Penetrating equity into the electricity market

Executive Summary

The unprecedented rate of change of the electricity network due to the transition to renewable energy sources is creating equity issues not experienced since the design of the Australian electricity market (AEM).

A cornerstone to the success of solving this challenge is defining what is equitable through urgent proactive collaboration with all market participants.

Inaction will increase the social inequity. This paper is focused on a plan for the next 5 years.

Recommended actions include:

- Proactive collaboration across the AEM to define equity.
- Regulations be reformed to enable future changes to be enacted in a timely manner.
- Stakeholder policies are updated to deliver equity in AEM.
- Implementing parallel solutions to minimise long term risk.
- Equipping the future workforce with market acumen and an appreciation for non-technical skills.

Successful delivery of these actions will ensure equity for all AEM participants as the Electricity network evolves.

Background

The rapid pace of change in the power sector moving from centralised large-scale fossil-fuel based generation to distributed renewable sources has created a divide in the sharing of cost between consumers.

The established regulatory framework and government policies have become incapable of equitably sharing the costs, benefits and risks of utilising renewable energy sources. Unaddressed, the social and economic impacts will only continue to grow. Without intervention, costs of renewable energy resources will continue to be borne more heavily by those unable to afford or install them.

This board paper details the actions needed within the Australian electricity sector within the next 5 years to address the inequity in benefitting from renewable sources with the aim of maximising their penetration for a viable zero emissions future.

Issues, Stakeholders and Inequities in Electricity Market

Carbon emission reduction is a complex problem and consideration of equitable outcomes for market participants has not been clearly linked. The challenge is the enormity of the problem and that it is not only a technical, economic or government policy issue alone, but all of these together. Getting it wrong has significant social ramifications.

There are several important issues that need to be resolved to achieve electricity market equity. They are:

- Lack of consensus among electricity market participants on the definition of equity.
- A disconnect between government policy on carbon emissions and the impact to the electricity market. This includes inconsistency between short and long-term goals.
- Growth in decentralised private investment in the market and a genuine desire and capability for customers to exert more control over the market.
- Competing interests from the different market participants leading to increased overall cost for consumers.
- Retaining underutilised assets for customers capable of off grid operation.

The electricity market serves many diverse societal demographics. The main demographic factors contributing to inequities are:

- Income or means. Adoption of (distributed) renewable energy technology has been proportionally higher for more affluent customers.
- Property ownership. Property owners have the opportunity to install renewable energy technology, which isn't available to leases.
- Geographic location of consumers. For example, those living in apartments vs those living in rural areas or standalone houses (different opportunity to earn feed in tariff) .
- Geographical location of the market. Competition between states for economic investment arises when the rate of renewable energy adoption directly reduces the overall energy price. This will challenge agreement and adherence to any long-term plan.

The following agencies are critical for incorporating equity into the response to renewable energy penetration in the electricity market.

- Most important will be consumers (including taxpayers). In addition to their increased ability to directly influence the market, an accepted social licence is essential.
- Regulatory bodies: Australian Energy Market Commission (AEMC), Australian Energy Regulator (AER), & Australian Energy Market Operator (AEMO).
- All levels of government: Federal, state and local.
- Network service providers
- Support service providers
- Private investors, business owners and shareholders. This will also apply to some NSPs.

Recommendations

The aforementioned stakeholders are key players for catalysing equitable innovation and changes to the Australian electricity market and the supporting workforce. The innovations and changes to enable equitable market outcomes are:

1) Unprecedented collaboration with consumers to create greater awareness and convey messages regarding this challenge.
   Prosumers represent an evolution of traditional consumers that can both produce and consume electricity. This capability has allowed unsolicited direct impacts on the established market, with very limited understanding of the implications on electricity equity. Educating consumers on the need for change is required as a vital to ensure viability of the existing network. There is a recognised risk that dissatisfied prosumers with sufficient means could initiate a market collapse by breaking their dependence on the network. The capability to address residential inequities (e.g. apartments, renters etc.) is dependent on retaining prosumers within the market.

2) A clear, collaborative government and industry policy is essential to enact equitable market reforms. Both short and long term outcomes (and implications) must be a focus.
   Past and current policies and programs have been successful in driving the adoption of renewable energy technologies. However, the unexpected popularity has been to the detriment of long-term viability of the market. It is important that the socio-economic goals of government are balanced with the priorities of industry stakeholders, particularly where there is private ownership. Failure of government policy to recognise and value short term returns may drive private investment (ownership) from the industry. Equally, the optimal long-term policy should not be compromised for short term gains either within industry or politically. Subsidiary levels of government (e.g. state and local) need to become more involved in framing policies, especially if they are expected to contribute to resolving the equity driven by geographical location of consumers. Their involvement will ensure that the importance of economic industries outside of the electricity market (e.g. agriculture and horticulture) are not forgotten.

3) AEMC and AER accelerate the introduction of tariffs that reflects equitable distribution of costs, risks and benefits between market participants.
   Policy enforcers need to drive the delivery of affordable electricity whilst rewarding renewable energy technology adopters for supplying green electricity. This ensures the benefits and costs of generating green electricity in the market is equitably distributed.

4) Transparent and coordinated planning across the electricity supply chain (from generators to DNSPs) will ensure costs are minimised and equitably shared in the market. For example, an uncoordinated response to the uptake of electric vehicles could lead to unnecessary augmentation of the distribution network. Thus, inequitably distributing the benefits, costs and risks from the owner of electric vehicles to consumers that do not own electric vehicles and DNSPs. Conversely, the volatile prices of renewable energy technology, batteries and electric vehicles necessitates the need for fast coordinated responses.

5) Upskilling and diversifying the workforce that supports the electricity market is important to help solve this challenge.
   This requires unconventional approaches and tools to be adopted by market participants, such as:
   - Social media engagement.
   - Modernising power engineering taught in tertiary education.
   - Developing non-technical skills (customer behaviour).
   - Improving market collaboration.

   The above are all currently underutilised or non-existent in the market.

6) Suitable governance to ensure compliance by tradesperson is another crucial aspect for ensuring the risk is equitably distributed in the market.
   AEMO recognise there is a gap in regulatory oversight, evidenced by their investigation of PV suppliers and installers compliance to Australian Standards. Self and regulatory auditing will alleviate this problem and ensure DER response is predictable and reliable. Consequently, ownership of non-compliance risk is distributed accordingly to risk originator.

7) Improving both vertical and horizontal market communication channels is an effective way of reaching optimum holistic solutions.
   Vertical collaboration, for example between TNSPs and DNSPs, will ensure both respective interests and perspectives are considered when addressing problems and developing solutions. Vertical collaboration needs to extend from generators to consumers. Horizontal collaboration remains important to ensure common market entities (e.g. DNSPs) have consistent approaches.

8) Progressing parallel solutions to the technical challenges is key to minimising the risk of decision making given the uncertainty in the future electricity network. The target needs to be 'investment of least regret' because if significant investment is made solely on one solution or approach, there is a significant risk of over-investment or underutilised assets. Consideration for this in policy development and pricing structures is important to avoid long term inequities for both consumers and investors.

Contributor Biography

Gazinga Abdullah, Independent researcher

Recently completed PhD degree in Mechanical Engineering at The University of South Australia. I am passionate about simulating and evaluating the integration of distributed renewable energy systems with the main grid electricity system, including residential solar air-conditioning systems.

Jessica Ng, Senior Operations Engineer Lead

Assisting stakeholders with risk identification and outage opportunity within Power System Operations to ensure planned program of works are co-optimised with network availability while impact to NEM and customers minimized.

Providing operational support to the control room centre and Event Management Team through the provision of knowledge share about the power system, NEM operations and the application of risk treatments.

Mick McGreevy, Senior Asset Maintenance Engineer, Energy Queensland

Currently focused on OH Conductors and Underground Cable maintenance policies and reporting to deliver efficient and effective outcomes for network safety and reliability. With over a decade of previous experience across Line design and Field based Engineering support roles including responsibility to High voltage Live Work safety management system and practices, I have gained a great insight into the traditional network business model.

Steven Maxwell, Network Planning Engineer, SA Power Networks

My focus is on network capital investment and the associated modelling to ensure constraints are recognised and economically resolved. I support operations by advising on planned outages and network model data. My other responsibilities are regulatory and include annual reporting and reset analyses.

Deeksha Sumanth, Transmission Lines and Cables Asset Strategist, Transgrid

Currently managing the operational expenditure for easements to ensure the network is safe and reliable at all times. Previously, I worked in compliance to ensure Transgrid's compliance to Electricity Network Safety regulations in NSW, ACT and Victoria. This involved authoring compliance documents and created a solution to help Transgrid identify and manage bushfire risk maintenance works program. Developed asset data rules for majority of Transgrid's assets and business rules to promote data quality.
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