

# Energy Consumers Australia

## **Principles for the Integration of Energy Storage**

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# Integration of Energy Storage into the NEM

## Introduction

The AEMC issued the *Integration of Energy Storage: Regulatory Implications* discussion paper in October 2015 (the **Discussion Paper**). ECA is aware that consumer advocacy organisations have made submissions to the discussion paper. ECA has not made a submission itself.

Following the final report by the AEMC (due December 2015) there may be other regulatory processes.

In this paper ECA outlines principles for the consideration of the integration of energy storage in the context of the long term interests of consumers. The intention is to frame the approach that ECA will take in relation to the further processes, including the AER review of the ring-fencing guideline.

The objective of the national energy market arrangements is promoting the long term interests of consumers with regard to price, quality, reliability, safety and security of supply of energy services. Within the various laws this is specified as the promotion of efficient investment in, and operation and use of, energy services.

At its simplest, the economics underpinning the regulatory concept of the long term interests of consumers says this is achieved when no individual could be made better off without making someone else worse off. Formally this is the condition of Pareto optimality, and economists define something as efficient if it achieves a Pareto optimum. Economic theory also tells us that this condition can be achieved through competitive markets and that prices are equal to long run marginal cost.

Economic theory also tells us that there are circumstances where competitive markets are not only not viable, but are really not desirable. These are the cases of natural monopoly. The technical definition of a natural monopoly is an industry where multi-firm production is more costly than production by a single firm. The electricity distribution networks are one of the most commonly cited examples of natural monopoly.

Theory then states that to achieve an efficient outcome the natural monopoly needs to be regulated so that it will produce the quantity of goods at the cost that would apply were the firm to be in a hypothetically competitive market. Unfortunately the criterion that the firm is a natural monopoly will almost certainly mean that the firm has economies of scale and hence has a declining marginal cost curve over all levels of output. As a consequence the regulated price is set at a higher price than marginal cost so that the firm doesn't operate at a loss.

To this point there would be vigorous agreement across participants in the energy market.

The principles of the regulatory regime underpinning the National Electricity Market were established in the report of the Hilmer inquiry. A central condition was that the natural monopoly services of distribution and transmission networks should be strictly separated from markets that are contestable (or viable).

Counter-arguments can be found that vertical integration by monopoly firms into downstream markets can be dynamically efficient as a way to manage the co-ordination of the investment required. Vertical integration, however, creates its own set of challenges, often described in the literature as sabotage.

Innovation in energy services is challenging the existing paradigm. The existence of “network embedded generators” – primarily rooftop photovoltaic (PV) panels – is changing the nature of distribution networks from one-way to two-way. The declining cost of battery storage is creating new opportunities for networks and now consumers to manage energy services.

Embedded storage in the distribution network or on the customer’s own premises (behind the meter) adds a number of dimensions to this. Storage has the potential to reduce variability but also to increase it.

This raises the important question of how these devices should be managed. This paper is only going to focus on the distribution network service provider (DNSP) role and whether a case has been made for varying the approach to regulatory separation.

### **Arguments for DNSP involvement**

There are two basic arguments for DNSP involvement in storage, either in network or behind the meter. One is based on efficiency of provision of the service; the other is based on network management.

The argument from efficiency is based on the claim that the network has efficiencies in scale or scope in managing these services. It is unclear exactly what aspects of network operation or asset base create this supposed efficiency. Certainly there is the prospect that network embedded storage has a scale efficiency over individual household storage. It may, however, have limitations that don’t apply to household storage. This argument is often related to a desire from DNSPs to develop “unregulated” revenue streams.

The argument from network management is that embedded storage can work as an alternative to other network investments to manage peak loads. In its strongest form it has been argued that only the DNSP can properly manage these resources for the purposes of generating system stability.

### **Argument against DNSP involvement**

If the DNSP is going to be involved in what is a potentially contestable market, the normal regulatory response is to propose “ring-fencing.” Ring-fencing can be an effective tool when previously integrated firms are being re-regulated; it is a way of insulating historic business units. An example is a consultancy business that might have been conducted by a DNSP.

There are only two possible outcomes from ring-fencing; that it will be effective or it will be ineffective. The only party that can genuinely know whether ring-fencing is effective is the DNSP.

If the ring-fencing is effective then the DNSP no longer has an incentive to exploit economies of scale or scope in the provision of the service. Indeed meeting the ring-fencing requirements introduces additional costs and is an inefficient solution. If the motivation is for network management purposes

these costs are probably greater than the costs the DNSP would face acquiring the benefits of storage as a contracted service.

Given these considerations, the DNSP has no incentive to invest in storage services if the ring-fencing is effective. As a consequence if the DNSP invests in storage under the ring-fencing rules it can be inferred that the ring-fencing is ineffective.

Other firms considering making an investment can only determine the effectiveness of ring-fencing on the basis of the behaviour of the DNSP. If the DNSP makes its own investment then other firms are more likely not to, because they will infer that the DNSP is making the investment to exploit its economies as the network owner and operator.

If the DNSP has supported a regulatory outcome which permits their participation on the basis of ring-fencing, potential storage service entrants will infer that the DNSP is likely to invest.

Consequently, even if ring fencing can be effectively enforced, permitting DNSPs to provide storage services will foreclose the market that would otherwise develop.

### **Alternatives to DNSP involvement**

There are a small number of consumers who are eager participants in energy innovation. They tend to be people either motivated highly by environmental concerns, are interested in technology in general or are just keen to respond to perceived poor service and high prices from suppliers in the past.

In general consumers will be better off with more choice in the provision of energy services. Existing and potential retailers are logical participants. Retailers have been slow to enter the market and their service offerings tend to be more focussed on churn-reduction through long term contracting rather than active engagement in the opportunity for customers.

There have been a number of impediments to the full development of the retail market. This has included jurisdictions, in attempts to protect consumers or be tough on the businesses, creating barriers to entry by innovative firms.

In the provision of storage embedded in distribution networks potential partners, generically, are generators who are simply relocating their generation activity.

DNSPs could argue that they only want to install storage for the regulated part of their businesses, in network support and quality and reliability of supply. However, even were it likely that DNSPs would restrict their use to only these functions and not to energy trading or the ancillary services market, there are strong reasons to restrict DNSP involvement.

The simplest part of the reasoning is the Averch-Johnson effect and the incentive for a rate of return regulated firm to inefficiently prefer capital expenditure over operating expenditure. Restricting DNSPs to the ability to buy network support and reliability “as a service” is the most effective way to mitigate this risk.

Additionally, restricting DNSPs to engaging in storage only as an acquirer of a service provides the DNSPs with the incentive to develop the processes and services needed to most effectively integrate both embedded storage and behind the meter storage.

### **Conclusion**

Ring-fencing is not an effective way to control the damage that will occur to competitive markets by enabling DNSPs to invest in storage. The benefits that DNSPs can gain from embedded storage and behind the meter storage will be more efficiently delivered by the development of vibrant markets for these services.