Solar PV Uptake

Key Drivers

- Falling system costs make solar PV competitive with or without subsidies
- Increasingly more viable for SME and industrial customers
- Around half of mass market PV generation is exported to the grid
- Rapid uptake of rooftop PV continues to reduce peak demand and operational consumption
- Rooftop PV installations are forecast to grow at avg. annual rate of 8.7%
Distributed Battery Uptake

Key Drivers

• Grid defection
• Regulations allow greater integration of storage into grid
• Li-ion price declines
• Price declines drive long-duration growth
• Utility-scale solar and storage
• Greater number of regions emerge
• Use of energy storage to defer transmission and distribution upgrades
• Revenue streams diversify

...Uptake has been under-forecast before. Should we be doing more to prepare?
Grid defection is fundamentally driven by economics, but emotional drivers also come into play.

**Economic Drivers:**
- Falling solar PV costs
- Decreasing export tariffs
- Increasing electricity prices

**Emotional Drivers:**
- Being more ‘green’
- Greater autonomy
- Control over future energy costs
Increase in Network Charges

Increase in network charges is linked to increase in uptake in PV.

<table>
<thead>
<tr>
<th>State</th>
<th>% residential dwellings with PV installations</th>
</tr>
</thead>
<tbody>
<tr>
<td>QLD</td>
<td>32.60%</td>
</tr>
<tr>
<td>SA</td>
<td>32.10%</td>
</tr>
<tr>
<td>WA</td>
<td>26.10%</td>
</tr>
<tr>
<td>NSW</td>
<td>17.80%</td>
</tr>
<tr>
<td>VIC</td>
<td>15.60%</td>
</tr>
<tr>
<td>ACT</td>
<td>14.20%</td>
</tr>
<tr>
<td>NT</td>
<td>14.20%</td>
</tr>
<tr>
<td>TAS</td>
<td>14.210%</td>
</tr>
</tbody>
</table>

Network cost component of annual electricity bills for representative consumer

Source: AEMC

Driving Value From Distributed Energy Resources - March 2019
Peer-to-peer electricity trading across the regulated electricity network.

**BENEFITS**
- Competitive advantage for innovative retailers to obtain and retain customers
- Enables more customers to access low-carbon energy
- More competitive electricity prices for consumers
- Better returns for customers generating excess energy
- Supports overarching energy system

**FEATURES**
- Real-time settlement
- Detailed billing and usage data
- Automatically converts electricity credits to fiat currency
- Transactions viewable on the blockchain
μGrid

Peer-to-peer electricity trading behind the electricity mastermeter (microgrids).

BENEFITS

• Tenants access cheaper, greener electricity
• Can be implemented on greenfield and brownfield developments
• Improved visibility over energy consumption
• Potential revenue stream for building managers
• Improves sustainability of development

FEATURES

• Real-time settlement
• Detailed billing and usage data
• Automatically converts electricity credits to fiat currency
• Transactions viewable on the blockchain
VPP 2.0

Enables energy companies to automatically manage supply and demand.

**BENEFITS**
- Reduces risk and cost for energy retailer
- Consumers contribute to solving price spikes and demand shortages
- Households with solar and batteries can sell frequency, capacity and ancillary services to their energy company
- Faster payback period for household on their battery
- Daily settlement

**FEATURES**
- Automatically manages supply and demand
- Real-time capacity management and load shaping
- Optimisation of uses for highest value
Asset Germination Events (AGE)

Allowing everyday investors to own a piece of tomorrow’s energy systems.

**BENEFITS**
- Supports uptake of clean energy
- Available to everyday retail investors, not just high net worth individuals
- Tradeable
- Reduces mistakes in asset registers and is more secure
- Diversifies cryptocurrency portfolios with a compliant, dividend-paying token

**FEATURES**
- Security token developed with oversight from regulators
- Profits automatically distributed to token holders
- Exchange-tradable tokens
- Participants have legally enforceable rights to underlying assets

Driving Value From Distributed Energy Resources - March 2019
C6 and C6+

Monetize, trade carbon & renewable energy credits more efficiently.

**BENEFITS**
- Improved ability to forecast and monetize future income
- Reduced barriers to claiming carbon & renewable energy credits
- Reduced burden of collecting and parsing data
- Transparent pricing for buyers and sellers
- Creates liquidity in carbon and renewable energy credit markets

**FEATURES**
- Accurate measurement of energy generation (C6)
- Easily generates regulatory compliant reports (C6)
- Automates process to issue credits (C6)
- Enables credit trading in efficient, transparent, liquid market (C6+)
- Fast market settlement (C6+)
- Allows consumers to purchase and retire renewable energy credits via an exchange (C6+)
Value Creation

**Pricing**

- Grid price
  - Solar generation cost
  - Sell to aggregator price: A, B B/kWh
  - Consumer’s saving: +C B/kWh
    - Sell to RIL users and consumer without battery
  - Consumer’s saving: E B/kWh
    - Sell to RIL users for battery case
  - PEA’s green electricity price
  - RIL Consumer’s saving: +D B/kWh
  - ESS

**Case: RIL Users & Consumers**

E = A+C, VAT excluded
E = B+C, VAT excluded

**Case: Battery**

F = A+C+D, VAT excluded
F = B+C+D, VAT excluded
Regulation

ENERGY MARKETS

• Creation of local P2P markets to provide clear price signals for owners of distributed energy resources to stay connected and continue to provide energy back to the grid

• Markets need to provide financial recognition of the types of services DER can provide to the market

NETWORK MANAGEMENT

• Current network charges are not designed to reflect the benefits that can arise from optimising locally generated renewable energy at the P2P level

• A category of network charges should take into account the reduced use of the transmission network and the more efficient utilisation of the distribution network

ACCESS TO DATA

• Current rules make it difficult to access real-time data from smart meters required to maximise the benefits of innovative new technology like blockchain

• Direct access to this type of granular data will increase the security and accuracy of the PL platform