



**Mark Byrne**  
**Energy Market Advocate**

“By 2050, it is estimated that... customer owned generators will supply 30-50% of Australia’s electricity needs.” (2016 NTR)

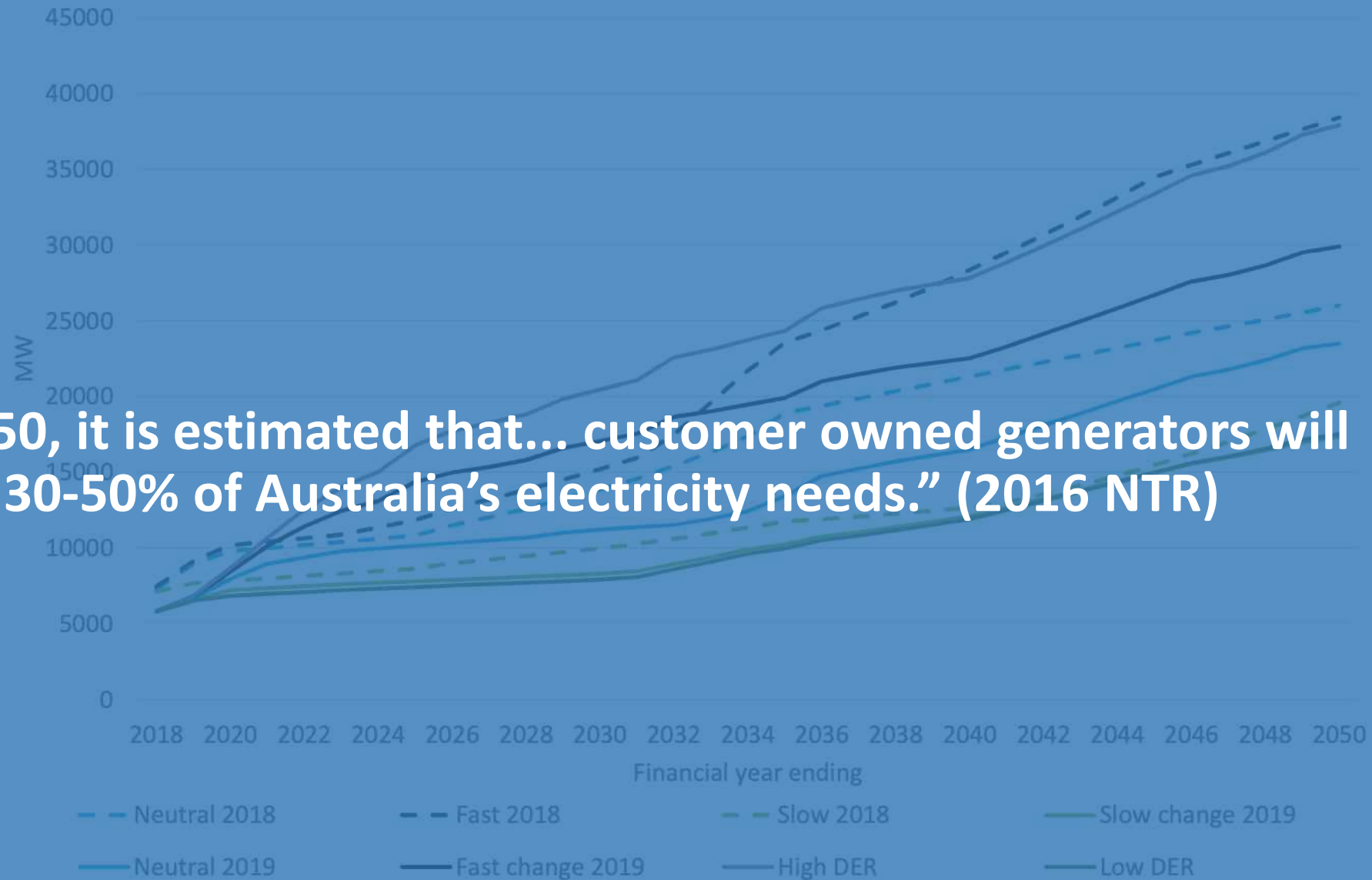


Figure 5-1: Residential rooftop solar capacity by scenario

# How good are DER?

- 7% total NEM consumption & up to 50% operational demand (SA) met by rooftop PV
- <\$360 million in DER-related network expenditure by 2025
- <\$1 billion (?) by 2030 for <15% total NEM consumption

“The High DER scenario shows the potential for even greater use of DER to lower the total costs to supply, with the NPV of wholesale resource costs reduced by nearly \$4 billion, compared to the Neutral case.”(AEMO 2018 ISP)

- Versus \$8-27 billion on new transmission and interconnection by 2040

# Problems and solutions

- **Equity impacts**

- Recovering subsidies via taxes instead of bills
- Shift to more cost-reflective tariffs

- **Tech challenges**

- Voltage
  - Smart inverters
  - Lowering network nominal voltage
  - Transformer tap changes
  - Dynamic DER management
- Capacity (thermal constraints)
  - Tariffs to fill solar trough

- **Inefficient investment & operation of networks**

- Solar export limited during midday trough
- VPP batteries export limited during high wholesale price periods
- Augex for new developments not incentivised

**What regulatory reforms are needed to ensure the most efficient, equitable and sustainable investment and operation of DER in the long-term interests of all?**

# Models to burn

- **Export pricing**
  - Networks to charge and/or reward for DER exports depending on network impacts
- **Flexible access/connections**
  - Upfront charge for future network costs at time of connection—likely in return for firm access for exports
- **Local use of system pricing**
  - DUOS reflects network utilised between generation & load
- **Resilience incentive**
  - Benefits recognised of nested/islandable local grids during upstream blackouts
- **Two sided network pricing**
  - Users pay for combined imports & exports to recover all network costs

# Potential applications

- **Solar trough**—to efficiently utilise or expand limited solar hosting capacity
- **Community batteries**—to transport energy 2 ways without incurring full network costs
- **VPPs**—to minimise network impacts of aggregated battery charging +/- discharging
- **P2P trading**—to allow through meter without compromising market metering, billing & settlements
- **Other new energy services markets**—eg demand response, network support or ancillary services
- **HILP events**—to incentivise resilient local networks

# Options

- Compulsory or optional for networks to adopt?
- Locational and temporal or smeared?
- What is the best way for networks to recover these costs—connection agreements (fixed), energy charges (kWh) or capacity charges (kW)?
- What should DER owners expect in return—firm access?



# Other considerations

- Should networks be able to take into account other market benefits when charging or rewarding for DER transactions?
  - Merit order effect
  - Reduced transmission investment
  - Lower line losses
- How would this mechanism interact with a DSO model?
- To what extent does this reform require an equivalent reform of transmission pricing?