

9th September 2020

Jashan Singh  
Australian Energy Market Commission  
GPO Box 2603  
Sydney 2001

**Submission in response to Consultation Paper titled “Distributed Energy Resources Integration – Updating Regulatory Arrangements”**

Dear Jashan

EcoJoule Energy is an Australian-owned developer and manufacturer of technology solutions that help transition the grid into a lower cost, environmentally sustainable and reliable system. Our products have been used by a number of DNSPs in Australia to solve problems associated with high penetration of consumer owned renewable generation.

We read with interest the above mentioned paper proposed by SA Power Networks (SAPN), St Vincent de Paul Society Victoria (SVDP), Total Environment Centre (TEC) and the Australian Council of Social Service (ACOSS) and welcome the opportunity to provide a submission.

We strongly agree with the objectives to meet community expectations for both efficient and reliable provision of “consumption-based services” (i.e. low cost and reliable electricity supply) as well as the efficient and reliable provision of “export services” (i.e. low cost and reliable connection for consumer owned renewable generation units (rooftop solar PV)).

We recognise that the rapid uptake of distributed renewable energy sources, particularly consumer owned solar PV is posing some challenges to DNSPs. We further recognise that there are costs associated with evolving the network to meet the increasing export requirement of consumer owned renewables.

We generally support the proposed amendment to explicitly recognise export services in the regulatory framework and the need to acknowledge the role of DNSPs as a platform to connect, manage and enable DER.

We further support the need to provide incentives for efficient DNSP expenditure in the export services space.

SAPN essentially proposes to introduce an additional Network Use Of Services (NUOS) charge for consumers who wish to export to the grid. This is proposed based on encouraging efficient investment to support export services and supported by SVDP on the basis of decreasing levels of inequity between those who have solar PV and those who don't.

While we partly accept this argument, we suggest that there are better mechanisms (eg STPIS) for recovery of costs that would be less complex to administer and would be less likely to be perceived by the community as an instrument to slow down the uptake of renewables.

We read with interest the proposal for the extension of STPIS to include export services. However this is tempered by the finding from CEPA that “Our research and discussion with stakeholders,

indicates that while there is a range of metrics available these currently lack accuracy and robustness”.

We suggest that this drawback is simply and efficiently removed by using **voltage magnitude as a metric**.

To explain, the AEMC no doubt understands that the biggest barrier limiting the increased penetration of consumer owned renewables is the issue of voltage management i.e. rooftop PV's exporting into the grid may push up the grid voltage, potentially requiring network augmentation.

Surveys by the UNSW and the University of Wollongong over many years show that the average voltages across the NEM are well in excess of the nominal 230V level, often in the region of 245V or more. This of course decreases the voltage margin available for the connection of consumer owned solar PV.

The high voltages delivered to consumers, results in not only renewable integration problems but also:

1. Energy wastage on a wide scale due to supplying consumer appliances at well above rated voltages. This energy wastage translates directly into higher than necessary bills for all consumers. System wide studies both in Australia and abroad show that for every percentage decrease in voltage there is on average a 0.7% decrease in energy (the so called Conservation Voltage Reduction effect).
2. Reduced lifetime of consumer appliances. Many appliances are designed for Europe 220V and are being supplied with in excess of 245V. This has a significant negative impact on appliance lifetime as shown by studies in Australia and abroad.
3. The energy wastage results in higher than necessary greenhouse gas emissions.
4. The higher than necessary energy consumption also translates to a higher than necessary system peak demand. United Energy in Victoria recently responded to a RERT events by lowering its overall system voltage to close to 230V during the event (without the minimum voltage to any consumers falling below minimum thresholds).

Our calculations (which we are happy to share) show that a NEM wide introduction of a voltage metric in STPIS, leading to a reduction in system voltage to nominal (230V) levels, would conservatively save every NEM consumer an average of \$210 per annum with a project payback of a few months.

This would result in:

- a net reduction in the cost of electricity to all consumers
- an inherent incentive (through the STPIS voltage metric) for DNSPs to support export services
- no need to introduce another tariff
- no potential community push back on an additional tariff
- no potential push back that the tariff discourages renewable uptake.

The STPIS is a proven successful mechanism for delivering sustainable reliability benefits to customers. It is proposed that quality of supply measure for voltage be included within the existing STPIS framework. The existing STPIS scheme contains a section titled “4 Quality of supply component”. The quality of supply parameters within this section 4.1 are not yet determined. Our

proposal is to include a voltage magnitude metric to this section. The current STPIS 'cap and collar' on revenue could potentially be maintained.

We suggest that the specific voltage metrics and incentives be determined by the AEMC and AER through analysis and consultation with various stakeholders and experts. We propose that the metric be developed to maximise total consumer benefit including solar PV/DER integration, energy/bill reduction and consumer appliance longevity. We suggest that this metric could be quite simple.

Voltage magnitude data would be relatively simple and cost effective to obtain from smart meter data. Furthermore, additional low-cost voltage measurement devices could be strategically deployed if smart meter penetration levels were not statistically robust.

This simple change to the existing STPIS scheme would greatly assist to solve renewable integration problems and deliver significant electricity bill savings to consumers.

We have provided responses to specific questions in the report in the Appendix. Please don't hesitate to contact the undersigned should you have any questions on this submission.

Your faithfully



Dr. Mike Wishart, CPEng, RPEQ

CEO

E: [mike.wishart@ecojoule.com](mailto:mike.wishart@ecojoule.com)

M: 0425613429

## APPENDIX: RESPONSES TO QUESTIONS IN THE REPORT

### QUESTION 1: APPROACH TO RULE CHANGE ASSESSMENT

1. Is the assessment framework, specifically the criteria outlined above, appropriate for considering the proposed rule changes?  
YES
2. Are there any other relevant considerations that should be included in the assessment framework?  
YES

### QUESTION 2: DEFINITIONAL ISSUES & QUESTION 3: PROPOSED CHANGES TO DEFINITIONS

WE HAVE NO PARTICULAR EXPERTISE OR OPINIONS ON DEFINITIONS

### QUESTION 4: OBLIGATIONS ON DNSPS

1. Should the NER be amended to impose obligations on DNSPs to provide export services as proposed?  
Yes
2. Would it be appropriate to impose obligations on DNSPs to consider network planning solutions in relation to DER integration?
  - a. Is there a need for the introduction of specific arrangements to guide network planning and investment decisions around additional DER hosting capacity?  
No, we think the introduction of a voltage magnitude metric in STPIS is sufficient
  - b. Do you consider that a net market benefit test is a useful way to guide DNSP network planning and investment for export services?  
No, we are concerned that this may be cumbersome to administer in practice
3. Should a principle for the allocation of export capacity in the NER be introduced? If so, what principle should be included?  
No, a more effective instrument would be a STPIS voltage magnitude metric

### QUESTION 5: EFFICIENCY INCENTIVES

1. If 'distribution services' expressly include export services, are there any regulatory barriers to adapting existing incentive schemes to export services?  
No
2. Should the STPIS be extended to export services or is a new incentive scheme required?  
Yes, but the metric should be focussed on voltage magnitude
3. If the STPIS or a new incentive scheme is to apply to export services:
  - a. What are the practical challenges of designing relevant performance measures and collecting robust data? Can these challenges be overcome over time?  
If the metric is based on voltage magnitude there are no major challenges. Accuracy of smart meters is already sufficient. In areas with low penetration of smart meters a statistical approach may be required.
  - b. Should the details of the scheme be prescribed in the NER or is it appropriate for the AER to design the scheme?  
We think the AER could design the scheme
  - c. Are there any additional factors the AER should be required to take into account (eg, under NER clause 6.6.2 relating to the STPIS)?  
As mentioned, we suggest voltage magnitude be used as the primary metric.
  - d. Do export service standards (to meet customer expectations) need to be established to set a performance 'baseline' for the incentive scheme?

No, however baseline voltage measurements may need to be established of sufficient data from UNSW, UoW and others is not sufficient for baselining.

#### QUESTION 6: PRICING ARRANGEMENTS

1. Should DNSPs have the option to propose to the AER charges for export services?  
Not now, we suggest there are too many potential pitfalls. We propose that a voltage magnitude based STPIS scheme be put in place.
2. What are the potential benefits and costs of enabling export charges?  
The benefit is potentially reducing inequality. However an extra charge will be very controversial and will be opposed by many in the community. It will be seen by many as an instrument to discourage uptake of renewables.
3. If customers can already negotiate 'deeper' connection agreements, is a 'supplementary' connection arrangement required to allocate DER-related costs – as proposed by TEC/ACOSS?  
We don't think this would be required. A STPIS voltage metric would remove that need.
4. If NER clause 6.1.4 is removed, and DNSPs are able to develop tariffs for export services: a. What are the implementation issues?  
We suggest community acceptance  
b. Should the existing tariff structure statement process and pricing principles apply? For example, is a principle required to guide DNSP decisions on cost allocation between consumption and export services – as proposed by SAPN?  
Potentially, but if a STPIS voltage metric is proposed this would not be required  
c. Are transitional or 'grandfathering' arrangements needed and, if so, should they be prescribed in the NER?  
To introduce an extra charge "yes". To introduce an incentive for voltage management "no".
5. Should the regulatory framework better recognise the benefits DER services provide to DNSPs? For example, does SAPN's proposal to allow for negative prices address the issue?  
Potentially but implementation could be complex.
6. Should these reforms only apply to small customers?  
No