NEG discriminates against rooftop solar and makes an ambitious target more expensive

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Following on from our first paper on the design of the National Energy Guarantee (NEG), “The NEG is worse than doing nothing” we have explored one of the perverse design features of the NEG which supports gas-fired generation and old hydro but excludes roof-top solar.

The emissions component of the NEG is meant to ensure that Australia’s greenhouse targets are met at lowest cost. Unfortunately for customers and the solar industry the way that the NEG has been designed means that some of the more cost-effective emission reduction technologies such as roof-top solar and energy efficiency are excluded from participating. This may not matter much under the currently proposed 26% emission reduction target which has already effectively been met and is not required to support any new investment. But a more ambitious target will become more expensive to meet as it excludes lower cost options and rewards pre-existing gas and hydro generators.

The Energy Security Board (ESB) started out with a “technology neutral” approach which recognised the emissions reductions from embedded generation and behind the meter consumption (typically roof-top solar). In its “High Level Design Document” (20 April 2018) which was approved by CoAG Energy Ministers, the ESB stated:

To ensure that the emissions reduction requirement remains technology neutral all existing embedded generation and behind the meter consumption will be added to a retailer’s load but will also be automatically allocated to the relevant retailer for calculating their emissions. Further work will be required in the next round of consultation to develop an appropriate methodology. (Page 27)

Unfortunately, for some inexplicable reason the ESB changed their design preference and decided to exclude “demand side” emission reductions. In their “Detailed Design Consultation Paper” (15 June 2018) the ESB stated:

Rooftop and other small-scale solar PV will be captured by adding the net exports from PV installations to the relevant market customer’s load and will also be automatically allocated to that market customer in the registry as zero emissions generation.

The way that the NEG is proposed to work is that the portion of solar PV generation that is self-consumed by the owner of the system will be for all intents ignored by the NEG as worthy of being recognised and rewarded for its emissions reductions. Meanwhile the emissions reductions delivered by the exported electricity will be automatically bestowed to the electricity retailer. The system owner will not be allowed to sell this to someone else who may offer a better price or may in fact want to voluntarily surrender the emission reductions.

These design changes discriminate against roof-top solar generation and fails to recognise the contribution that households and businesses are making when they install solar and reduce emissions. Contrast this to the treatment of old gas-fired power stations, their emission reductions (relative to the NEG emission intensity target) will be registered and able to be unbundled from the electricity and sold separately.
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There was more than 7,900 MW of solar PV installed in the National Electricity Market (NEM) at the end June 2018. Of this only 10% is eligible to participate in the NEG emissions guarantee (refer to table below).

<table>
<thead>
<tr>
<th>Solar PV</th>
<th>Number of Systems</th>
<th>Capacity MW</th>
<th>Capacity Post 1997 MW</th>
<th>Current Scheme</th>
<th>Eligible for NEG MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rooftop systems (&lt;100kW)</td>
<td>1,880,871</td>
<td>6,993</td>
<td>6,993</td>
<td>SRES / STCs</td>
<td>no</td>
</tr>
<tr>
<td>Small Power Stations (&lt;5MW)</td>
<td>410</td>
<td>145</td>
<td>145</td>
<td>LRES / LGCs</td>
<td>no</td>
</tr>
<tr>
<td>Utility Scale Power Stations (&gt;5MW)</td>
<td>20</td>
<td>797</td>
<td>797</td>
<td>LRES / LGCs</td>
<td>797</td>
</tr>
<tr>
<td><strong>Total Solar</strong></td>
<td><strong>1,881,301</strong></td>
<td><strong>7,935</strong></td>
<td><strong>7,935</strong></td>
<td></td>
<td><strong>797</strong></td>
</tr>
</tbody>
</table>

Note: nearly all of the small power stations are “behind the meter” and are not eligible to participate in the NEG. There are however a very small number of small power stations (less than 5 MW in size) that are in-front of the meter and would be eligible to participate in the NEG (less than 15 MW in total).

A total of 48,551 GWh of generation in the NEM in 2017-18 was below the likely emissions intensity target for 2020-21 of 0.71 tonnes per MWh. In total this amounted to 25.8 million tonnes of emissions below the target, that could have a financial value (refer to Table below). Roof-top solar, most of which had been built over the last 5 years and represents 5.2 million tonnes is excluded from participating in the NEG and is deemed by the ESB to have no value.

<table>
<thead>
<tr>
<th>Fuel type</th>
<th>2017-18 sent out generation</th>
<th>Emissions reductions</th>
<th>Emissions reductions</th>
<th>NEG eligibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydro</td>
<td>14,670 (tonnes/MWh)</td>
<td>0.71</td>
<td>10,441</td>
<td>yes</td>
</tr>
<tr>
<td>Solar</td>
<td>799</td>
<td>0.71</td>
<td>569</td>
<td>yes</td>
</tr>
<tr>
<td>Biomass</td>
<td>329</td>
<td>0.71</td>
<td>234</td>
<td>yes</td>
</tr>
<tr>
<td>Wind</td>
<td>8,525 (tonnes/MWh)</td>
<td>0.71</td>
<td>6,068</td>
<td>yes</td>
</tr>
<tr>
<td>Gas</td>
<td>16,987</td>
<td>0.20</td>
<td>3,326</td>
<td>yes</td>
</tr>
<tr>
<td>Roof-top solar</td>
<td>7,240 (tonnes/MWh)</td>
<td>0.71</td>
<td>5,153</td>
<td>no</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>48,551</strong></td>
<td><strong>25,791</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- Emissions target of the NEG in 2020-21 is 0.71 tonnes per MWh and is broadly unchanged to 2030
- Emissions factor for gas generators from AEMO Integrated System Plan (July 2018)

Interestingly the emission intensity modelled by the ESB remains broadly unchanged to 2030. A 26% emission reduction target means slightly lower emissions of 130 million tonnes by 2030 (compared to the target of 135 million tonnes in 2020-21). Over the same period AEMO is forecasting a slight increase in electricity consumption. This incorporates the impact of roof-top solar which reduces the increase in electricity consumption that we would otherwise expect with continued economic growth. As a result, emission intensity remains the same over the 10 year period. Perversely, the continued roll out in roof-top solar is keeping electricity emission intensity the same, yet it’s contribution is not being recognised by the ESB.
The ESB will be recognising the lower emissions associated with all the pre-existing gas-fired generation and all the old hydro generators, built years ago. But it will not be recognising the emissions reductions associated with new investment in roof-solar by Australian households and businesses.

The impact of this approach is to discriminate against investments made by residential and business consumers. Rooftop solar PV installed behind the consumer’s meter is one of the lowest cost ways to reduce emissions. We will need to have all options available to meet a future government’s more ambitious emission reduction target at lowest cost.

At present residential consumers that install solar PV are estimated to self-consume approximately 25% of their generation, although if batteries or electric vehicles become commonplace this could rise dramatically. For commercial installations, which represent about 30% of capacity and growing, they often consume all the generation. Indeed, in many cases businesses are not allowed to export solar generation by the electricity network.

It might seem that the ESB no longer cares about technology neutrality or delivering emissions reductions at lowest cost. However, the ESB in outlining the role of long term price signals, clearly state the important role that roof top solar and energy efficiency play:

> Market participants are expected to contract in a variety of ways to meet both the emissions reduction and reliability requirements. Through their contracting retailers will support a range of different generation and demand-side technologies. (Page 14 of final decision under the NEG)

Unfortunately, the NEG design details do not match the ESB’s rhetoric. It would not appear to be difficult to change the design elements, it just seems that it does not align with the ESB’s priorities.

Some may point out that behind the meter roof-top solar is eligible for financial incentives under the Renewable Energy Target (RET). Large-scale Generation Certificates (LGCs) will be worthless soon after the NEG commences as large renewable power stations will be eligible for LGCs and emissions reductions under the NEG. Roof-top solar systems can claim Small-scale Technology Certificates (STCs) which decline every year and over time will be worthless.

The NEG is purported to be the primary policy mechanism to drive emission reductions from electricity generation beyond 2030 when the RET ceases. As a result, it is important that the NEG does not exclude or discriminate against smaller renewable generators. To avoid double counting the owner of the generation system should be able to opt in to the NEG and if they do then they should cease to be eligible for creating STCs or LGCs. There should be no discrimination based on either size or connection characteristics.

To improve customer outcomes and encourage their participation in the market, system owners should not be forced into contracting with retailers only. The recent ACCC report on Electricity Pricing has highlighted several problems with the retail market and raised concerns regarding the level of competition. To provide a robust and competitive market there should be no impediment to unbundling the electricity and emission reductions that are provided by renewable generation and there should be no impediment to the ability of other participants to contract for and carry forward emission reductions.

These changes would provide increased competition, lower costs and improved transparency. They would facilitate the development and emergence of new technologies and ensure that the NEG remains relevant beyond one election cycle.