energy networks association

## Submission to the Productivity Commission

# Energy Efficiency

## Response to Draft Report

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# 1. Overview

The Energy Networks Association (ENA) welcomes the release of the Productivity Commission Energy Efficiency Draft Report (the Draft Report) as providing a good basis to consider the development of energy efficiency policy in Australia. The ENA limits its response to issues raised in Chapter 13 of the Draft Report relating to the energy market.

The ENA has observed a growing market for demand management (which includes energy efficiency as a subset), amongst different parties, including retailers, distributors, generators, aggregators, users, traders, contractors and governments to access available demand side response for retail, network and environmental driven demand management. In terms of energy savings and a more efficient use of energy infrastructure, demand management offers major benefits beyond even the most effective government program seeking to improve consumer behaviour.

However, government policy and the approaches adopted by pricing regulators can hinder the development of this market for demand management. Policy interventions may distort the market for demand management and may limit the ability of energy users to access the highest value market for the energy flexibility they may be able to offer.

Of particular concern to ENA members is the fact that the regulatory regime faced by distribution businesses can affect the incentives and risks faced by distribution businesses in pursuing demand management opportunities. A number of recommendations are outlined in this submission that would improve the regulatory and economic environment for investment in network driven demand management.

The *Draft Report* usefully identifies the lack of cost reflective price signals (network and retail) as providing a disincentive for energy users to invest in improved energy efficiency. The ENA agrees with this assessment. The lack of cost reflective pricing for many small energy users limits the pricing signals faced by consumers, thereby dulling incentives for consumers to invest in energy efficient technologies or participate in demand management projects. Further, the lack of pricing signals where certain customers disproportionately contribute to peak energy load, in particular users of domestic air conditioners, also creates significant inefficiencies in the market through cross subsidies between users in the cost of network investment and peak energy to meet this demand.

The ENA considers that the introduction of cost reflective time of use pricing is a critical issue for the future efficient development of the energy market, which is an outcome that would also provide improved signals for energy efficiency for all energy users. The ENA notes, however, that there are a number of ways to deliver efficient, cost reflective price signals which may not necessarily involve interval metering.

The ENA supports the recommendation that interval meters should only be introduced following comprehensive cost benefit analysis showing that they are the most efficient approach to achieve demand response in a given situation. Such an analysis should consider the secondary costs of introducing these meters including customer data management and stranded metering assets. Interval meters have long been used in demand management, but only where the benefits of interval meters in reducing costs have outweighed the costs of data collection and management for the party outlaying the cost, whether that is the user, retailer or distributor. Interval meters are often essential to verify contractual energy use reductions for large customers.

## 1.1. Background

This submission responds to the Productivity Commission Draft Report on Energy Efficiency (the Draft Report), released in April 2005.

The Energy Networks Association is the national representative body for gas and electricity distribution network businesses. The members of the ENA include:

- ActewAGL
- AGL Energy Networks
- AlintaGas Networks
- Aurora Energy
- Citipower
- Country Energy
- ENERGEX
- EnergyAustralia
- Envestra
- Ergon Energy
- ETSA Utilities
- Integral Energy
- Multinet Gas
- NT Power and Water Corporation
- Powercor
- SPI Networks
- United Energy Distribution
- Western Power

Energy network businesses deliver electricity and gas to over 12 million customer connections across Australia through approximately 800 000 kilometres of electricity lines and 75 000 kilometres of gas distribution pipelines. These distribution networks are valued at more than $34 billion, and each year energy network businesses undertake investment of around than $5 billion in network operation, reinforcement, expansions and greenfields extensions.

# 2. Scope of ENA response

The Energy Networks Association welcomes the release of the Productivity Commission Energy Efficiency *Draft Report* as providing a good basis to consider the development of energy efficiency policy in Australia.

The ENA limits its response to issues raised in Chapter 13 of the *Draft Report*, relating to the role and impact of energy efficiency investments within the energy market. In particular, this submission focuses on:

- the emerging market for demand management (including energy efficiency);
- the impact of economic regulation of electricity networks on decisions to invest in network driven demand management; and

- the importance of cost reflective price signals in improving investment efficiency in the energy sector and the operation of the energy market.

## 3. Demand management: an emerging market

*Energy efficiency as a type of demand management*

As the *Draft Report* recognises, investing to improve energy efficiency is one of the approaches available to governments, distribution businesses, retailers, energy users, energy aggregators, traders, generators and energy service suppliers to manage energy use. Other approaches include:

- Load management measures aimed at alleviating short term demand peaks, including;
  - Interruptibility or curtailability arrangements;
  - Load shifting technologies; and
  - Direct load control;
- Distributed generation;
- Power factor correction; and
- Fuel substitution.[1]

These demand management (DM) approaches may provide alternatives to increased energy supply or augmentation, through shifting or reducing customer demand, actions that alter the level or pattern of energy consumption, the energy source, or the use of the distribution network.

Different approaches may be more appropriate depending on the party that is investing in the DM technology, and the category of DM response for which it is intended.

*Different categories of demand management*

There are three commonly recognised categories of demand management; retail market driven DM, network driven DM and environment driven DM. While the DM technologies used for each of these approaches are often similar, the objectives for each are often different.

Retail driven DM is driven by market forces to reduce exposure to high wholesale energy prices for either an energy user or a retailer. In contrast, network driven DM is aimed at deferring network expenditure so that network businesses can retain (for a period) the benefits of improved capital investment efficiency under a regulatory regime. Environment driven DM is currently driven more by policy than the market, with the aim of reducing the environmental impact of high energy use (including greenhouse impacts). Often this is achieved through programs and subsidies, as highlighted in the *Draft Report*.

[1] Essential Services Commission of South Australia, *Assessment of Demand Management and Metering Strategy Options*, Charles River Associates, August 2004, p.7.

*Competition amongst parties to access DM opportunities*

As outlined above, the objectives of retail, network and environment driven DM are different, and in many cases outcomes may not be complementary or additive. A party capturing one type of demand management may close out economic opportunities for others to access benefits.

For example, retail market driven DM essentially commoditises parcels of demand side response that can be used to reduce demand in times of high prices. This commodity aspect derives from the fact that retailers are dealing with a general wholesale price exposure spread across all of their customers in a region. Retail driven DM responses can therefore be sourced from across a pricing region, aggregated and used to alleviate high price events. The value of retail driven demand management comes from the avoided costs of buying that electricity on the market for the retailer or user, or, alternatively, the value of that avoided electricity when resold on the market. This value can be quite high when the wholesale spot price is high.

Investment in DM technologies and energy efficiency in particular by businesses or individuals can be privately cost effective without additional benefits (payments) arising from commoditised retail or network driven DM (or government subsidies). This is a type of retail driven demand management. The value of private investment in energy efficiency accrues mainly to the energy user in lower energy costs from lower consumption.[2] As the Draft Report points out, this incentive can be quite weak due to a lack of clear price signals for consumers for energy use. This issue is returned to in section 5 where cost reflective retail and network pricing is discussed.

Network driven DM does not share the same commodity-like characteristics of retail driven DM. Instead, network driven DM is generally used to manage local network constraints if and when DM options are more cost-effective than network augmentation. These approaches can include general energy efficiency where this approach may slow peak energy growth and delay network investment. The value of network driven DM for a distributor derives not from savings in the wholesale price of energy (though this can be a component of the value for the DM donor), but instead from the net present value of deferred network expenditure. This approach is driven by market forces on the cost of capital sunk in network assets compared with other investments.

In this regard the economic decision of a distribution business to pursue network driven DM will not be driven by the price of energy but by the net present value of deferred network expenditure. On the other hand, the decision by the user to take part in a DM project or contract will be directly related to the value that user receives from deferred energy costs and any payments from the distributor for providing DM flexibility. Therefore, while retail prices do not drive the decision by the distribution business to pursue network driven DM, they are a key component in the decision by users to participate in a network driven DM project or contract. Non-cost reflective energy prices that suppress the true cost of energy therefore dilute the incentive for users to participate in network driven DM.

[2] There is also a more general environmental value accruing to the community through reduced energy use which may also be valued by the user.

While there are similarities in the DM mechanisms or technologies used by retailers and distributors, the scope for using these mechanisms, as well as the time before benefits are realised, differ. Aggregation of network driven DM is therefore often not straightforward and in some cases there may not be a suitable non-augmentation option to deal with local network constraints. Increasing network capacity to meet increasing demand may be the only option available to network businesses and they should not be penalised where this is the case.

As network driven DM is generally used to deal with local network constraints, opportunities for distribution businesses are often difficult to access, may be site specific, or may be unavailable (ie. they do not "commoditise" well). Retail market DM can also at times work at cross purposes to the goals of alleviating network constraints, by increasing local constraint issues and the costs incurred by distribution businesses in maintaining system security, while possibly removing network driven DM opportunities by tying them up in retail contracts. As retail and distribution businesses can be competing for DM opportunities, the opportunities for demand side response may not be additive.

Similar to retail driven DM, environment driven demand management (including energy efficiency) commoditises energy use by essentially reducing total energy consumption independent of pricing regions or specific network constraints. Environment driven demand management (particularly when subsidised through government programs) may close out opportunities for retail and network driven demand management, as it "takes up" demand side response opportunities, but does not necessarily direct the reduction in energy use to the high value areas of retail or network driven DM. Retail and environment driven DM can also reduce energy throughput for a distribution businesses, thereby decreasing revenue if they are regulated under a price cap, without any offsetting infrastructure efficiency savings.

The table included at Attachment A of this submission summarises these financial flows for different investors and DM technologies.

The ENA has observed an emerging market for demand management. This market is between the different parties seeking to access financial gains from DM, such as retailers, distributors, generators, aggregators, users, traders, contractors and governments, and the different types of demand management from which these parties are seeking to derive advantage, whether it be retail, network or environment driven DM.

Government and regulatory policies and approaches may hinder the development of this market for demand management, and may limit the ability for users to access the highest value market for the energy flexibility they may be able to offer. Two areas where these hurdles exist are outlined below. These are the regulatory regime faced by electricity distribution businesses, which affects the incentives and risks faced by distribution businesses in pursuing DM opportunities, and limits on the use of cost reflective retail and network pricing.

# 4. Electricity distribution network regulation

In Australia, distribution businesses operate in a regulated environment, meaning that the prices and potential returns that a business can expect are approved by the regulator. The way regulators treat investment in DM has a critical impact on a distribution business' decision over network investment.

There are several aspects related to regulatory arrangements which can act as an impediment to the uptake of network driven DM opportunities. These include the form of regulation (price cap or revenue cap), the approach taken by the regulator to DM contract and investment costs, and the treatment of deferred network costs late in a regulatory period.

*Form of regulation*

The National Electricity Code requires that the form of regulation applying to a Distribution Network Service Provider can be either:

a. a revenue cap
b. a weighted average price cap; or
c. a combination of revenue and weighted average price cap.

Under revenue cap regulation, a regulator caps a utility's allowable revenue with an external index. Subject to this cap, the utility can manage costs to maximise its profit margin underneath the cap. This approach effectively decouples throughput from revenue, though regulators usually allow some adjustment for increases in the number of customers (but not per-customer sales). In contrast, under price caps regulators set prices for particular utility services.

Although revenue and price caps create the same incentives to minimise costs, they can differ significantly in terms of the incentives that they provide for incremental sales. Distributors regulated under a revenue cap are generally insensitive to network throughput, unless that throughput begins to affect investment needs in the system (through increased demand). Distributors regulated under a price cap are sensitive to throughput, and a decrease in demand will generally negatively affect revenue. As a general statement, revenue caps are therefore considered to offer less of a disincentive for distribution businesses to pursue DM options.

There are mechanism that can be introduced under a price cap regime that make distribution businesses insensitive to changes in throughput that result from DM projects, for example as introduced by the NSW distribution regulator in 2004.[3]

*Treatment of DM-related costs*

In a regulated environment, distribution businesses need certainty as to how particular investments and costs will be treated by the regulator, including whether costs can be passed through to consumers, whether investment will be considered prudent and

[3] IPART, NSW Electricity Distribution Pricing 2004/05-2008/09

included in the regulated asset base, and if some costs will be borne by the distributor and/or addressed through incentive mechanisms.

Uncertainty as to how a regulator will treat a particular investment increases the risk of that investment and reduces the possibility of the investment proceeding. A distribution business may incur a number of costs involved in investing in DM projects. Some of these are outlined in Attachment A and may include:

- **Information costs** – This includes the costs involved in developing a DM proposal, determining whether a proposal is technically possible and will address the relevant constraint, and the costs of identifying and educating possible demand-side businesses that may be able to provide DM capabilities, and the costs of supplying information to DM proponents if it is requested;
- **Infrastructure costs** – This includes the costs of the DM technology itself, for example remote control technology, or power factor correction facilities, within the demand-side business and in the distribution business;
- **Personnel costs** – Development, planning and implementation of DM projects involves particular expertise that distribution businesses may not have. Developing and retaining these skills may contribute to operating costs for distribution businesses;
- **Contract costs** – Network related DM projects usually involve contracts negotiated between the distribution business and the consumer regarding the nature and obligations involved in the DM response in times of network constraint. This usually involves payments between the distribution business and the consumer for providing a DM option. For example, a distribution business may have a contract with a major shopping centre that allows the distribution business to vary the centre's air conditioning load in times of network constraint. In return for this option the distribution business may pay the shopping centre a yearly amount. Alternatively the distributor may only pay the user when the DM option is called upon. These contracts may also include penalties on the consumer if it fails to respond as required in the contract. The penalties may approximate the penalties faced by the distributor if supply is interrupted, thereby offsetting some of the inherent risks of DM options arising from technical issues outlined in a later section.

The potential for the regulator to either "optimise out" DM capital costs from a distribution business' capital base, or not to recognise DM operating costs as legitimate, increases the risks and therefore the costs involved in a particular DM project.

*Efficiency carry-over mechanisms*

Distribution businesses operating under either price or revenue caps may face declining incentives to pursue DM options toward the end of a regulatory period. This is because, absent a special efficiency carry-over or other mechanism to promote DM investment, the only benefit a distribution business may derive from a DM investment is through decreasing network augmentation costs, which allow the distribution business to keep a share of the difference between the revenue or price cap and the level of actual investment until the next reset.

If the investment occurs at the start of a regulatory period the distribution business can access the efficiency benefit over several years, but towards end of the period the incentive is diminished and accrues to consumers almost immediately at the reset. This risk is further accentuated where a project investment may span several regulatory periods. This fact effectively limits distribution businesses, absent a special DM or efficiency carry-over mechanism, to only pursuing DM projects that can repay their initial capital outlay in the remaining years of the regulatory period before the next reset.

Where carry-over mechanisms are in place (eg. Victoria), they allow the distributor to retain the benefits of augmentation deferral arising from DM for a maximum 5 years. These DM projects, however, can introduce additional risk over time, particularly under reliability target penalty schemes, such as the S Factor regime in Victoria. The additional risk the business is exposed to in terms of S Factor penalties remains indefinitely where demand management is not firm. Such incentives on the distributor may result in disincentives for customers to contract for DM if a distribution business needs to include commercial arrangements for compensation for any S Factor penalties incurred because of a failure to perform under the DM contract. Alignment of the duration of risks and benefits could remove distortions currently faced by distribution businesses and improve overall efficiency of investment.

*Recommendations*

While the ENA understands that the different approaches of regulators throughout Australia in the treatment of DM is strictly outside the scope of the Productivity Commission's Inquiry, these issues, in particular the risks introduced under the regulatory regime, provide impediments to the pursuit of network driven DM options that would otherwise be economically efficient in a lower risk environment.

In many cases, the costs of developing DM opportunities, and the economic and technical hurdles involved in integrating new DM technologies in the network, are underestimated. Networks need to remind other parties regularly that DM is essentially about a temporary deferral of network augmentation rather than a permanent avoidance of augmentation. Using DM to manage network constraints is also often more risky than network build options, and can therefore carry a higher risk premium than network investment. It is also only available where the network is constrained and DM options to offset new investment exist.

The ENA considers that the most appropriate way to encourage DM in the longer term is through a stable and dedicated regulatory and policy approach that seeks to build knowledge and capacity amongst end users and distributors, provides incentives to invest in DM technologies, addresses the causes of load growth and allows for returns to be delivered over the long term.

Elements of such an approach would include:

- A commitment to a stable regulatory and policy environment for DM over the long term to provide certainty to investors in DM technologies;

- An incentive based regulatory regime for distribution networks that promotes the implementation of efficient DM projects. This would include;
  - A mechanism that allows the costs of investment in DM technologies to be rolled into the regulated asset base of the business;
  - A mechanism to allow costs of research, development and education, as well as contract costs (and payments) to be recouped by the distributor;
  - A mechanism for compensating for distribution revenue foregone (where regulated under a price cap) from DM projects;
  - An efficiency carry-over or other mechanism that allows distributors to access benefits of avoided network investment for an appropriate period of time;
- Appropriately structured DM funds to facilitate development of untried or marginal projects for development of DM capacity;
- Where appropriate, DM should be supported by action by distributors to publish information on forecast constraints in the network;

  Provision of this information would need to be coupled with an allowance in the regulatory decision that recognises and recovers the costs of providing such information to the market.
- An ability for the distributor to recover costs from a proponent for the provision of detailed information on particular sites or for specified projects as requested;

  This is based on a "user pays" principle. Detailed information on the viability of a DM project can be complex and time consuming to produce and may not lead to a proposal being implemented.
- Recognition of "DM knowledge and capacity building" costs in the distribution business, including the costs of pilot projects, information campaigns and training in building experience and understanding within the distribution business and with users;

  This can include the use of government or specific regulatory funds to pursue DM projects, but should also allow businesses to initiate projects to build understanding and knowledge.
- Appropriate recognition in regulatory frameworks of shorter term location specific DM initiatives and longer term system wide initiatives such as energy efficiency.

A comprehensive approach to DM also needs to recognise the unique position of distribution businesses in a deregulated market. Regulatory frameworks should make appropriate provisions to allow distribution businesses to address broader DM issues.

## 5. Cost reflective retail and network prices

The *Draft Report* correctly identifies the lack of cost reflective network and retail prices for consumers as a significant barrier to demand management generally, and energy efficiency in particular. Current energy prices for small consumers provide only weak signals for increased energy efficiency, and virtually no signals for reducing peak energy demand.[4]

[4] In contrast, demand based tariffs for larger customers can have relatively strong peak signals.

The final cost of energy for customers is a composite of generation, transmission, distribution and retail costs. Peak energy price signals can be incorporated in any (or all) components of the energy price, but may not, in the end, be reflected in retail prices to small customers. This may be due to government imposed retail price constraints or decisions by retailers to offer smooth or flat prices to consumers. There are many network tariffs that have a strong peak demand signal which is not necessarily reflected in retail prices.

Increases in peak energy use, in particular through the increased uptake of domestic air conditioners, is driving network investment in many regions of Australia.[5] In the residential sector, air conditioners contribute only 5-6% of energy throughput but nearly 40% of peak day demand. On the EnergyAustralia network, it is estimated that every air-conditioned household receives an annual cross-subsidy of $86 from non-air conditioned households.[6]

It is important to note, however, that improved energy efficiency of appliances and infrastructure may not alleviate energy peak demand problems. This is because improved energy efficiency may decrease overall energy use, but may ultimately have little effect on load duration curves and the overall efficiency of capital utilisation. In other words, increased energy efficiency across the economy may shift the energy use curve down across peak and off peak periods, without changing the shape of the curve (and therefore efficiency of the capital used to meet that demand). Specific DM projects designed to defer network expenditure may be more appropriate mechanisms to alleviate peak energy use and resulting investment in the network, though both general and targeted energy efficiency projects can play role in this area.

An advantage of cost reflective pricing that signalled both the network and retail costs of peak energy growth is that it would limit cross subsidies and improve the efficiency of the market. It is also likely to drive consumers' decisions over energy use and investment in more efficient technologies.

The ENA notes that these outcomes can be achieved through a number of pricing and metering approaches. Pricing approaches such as inclining block and seasonal tariffs can be used with simple accumulation meters. Metering approaches can include time of use meters or interval meters. Time of use meters are considerably cheaper than interval meters and can deliver price signals for different daily pricing periods (for example peak, off-peak and shoulder periods) that efficiently reflect underlying energy costs.

For a sustainable market to emerge in the context of full retail contestability, there must be a commitment to allow retail prices to vary according to fluctuations in input costs. It is important that governments recognise the potentially negative market impacts of transitional price regulation that does not sufficiently allow for the recovery of costs.

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[5] Peak energy growth is not a key factor in some jurisdictions or regions which do not experience a summer energy peak, or which have relatively unconstrained distribution networks.

[6] Colebourn, H, *Increasing Block Network Tariff – Follow-up presentation to IPART's Pricing Issues Consultation Group*, Harry Colebourn, Manager Network Pricing and Customer Connection, EnergyAustralia, June 2003.

Cost-reflective pricing will promote greater competition following the introduction of full retail contestability by encouraging energy retailers to compete for every potential customer in the market, not simply those high-value customers who in some cases as outlined above, may subsidise other consumers.

Where cost-reflective pricing is not currently in place, energy retailers and distributors should be permitted by governments and regulators to adjust final prices to consumers over a reasonable period of time to ensure that all prices to customers are cost-reflective. This adjustment may take the form of restructuring of tariff and pricing arrangements, and it is critical that regulatory barriers are not created which prevent the adoption of new flexible arrangements.

The ENA therefore encourages the Productivity Commission to recommend that tariff-based approaches which reflect the cost of peak supply and incentivise load shifting where possible be introduced. This can include the use of inclining block tariffs, time of use tariffs with interval meters or seasonal tariffs.

*Interval meters*

The *Draft Report* focuses on the use and importance of metering technologies, in particular interval and smart meters, to deliver cost reflective price signals to consumers. As mentioned above, there are a number of pricing and metering options that can deliver cost reflective pricing.

The ENA supports the use of interval meters to facilitate improved demand side response in the market where it is the most efficient approach available. Interval meters are often essential to verify contractual energy use reductions that are part of a demand management contract for large customers. With these benefits also come significant costs. Interval meters are more expensive than standard accumulation or even time of use meters, and reading and data management is more complex. Significant economies of scale exist in reading where meters are consistent and grouped, however, where meters are inconsistent or patchy in distribution, meter reading can involve significant "double handling" of reading, with separate practices needed to read different types of meters, thereby increasing costs.

The economic benefits that can derive from the installation of interval meters can be different depending on the circumstances of the load in question. Distribution businesses should have the flexibility to adopt the most appropriate form of demand management and metering to meet the requirements of the load they serve. In some cases, interval meters may be warranted, particularly for larger consumers, where in others, more basic forms of metering and tariffs may be more efficient.

Interval meters have long been used in demand management, only where the benefits of interval meters in reducing costs have outweighed the costs of data collection and management for the party outlaying the cost, whether that is the user, retailer or distributor. Specific mechanisms, through rebates for users, or regulatory mechanisms for distributors, may improve the economics of demand management projects, increasing the use of interval meters as part of an integrated demand management strategy.

Where the individual economics of a situation may not justify the installation of interval meters, any mandatory rollout must ensure that the party charged with installing meters is adequately reimbursed for the cost of capital, and provided a return on capital if those meters are to remain in the ownership of that party. The cost of managing and maintaining that meter must also be recognised.

As noted in the *Draft Report*, the degree of elasticity of electricity demand to price is not well understood. The degree of response to price signals will significantly affect the economics of any rollout. Managed trials of interval meters (including interval meters with real-time communications) with time of use tariffs across a number of customer groups to ascertain the level of demand response that can be expected given differing price signals and the costs and benefits of meters may be appropriate before widespread utilisation of this technology. The ENA notes that such trials are currently underway in a number of jurisdictions.

Energy Networks Association
27 May 2005

**ATTACHMENT A**

## Demand Management opportunities and financial flows

| Activity | Investor | Purpose | Money flow | Secondary beneficiaries | Potential disadvantage | Outcome |
|---|---|---|---|---|---|---|
| Energy efficiency | Energy user/ government scheme | Lower energy costs, environmental outcomes | User to energy efficiency consultant or product/appliance supplier<br>Government to energy user | DB – if energy reduction occurred at times or sites of peak network constraint (dilute)<br><br>Retailer – if energy reduction occurred at times of peak market prices (dilute) | DB – reduction of revenue if regulated under price cap<br><br>Retailer – loss of sales volume | User may not be able to benefit from the full value of EE investment for DB and retailer<br><br>DB and retailer may lose opportunity to manage augmentation and energy costs through contracts |
| | DB (costs can be shared with user) | Address network constraint (offset augmentation) | DB to User – Supply of efficient products/appliances (shared) | Energy user – lower energy and network costs<br><br>Retailer – if energy reduction occurred at times of peak market prices (dilute) | DB – reduction of revenue if regulated under price cap; ability to recoup cost of investment under regulatory regime<br><br>Retailer – loss of sales volume | Benefits of energy efficiency project shared between user and DB – may be uneconomic as neither is rewarded sufficiently for investment/risk |
| | Retailer (costs can be shared with user) | Smooth demand curve/lower wholesale energy purchase costs; possible greenhouse credits (jurisdictionally based) | Retailer to User – supply of efficient products/appliances (shared)<br>Generator to Retailer – greenhouse credit payment | User – lower energy and network costs<br><br>DB – if energy reduction occurred at times of peak network constraint (dilute) | DB – reduction of revenue if regulated under price cap<br><br>Retailer – loss of sales volume | Benefits of energy efficiency project shared between user and retailer – may be uneconomic as neither is rewarded sufficiently for investment/risk |
| Controllable load (reduce or turn off load) at peak times | Aggregator and user | Source demand side for sale to retailers (or other) in parcel | Aggregator to user – supply of efficient products/appliances (shared); callable demand side response contract payments<br><br>Retailer to Aggregator – purchase of aggregated demand side | DB – if energy reduction occurred at times of peak network constraint | DB – reduction of revenue if regulated under price cap; loss of opportunity to contract demand side to manage network constraint.<br><br>Retailer – loss of sales volume | Benefits of project shared between user, aggregator and retailer - may be uneconomic as none are rewarded sufficiently for investment/risk |

| | | | | | | |
|---|---|---|---|---|---|---|
| | DB and user (shared) | Address network constraint (offset augmentation) | DB to user – supply of controllable load technology (shared); network support payments | Energy users – lower energy and network costs<br><br>Retailer – if energy reduction occurred at times of peak market prices (dilute) | DB – reduction of revenue if regulated under price cap<br><br>Retailer – loss of sales volume; loss of opportunity to contract demand side for market response | Benefits of project shared between user and DB – may be uneconomic as neither are rewarded sufficiently for investment/risk |
| | Retailer and user (shared) | Smooth demand curve/lower wholesale energy purchase costs | Retailer to user (shared); callable demand side response contract payments | DB – if energy reduction occurred at times of peak network constraint<br><br>User – lower energy and network costs; demand side contract payments | DB – reduction of revenue if regulated under price cap; loss of opportunity to contract demand side to manage network constraint. | Benefits of project shared between user and retailer – may be uneconomic as neither is rewarded sufficiently for investment/risk |
| Network tariff measures | DB in interval meters | Encourage energy efficiency or load shifting | User pays more or less in network tariffs depending on time and volume of use | DB – if energy reduction occurred at times of peak network constraint<br><br>Retailer – if energy reduction occurred at times of peak market prices (dilute)<br><br>User – lower energy network costs if good demand profile. | Users – could end up paying more for energy if time of use not discretionary<br><br>DB – reduction of revenue if regulated under price cap<br><br>Retailer – loss of sales volume | Unclear. Significant investment in infrastructure that may not lead to decrease in peak demand, depending on the strength of price signal. |
| Power factor correction | DB on network | Improve efficiency of network through greater capacity | DB to supplier of power factor correction equipment | DB – better asset utilisation without contract costs.<br><br>User – lower energy and network costs | DB – reduction of revenue if regulated under price cap | DB may not be able to benefit from full value of power factor correction for the retailer and user – may be uneconomic as neither is rewarded sufficiently for investment/risk |
| | User | Improve energy use efficiency on site | User to supplier of power factor correction equipment | User – may be able to access cheaper tariff based on good power factor on site<br><br>DB – better asset utilisation without contract costs. | DB – reduction of revenue if regulated under price cap | DB may not be able to benefit from full value of power factor correction for the retailer and DB – may be uneconomic as neither is rewarded sufficiently for investment/risk |

| | | | | | | |
|---|---|---|---|---|---|---|
| Embedded generation | Generator | Sale of energy to grid/retailer/user | Energy purchaser to generator | DB – if energy reduction occurred at times of peak network constraint<br><br>User – energy security, reduced energy and network costs (if generator operated at peak times)<br><br>Retailer – if energy reduction occurred at times of peak market prices (dilute) | DB – reduction of revenue if regulated under price cap; loss of opportunity to contract to manage network constraint.<br><br>Retailer – loss of sales volume; loss of opportunity to contract for market response | Generator relies on value of energy sold to market – lack of other contracts for network support may make project uneconomic |
| | User | Augment on-site energy use | User to supplier of generation unit | DB – if energy reduction occurred at times of peak network constraint<br><br>Retailer – if energy reduction occurred at times of peak market prices (dilute) | DB – reduction of revenue if regulated under price cap; loss of opportunity to contract to manage network constraint.<br><br>Retailer – loss of sales volume; loss of opportunity to contract for market response | User must recover costs of investment – may not be able to generate at cost below network cost without contracting |
| | Retailer | Augment wholesale energy purchases/ smooth demand curve; provide a “natural hedge” | Retailer to supplier of generation unit | DB – if energy reduction occurred at times of peak network constraint<br><br>User – energy security, reduced energy and network costs (if generator operated at peak times) | DB – reduction of revenue if regulated under price cap; loss of opportunity to contract to manage network constraint. | Retailer must recover costs of investment through the NEM |
| | DB – direct investment or through tender/contract | Address network constraint (offset augmentation) | DB to Generator in form of network support contract | User – network support payments, energy security, reduced energy costs (if generator operated at peak times)<br><br>Retailer – if energy reduction occurred at times of peak market prices (dilute) | DB – reduction of revenue if regulated under price cap; ability to recoup cost of investment under regulatory regime<br><br>Retailer – loss of sales volume; loss of opportunity to contract for market response | Benefits of generation project shared between user and DB – may be uneconomic as neither is rewarded sufficiently for investment/risk |