS operated by anyone other than the local DNSP should be regulated
- Final report due end October 2019



Key design choices for a regulatory framework for SAPS

Five dimensions of a regulatory framework for LNSP-led SAPS



The SAPS regulatory framework for SAPS incorporates:

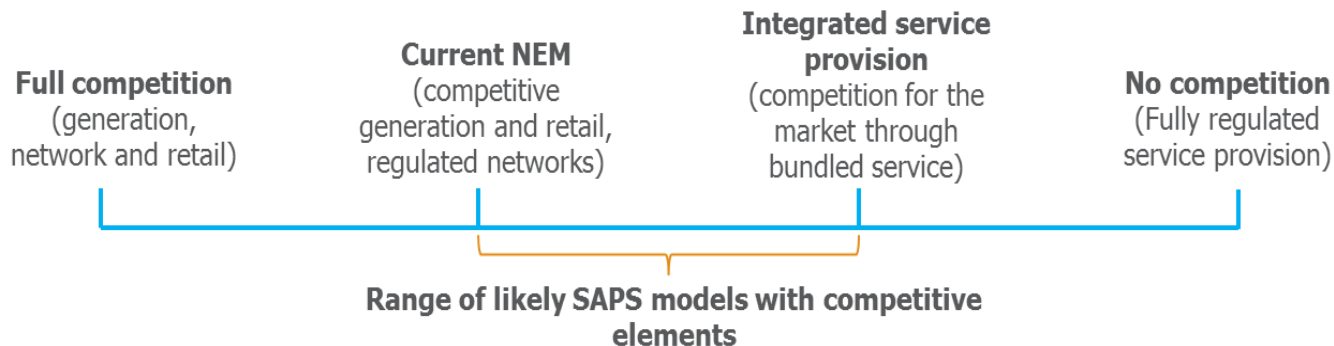
- arrangements by which LNSPs would decide to **transition** a customer(s) to SAPS supply
- subsequent arrangements for the **ongoing supply of electricity** to those customers

In this context, AEMC identified five key areas of the regulatory framework for SAPS

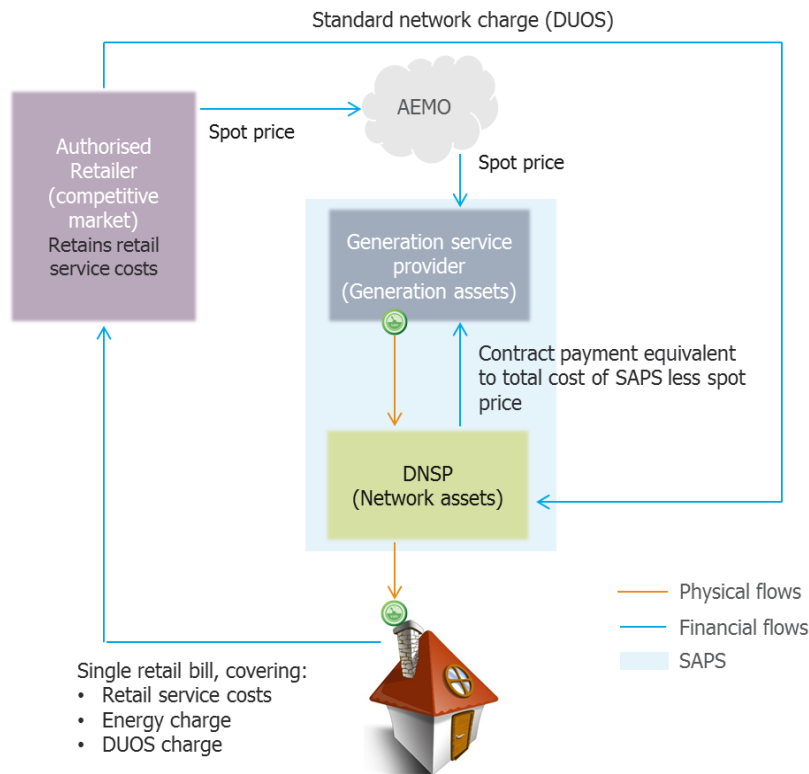
Decisions on the SAPS service delivery model needed in the first instance

SAPS service delivery models

- A SAPS service incorporates a suite of activities and services including local generation services, network services and retail services, as well as supporting services such as metering.
- Incorporating effective competition is the preferred means of achieving efficient (lowest cost) service provision
- The level of competition associated with different SAPS service delivery models can be shown along a competition continuum

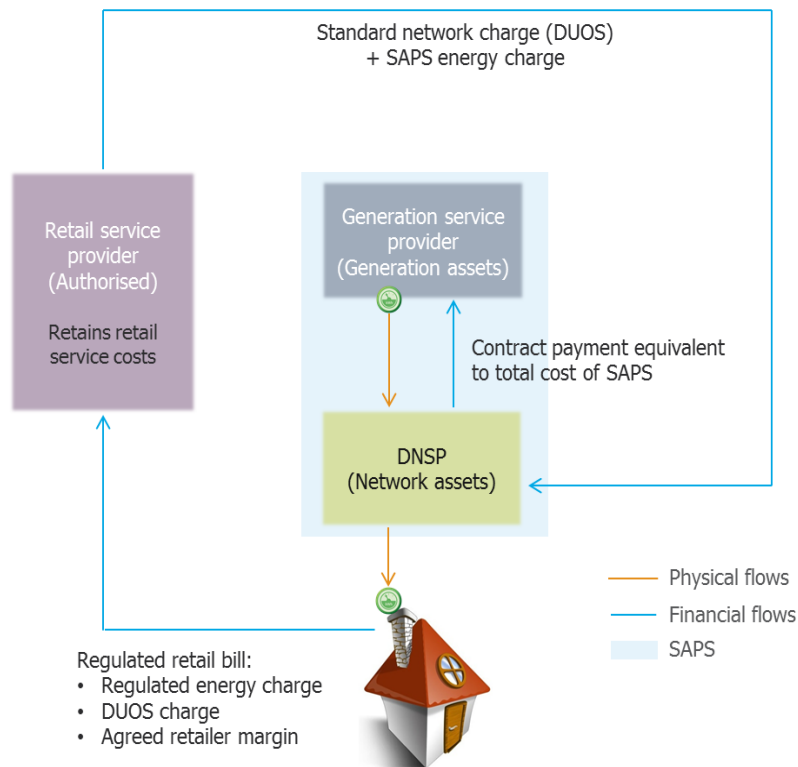


Model 1: NEM consistent service delivery model



- Seeks to preserve customer access to the competitive retail market
 - Utilises existing wholesale energy market arrangements, including settlement system
- Allows SAPS customers to retain their current retail offer and relationship with their existing retailers
 - Ensure SAPS customers “no-worse-off” in terms of consumer protections they receive, including price
- Facilitates seamless transition to SAPS and negates need for LNSPs to gain explicit consent from customers for the transition

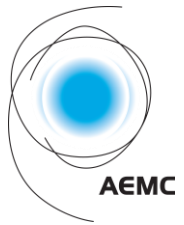
Model 2: Integrated service delivery model



- Assumes:
 - existing wholesale energy market arrangements are not optimal for SAPS supply
 - efficiency benefits available from services being provided by specialised, integrated service providers
- Arrangements necessarily diverge from current retail and wholesale settlement arrangements
 - SAPS customers would no longer be able to access the benefits of the competitive retail market
 - a new retailer role and a regulated retail price would need to be established for SAPS customers

AEMC recommendation – SAPS service delivery model

- Best approach to the delivery of the SAPS service is through a NEM consistent approach to service delivery...
 - ...albeit with a slight variation to the settlement price charged to retailers for the delivery of energy to SAPS customers
- Utilising existing wholesale market arrangements, including the settlement system, will facilitate a seamless transition to SAPS
 - In doing so, model negates the need for LNSPs to gain customer consent for the transition
- Emulating competitive retail market conditions provides a simple and straightforward means of ensuring transitioned customers are no-worse-off in respect of the consumer protections they receive, including price



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