

# Stand-alone energy systems

ECA submission to EMTPT Consultation

October 2016



Energy  
Consumers  
Australia



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## Introduction

Energy Consumers Australia (ECA) is pleased to have this opportunity to contribute to the Energy Market Transformation Project Team (EMPTP) consultation paper (the Paper) on *Stand-alone energy systems in the Electricity Market: Consultation on regulatory implications*.

ECA is also submitting to the EMPTP consultation paper *Consumer Protections for Behind the Meter electricity supply*. There are aspects of these consultations that raise common issues and ECA will try to highlight these in its submissions.

ECA notes that technology changes have created many new options for the way consumers can acquire the electricity they need to live their lives or run their businesses. These options have created a plethora of terms such as “behind the meter”, “stand-alone power system” and “micro-grid” that are used inconsistently. ECA’s submission commences with an attempt at a consistent approach to describing the ways that households and businesses can obtain energy. This analysis will form the first section of this submission.

As the Paper is primarily concerned with the scenario that ECA terms “micro-grid”, the next section of the paper expands on the concept.

The third section of the paper will be a response to questions posed in the Paper.

## A tentative typology

There is a tendency to refer to meters as if there is a one-to-one correspondence between metering points and premises. In fact, there are many cases where there can be meters connected behind a primary meter in configurations ranging from single granny flats to larger sites such as apartment blocks, shopping centres and industrial parks.

Given that this is the case, a distinction can be drawn between single premises and some kind of community which is a collection of premises connected together. Distributed energy resources (DER) can be supplied at the individual premises level or as part of a community of premises. Finally, in cases where there is DER that can supply electricity, there is less dependence on a grid connection to obtain electricity, although the grid connection may have value for energy trading.

This provides the opportunity to develop a typology of six different use cases.

<b>Grid Connection</b>	YES	YES	NO
<b>Distributed Energy Resources</b>	NO	YES	YES
<b>Single Premises</b>	Traditional installation	'Behind the meter'	Stand-alone power system
<b>Community</b>	Embedded network	Micro-grid	Islanded micro-grid

In each of the three variants of the 'single premises' construction, the consumer protection issues are about the obligations to property occupants by electricity suppliers directly. In the 'community' cases there are questions about the issues that relate to the relationship between individual occupants, suppliers and possibly the community as an entity, as well as the relationship between the community collectively and suppliers.

ECA is particularly concerned that the consultation papers together (behind the meter and stand-alone systems) do not address the issues of the consumer protections that are not available to consumers connected to embedded networks (and usually through exempt sellers).

## Defining 'micro-grid'

The Paper quotes the U.S. Department of Energy definition of a micro-grid as "group of interconnected loads and distributed energy resources with clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid [and can] connect and disconnect from the grid to enable it to operate in both grid-connected or island mode."

This identifies the three essential characteristics of micro-grids. They include interconnection, they include loads and generation, and they act as a single controllable entity. In this context an individual battery operates as both a load and generator. Whether the micro-grid stands alone or not is a characteristic of the micro-grid, and is referred to in our typology as an 'islanded micro-grid.'

In this submission we will use the terms as outlined in our typology.

The descriptor 'micro' can be misleading in this context. Islanded micro-grids can cover whole cities or regions. At the extreme it is any grid not connected to the interconnected NEM. A slightly narrower definition might include all of Horizon's networks in Western Australia (WA) but not the network in South East WA.

This latter point highlights the fact that micro-grids are not new. All the municipal networks that were the foundation of the electricity industry were micro-grids. When the four networks in the Sydney area (Balmain Power Co, Sydney Council Electricity Undertaking, Railways and Public Works) were linked-up at the start of World War II each still operated as a separate grid.

The advent of bigger cheaper generating plant and better transmission technology over the decades has seen the conversion of many islanded micro-grids into grid-connected communities. Technology change is creating the prospect of unwinding the developments of the last half century coupled with consumers expressed preferences to “get off the mains” in the light of electricity prices.

ECA notes that it could be useful for the Final Paper to lay out for stakeholders information on how the isolated micro-grids that still operate in different states are currently regulated.

## Questions raised in consultation paper

### *Objectives*

#### ***What objectives, beyond the Energy Council’s general objective, should be held in mind in addressing regulatory arrangements for stand-alone systems?***

By its constitution, ECA’s task is to promote the long-term interests of consumers by providing and enabling strong, collegiate, evidence based advocacy on matters of national significance to residential and small business consumers of energy services. In our constitution we are required to have regard to “price, quality, reliability, safety and security of supply” (as used in the NEO and NGO) rather than the shorter “price, quality and reliability” incorporated in the AEMA.

ECA has consequently spent some time considering the implication of this objective. In doing so we conclude that economic efficiency (‘efficient investment in, and operation and use of, energy service’) is the most significant means to that end. The consequence is that consumers pay no more than they need to for energy services to meet their needs.

The obligations that Australia has entered into in Paris to join with the international community to contain global warming to less than 2 degrees over pre-industrial levels is a policy constraint that applies to how Australia’s energy system develops. ECA’s obligation under its constitution is to advocate for the achievement of this goal in the way that best promotes the long term interests of consumers.

The development of DER creates two opportunities. Firstly, irrespective of carbon targets, they may be a more economically efficient means of delivering services including in scenarios of increasing extreme weather events where security of supply is an issue. Secondly, they are a means to achieve agreed target reduction in carbon emissions. The use of DER for the second objective is justified if by doing so the overall benefit to consumers is greater than other approaches for achieving the agreed goal (e.g. centralised renewable energy).

DER is the source of much innovation. That innovation however is also only a means to an end, that being the long term interests of consumers. Sponsoring innovation may have wider economic benefits such as the creation of new industry opportunities for Australia. But where these benefits are external to the consumption of energy in Australia they should not be funded by energy consumers.

ECA submits that the objectives beyond the long-term interests of consumers need not be considered in determining regulatory arrangements for micro-grids.

## What is a stand-alone energy system?

### ***What is an appropriate definition for our purposes?***

See the discussion above. It is ECA's view that the definition of a stand-alone energy system as 'a local energy grid with control capability, which means it can disconnect from the wider grid and operate autonomously' is better applied to an 'islandable micro-grid'.

The really important elements are the three identified above – there is a network of loads and generation under single control. That control may be fully automated rather than involving regular human intervention, but the essential feature of balancing load and generation is managed by the network.

### ***What are the different regulatory issues that arise from stand-alone systems that are connected to the grid versus those that are not?***

Any micro-grid has to be able to fulfill the expectations of the consumers who are connected to it in regard to price, quality, reliability, safety and security of supply.

If the micro-grid is a monopoly provider (as they usually are) there are important regulatory issues arising about the bargaining position of consumers with the micro-grid controller.

Any micro-grid can be disconnected from the NEM. The regulatory question is what are the additional regulatory issues that arise from the disconnection?

In any configuration the micro-grid controller becomes responsible for the reliability of electricity services to the premises connected to it. In a grid connected scenario the capacity of that grid connection will be less than the expected peak demand of the loads connected to the micro-grid. The decision on the capacity of that connection will determine the reliability standard for the micro-grid.

## Potential Scenarios – Ownership Models

### ***Are there any other potential business models we should consider?***

Not that ECA has identified.

### ***What are the unique regulatory challenges presented by each ownership model?***

As noted above the question is the negotiating power of the individual consumer versus the network owner. Anyone with experience of the Committees of Management in strata-titled apartment complexes can give a detailed assessment of the failings of these governance models.

How such a model will reconcile the competing reliability expectations of residents is the challenge. However, depending on the micro-grid design it can also be an opportunity if the local grid control facilitates the implementation of differential reliability standards.

The three parts of the micro-grid each result in different challenges, and it is not necessary that all three elements be under common ownership. One entity – possibly someone who is a distribution network service provider (DNSP) – could own and maintain the grid, while another

is the controller and the different assets for generation or storage could be under multiple ownership, as are household loads.

The ownership model referred to as a 'Co-op' model is not a true micro-grid unless the 'voluntary' participation by individual premises is whether they decide to operate as 'stand-alone power systems' rather than connect to the micro-grid. The 'local energy trading' model that is implied by the description is in our typology a collection of premises with 'behind the meter' resources with a set of purchase agreements between them or with a centralised market maker.

***Are some ownership models more closely aligned with the National Electricity Objective than others?***

Each model of ownership can be designed in a way to promote the long term interests of consumers. Whether one ownership model or another better optimizes the long-term interests of consumers is ultimately an empirical efficiency question.

***Issues – Consumer Protections***

***How would the discipline of price and service competition be maintained on stand-alone power infrastructure providers, given customers would not be able to switch retailers in the event they became dissatisfied with energy prices and/or customer service?***

It is common in competition policy to draw a distinction between competition 'in the market' and competition 'for the market' – the latter being exercised through franchise or licence bidding. It isn't necessary for each individual consumer to have the right to switch retailers to gain the efficiency benefits of competition, and franchise bidding for micro-grids can even result in competition benefits in the monopoly (grid) infrastructure.

The limitation on franchise bidding is whether it is a one shot game; that is, whether after initial allocation it is possible to have another round of re-allocation. Ultimately, this is an element of the design of the first franchise bidding.

Whether the micro-grid is a greenfield or brownfield development is a further question. In the former the asset of the grid can be co-operatively owned by the premises collectively and leased for the duration of a management right to the successful bidder. In the latter case there is an *in situ* grid owned by a DNSP; the options depend on the approach the DNSP wants to take to its asset.

***What contractual relationships should exist, and to what extent should they be regulated, between parties involved in the supply of the services of stand-alone systems?***

The network and the system controller in a micro-grid both have a monopoly for the duration of the contract. That monopoly position requires oversight, but that may be by an identified professional dispute resolution body rather than a regulator. But the requirement that such contracts include a standard dispute resolution process should be part of regulation.

Once again the contractual relationship between householders (or 'small customers') will vary depending on whether this is an existing network becoming a micro-grid or a new network. In the latter case the decision to purchase within the micro-grid area needs to be informed by the terms and conditions of electricity supply. In the former the consumers should lose none of the protections afforded them before the area converted to a micro-grid.

***How can the incentives of the procurers of stand-alone systems be aligned with the end use customers they will serve?***

Ultimately by the measures in the previous answers to questions in this section of the discussion paper.

***How would we ensure that the public is protected against unreasonable rates, bad service, and negligence that results in safety or human health risks? For instance, would the ACL protections be sufficient for customers on stand-alone systems?***

In the same way as occurs with islanded micro-grids today.

***What would become the equivalent of a "retailer of last resort" in the event that an energy services company, delivering stand-alone power solutions, became insolvent? For example, should an insurance scheme or similar be considered for stand-alone system providers/operators in the event of insolvency?***

The most important question here revolves around asset ownership, because access to the assets is what is important for providing security of supply. A simple scheme would entail a default right falling on a market body (possibly the Australian Energy Market Operator (AEMO) or the Australian Energy Regulator (AER)) to take control of the assets and procure a temporary service provider until such time as the receiver or administrator has made alternative arrangements.

The nominated regulator with responsibility would need to make its own decision about whether it needed to put standing arrangements in place (by tender) for the role of temporary service provider or make that on a customer by customer basis.

A scheme such as this indicates a requirement for some kind of 'light touch' licence for micro-grid operators.

***What dispute resolution arrangements should be put in place for customers and should they be energy only dispute resolution or connected to broader tenancy/ownership arrangements?***

ECA is not familiar with tenancy arrangements. However, micro-grids can operate in an area where all the premises are individually owned or, where the premises are rented. The landlord may not be the same party as the micro-grid provider. Due to the inherently monopoly characteristic of the service ECA has recommended above the inclusion of a dispute resolution process as part of the contract.

***What hardship and financial support provisions should apply to stand-alone energy customers?***

This issue needs to be addressed in a wider context of a review of these arrangements. Currently if a consumer makes a private decision to invest in DER and go off-grid in what we call a 'stand-alone' configuration they will receive no financial support. The same is probably true of micro-grids.

The availability of financial support should not be dependent on the mode of delivery but this is a bigger issue than just the consideration of micro-grids.

***Issues – Reliability and Service Standards***

***How should the service standards that apply to each stand-alone energy system be decided?***

There are fundamentally only two ways. They are agreed on a case-by-case basis by the consumers and the network, or they are standards imposed by regulation (that might have some variables for size and location of the micro-grid).

For micro-grids that will be created by cutting a community off from the main grid these standards need to be imposed by regulation.

In the greenfields case, they can represent part of the terms and conditions on which people decide to buy-in to the community. There is an issue with respect to the longevity of the assets that have been deployed, for example, does the business model cover the cost of capital replacement over time?

***How will we ensure that customers are making fully informed decisions about the reliability standards and service quality of the energy services provided through a stand-alone energy system?***

Through providing standard form clear information.

***Under what governance framework will decisions about reliability versus cost trade-offs be made?***

Same as the question on how standards are set.

***How and by whom should standards be enforced?***

If the standards are the same standards as apply to grid connected premises, then the same regulators (the AER and state based safety regulators).

***Should some obligation to supply apply in an area where a stand-alone system is in place?***

No.

***Who should be the responsible party if an obligation to supply is put in place in a stand-alone system area?***

Not applicable.

#### ***Issues – Regulatory challenges: Networks***

ECA has not addressed the questions in this section. ECA believes these are detailed issues that could be considered at a second stage of this consultation that is informed by the development of a framework for the approach to the development of new micro-grids. We would be pleased to have further discussion with the EMPTP on our initial thoughts on these issues at any stage.

***What regulatory barriers exist to third parties supplying stand-alone energy solutions?***

***How should the regulatory framework ensure that a stand-alone power system is considered as an option where this is the most efficient way to provide energy services?***

***What elements of the national framework are potentially applicable to stand-alone energy systems?***

***Are the existing connection frameworks adequate for stand-alone energy systems?***

#### ***Issues – Regulatory challenges: Retailing***

ECA has not addressed the questions in this section. ECA believes these are detailed issues that could be considered at a second stage of this consultation that is informed by the development of a framework for the approach to the development of new micro-grids. We would be pleased to have further discussion with the EMPTP on our initial thoughts on these issues at any stage.

***In what circumstances should or could a stand-alone system become subject to economic regulation?***

***How should a regime for economic regulation – if any – be structured to address stand-alone systems?***

***Should price regulation extend to the entire cost of energy services for customers of stand-alone systems?***

***Should stand-alone systems that have a grid connection be treated as embedded networks for metering and settlement purposes?***

***In what circumstances should a decision to establish a stand-alone system be regulated? Who by? And what justification should be provided to the regulator?***

#### ***Issues – Consistency versus tailoring***

***What principles should be adopted in determining the need for and nature of any new regulatory arrangements that will apply to stand-alone energy systems?***

The simple principle is that regulatory arrangements should be those that promote the long-term interests of consumers. Where those interests are best promoted by competitive markets those regulatory arrangements need to be chosen to ensure effective competition. A pre-condition for effective competition is that consumers can participate in the market with confidence.

As stated in our submission on 'behind the meter' consumer protections, it is ECA's view that the protections afforded to consumers of energy services should not depend on how they choose to have their energy supplied. Notwithstanding that general principle, ECA has detailed circumstances where reliability need not be to the level of grid reliability.

In short the regulatory arrangements should to the maximum extent possible be harmonised. However, opportunities to make regulatory arrangements 'less onerous' without compromising the long term interests of consumers should be embraced.

***What would be the appropriate balance between a strong reporting and compliance regime and a flexible regulatory framework?***

The concepts of 'a strong reporting and compliance regime' and 'a flexible regulatory framework' are not appropriately positioned as alternatives. The latter is about the nature of the obligations whereas the former is about how they are enforced. Consider their opposites, it is possible to have a highly prescriptive regulatory regime with minimal reporting and compliance requirements. There is also a distinction between compliance regimes (which is what those who are regulated do) and enforcement regimes (that the regulated do).

There is no short answer to this question because it depends so much on the cultural characteristics of the market under consideration, and the micro-grid market can be considered immature.

Recognising that ultimately all costs are borne by consumers, ECA favours an approach whereby policy makers clearly specify the outcomes they seek from the regulatory regime and then industry develops approaches to fulfill those requirements, and if policy makers or regulators are satisfied, these are put in place. The approach lies somewhere between self-regulation and co-regulation. Despite some initial teething issues, it has been an incredibly successful approach in telecommunications, is partially in use in clean energy and is well adaptable to electricity markets.

***Conclusion (of discussion paper questions)***

***Of the various issues raised in this paper, which areas and potential market failures have the highest risks and should be prioritized in terms of regulatory interventions and reforms?***

It is ECA's view that the consultation could proceed by clearly distinguishing the two major scenarios of firstly, existing grid connected communities being disconnected to create an islanded micro-grid and secondly, the creation of a micro-grid that may or may not be grid connected in a greenfield development.

There are big distinctions between the two scenarios in terms of the ownership of the 'poles and wires' (DNSP vs developer) and the consumer protections required (continuation of existing vs can be opted in to by purchasers).



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