Maximising customer value from the network in a high-DER future

AEMC / ARENA Regulatory DEIP dive, 6th June 2019
The future of the distribution network

- Providing additional value for customers
- More relevant than ever

Confidential

Traditional network services

New services customers value

Supplying energy

Enabling distributed generation

Grid stability

Transport

1900 2010 2010-2018 2018-2025 Post 2025 >
AEMO’s minimum demand forecast for South Australia

By 2023, there will be enough rooftop PV to supply all SA demand during certain periods

Rooftop PV

The largest generator in the State

Distribution network now key source of supply as well as meeting demand

More on the way...

Virtual power plants and electric vehicles will expand network use:
- Demand & supply
- Firming & flexibility
- Transport

Transition must be carefully managed to capture opportunities and minimise risks

Distributed resources: integral to the energy mix
Forecasts - rooftop PV and batteries

- **20,000** new small-scale PV systems in 2018
- **284 MW** of new solar in the past 12 months
- **Up to 90,000** batteries in coming years under SA Government schemes

Source: SAPN and AEMO ISP 2018
Challenges in integrating DER

• Our network has a finite **hosting capacity** to transport energy exported from the premises

• We have **estimated the hosting capacity of our LV network** using a statistical modelling tool developed for Ofgem in the UK (EA Technology)

• A key challenge is we have **almost no visibility** of our LV network today
Hosting capacity analysis

- Current 5kW export limit

- Rural Single Customer (2%)
- Old UG (2%)
- Small OH (2%)
- Rural Township Small (3%)
- Rural 2-4 Customers (6%)
- Rural Township Large (7%)
- Large OH (11%)
- Rural Township Med (15%)
- New UG (24%)
- Medium OH (26%)

Legend:
- Voltage limit
- Thermal limit
Hosting capacity analysis

- Average PV penetration per network type today
Hosting capacity analysis

- Forecast average PV penetration per network type 2025 (neutral uptake)
Customer enquiries – high voltage
Integrating DER – static strategies

We are actively pursuing strategies to increase DER hosting capacity

Smart inverter settings
AS4777.2 Volt/VAR response modes

Shifting controlled load into the solar trough

Tariffs and price signals
Incentives for customers

Improved voltage control and network nominal voltage
What can we do when we reach hosting capacity?

1. Invest in increasing network capacity to support DER
   *Upgrade the network* or procure demand-side services to support DER growth

2. Cap DER at hosting capacity
   *Once local* hosting capacity reached, limit new systems to zero export

3. Dynamic DER management (flexible exports)
   *Manage DER output only on rare occasions* to remain within network capacity
Modelling the strategies

To determine the **best long-term option for all customers**

Estimated economic value of exported energy
- Volume (MWh)
- Value ($/MWh)

Cost of enabling technologies
- Capex and opex

Cost of increasing network capacity

NPV to 2035

- Static limits
- Dynamic limits
- Add capacity
What do our customers think?

“Dynamic” upgrade ranked as both the most preferred, and as most in the long-term interests of customers across all customer segments, including solar, non solar and vulnerable customers.

Full Newgate Research report available on talkingpower.com.au
Flexible exports

• 2017 reduced standard export limits from 10kW to 5kW – likely to reduce further in future

• 2020-25 Regulatory Proposal proposes expenditure to implement flexible exports

• Planning for new flexible export connection option to be available by 2021

A new option for customers that enables their system to respond to dynamic export limits based on the real time capacity of the network

• Currently undertaking ARENA-funded $2.1m proof-of-concept trial with the Tesla / South Australian Government VPP
Key challenges

Although international standards are emerging, **we are at the forefront**

**Vendors unlikely to adopt** unless national direction and standards agreed

**Require clear direction and agreement** from policy makers and rule enforcers on DER integration strategies

**The longer we wait**, the more non-smart DER is connected (220,000 per year nationally)

**We must work as an industry to agree on common approaches and standards for DER integration**