

Mr John Pierce  
Chairman  
Australian Energy Market Commission  
PO Box A2449  
Sydney South NSW 1235

5 February 2016

Dear Mr Pierce,

This submission regards rule change request ERC0191, for establishing **local generation network credits**.

The rule change request touches on some very important issues regarding the operation of and investment in electricity distribution networks. There is no doubt that embedded generation (EG) technologies can be used to support the efficient provision of distribution network services, reducing both the short-run operating costs of power delivery and costs over the long-run investment cycle.

However, the design of a scheme that credits network service users for the network benefits of their actions must be undertaken with careful consideration of any perverse outcomes that may arise. With this in mind, the following concerns about the proposed rule change are raised and discussed:

**Estimating the value of EG on network costs is difficult:** There will be great difficulty accurately calculating the effects on network flows of embedded generators, for at least two reasons.

- First, there is a great deal of uncertainty around the electrical parameters of components in any distribution network, making estimates of changes in the power flows caused by EG subject to significant model uncertainty. This will directly impact DNSPs ability to accurately apportion their own operating expenditure reductions and changes in power losses, and also any avoided transmission use of system charges.
- Second, there is a large degree of uncertainty around future energy use growth rates, as illustrated by AEMO's recent experiences in forecasting aggregate peak demand. This makes accurately estimating the future, long-term value of EG with respect to deferred and avoided network capital expenditure very difficult.

**The proposed rule change is not technology-neutral:** The request for rule change appears to suggest paying one group of network users the entire benefit of their actions, and selecting this group based on the technology they invest in, when other network users may provide the same service but be denied access to LGNCs. This is not technology neutral, and as such, it means that it is also highly unlikely to encourage efficient investment and operation of the electricity system, in contradiction of the National Electricity Objective.

- For example, a customer that reduces their peak energy consumption by investing in battery storage will be entitled to LGNCs that pay them for the deferred or avoided network augmentation costs. A customer that does the same by investing in efficiency measures, such as more efficient heating or cooling

appliances, or better quality insulation, will not be able to claim the credits, even if their effect on future network augmentation costs is identical.

- The proposed rule change will also introduce an asymmetry in the recovery of network costs from loads and EG. For example, a customer that installs a high-powered air conditioner does not have to bear the whole long-run marginal cost of the resulting increase in demand, these are spread across many customers; while under the proposal, a customer that invests in EG can claim the whole amount of any long-run marginal benefit flowing from their investment, in addition to their private cost reductions.
- This bias may also prompt questions around the equity of a credit scheme that is available only to those network users that can afford to invest in specific types of technology, which are typically expensive.

**The claim for 100% of the network benefit to flow to EGs is excessive:** At the other extreme, a DNSP could argue that the value of surplus EGs energy is nothing without the network to export to, so they should receive all of the benefit (nb: no DNSP has made this claim). Over and above this, both of these extreme claims do not perceive a need to share the cost reductions of EGs with all end users, by reducing the general cost of delivering electricity. As such, if LGNCs are established, the proportion of the network benefit that is paid to EGs should be material, but significantly less than 100%.

**Cost-reflective pricing is impossible with fixed tariffs:** Any *fixed* tariff, even if it is time varying (e.g. as used in time-of-use energy tariffs) and/or seasonal, is unable to accurately reflect the true marginal value or cost of supplying a service.

- In the case of a DNSP managing distribution network constraints that are, by design, only ever rarely approached, a fixed tariff will effectively pay EGs for supplying a network support service that is simply not required most of the time. Worse, it may turn out that they pay some EGs
- Similar inefficiencies would also arise if tariffs were to be applied uniformly across different locations on the networks, where there are different needs for network support services, as highlighted by the AEMC.

On this last point, and in an effort to provide some positive feedback on the proposed rule change: There are alternative paths to achieving the same end, of providing efficient pricing signals to network service users that reflect the costs and benefits of their actions to the network and the power system generally, irrespective of their technology type and size. One such avenue may be found by making the DNSPs' network support services procurement process more transparent, opening it up to contestable market forces, and standardising the procedures across all DNSPs (elements of this suggestion are contained the proposed rule change).

Currently, network support service contracting processes are not conducted via pooled, visible and contestable markets. This hinders the price discovery process for these services, potentially preventing efficient patterns of investment in network and non-network solutions to overcome network constraints. This market structure may also enhance the market power of the (monopsonist) NSPs. These barriers, whether real or perceived, to accessing fair network support payments for small EGs appear to be one of the motivating complaints of the rule proponents. The validity of this complaint is not in question, and efforts should be made to support the integration of new technologies into the provision of network support services, but it is not clear that the proposal achieves these ends in an effective way.

However, having made this suggestion, it is worth keeping in mind that any moves to a transparent market for network support services may require further, more radical, reform steps to be successful. These may include: establishing the DNSPs as independent network service operators and giving them responsibility for running market procedures defined in the NER; establishing a system of oversight by the AER; and possibly giving partial administration of the markets to AEMO. Moreover, this process may also benefit by being coupled with other changes to the NER that facilitate the participation of aggregation services in the retail market, as distribution companies are not equipped to develop billing relationships with many small customers and may struggle to do so.

**Future participation in the rule change process:** In the context of the above, the University of Sydney's Centre for Future Energy Networks is currently undertaking research within this space. Our efforts include developing detailed models of distribution feeders with high penetrations of rooftop PV generation that also incorporate the load shifting behaviour of customers with battery storage and other controllable devices, and control systems for keeping such active networks within their safe operating technical envelope. The purpose of this work is to: ascertain the network (power flow) effects of embedded generation and controllable load technologies; estimate the resultant economic costs and benefits at the individual, network and system level; and also to examine the possible market structures that support efficient operating and investment decision-making. We are willing to contribute our expertise to the AEMC's efforts at evaluating this and future rule change requests.

If you have any queries about the submission or require further information, please contact me at [archie.chapman@sydney.edu.au](mailto:archie.chapman@sydney.edu.au) or on 02 8627 0386.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'A. Chapman', is written over a light blue rectangular background.

**Dr Archie Chapman**  
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Centre for Future Energy Networks  
University of Sydney