GREENSYNC

Mr John Pierce

Chairman

Australian Energy Market Commission

PO Box A2449

Sydney South NSW 1235

24 July 2017

Dear Mr Pierce

RE: Distribution Market Model

GreenSync is a technology company that is part of a new generation of energy innovators using smart software control to optimise the use of distributed energy resources (DERs) in electricity grids. We provide network support to the country's largest utilities, deliver demand charge reductions and physical hedging of spot market exposure for commercial & industrial customers and optimise microgrids to maximise the efficient use of energy resources. We have been successful in attracting federal and state government grants. We have been awarded the largest Regulatory Investment Test for Distribution (RIT-D) project for a non-network provider to date, and work collaboratively with a range of organisations within the energy industry to drive the transformation of our energy system.

We are focused on building the technology to support an integrated, reliable, sustainable and affordable electricity grid.

GreenSync creates technology for behind-the-meter resources such as discretionary loads, backup generators, solar power and battery storage so they can be best utilised through the electricity value chain. This enables resource owners to monetise their existing assets or build stronger business cases for deploying new assets. This technology enables system operators, retailers and networks to utilise previously hidden, uneconomic or unreliable individual DERs. This is provided as an aggregated portfolio that is reliable, economic and visible.

We believe that the technology available today can help Australia build a more affordable, reliable and cleaner energy system within the next 5 to 10 years. If we work together as an industry, this technology driven transformation could see real price decreases for end consumers.

The AEMC's role in this transition is pivotal. The Commission must raise the right questions, and identify the enablers which will ensure that the market is able to transition in a way that continues to deliver affordable and reliable energy supply.

With technological advancements such as those developed by GreenSync and others, the challenges, debates and discussions of yesterday are not the challenges that we face today, let alone tomorrow.

In this submission, we will paint a broad picture of tomorrow's world and identify the enablers that we believe will allow the market to take its next step.

A customer led NEM

Our current electricity market and system has been designed around a traditional model: distant generation connected by long transmission lines to our cities and towns. The NEM philosophy and design, from 25 years ago, has served us well based on the physical infrastructure and technology available at the time.

In 2017, our largest generator now sits in the middle of those cities and towns on our rooftops. Rapidly declining cost of communications, advanced data sharing, storage and battery technology has put powerful computers and control in everyone's pocket. We are on the verge of driving electric cars in those cities and towns using the electricity that we produce and store ourselves.

The rapidly declining cost of communications and data sharing has enabled the world's largest taxi company to thrive without owning a single taxi, and the world's biggest hotel chain to provide a better experience when we travel without owning a single bed.

The law, the rules and the procedures that govern our NEM have not evolved in step with technology advances, consumer preferences and industry developments.

We see an energy market of the future designed from the bottom up; not only around our current physical infrastructure, but open to future infrastructure and technological development. Such a structure recognises that the technology exists which puts the power back into the customer's hands and lets them decide how they balance green, affordable and reliable.

Networks will continue to play an integral role, however, how they are regulated will need to change. Similarly, retailers and retail models offering different services and outcomes to customers will evolve to take advantage of technology and consumer-led change.

The decentralised energy Exchange (deX) provides one such example of how the market will offer those future services.

deX

The deX is designed to bring together a wide variety of participants including residential consumers, commercial and industrial consumers, aggregators, energy services companies, technology providers, network operators, retailers and regulatory agencies.

The deX will contain a series of information layers that provide exchange participants with much of the information required for efficient distributed energy resources (DER) investment decision-making, DER service contract design and secure power system management. Information provided by the deX will include a base set of solutions with capacity to grow to meet needs and match market capabilities over time:

- Network information (e.g. network load forecasts, network constraints, network element hosting capacity, existing DER locations, contracted services, operation and capabilities);
- Contract information for existing and offered contracts (e.g. services required, service level agreements, network statements of opportunities);

- Real-time status and dispatch data for each DER to verify and settle services provided under contract; and
- System security management rules to limit DER dispatch impacts on network security (e.g. acceptable recharge times for batteries, response to voltage control issues, contract conflict management systems design).

It offers a set of capabilities to attract users to the deX, from providing the information required for efficient price discovery, to tools for the trade and dispatch of distributed energy services. The deX will also allow DER asset owners and aggregators to enter into multiple contracts with more than one buyer for their DER services, which will minimise the influence of large buyers in the market.

The deX offers an open API to allow developers to bring new products and services to the deX market. The deX is designed to create a multisided market that will build on positive network effects— increasing scale generates more value, which attracts more members, which creates more value—to drive market thickness. These positive network effects also increase the value of deX participation for early adopters as a growing number of DERs enrolled in the deX expands the range of services DER owners can be paid for.

The deX's data-driven matching service will facilitate coordination between exchange participants to optimise investment in and dispatch of distributed energy. By this process, the exchange will capture the benefits created by granular differences in the place and time of dispatch of distributed energy resources.

The small scale of individual DERs relative to the power system as a whole means they are often best aggregated and coordinated. The deX will provide ongoing data about DER responses to dispatch signals, allowing aggregators to ensure the failure of any subset of assets does not affect their ability to reliably deliver contracted services.

The deX will coordinate the advance commitment of DERs through a day-ahead dispatch planning and review system within boundaries set by the Distribution Network Service Provider (DNSP); or, as distribution markets evolve, a distribution system operator (DSO). The DNSP will be able to monitor and manage the impacts of DER dispatch on system security through continuous review of dispatch plans against system technical capabilities up until a final gate-closure period, before physical dispatch.

Catering for the new world

In the context of DER market development, a key challenge for the AEMC is how to develop rules which enable multiple approaches to co-exist, such as the deX, without 'picking-winners' or responding to passing trends. We believe that the cyclical nature of markets requires the AEMC to enable innovation while also putting in place basic operating requirements. In essence, this best includes developing some new approaches, such as sandbox environments, as well as using existing levers such as derogations.

Create a sandbox

In tech development, a sandbox is a testing environment which isolates untested code changes and outright experimentation from the production environment. In recognition of the growth of technological solutions, regulatory sandbox environments are being considered by energy market regulators.

In February 2017 the Office of Gas and Electricity Markets (OFGEM) launched a call for interest in a regulatory sandbox to trial innovative energy business propositions in the United Kingdom (UK), and to allow OFGEM to adapt its regulatory framework to future developments in the UK's energy sector[1].

OFGEM notes that such proposals might include:

- Bespoke guidance: guidance on the interpretation of or compliance with regulatory requirements, which innovators can rely on for a defined period of time;
- Indication of approach to enforcement: guidance on how we might enforce particular regulatory requirements (in accordance with our Enforcement Guidelines) which would be valid for a particular period of time; and
- Derogations or exemptions from certain regulatory requirements: where relevant, we will refer innovators to exemptions or derogations that already exist and support them in their application.

OFGEM propose the following eligibility criteria for assessing proposals:

- Genuine innovation: the concept must be ground breaking or significantly different to existing offerings;
- Consumer benefit: the concept must offer a good prospect of benefits to consumers;
- Need for regulatory sandbox: the innovator must be able to demonstrate why it needs a sandbox arrangement – i.e. what regulatory barrier currently exists that impedes the business trialling the new proposition;
- Type of regulatory barrier: Ofgem cannot remove regulatory barriers which arise from primary legislation, or rules enforced by others. The barrier must arise from requirements or provisions enforced by Ofgem; and
- Timescales: the innovator must be able to set out the timescales on which it will be ready (e.g. technically, financially and commercially) to conduct its trial and how it expects to achieve this. Any dependencies (e.g. on other organisations) should be made clear.

The Singaporean Energy Market Authority (EMA) is also considering the implementation of a Sandbox to allow the industry to test new products and services. It notes that the environment can provide the necessary safeguards to contain the consequences of failure on consumers and the energy market. At the same time, the Sandbox can provide an avenue for EMA to review its regulatory frameworks and to provide appropriate regulatory support to firms[2].

[1] The Innovation Link, Open Letter, Office of Gas and Electricity Markets,6 February 2017

[2] Framework for a Regulatory Sandbox for the Energy Sector in Singapore, Consultation Paper, Energy Market Authority, 29 June 2017

Use existing levers such as derogations, expediting and time-limits

Should the AEMC consider that a sandbox environment has merit, it is likely to take time to propose, develop and consult on the framework that achieves the desired objectives. In the interim the AEMC could enable alternative market arrangements using time-limited derogations. The rules currently provide both jurisdictional and participant derogations, as well as an adoptive arrangement embedded throughout the rules. Using the derogations provisions and time limiting them to either 18, 24 or 36 months, will provide the AEMC with the ability to allow new technologies, approaches and models to enter the market without introducing undue risks for customers and participants.

We recognise that the use of derogations may be inconsistent with the desire for a consistent national framework. However, we believe that it is in the best interest of consumers to understand the pros and cons of new technologies and new arrangements rather than continue with the current framework or design arrangements that cannot benefit from the short-term testing of new approaches and models. To design without such information may lead to incongruous regulatory and market arrangements.

In light of the pace of technological change, we invite the AEMC to consider its position on expediting rule changes. We note that the criteria for an expedited rule change can limit the AEMC's ability to use these provisions, however, there may be some cases where the provisions could be read in the broadest possible terms. If the AEMC is unable to expedite a rule change, it could consider commencing consultations on DER related rule changes ahead of other rule changes and reviews proposed at the same time. We note the AEMC could outline such intent as part of its bi-annual strategic priorities assessment.

Information is key

Central to the future world is improved information sharing to enable the different models and systems to communicate and interact with one another.

The Independent Review into the Future Security of the National Electricity Market identified some of these challenges:

- There is a lack of transparency of information about electricity prices and consumer bills;
- Existing arrangements for sharing electricity consumption data are not effective. Consumers struggle to access their own consumption data in an effective way and to be able to share it with service providers;
- A lack of visibility of DER, including what is installed and how it is operating, is challenging AEMO's ability to manage power system security; and
- A recognised gap in data used for NEM forecasting and planning is the limited information on energy consumption and the changing drivers of energy demand. For instance, as a result of current net-settlement arrangements between retailers, no single entity (including AEMO) has access to a complete set of energy consumption data[3].

[3] Independent Review into the Future Security of the National Electricity Market, Blueprint for the Future, June 2017, p 165

While there have been good strides made towards improving information transparency at the lower voltage levels, such as through the Distribution Annual Planning Report template, further information is required on the following network challenges:

- Voltage;
- Frequency;
- Harmonics;
- Flicker; and
- Power factors.

There are two, non-mutually exclusive, ways that such information could be delivered to the market.

The first of these involves incentives to DNSPs. If Distribution Businesses receive sufficient rewards to the explore DER, they will be willing to provide this information to the market. We have worked with many businesses and where there has been a willingness to explore DER usage we have sufficient information to deliver real cost savings to customers. We encourage the AEMC, in collaboration with the AER and DNSPs to continue to explore alternative revenue setting arrangements, such as the RIIO (Revenue = Incentives + Innovation + Outputs) in place in the UK, or provide greater rewards above the 1% used to encourage DER through the Demand Management Incentive Scheme (DMIS).

Secondly, at the same time, the AER could compel businesses to capture and release relevant information, through its broad information gathering powers under the Regulatory Information Notice (RIN) provisions. If the information is not currently collected by the DNSPs, we would support them putting proposals to collect and present the information as part of their revenue reset applications. Such requirements would also support the AER approving efficient expenditure associated with such proposals.

AEMO has also identified some potential information challenges with managing a centralised power system. Some of the information gaps identified by AEMO include:

- Trip settings;
- Modes of operation;
- Device part of aggregated control;
- Performance derating;
- PV and Battery Manufacturer, make and model number; and
- PV and Battery Installation date and decommissioning date.

While the information identified by AEMO was developed from its perspective as a central system operator, decentralised operators will need similar information to manage their interactions with the other decentralised sources.

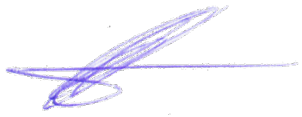
Again, we encourage the AEMC, and the AER, to continue to support a framework which both rewards and compels NSPs to collect and release this information regularly to the market and periodically also to the public.

Allow the evolution to reveal itself and identify red flags

While we have identified some challenges that we hope that the AEMC will seriously consider within the context of this Distribution Market Model review, we stress that we do not yet know what tomorrow's energy market will looks like, nor which models will prevail. We therefore encourage the AEMC to enable the market to evolve to meet tech, consumer, asset owner and market operator needs. We understand this requires a shift in thinking, but regulatory innovation is a key enabler of market innovation. In this context, one option for the AEMC would be to identify a series of red flags which trigger future rule changes. This will ensure that the AEMC supports the energy market's iterative development rather than forcing changes which are not grounded in experience and evidence.

We would welcome an opportunity to meet with the Commissioners to provide an overview of the deX and to discuss the future direction of DER. If you have any questions about anything we have raised in this submission please do not hesitate to contact me on 0406 677 162.

Yours Sincerely



Matthew A. Coleman

General Manager Network Services

Appendix: GreenSync response to AEMC Distribution Market Model Draft Report Questions

Question 1: Do stakeholders consider that there are any other barriers to the development and implementation of cost-reflective network tariffs? How material are these barriers? Are there other means for them to be addressed?

Yes, GreenSync considers that material barriers exist to the development and implementation of fully cost-reflective network tariffs in addition to those mentioned in the report. These barriers relate to a lack of information available to accurately determine the network services costs required to calculate fully cost-reflective tariffs. GreenSync considers that digital exchanges like the GreenSync deX are likely to play an increasingly important role in providing information about network usage patterns and network costs at the granularity required to minimise distortions arising from the practical approximations made in current approaches to developing cost-reflective tariffs.

As the report acknowledges, a fully cost-reflective tariff should comprise the costs of providing network services at a particular location and particular point in time. Theoretically, a fully cost-reflective tariff should reflect the efficient long run marginal cost (LRMC) of providing network services at each network connection point, at each point in time.

In contrast to the theory, practical tariff-setting needs to deal with the inherent difficulty of calculating tariffs at all points in the distribution network at all times. Practical tariff-setting also needs to contend with customer responses. Fully cost-reflective tariffs would likely be complex and volatile, potentially blunting their ability to drive efficient responses from many customers. Consequently, the development of cost-reflective tariffs always involves approximations and compromises, which have the potential to send economic signals that distort efficient investment and operational decision-making.

The practical difficulties of developing fully cost-reflective tariffs are further compounded by the high levels of uncertainty the evolution of distribution markets is likely to produce in future network usage and costs. Calculations of LRMC are dependent on long-term forecasts—e.g. of demand, capital costs and operating costs—forecasts that are unlikely to be robust under conditions of rapid change and disruption to historical patterns of network use.

It is likely that a wider range of customer responses to electricity prices (including tariffs), increasingly varied distributed energy resources (DERs) and increasing options for participation in distribution markets will combine to diversify network usage patterns and lower their predictability. Increases in diversity will challenge current methods of cost-reflective tariff design and demand more granular data on DER locations and density on network elements, the operation of DERs in DER markets, and customer responses to different DER market offers.

GreenSync's deX captures and makes available for data analytics:

- network information (e.g. network load forecasts, network constraints, network element hosting capacity, existing DER locations, contracted services, operation and capabilities)
- contract information for existing and offered contracts (e.g. services required, service level agreements, network statements of opportunities)
- real-time status and dispatch data for each DER to verify and settle services provided under contract.

GreenSync believes such data will help inform DNSPs in their development of efficient, non-distortionary, cost-reflective network tariffs that are more robust to the uncertainties arising from the evolution of distribution-level electricity markets. Data available on the deX will also help DNSPs understand the ways in which their tariff design is likely to combine with price signals from the wholesale market, retailers, energy services companies and equipment manufacturers. This will assist in designing tariffs that drive efficient responses to network issues without being confused or obscured by other price signals.

Question 2: Do stakeholders consider that there are any 'missing markets' or 'missing prices' beyond those that will be implemented through cost-reflective network tariffs? If so, what are these?

Yes. GreenSync considers that the development of distribution markets could face substantial coordination failures, which cost-reflective network tariffs are unlikely to solve. Distribution market participants will be exposed to a range of market signals from not just the distribution network, but from aggregators, retailers, and the NEM.

In the absence of market platforms that enable the transparent communication and publication of information about network topology, DER location and DER operation, it is likely that coordination problems will inhibit efficient market formation in distribution markets.

GreenSync's work with project partners and other clients highlights the importance of information about DER distribution network density and network location for the efficient provision of network services and efficient risk management for economic actors wanting to capture DER services for other benefits (e.g. to provide virtual power plant (VPP) services). At present, drivers that might coordinate patterns of installation of DERs at specific locations or at particular densities on distribution networks are either absent or weak.

Uncoordinated installation of DERs is likely to reduce the overall economic benefit delivered and stymie the development of distribution markets, ultimately limiting the potential of DERs to support the transition to a high penetration renewables grid.

GreenSync's deX has an important coordination role in the early stages of distribution market evolution. It can provide the technical, information and economic incentives required to drive efficient investment in installing DER at the locations and densities on distribution networks required for more sophisticated distribution market development.

GreenSync also considers that the evolution of distribution-level electricity markets presents DNSPs with substantial innovation challenges. Efficient capture of the benefits DERs can offer network and avoiding the costs of uncoordinated connection and operation of DERs will require a parallel evolution in the operation of DNSPs.

GreenSync believes the AEMC has an important role in establishing a regulatory regime for DNSPs that encourages innovation and assists DNSPs manage the uncertainties inherent in the transition to a high-DER future. Examples of changes to the regulatory regime that could be considered in addition to cost-reflective pricing include:

- developing incentives for DNSPs that align business planning and operational decision making with the ongoing pursuit of cost-saving solutions from DER markets across all classes and quanta of network expenditure (e.g. CAPEX and OPEX OPEX as well as non-network alternatives for smaller augmentations than those covered by the current RIT-D process)
- balancing incentives for efficient capital and operational expenditure (e.g. TOTEX-based approaches)
- introducing incentives for continuous learning and knowledge sharing across DNSPs to drive innovation and reduce the costs of failure (knowing that as much is to be learnt from failed projects as successful ones)
- introducing measures to assist DNSPs manage the uncertainties surrounding costs and remuneration during a period of significant change in the operation of networks caused by the evolution of distribution markets, this is particularly important to ensure that risk-averse decision-making does not produce inefficient outcomes in the evolution of distribution-level electricity markets.

Question 3: Do stakeholders consider that an open access regime will continue to be appropriate in an environment of increasing uptake of distributed energy resources and more constraints on distribution networks? If not, what principles or considerations should be taken into account in determining whether a different access regime is more appropriate?

GreenSync agrees with the Commission's assessment that a holistic assessment of the issues surrounding various access regimes for distribution networks on the evolution pathways for distribution-level distribution markets would be beneficial as soon as possible.

GreenSync considers that forward-looking price signals would be one useful tool to reflect the contribution of DERs to the costs of future network augmentation and management. For example, if the aggregate operation of DERs on a network element suggests network augmentation may be required to maintain network security at aggregate DER power injection peaks then some form of peak-period network access change could be used to send a price signal to DER owners to more efficiently coordinate their peak power injections.

Question 4: Is there support for the Commission's proposal that the deletion of clause 6.1.4 of the NER be explored?

Yes. GreenSync supports further exploration of the costs and benefits of the Commission's proposal for deletion of clause 6.1.4 of the NER.

Question 5: Are there any other aspects of the development of Australian standards that are relevant and should be considered?

GreenSync considers that standards development needs to balance risk management with the potential that standards requirements are so stringent that they inhibit market development.

Question 6: Do stakeholders see value in the AEMC (or other party) reviewing the technical requirements that DNSPs apply to the connection of distributed energy resources?

Yes. GreenSync believes the Commission should review the technical requirements DNSPs apply to the connection of DERs. GreenSync suggests that the following issues be explored in the Commission's review:

- the value of a single Australian connection standard across DNSPs for each class of DER
- the value of an ongoing connection standard rather than an on-connection, point-in-time standard, i.e. a standard that includes a requirement for ongoing provision of information to DNSPs about the operation of the DER (including any control or operation requirements arising from contracts the owner of the DER may have entered into for its operation).

GreenSync considers that both these issues merit consideration because of their importance to the efficient development and operation of distribution-level electricity markets.