Australian residential solar feed-in tariffs (FiT): Industry stimulus or regressive form of taxation?

Tim Nelson
Smart Utilities – November 2012 - AGL External
Support Movember

http://au.movember.com/mospace/5147129
Agenda

› A brief history of solar PV feed-in tariff policy in Australia
› The industry and policy cycle
   » Global experience similar to Australia
› Three public policy criteria for assessment of solar PV feed-in tariff policy
› Analysis of previous QLD feed-in tariff policy
› The merit order effect
   » Suppression of wholesale electricity prices...
   » But not welfare enhancing
History of solar PV feed-in tariffs
Feed-in tariff policies in place in 2010

All states had generous feed-in tariff policies, introduced between 2008 and 2010

<table>
<thead>
<tr>
<th>State</th>
<th>Max size</th>
<th>Rate $/MWh</th>
<th>Duration</th>
<th>Approximate pay-back period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vic</td>
<td>5kW</td>
<td>$600 (net)</td>
<td>15 years</td>
<td>6.5 years</td>
</tr>
<tr>
<td>SA</td>
<td>30kW</td>
<td>$540 (net)</td>
<td>20 years</td>
<td>7.5 years</td>
</tr>
<tr>
<td>NSW</td>
<td>10kW</td>
<td>$600 (gross)</td>
<td>7 years</td>
<td>2 years</td>
</tr>
<tr>
<td>QLD</td>
<td>30kW</td>
<td>$440 (net)</td>
<td>20 years</td>
<td>9 years</td>
</tr>
<tr>
<td>ACT</td>
<td>30kW</td>
<td>$450 (gross)</td>
<td>20 years</td>
<td>2.5 years</td>
</tr>
</tbody>
</table>

Source: Nelson, Simshauser and Kelley (2011)
Public uptake was significant due to FiTs

Industry growth of 10,000% over three years

Source: Clean Energy Council (2011)
Public uptake was significant due to FiTs

Significant variation in State uptake reflects policies in place

Source: Clean Energy Council (2011)
Sustainability of FiT policy questioned

Public policy makers gradually became aware of the unsustainable nature of the policy framework

- Nelson, Simshauser and Kelley (2011)
  - FiT policy very regressive
  - Indirect tax on consumers three times greater on low-income households compared to high income households
- Independent regulators highlighted costs being incurred by electricity consumers to fund FiT policy
  - Independent Pricing and Regulatory Tribunal
- As a result, policy makers began to reconsider FiT policies and in most jurisdictions, policies have been abandoned or significantly wound back
Feed-in tariff policies in place in 2012

All states have significantly wound back or abandoned feed-in tariff policies except Queensland

<table>
<thead>
<tr>
<th>State</th>
<th>Rate $/MWh</th>
<th>Duration</th>
<th>Approximate pay-back period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vic</td>
<td>$250 (net)</td>
<td>5 years</td>
<td>Beyond mandated tariff</td>
</tr>
<tr>
<td>SA</td>
<td>$160 (net)</td>
<td>5 years</td>
<td>Beyond mandated tariff</td>
</tr>
<tr>
<td>NSW</td>
<td>See IPART</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>QLD</td>
<td>$80 (net)</td>
<td>N/A</td>
<td>Beyond mandated tariff</td>
</tr>
<tr>
<td>WA</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ACT</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
The industry and policy cycle
Australian policy experience in context

FiT boom bust scenario has occurred around the world

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>% of installations in any year compared to max installations in year T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>2008</td>
<td>100%</td>
</tr>
<tr>
<td>France</td>
<td>2011</td>
<td>100%</td>
</tr>
<tr>
<td>Germany</td>
<td>2010</td>
<td>100%</td>
</tr>
<tr>
<td>Italy</td>
<td>2010</td>
<td>100%</td>
</tr>
<tr>
<td>California</td>
<td>2008</td>
<td>100%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>2010</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: First Solar (2011)

Smart Utilities
November 2012
AGL External
Public policy criteria for assessment of feed-in tariff policy
Assessment of FiT using policy criteria

Nelson, Simshauser and Kelley (2011) established three criteria for assessing FiT policy

- **Criteria 1**: The funding for feed-in tariffs should be derived from an equitable source; small-scale renewable stimulus policies result in very private benefits that are comprehensively and unambiguously internalised by the participating household. As such, the fairness of the policy should be based upon whether its funding method is progressive or regressive in nature.

- **Criteria 2**: Anti-cyclical long-term industry development; policy settings should be designed to facilitate smooth industry growth and accommodate predictable changes in technology costs and price movements in the energy sector.

- **Criteria 3**: Capture of potential distributed generation benefits; the structure of a feed-in tariff should capture any benefits of reduced network congestion or augmentation reasonably delivered by distributed generation.
Assessment against three criteria

Nelson, Simshauser and Kelley (2011) provided an assessment against the identified criteria for generic FiT policy

- Funding is clearly regressive
  - Using NSW data, it was established that the effective indirect taxation rate on NSW low-income households was 2.7 times that of high-income households

- The FiT policy actually exaggerated a boom-bust cycle

- Benefits related to network augmentation were found to not exist
  - “we are not aware of any analysis by policymakers addressing the question of whether distributed solar PV systems provide network benefits.”
Analysis of Queensland feed-in tariff policy
QLD FiT policy: assessment against criteria 1

QLD FiT policy was regressive with low-income households indirect tax rates 3.4 times those of high-income households

<table>
<thead>
<tr>
<th>Household Income (before tax)</th>
<th>NFiT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weighted Average Cost Per Household</td>
</tr>
<tr>
<td>&lt; $30,999 pa</td>
<td>83.39</td>
</tr>
<tr>
<td>$31,000 - $70,999</td>
<td>93.25</td>
</tr>
<tr>
<td>$71,000 - $150,999</td>
<td>102.89</td>
</tr>
<tr>
<td>&gt; $151,000</td>
<td>121.38</td>
</tr>
<tr>
<td>Not disclosed</td>
<td>96.32</td>
</tr>
</tbody>
</table>
QLD FiT policy: assessment against criteria 2

QLD FiT policy was not sustainable as households began generating profit after less than half of tariff period

- Funding is provided over nearly twenty years (to 2028)
- Payback of initial costs after SRES and FiT revenue occurs after 9 years (see Nelson, Simshauser and Kelley (2011))
- As such, QLD FiT policy was delivering more than “fair value”
- Regulatory proposal of paying “fair value” more appropriate
QLD FiT policy: assessment against criteria 3

Evidence presented by Energex (and Endeavour in NSW) indicates that the FiT policy did not address network issues.
The merit order effect
Merit order effect explained

Partial equilibrium analysis for traditional thermal system with peak and off-peak demand
Merit order effect explained

The introduction of renewable resources with low short-run marginal costs shifts the supply curve lowering *wholesale* prices.
Merit order effect explained

But short-term wholesale price reductions are a transfer of wealth from producers to consumers – not a welfare improvement.

Price ($/MWh)

Quantity (MWh)

Smart Utilities

November 2012

AGL External
Merit order effect explained

The introduction of low short-run but high long-run marginal cost renewables increases costs and is not welfare enhancing.
“The price-suppression [merit-order] effect is typically raised to support clean energy resource policies...although it has also been used to support transmission and nuclear power investments. It is used most forcefully to justify “out-of-market” investments, such as solar and wind, whose costs are higher than the revenue that they would obtain over their operating lives. Imagine, however, if all electricity was provided by out-of-market technologies. Wholesale energy prices would be near zero, yet consumer electricity costs would increase to cover the additional costs of these technologies, thereby indicating that there was something amiss. How can out-of-market investments decrease the price of electricity for consumers?”

Source: Felder(2011)
Further information

AGL Sustainability Report (online and concise summary)

www.aglsustainability.com.au

AGL Sustainability Blog

http://www.aglblog.com.au