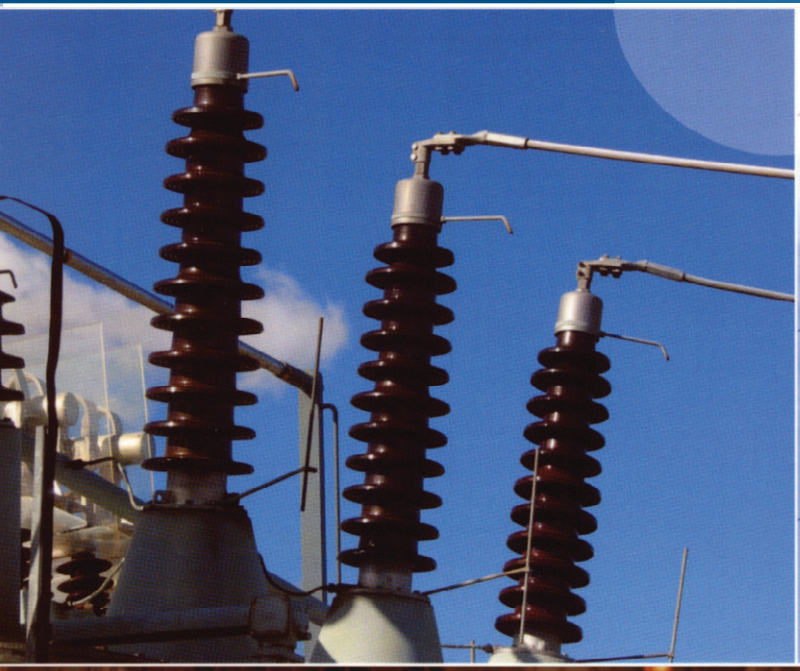
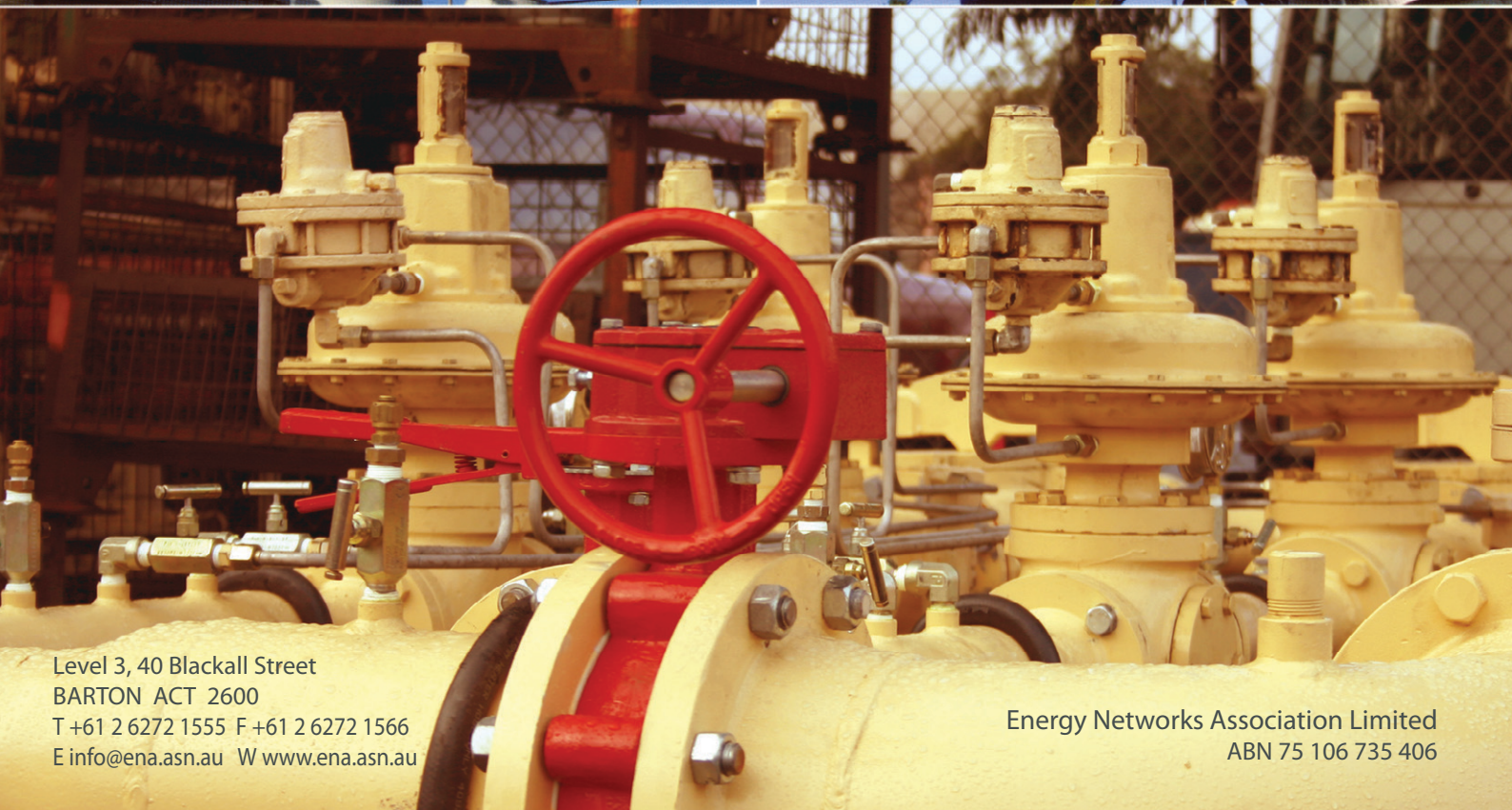
energy networks association

Demand Management Regulatory & Policy Framework

February 2008





Level 3, 40 Blackall Street
BARTON ACT 2600
T +61 2 6272 1555 F +61 2 6272 1566
E info@ena.asn.au W www.ena.asn.au

Energy Networks Association Limited
ABN 75 106 735 406

MESSAGE FROM ENA CHAIRMAN

The energy needs of the Australian community are changing. Our technology-driven society expects excellent reliability standards, high quality power, and adequate energy capacity to enable customers to use comfort appliances where and when they want.

At the same time, there are concerns in the Australian community about the level and growth of electricity consumption. Primarily, these concerns relate to the level of greenhouse gas emissions that are associated with our energy use, as well as the capacity of existing infrastructure to sustain peak demand without additional costs to the consumer. A balance must be struck between the costs to the community of increasing energy demand, and the desire to maintain and improve the lifestyle enabled by Australia's sustained prosperity, and the economic benefits brought by the continued low cost and unfettered use of energy delivered with high reliability.

Alternative energy delivery strategies such as demand management and embedded generation, as well as enabling technologies such as smart meters, have the potential to deliver this balance.

This *ENA Demand Management Policy 2008* has been developed over a period of 12 months and reflects the extensive knowledge and experience held in many of the network businesses through dealing with demand management issues. ENA member companies are the leading experts in Australia in the area of demand management, particularly as it applies to managing networks.

In 2008 electricity network businesses, through their direct connection to consumers, are in a unique position to identify and implement demand management opportunities providing the policy and regulatory frameworks do not act as barriers to investment in non-network options. Given these requirements, ENA has produced 26 recommendations (see Attachment A) based on a considered assessment of the issues and approaches to demand management solutions.

This paper identifies a need for a more balanced policy and regulatory approach to ensure that Australia realises the full benefits that are potentially obtainable from demand side options. ENA believes that by using this approach, Australia's electricity sector can improve the performance of network assets through the better management of peak load customer demand. In addition there would be benefits arising from lower energy use including a reduced need for electricity generation and network infrastructure, and consequently lower greenhouse gas emissions.

The paper also draws attention to a number of existing barriers and impediments that need to be overcome before these advantages can be realised. The recommendations outlined in the paper are aimed at achieving a balanced policy and regulatory approach to network demand management.

ENA believes there is a strong case to put in place positive incentives for demand management to assist in the development of this industry, build expertise in Australia, and advance demand management as an alternative to network infrastructure options.

ENA commends this policy to all energy stakeholders and welcomes your feedback.

George Maltabarow | **ENA Chairman |** January 2008.

CONTENTS

OVERVIEW

Demand management and the role of network businesses

Demand management activities seek to influence the patterns of energy consumption including the amount and rate of energy used, the timing of energy use and the source and location of energy supply.

This policy paper is focused on network-driven demand management, which aims to slow the growth of peak energy demand with a view to improving the utilisation of network assets, deliver savings to customers and increasing service reliability. The paper outlines issues surrounding the increased use of network demand management by distribution businesses and makes a number of policy and regulatory recommendations on ways to address these issues.

Electricity network businesses, through their direct connection to the customer, are in a unique position in the electricity market to identify demand management opportunities and deliver successful demand management programmes and approaches. These programmes can deliver value to individuals, and the whole community through decreased investment in generation and network infrastructure, lower energy prices, and potentially lower greenhouse gas emissions.

The integration of demand management into mainstream energy supply and network planning is progressing to put demand management on an equal footing with established infrastructure-based approaches to energy supply. However, reform of policy and regulatory action is needed to advance demand management in four key areas which are:

1. Network demand management

A long term policy commitment, backed by market and regulatory reform, would give network businesses confidence to support demand management research, commit to significant investment, and build capacity and understanding amongst end users, without the risk of stranding that effort and investment as a result of regulatory or policy change. Policies must be appropriately targeted at addressing the issues and barriers facing network businesses in pursuing demand management. These barriers include persistent price distortions faced by end users, the disaggregated structure of the energy supply chain, the risk/reward imbalances created by demand management uncertainty, and lack of customer information. In this context ENA welcomes incentive schemes such as the current NSW "D-factor" incentive scheme which permits the recovery of demand management costs where they can be related to the deferral of actual network expenditures relating to specific network constraints.

Policy-makers must also be clear about the outcomes that are sought from reform, which can have a relatively narrow focus on network capital investment efficiency, or can encompass supply chain wide efficiency or broader community benefits.

2. Economic regulation

In many cases, the current economic regulatory regime discourages network businesses from using demand management to moderate growing peak demand by customers, resulting in poor utilisation of network assets in some instances. To promote more efficient utilisation of assets a more neutral regulatory framework should be developed so that demand management options can compete with network-building options on an equal basis.

Changes in the regulations would need to address; the relative incentives embedded in the regulatory regime for capital and operating expenditure, the increased risks posed by the effective *ex poste* consideration of demand management expenditure, the foregone revenue risks where networks are regulated under a price cap, and the extent to which network businesses can access efficiency benefits.

3. Network planning and reliability

The approach to network planning, as well as uncertainty over the reliability of non-network elements for use in network planning, can act as barriers to the full adoption of demand management alternatives. Strong regulatory incentives for reliability of networks can also act as a barrier where demand management options lack the "firmness" in response compared to network build options, or where reliability of "firmness" characteristics are unknown.

Approaches to address these issues include allowing greater scope for network businesses to undertake pilots and trials, and support for research and development, to build knowledge and understanding in how to integrate demand management into everyday network planning and development. The regulatory regime can also assist demand management by ensuring that the relative incentives for demand management are considered in the development of reliability incentive schemes.

4. Improving information and understanding

There are many ways that community understanding of peak electricity demand can be improved. These can include direct campaigns to increase customer awareness and understanding, but also education programmes for service providers such as tradespeople, builders and designers. Further, appliance manufacturers and retailers could be better informed of the contribution appliances may make to peak load growth. Education programmes on the balance between price, service and demand can assist in improving community understanding of the reasons behind demand management programmes and the benefits available for customers in taking part in these programmes. This is a potential role for governments.

Policies and approaches to enable network businesses to capitalise on their experience, like those mentioned above for network planning, will also assist in integrating demand management options into energy supply planning and development.

Areas of policy intersection and implementation issues

Demand management policy and regulatory reform cannot be conducted in isolation of other energy market developments. Key areas of policy intersection include electricity retail price regulation, provision of advanced metering, and energy efficiency and greenhouse initiatives. Integrated policy development in all of these areas can assist in removing barriers for network demand management.

The recommendations outlined in the policy are directed at achieving a balanced policy and regulatory approach to network demand management, by removing policy and regulatory barriers. There may be a case, however, to put in place positive incentives for demand management to assist in the development of this industry, build expertise in Australia, and advance demand management as an alternative to network infrastructure options. This will ultimately be a decision for governments, based on policy priorities for the future direction for the electricity market.

POLICY STRUCTURE AND BACKGROUND

This policy paper outlines issues surrounding the increased use of network demand management by distribution businesses, and makes a number of policy and regulatory recommendations on ways to address these issues.

Structure of policy paper

The policy paper is divided into eight sections.

Section 1 introduces some of the issues surrounding energy supply that have led to the development of this demand management policy, and the role of distribution businesses in demand management.

Section 2 provides an overview of demand management, including a description of the different types of demand management, and outlines the potential scope for demand-side approaches and initiatives to address average and peak load growth.

Section 3 marks the start of the analysis of particular problems and issues facing network businesses when they pursue demand management. The section focuses on policy issues.

Section 4 explores economic regulatory issues that influence network demand management incentives.

Section 5 looks at network planning and reliability issues and approaches to resolve the significant barriers that can emerge.

Section 6 focuses on approaches and policies that will improve information and understanding of demand management amongst network businesses, customers and the market.

Section 7 outlines some areas of intersection with other government policy objectives.

Section 8 sets out an implementation plan for the ENA demand management policy and regulatory approaches set out in this paper.

Attachment A to this document contains a summary table of recommendations made in this ENA policy paper.

Attachment B is an overview of the current policy and regulatory environment for demand management in Australia.

Energy Networks Association

Energy Networks Association (ENA) is the national representative body for gas and electricity distribution network businesses. Energy network businesses deliver electricity and gas to over 12 million homes and businesses 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 $35 billion, and each year energy network businesses undertake capital investment of more than $5 billion in network reinforcement, expansions and extensions.

ENA distribution-sector member businesses include:

- ActewAGL
- Alinta
- Aurora Energy
- Citipower
- Country Energy
- ENERGEX
- EnergyAustralia
- Envestra
- Ergon Energy
- ETSA Utilities
- Horizon Power
- Integral Energy
- Multinet Gas
- NT Power and Water Corporation
- Powercor
- SP Ausnet
- United Energy Distribution
- Western Power

This policy was developed by the members of ENA, and represents a distribution-sector wide policy position.

1. INTRODUCTION

Australia's energy needs

The energy needs of the Australian community are changing. Our technology-driven society expects high power quality, excellent reliability, and adequate energy reserves to use comfort appliances such as air conditioners and pool pumps where and when customers want.

At the same time, there are concerns in the Australian community about the level and growth of electricity consumption. Primarily, these concerns relate to the level of greenhouse gas emissions that are associated with energy use, and the direct costs borne by the community from increasing energy consumption and demand growth.

Growth in peak demand in particular leads to the need to invest in new electricity generation infrastructure and network augmentation. This increased investment means higher costs for energy services for households and businesses, as well as increased greenhouse gas emissions from generation.

A balance must be struck between the costs to the community of increasing energy demand, and the desire to maintain and improve the lifestyle enabled by Australia's sustained prosperity, and the economic benefits brought by the continued low cost and unfettered use of energy delivered with high reliability.

Alternative energy delivery strategies such as demand management have the potential to deliver this balance. Achieving the benefits of demand management, however, will require policy, regulatory and market change.

What is demand management?

Demand management describes approaches, technologies and programmes aimed at changing the pattern of energy use, which may include energy demand reduction.

There are a number of ways that energy demand can be influenced, either through direct actions by the customer or through actions by distribution businesses, retailers, traders or aggregators working with a customer or a group of customers.

Demand management approaches and technologies include:

- Load management measures such as:
    - Interruptability or curtailability arrangements
    - Load-shifting technologies
    - Direct load control
- Peak or demand tariffs with appropriate metering options
- Distributed generation
- Power factor correction
- Capacity limitation
- Energy efficiency
- Fuel substitution.

These options can reduce overall energy demand, or shift energy use to different time periods or to alternative fuel sources. Collectively, the potential stock of energy that can be managed through demand management is referred to in this paper as demand-side resources.

Demand management from ENA's perspective is defined as:

Activities that seek to influence the patterns of energy consumption including the amount and rate of energy used, the timing of energy use and the source and location of energy supply.

Supporting demand management

The integration of demand management into mainstream energy supply and network planning can deliver positive outcomes for national energy policy. In particular, demand management can deliver benefits along the entire energy supply chain, not only deferring the need to build network infrastructure, but also reduce generation requirements, transmission investment, and potentially energy prices.

Demand management programs involve identifying customer energy demand reducing initiatives and assisting customer implementation of those initiatives through education, financial and other assistance. In general, network providers have found that demand management initiatives with short payback periods may be implemented by customers but that those with initiatives involving long pay back periods tend to be rejected. Any mechanism that assists customers with the implementation of initiatives, such as interest free loans, can significantly increase the successful implementation of demand management activity.

Positive action is needed to advance demand management to bring it on at least an equal footing to established infrastructure-based approaches to energy supply. A new way of thinking must emerge to transform the energy sector and integrate the customer into energy supply for the benefit of Australia.

Role of network businesses in demand management

The changes required to facilitate integration of demand side strategies into the energy market will require more efficient price signalling. This is an important step, but alone is not sufficient to deliver efficient demand management.

Efficient energy prices give customers the incentive to act, but not necessarily the opportunity to access the highest value that their demand response can achieve. Even with the introduction of advanced metering technologies and time of use pricing, these prices will only reflect the long term average cost of supply. It is not appropriate to reflect the cost of location-specific and sometimes transient network and generation constraints that can drive demand management.

Electricity distribution businesses are in a unique position in the electricity market to identify demand management opportunities and deliver successful demand management programmes and approaches as distribution businesses have:

- a direct physical connection to almost every customer, and
- a contractual relationship with every customer.

Network-driven demand management also delivers transmission investment benefits and can provide wholesale market benefits to both generators and retailers as well as verifiable environmental benefits.

Electricity network businesses, through their direct connection to the customer, can play an important role in identifying demand management opportunities, and aggregating customer response to deliver value to individuals, as well as to the whole community, through decreased investment in generation and network infrastructure, lower energy prices, potentially lower greenhouse gas emissions and reduced environmental footprint.

Accordingly, if the regulatory framework is supportive, distributors can lead the electricity supply industry and the community in delivering on the stated Council of Australian Governments (COAG) aim to better integrate the customer into the energy market.

Why does Australia need a specific policy for network demand management?

Network businesses are regulated for price and service. This means that appropriate levels of service and efficient investment are determined by an economic regulator, either directly, or through incentives.

The model of regulation, as well as businesses' responses to the incentives offered, has built up through experience. This experience has mainly been based on investment in poles and wires-type infrastructure. This type of infrastructure has well understood reliability characteristics, standardised installation procedures, and, in many cases, procurement costs determined by internationally competitive markets. This has in turn influenced the regulatory approach which largely links improved reliability with increases in capital expenditure.

Incentives for network businesses to pursue the most efficient options to deliver regulatory requirements like service reliability are part of the fundamental regulatory structure. Central to these incentives is the *ex ante* regulatory approach, which allows network businesses to retain for a period the benefits arising from any efficiencies in capital expenditure achieved while meeting regulatory requirements. This approach is considered to offer sufficient incentives such as not to require *ex poste* prudency review of expenditure. This regulatory approach has proved successful and has delivered considerable capital efficiency benefits to customers.

The approach is centred, however, on the assumption that achieving efficiency involves choosing the least cost option between alternatives with similar, and known, reliability characteristics, or optimising reliability and efficiency, in line with the incentives offered through the regulatory regime. The system falls down when the response characteristics or "firmness" of an alternative, potentially cheaper non-network option is unknown, as the optimisation calculation between price and reliability cannot be made. This is often the case with demand management projects.

Therefore the adoption of demand-side opportunities is often not a straight forward case of economic efficiency. Demand management creates response uncertainty, adding to the risks and costs of non-network options. Specific policy and regulatory approaches are needed to manage and reduce this uncertainty, to bring demand side options into mainstream network planning, development and energy delivery. Over time, some areas of uncertainty are expected to decrease, and with them the case for some specific regulatory and policy approaches.

2. ABOUT DEMAND MANAGEMENT

Demand management objectives

Demand management activities can be directed towards three different objectives. These are network, retail and environment-driven demand management activities.

Network-driven demand management

This policy is focused on network-driven demand management. Network-driven demand management is principally directed at achieving two aims:

1. Deferring or occasionally entirely avoiding the need to invest in network infrastructure.

Network-driven demand management can mitigate the need to invest in generation and network infrastructure by slowing the growth of peak demand. This leads to lower energy delivery costs in the medium to long term, though it is unlikely to completely defer the need to invest in the network. Figure 1 shows the ETSA Utilities forecast load duration curve for 2006/07. This graph shows that the top 30% of load occurs for less than 2% of the year. Reducing this peak demand by even a small amount could deliver significant savings to energy customers, by delaying the timing of the need for investment in expanded capacity.

ETSA System Load Duration Curve – Forecast 2006/07

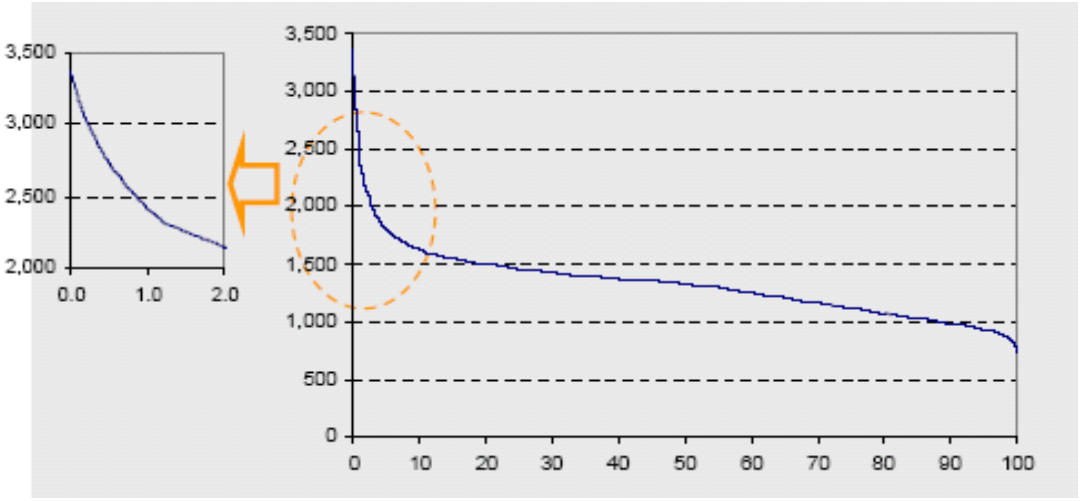


Figure 1:ETSA Utilities forecast Load Duration Curve

The value of this deferral derives from the net present value of that deferred network expenditure. This value is principally influenced by the regulatory regime applying to the network business.

2. Improving system-wide reliability.

Demand management projects, depending on their risk/reliability characteristics, can be used to improve reliability by reducing the amount of load at risk on days of peak electricity demand. This reduces the risk of loss of supply due to generation shortages and network outages, thereby reducing the cost to the community of blackouts arising from peak electricity demand. These approaches may be useful in situations where workforce, supply or capital restrictions mean that network augmentation does not occur when it might otherwise have been undertaken.

Network management is about delivering the right solutions at the right place at the right time. The same applies to network-driven demand management.

The two aims described above are of course related, and they are significantly influenced by the types of incentives for demand management that are available. This issue is considered further in the following sections of this paper.

Retail-driven demand management

Retail-driven demand management is directed at responding to wholesale market or price imperatives. This type of demand management can deliver lower electricity prices through deployment of demand-side response during high price events, as well as a more predictable energy supply curve reducing the demand for high cost peak electricity supply contracts.

Environment-driven demand management

Environment-driven demand management is directed at reducing overall electricity demand for environmental purposes. Energy efficiency is an example of this type of demand management, as is using low or zero emission generation technologies such as photo voltaics, in place of higher emission technologies like coal fired generation.

Relationship between types of demand management objectives

The types of demand management objectives described above have a certain degree of overlap, as shown in Figure 2. For example, price based approaches such as peak or demand tariffs offered through interval meters can significantly contribute to *retail* demand management objectives by aligning the prices customers face more closely with the costs of supplying energy at particular times during the day. This can reduce energy contracting costs and risks faced by retail businesses. In addition, time-of-use tariff approaches have led to small but significant energy efficiency benefits as customers reduce their overall energy use in response to price signals. This contributes to environment-driven demand management.

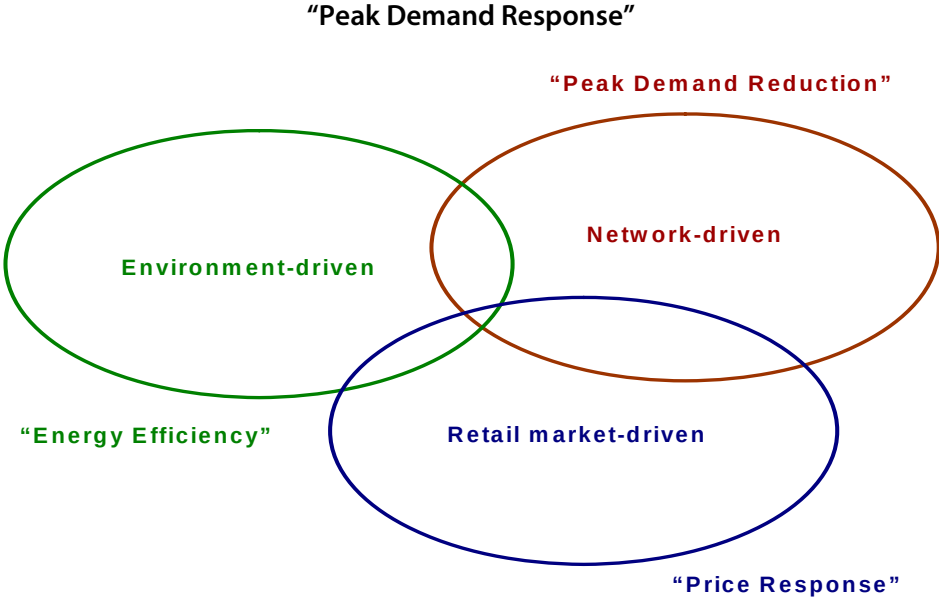


Figure 2: Relationship between demand management objectives

This overlap in objectives between the different types of demand management is not perfect. For example, network-driven demand management initiatives directed at peak demand reduction can include efforts to shift rather than reduce load, which may have no net positive environmental benefit.

Similarly, high wholesale market price events do not always correlate with peak network demand. Figure 3 charts 2006/07 highest demand days in New South Wales in summer and winter with the highest electricity price days. These often do not fall on the same day. This means that price based approaches *alone*, may offer only modest benefits to network businesses trying to achieve network demand management because price based responses rely on electricity retailers and customers acting in response to price signals. This voluntary approach may produce changes in behaviour on days of normal weather, but this response may be less reliable when weather conditions are extreme. Other options such as direct load control and customer education may provide for better outcomes.

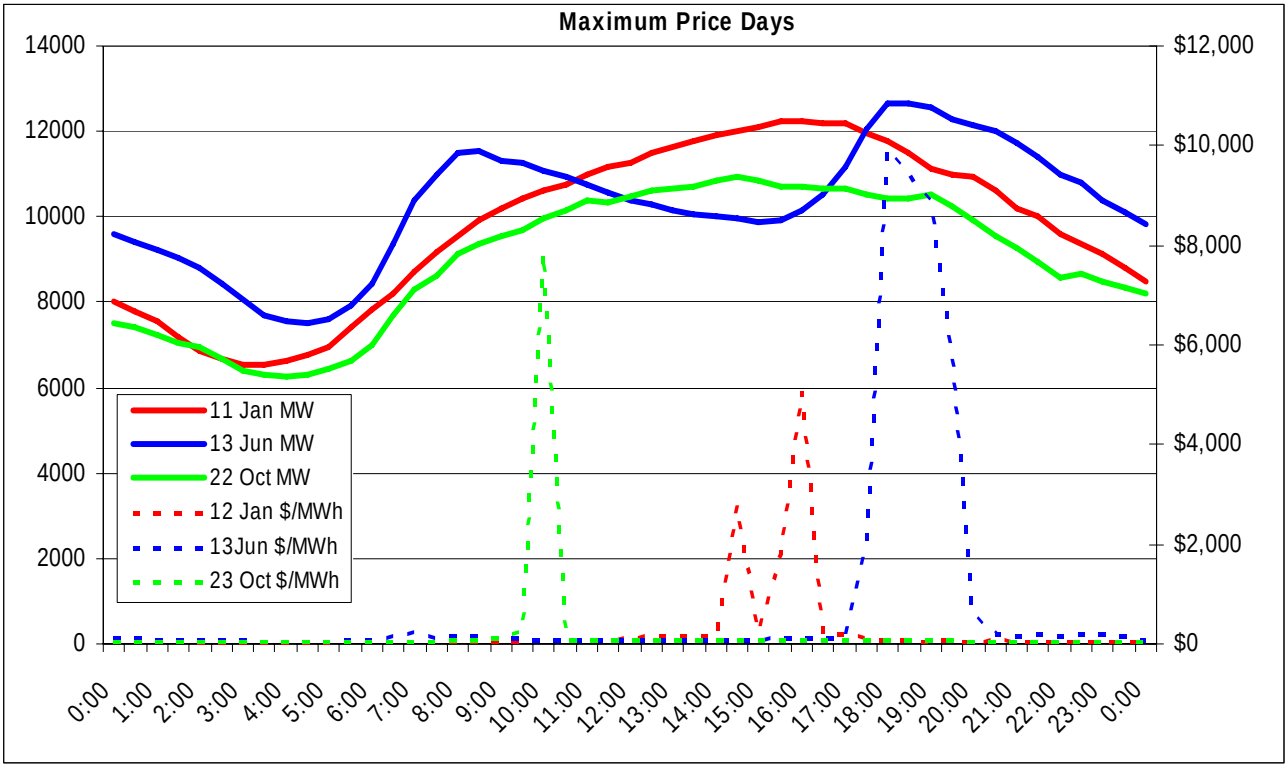


Figure 3: Comparison of maximum demand days to maximum price days in NSW

Different demand management approaches and technologies may also be more appropriate to one type of demand management than another. Network demand management requires a high degree of "firmness" of peak reduction to ensure that system security is not jeopardised through the reliance on demand side resources. Approaches suitable for network demand management typically have an automated element, such as power factor correction equipment installed by the distribution business, or direct load control and load cycling which is controlled by the distributor.

3. NETWORK DEMAND MANAGEMENT

Need for demand management policy

Electricity market reforms to date have focused on supply-side issues, introducing generator competition, regulated access to network infrastructure, and retail contestability. While these reforms may have delivered significant benefits to customers, many have had the unintended effects of concentrating attention on supply-side issues at the expense of the development of demand-side resources, or removing incentives for businesses to secure and utilise demand-side resources.

Policy and regulatory reform is needed to support the wider use of demand management, and in particular, change the systemic barriers to network demand management faced by distribution businesses. There are a number of important parties to delivering this regulatory reform. Governments, in particular through the Ministerial Council on Energy, must set the overall policy framework and direction for the energy market. The Australian Energy Market Commission (AEMC) will have a role in developing the market and regulatory rules that will govern many of the incentives that face network businesses. The Australian Energy Regulator (AER) will make the regulatory decisions that fundamentally influence how network businesses utilise demand management as part of delivering a safe and secure energy supply to all Australians.

Equally important are the network businesses, who must continue to build their understanding and capabilities in demand management, which will influence the way these businesses operate. Perhaps most important are the customers, who, empowered with knowledge, will drive the development of demand management by taking hold of the opportunities offered through demand management, and benefit from the value of their demand flexibility.

Importance of a long term policy commitment to demand management

In recent times, policy and regulatory attention has shifted towards electricity demand-side issues. This policy attention has led the Council of Australian Governments to agree in February 2006 to "establish effective demand-side response mechanisms in the electricity market, including network owner incentives, effectively valuing demand-side responses, regulation and pricing of distribution and embedded generation, and end user education".

There is potential for this commitment to lead to the establishment of arguably the most important element of any demand management policy and regulatory approach - a long term policy and regulatory commitment to support the development and utilisation of demand-side resources.

A long term policy commitment, backed by market and regulatory reform, would give network businesses confidence to support demand management research, commit to significant investment, and build capacity and understanding amongst end users, without the risk of stranding that effort and investment as a result of regulatory or policy change. Essential elements of this commitment include:

- Political and regulatory acceptance of demand management approaches as acceptable alternatives to network build options, and the essential role of network businesses in providing network demand management

- Political and regulatory understanding of the barriers facing network businesses in adopting demand management approaches, and acceptance of the breadth of the task required to address these barriers, and

- Regulatory and policy change to support the development of demand-side resources, removing unnecessary and inefficient financial, policy and regulatory hurdles to the increased investment in demand management as a legitimate alternative to investment in supply side infrastructure, and as a tool to deliver significant environment benefits.

This policy approach should be focused on addressing the long term causes of load growth, and have a clear objective that recognises the three types of demand management, and the different benefits they bring. It is also essential that the policy approaches adopted include recognition that no single technology or policy approach will deliver all the potential benefits that can be derived from demand management.

It is important that the policy and regulatory framework for demand management does not attempt to pick technology winners, but instead seeks to change the incentive, cost and risk structures currently embodied in energy market and regulatory approaches that favour supply-side investment at the expense of demand-side alternatives. Mechanisms adopted to support policies should focus on reducing the uncertainty and risks faced by network businesses and demand-side proponents in undertaking demand-side projects. Changing incentives and removing barriers will allow the market to adopt new demand side technologies and approaches that benefit customers, and bring balance to the energy supply/demand equation. Appropriate regulatory and market development mechanisms are discussed further in sections 4, 5, and 6 of this policy paper.

Recommendation 1

The Ministerial Council on Energy commit to adopting policy and regulatory approaches to support the development of the skills and capabilities of network businesses to pursue network demand management options.

Recommendation 2

The Ministerial Council on Energy commit to implementing the reforms necessary to deliver a balanced policy and regulatory framework that allows network businesses to adopt efficient network and non-network options on an equal basis.

Appropriate targeting of policies to support network demand management

As outlined in Section 2 of this paper, there are three possible demand management objectives; network, retail and environmental. It is critically important to identify which demand management objective a particular policy approach is seeking to encourage, as well as the market and regulatory factors that influence businesses in pursuing those approaches, and target policies and incentives to address specific issues. Poorly directed or confused policy objectives can lead to poor policy design and misdirected incentives. This can particularly be the case where demand management approaches and technologies are not well matched to the types of demand management objectives sought.

A policy and regulatory approach that seeks to encourage network demand management must consider and address the specific market and regulatory conditions under which network businesses operate.

Network businesses, like all businesses, have a fiduciary obligation to maximise possible returns to investors within the applicable policy and regulatory regime. Network businesses operate under a regulatory regime that uses incentives to maximise the efficiency of network investment, while at the same time providing incentives to maintain or improve network reliability. Network investment, including any investment in demand side resources, must fit within the potentially competing regulatory objectives of cost minimisation and network reliability.

The regulated operating environment is largely unique to network businesses, and means that investment decisions largely rely on the prevailing regulatory framework and the attitude and approach of the regulator in applying that framework. Network businesses are not "at large" to take advantage of potentially risky demand management options, build markets, or lead the industry, unless they have support from the legal framework, shareholders and the regulator.

Approaches intended to encourage network demand management must therefore address regulatory structural issues that act as barriers, and seek to balance demand management policy aims against the other obligations on network businesses by:

- Ensuring regulatory return is appropriate where network businesses pursue demand management approaches
- Managing the regulatory risk faced by network businesses in pursuing demand management
- Ensuring the regulatory regime appropriately balances competing objectives, and
- Providing clear guidance as to the expectations of governments on the behaviour and approaches of the regulator and businesses.

Practical mechanisms to deliver these outcomes are highlighted in the following sub-sections.

Recommendation 3

The policy and regulatory framework must balance demand management objectives against other obligations on network businesses by:

- *ensuring regulatory return is appropriate where network businesses pursue demand management approaches*
- *managing the regulatory risk faced by network businesses in pursuing demand management*
- *ensuring the regulatory regime appropriately balances competing objectives*
- *providing clear guidance as to the expectations of governments on the behaviour and approaches of the regulator and businesses.*

Constraint-specific versus broad-based network demand management

Network demand management approaches can be categorised into constraint-specific and broad-based approaches.

Constraint-specific approaches

These approaches focus on managing risk or deferring investment at a specific network constraint. The calculation of benefits of this approach involves the deferral and avoidance of a specific investment proposal as a result of a demand management action that influences the pattern or level of electricity demand at that site. The demand management action is pursued where it costs less than the net present value of the network augmentation. The net present value is influenced by regulatory mechanisms such as cost and revenue recovery, and the influence of reliability incentives.

In the absence of mechanisms to balance the value of non-network (usually operational expenditure) options against network (usually capital investment) options in the regulatory framework, non-network options face additional cost barriers and may not deliver sufficient benefits to the network businesses to justify the project, compared to the costs of network options.

One option for addressing specific network constraints is the "D factor" approach. The D-factor regulatory approach[1] currently operating in New South Wales is weighted towards constraint-specific demand management projects as it only allows the recovery of network investment up to the identified value of deferred network expenditure. This means that to recover costs through the D-factor, the demand management investment must be linked to the deferral of actual network expenditure. This approach effectively limits the application of the D-factor to demand management projects directed at specific, local network constraints.

Broad based network management

The second approach involves investment in broad-based demand management capabilities in the community, which may not be directed to specific network constraints, but can be used to address constraints as they emerge over time.

Longer term investment in broad-based demand management capacity can assist in managing overall load growth, as well as ensuring that a ready demand-response resource is available to meet short term constraints. An example of this approach may be incorporating demand management signalling and switching capabilities into air conditioners and other high energy use appliances, as well as investing in communications facilities to switch these appliances on a broad scale. This available capacity (backed by agreements with customers on the use of this capacity) could provide long term benefits in capital deferment and network reliability, without the initial investment in the capacity being targeted at addressing a specific network constraint. A similar latent capacity currently exists with respect to hot water load control, which is delivering benefits beyond those expected at the time of initial investment in the load control infrastructure.

[1] The D-factor is described in Attachment B to this paper.

The estimation of benefits of this approach is less predicable than constraint-specific approaches, as the decision to invest in non-network capacity cannot be directly balanced against the expected benefits of deferral at the time of the investment. A positive aspect of investments in broad-based demand management capacity is that it can significantly increase demand management resources available in the community and also reduce the lead times required to mobilise demand response. This means that a broader set of demand problems, whether they be reliability or investment issues, can be managed through this type of capacity.

Assessment of broad-based demand management approaches is likely to be more challenging. The development of generic policy and regulatory mechanisms to support this type of investment is one alternative, another is to use a case-by-case approach with the support of policy makers and/or the economic regulator.

Broad-based demand management projects are likely to draw value from a variety of sources, delivering benefits across the energy supply chain. The implications of this are discussed in the following sub-section.

Efficient investment in demand management approaches targeted at specific as well as broad-based demand management can bring significant economic benefits. One approach that may in future provide some encouragement for network businesses to invest in broad based demand management activity is the Efficiency Benefit Sharing Scheme (EBSS) set out in recently amended National Electricity Rules (NER). The amended NER requires that the Australian Energy Regulator (AER) develop and publish a EBSS that provides for a fair sharing of efficiency gains and losses between network businesses and network users. As the distribution EBSS may be extended to capital expenditure it may provide an incentive to opt for demand management solutions. The AER however notes[2] that the EBSS is only one of a number of factors impacting on network businesses when considering demand side responses. Others include the availability of advanced meters, tariff structures, the form of price control and the regulatory methods for determining network business revenue requirements.

Recommendation 4

The Ministerial Council on Energy and the Australian Energy Regulator adopt specific policy and regulatory approaches to support efficient investment in both constraint-specific and broad-based network demand management.

Capture of supply-chain wide demand management benefits post the disaggregation of energy utilities

A key part of the competition reforms of the 1990s was the disaggregation of energy utilities into sectoral components. This led to the creation of separate generation and transmission businesses, as well as creation of distribution/retail businesses with ring-fencing requirements between regulated and market sectors. Since this time, ownership changes reflecting the relative risk characteristics of network and retail businesses have seen many of these businesses separate further, so that more than half of the network businesses operating in Australia today have no related retail interests.

[2] AER Issues Paper; "Guidelines, models & schemes for electricity distribution network service providers", November 2007.

The full disaggregation of electricity utilities has meant that the supply chain-wide business case for demand management projects has diminished. This has led to the loss or under-utilisation of a large amount of demand response capability in the market that was initially developed on the basis of a supply chain wide business case. Much of this demand response came from large customer curtailment contracts and controllable loads such as hot water. Similar trends in the loss of demand management capacity from disaggregation can be observed in other countries that have followed a similar liberalisation path to Australia.[3]

Aggressive economic regulation of network businesses has also limited network business demand management activities to projects that are cost effective to the network business alone, without taking account of potential benefits to other sectors, or wider societal or environmental effects.

While both disaggregation and economic regulation have delivered benefits to customers by managing the negative effects arising from the potential misuse of market power by natural monopolies, the loss of the supply-chain wide business case for demand management projects has led to higher infrastructure costs for customers than may otherwise have been appropriate with the use of demand management. By providing scope for the reintegration of potential benefits, through aggregation activities and wider economic justification of projects, some of this lost ground can be clawed back.

No single party in the supply chain has a clear motivation to manage demand growth, with the exception of the customer, where the customer experiences the true costs of supply. The customer, however, is likely to be poorly equipped, both in information and scope to offer significant demand responses, to effect change on a scale sufficient to influence infrastructure investment. The customer, without assistance from an aggregator, is also unlikely to be able to access the full value of their demand response potentially offered by demand management.

Investment in demand management capabilities that are intended to deliver (and are only justifiable through) supply-chain wide demand management benefits require a specific regulatory approach. Network investment of this type requires significant regulatory support, as no one party receives sufficient returns through the market or through efficiency benefits to justify the investment, even though the investment may deliver net economic benefits to the community as a whole. The decision to pursue such investment is likely to be made on a case by case basis, with the assistance and support of policy makers and the regulator.

Cost pass through mechanisms are likely to be the most appropriate approaches where there has been a policy decision to pursue these approaches. This is a regulated, "community service"- type approach, which would lead to distribution businesses providing demand management services on a commercial open access basis to other businesses and the community.

Recommendation 5

The Ministerial Council on Energy and the Australian Energy Regulator adopt specific policy and regulatory approaches that allow network businesses to aggregate demand response resources on a commercial open access basis to deliver potential network, retail and environmental demand management benefits.

[3] Federal Energy Regulatory Commission, *Assessment of Demand Response & Advanced Metering: Staff Report*, August 2006, pg. 10.

Recommendation 6

The Ministerial Council on Energy ensure that policy decisions to pursue specific demand-related outcomes (such as the rollout of smart meters) are supported by clear cost recovery mechanisms reflecting potential misalignment of costs and benefits accruing to another part of the supply chain.

Demand management as a risk management tool

The discussion above has focused on network demand management mainly targeted at deferring network expenditure. As noted in section 2, network demand can be targeted at improving reliability and reducing load at risk, thereby improving site-specific and system-wide reliability.

Where demand management option responses are well understood through experience of pilot studies demand side resources can be used to improve network reliability and **system latency** by reducing the amount of load at risk and providing contingent services. Demand management can also reduce load at risk in the lead up to an augmentation. There is therefore an important relationship between demand-side investment to deliver improved reliability, and incentives available under a specific service standard incentive regime.

While the value of demand management approaches in deferring network expenditure is fairly easy to identify and quantify, the **value of improved system latency** and reliability through demand management is less easy to quantify, particularly in the absence of an incentive based service standard regulatory regime. Demand management value is clear where it provides **lower cost system latency** required under planning regulations, but less clear where it **only offers a proportion of required system latency** and reduces the total amount of load at risk in the event of an outage. Therefore there is also an important relationship between network planning requirements and demand-side investment to deliver improved reliability.

It is important for the regulatory regime to recognise and accommodate the dual roles of network demand management in deferring network expenditure and management of network reliability risks. This is particularly important with respect to broad based demand management projects that offer significant potential for demand and risk management.

A possible mechanism to deliver this could be one that values demand-side investments that lead to a reduction in the amount of load at risk, even where that load risk is not reduced to zero.

Recommendation 7

The Ministerial Council on Energy and the Australian Energy Regulator adopt specific policy and regulatory approaches that recognise the contribution that specified network demand management options can make to system reliability.

Recommendation 8

The Australian Energy Regulator recognises and accommodates the interrelation between demand management policies and approaches, and those for reliability and network planning.

4. ECONOMIC REGULATION

Economic regulatory regime

The economic regulatory regime can have a significant impact on incentives faced by distribution businesses for pursuing network demand management. In many cases, the regulatory regime can give rise to significant disincentives for network businesses to look at demand-side approaches to manage risk and defer network investment. These disincentives arise where:

- Persistent distortions in retail prices mean that some customers will not face their real costs to supply, even with the introduction of advanced metering technologies
- There is uncertainty over the future regulatory approach for demand management, which undermines business confidence to research and invest in potentially long-term or capital intensive demand-side alternatives
- The full costs of demand management projects, including capital and operating costs associated with project establishment, project management, customer awareness and education programmes are not recognised by the regulator as part of the efficient costs of a demand management project
- Demand management capital and operating costs are treated differently (and inferior to) capital and operating costs associated with network infrastructure investment. There is ex poste recovery of costs associated with demand management
- Network businesses experience a reduction in revenue arising from a successful network demand management project because of decreased network energy throughput where they are regulated under a price cap, and
- Network businesses are not able to access the economic benefits from demand management projects, thereby removing incentives to pursue demand side options.

Ideally, policy-makers should address these issues by ensuring that the basic regime itself is balanced, and does not require add-on regulatory structures for demand management to correct distortions in the underlying regulatory structure. Unfortunately, the development of economic regulatory policy to adequately deal with this issue is still in its infancy. Until such a time when economic and regulatory theory catches up to community and business needs, specific mechanisms are required to address at least some of these disincentives that are embedded in the economic regulatory regimes facing most Australian electricity distribution businesses.[4]

To deliver these changes, the Ministerial Council on Energy should task the AEMC with developing an appropriate framework for demand management within the regulatory rules, particularly with regard to addressing economic disincentives faced by network businesses in pursuing demand management opportunities.

The following regulatory mechanisms and changes to the current approach to economic regulation are intended to assist in delivering a neutral regulatory regime towards the use of demand-side alternatives. Addressing these concerns can potentially increase the value of demand management for network businesses and customers, thereby increasing the potential pool of demand side resources in the market.

[4] Regulatory approaches like total factor productivity hold potential in this area, if some of the current informational barriers can be addressed.

Recommendation 9

Until such a time that the regulatory model evolves to adequately address demand management incentives as part of an integrated model, the Ministerial Council on Energy, Australian Energy Market Commission and the Australian Energy Regulator should adopt specific policies and mechanisms to support network demand management and remove or neutralise disincentives to demand management embedded in the current regulatory approach.

Recommendation 10

The Ministerial Council on Energy direct the Australian Energy Market Commission to conduct an in depth industry review of appropriate rules and economic regulatory mechanisms to support network demand management for possible future inclusion in the National Electricity Rules.

Full recognition of demand management capital and operating project costs

Demand management projects have many facets. They can involve significant capital costs, both in setting up projects, and in their ongoing maintenance. They can also include significant operating costs, going beyond contract costs (and payments) to demand management providers, to include investigation and research into suitable demand management options and project management and procurement costs.

Demand management projects that involve a large number of customers, for instance direct load control programmes for air conditioners, also require considerable consumer education and marketing in order to recruit suitable customers and satisfy customer information needs. Education and information programmes can be very costly, but are essential to the success of a demand management project seeking to recruit customers on a voluntary basis.

All of these aspects are important elements of a successful demand management project, and must be considered as part of the costs of that project. It is critically important that the regulator recognises these costs, and includes them as part of the efficient demand management costs incurred by a distribution business.

Recommendation 11

The Australian Energy Regulator recognise efficient demand management capital and operating costs incurred by distribution businesses as part of approved capital and operating expenditure.

Relative incentives for capital and operating expenditure

Demand management projects can involve significant substitution of operating expenditure for capital expenditure. This leads to disincentives to pursue demand management, as operating and capital costs are not treated equally under current economic regulatory regimes, leading to a potential disincentive to pursue demand management projects.

A balanced approach would require a mechanism to compensate businesses where operating costs replace capital costs. Any approach adopted could have far reaching impacts on the broad regulatory incentives faced by distribution businesses. It can also influence other factors such as accounting, taxation and regulatory reporting. The approach that is ultimately adopted to balance incentives for capital and operating efficiency requires careful regulatory policy consideration.

Recommendation 12

The Australian Energy Market Commission consider including in the National Electricity Rules appropriate mechanisms for balancing the differing economic incentives between capital and operating expenditure which influence network business decisions to pursue demand management options as an alternative to network augmentations.

Ex ante rather than *ex poste* consideration of costs associated with demand management

The economic regulatory regime allows any capital expenditure approved as part of the regulatory price determination to attract a return. At the end of each regulatory period, actual capital expenditure is rolled forward as the starting asset base for the new period.

This capital expenditure is not subject to *ex poste* prudency assessment, as network businesses face an incentive to minimise expenditure through the regulatory regime. Therefore, network businesses do not generally face optimisation risks of capital assets, except where those assets are made obsolete. This means that most investments in capital are assured of making a return (though the level of the return is subject to the risk that WACC parameters will change in future regulatory decisions). This widely accepted "ex ante" approach has been incorporated into the new *National Electricity Rules* for distribution regulation.

A balanced approach to network demand management requires a similar approach for capital and operating costs related to demand management projects. Such an approach may involve the regulatory regime including a mechanism to allow the recovery of costs related to demand management projects. This cost recovery approach would balance the risk exposure faced by businesses for network demand management compared to network investment, by ensuring that a prudent demand management project will recover its costs regardless of whether expected demand management efficiencies are achieved. This approach matches the reasonable expectation that distribution businesses have when investing in poles and wires infrastructure, that capital and operating expenditure will be recovered and capital assets will not be optimised out of the regulatory asset base.

Without this type of demand management cost pass through, network businesses are reliant on actual delivery of efficiency benefits to cover the investment costs, which is a high risk proposition and akin to an *ex poste* prudency assessment on expenditure. This places a much higher risk on demand management projects without commensurate return. Avoiding this extra risk would deliver a more balanced regulatory regime.

Recommendation 13

The Australian Energy Market Commission consider including in the National Electricity Rules a mechanism to balance the infrastructure investment risks faced by network businesses when they invest in non-network options, such that the risk is identical to investing in network options. A possible mechanism to achieve this may be a demand management cost pass through mechanism.

Form of regulation and foregone revenue arising from demand management projects

The *National Electricity Rules* include provisions that allow the form of regulation to apply to a distribution business to be either:

- a revenue cap
- a weighted average price cap, or
- a combination of revenue and weighted average price cap.

Under revenue cap regulation, a regulator caps a network business' allowable revenue with an external index. Subject to this cap, the business 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 services.

Although revenue and price caps create the same incentives to minimise costs, they 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 influence investment needs in the system (through significantly increased peak demand not anticipated in the demand forecast for the regulatory decision). In contrast, distributors regulated under a price cap are sensitive to throughput, and a decrease in demand will generally negatively affect revenue.

Demand management projects usually mean selling less energy. Distribution businesses will always face a disincentive to pursue demand management projects that lead to risks that they will not fully recover allowable revenue, when they are regulated under a price cap. This can be a significant disincentive for demand management as it increases the costs of potential projects. It also creates different incentives across distribution businesses depending on whether they are regulated under a price or revenue cap.

While allowing a range of regulation options in the *National Electricity Rules* may be appropriate in respect of determining the best approach for the network in question, the regulatory regime must recognise through an alternative mechanism the influence of the form on regulation decision on incentives to pursue demand management.

A mechanism for recovery of foregone distribution revenue (where regulated under a price cap) from both tariff and non-tariff based demand management projects would remove distortions in demand management incentives arising from differences between revenue and price caps.

This would have the effect of neutralising the revenue impact on distribution businesses of lower energy throughput that results from demand management under a weighted average price cap. It would also remove the perverse outcome whereby network businesses face differing incentives for demand management across different jurisdictions under a national regulatory framework.

Recommendation 14

The Australian Energy Market Commission consider including in the National Electricity Rules a mechanism to allow the recovery of foregone revenue from demand management projects for businesses operating under the price cap form of regulation.

Access to efficiency benefits

A key value of demand management for network businesses comes from its ability to defer network expenditure. This value derives from the net present value of that deferred network expenditure. The longer businesses are able to retain these efficiencies, before they are passed on to customers, the more value they have.

For incentives for demand management to work, it is critical that network businesses can access the net present value of money not spent on the network for a period, before these efficiencies are passed on to customers. This period can be shortened where efficiencies are made towards the end of a regulatory period.

To avoid perverse incentives to only pursue demand management towards the start of a regulatory period, access to efficiencies should be independent as to the stage of the regulatory review period. The precise approach adopted to address this efficiency incentive can include carry-over mechanisms that allow distributors to access benefits of avoided network investment for an appropriate period of time, but could also be related to broader incentives adopted to balance capital and operating expenditure. The approach adopted will require careful regulatory policy consideration.

Recommendation 15

The Australian Energy Market Commission consider including in the National Electricity Rules a mechanism to ensure that incentives to pursue demand management arising from access to efficiency benefits are independent of the time of the next price review.

Taken together, the mechanisms recommended in this Section should remove some of the disincentives facing network businesses in pursuing demand management options. The following part looks at some of the issues arising from network planning and reliability requirements that also impact incentives for network demand management.

5. NETWORK PLANNING AND RELIABILITY

Network Planning

Network planning criteria, and the approaches of individual business to network planning obligations, can influence the business case for pursuing demand management projects. In particular, strict adherence to deterministic planning approaches that consider only supply-side options, coupled with limited knowledge of the risk and reliability characteristics of non-network options, can limit the use of demand management as part of the normal planning processes of network businesses.

One goal of the recommendations in this policy paper is to make network demand management an integral part of planning to deliver an acceptable energy service to customers. This approach would require changes to business, government, regulatory and community perceptions of demand management, which can often see demand management as an option used by businesses where they have failed to invest adequately, rather than as part of the efficient delivery of energy services to the community.

The approach to planning, as well as uncertainty over the reliability of non-network elements for use in network planning, can act as barriers to the full adoption of demand management alternatives in network planning.

Deterministic versus probabilistic planning approaches

Planning requirements are generally set as "deterministic" requirements, where rules or standards require investment to meet N (or N-0), N-1 and N-2 contingency criteria. These criteria basically define the level of reliability and security to which a network is designed. These requirements are intended to ensure that the network can withstand periods of plant outage, without leading to load shedding. The strict use of deterministic planning criteria that consider only supply-side options, however, may undermine the business case for network demand management.

Under the deterministic planning approach, the timing of augmentations is determined on the basis of peak demand exceeding the planning criteria. If the deterministic planning approach is applied strictly, network investment to augment capacity would be required prior to the year when peak demand exceeds capacity. Deterministic criteria like N-1 and N-2 also assume that network investment occurs in discrete units, with known levels of reliability. It therefore effectively assumes that investment in infrastructure is used to meet planning criteria. This can be a barrier to demand management as demand management projects are not always available in discrete blocks to balance against network investments in infrastructure such as transformers and line upgrades.

The "probabilistic" planning approach is an extension of the deterministic planning approach in the sense that it provides a method of assessing the economic value of network reliability to customers. This can be used as a way to prioritise competing projects. In doing this, probabilistic planning also provides scope for non-network demand management alternatives to reduce load by introducing the economic value of supply for customers, which is the basis for all demand management projects.

Customers will offer demand response capabilities when the reward for demand response is greater than the value they place on that supply. This can include accepting some degree of direct load control or capacity limitation. Deterministic planning criteria, strictly applied, do not facilitate distribution businesses offering this type of optimisation decision to customers, as it focuses entirely on the level of reliability and security of supply, not the value of that supply to customers. A probabilistic planning framework therefore may offer a different range of opportunities for demand management.

This means that where businesses operate under deterministic planning criteria, it is important to ensure that special consideration is given to the appropriate integration of demand management solutions into network planning.

Uncertainty in demand management reliability characteristics

Network business planning is about putting together potential network elements, infrastructure investment options and demand scenarios to deliver an energy supply system that meets relevant network reliability, safety and security requirements. Demand forecasts are a critical part of this process, as they determine whether reliability, safety and security requirements are likely to be breached.

The network planner has essentially two options to deliver safe and secure supply:

- manage demand by reducing load or changing network utilisation patterns, or
- investing in increased capacity in the network to meet forecast demand.

Deciding between these two options, however, is not simply a matter of choosing the least cost option. Uncertainty related to demand management responses arises because the greatest unknown is the customer's willingness to participate. Experience to date has shown that customers are generally reluctant to invest in projects with long pay backs. Therefore demand management and network infrastructure options cannot be directly compared, particularly with regard to their reliability characteristics. In addition, network options are usually "off-the-shelf" and available for supply within short lead times. Demand management options can take a long time to plan and implement, meaning that they may not be available to address short term and quickly arising demand issues.

There is no simple solution to this problem. Network investment planning rules and procedures within businesses have built up with experience over time – there was a time where network options suffered from similar uncertainties as to reliability and delivery times. This experience was built, however, over a period where customer expectations over energy supply quality and reliability were different than they are today. Trial and error network planning using demand management alternatives to build experience is no longer an option in the community today.

Demand management options will only become an integral part of system planning with experience, such that network planners understand the inherent reliability characteristics of different approaches, and the timing in which these options can come on line. Not all demand management options are less reliable than network options; it is the uncertainty around implementation that in many cases impacts the perceived reliability. Potential solutions to this problem include building capabilities and experience in demand management options "offline", through trials and pilot programmes. It also involves increased research and development into the reliability characteristics of different approaches, to improve the scope for "packaged" demand management options to be used in a similar way to network investment options. Section 6 discusses some of these options for improving business and customer understanding of demand management.

The most effective way that this problem will eventually be resolved is through the sustained application of clear policies for demand management, supported by a stable regulatory regime with clear incentives. Network businesses will build their capabilities in demand management where they know there is a long term benefit in doing so. This will not happen while regulatory structures and incentives change between regulatory periods and government policies wax and wane.

Recommendation 16

The Ministerial Council on Energy note the importance of a stable policy and regulatory environment to integrating demand management options into energy supply planning and development.

Reliability incentives

Many demand management options have different reliability characteristics to network augmentation. Even where these reliability characteristics are known, they can be less reliable than the comparable network option they are seeking to displace. They can therefore increase the network business' exposure to any service penalties that may result if the demand management solution fails. This means that the network demand management opportunity will incur additional risk costs as a result of that decreased reliability. Where the reliability characteristics of the demand management option are unknown, the risk costs can be even higher. These risk costs must be built into the business case assessment of demand management projects.

This places some heavy requirements on demand management approaches in order for them to effectively and reliably defer network expenditure. For a network demand management opportunity to be viable, four conditions must be satisfied:

- the network area must be constrained and in need of additional investment
- the demand management option must be sized correctly to defer augmentation
- there must be sufficient time to deploy the demand management option, and
- the demand management option must be reliable enough to deliver the required energy delivery/customer service outcomes.

Once these issues are addressed, the relative cost of the project cost can be taken into account. Service incentive penalties arising from risk can increase this cost significantly.

The policy decision to increase incentives for demand management (and therefore, presumably, the uptake of demand management options to defer network investment) contains an implicit acceptance of an increased risk of outages due to the differing reliability characteristics of demand management options. Arguably, this increased risk should be recognised by the regulator.

Where demand management options that defer network expenditure offer reduced reliability for the network, it may be appropriate to consider mechanisms which either remove or pass through these risks. These mechanisms can include:

- exempting the businesses from service standard penalties under the regulatory regime where the outage is directly attributable to the failure of a demand management option for which it was otherwise reasonable to have relied upon, or

- passing through service standard risks by requiring the demand management proponent to take on the risk of service standard penalties in the case of failure. This can be achieved through:

    - contracts, or

    - deemed responsibility through the regulatory regime.

Both of these options have drawbacks.

Exempting demand management-related outages from reliability incentive mechanisms may create perverse incentives on network businesses to use demand management to avoid service standard penalties, rather than to address network constraints. It may be appropriate to only exempt demand management-related outages from service standard penalties where the network business reasonably relied upon the demand management option, or where the demand management proponent was required to enter into a network support arrangement. This may not be an acceptable option for the community, however, as the cause of a particular outage does not impact on its effect on the community.

An alternative approach is to effectively pass through service standard penalties to demand management proponents through contracts or regulation. This approach is unlikely to be satisfactory, as:

- even where a demand management proponent has taken on financial responsibility for potential service standard penalties, network businesses retain legal and political exposure for outages

- demand management proponents often do not have the financial capacity to accept the potentially large risk arising from service standard penalties, and

- often, the demand management proponent is the distribution business, therefore the financial risk remains with the distribution business.

A demand management project may also fail for reasons outside of the control of the proponent, making the transfer of this risk inappropriate.

These issues all limit the scope of potential viable options for network demand management, moving network businesses towards more reliable demand management options like direct load control, capacity limitation and cycling, and power factor correction.

Recommendation 17

The Australian Energy Market Commission consider appropriate mechanisms to manage the reliability risks imposed by demand management projects so that distribution businesses are not disproportionately penalised for adopting demand management projects to defer network expenditure.

6. IMPROVING INFORMATION AND UNDERSTANDING

Introduction

The lack of empirical evidence to support the efficacy, cost and reliability of demand management projects needs to be addressed to encourage uptake by network businesses. Customers have limited understanding of potential demand management opportunities open to them. Policies and approaches to improve information and understanding, both of network businesses and customers, will assist in integrating demand management options into energy supply planning and development.

Network business understanding of demand management opportunities

Regulatory incentives currently in place effectively limit demand management to "live" situations, where the demand management is relied on to defer or avoid network expenditure. The risks of failure in this approach acts as a clear disincentive to network businesses to trial approaches for which they may not have adequate experience or certainty that they will succeed.

There is widespread need for policy and regulatory support for research and development in network demand management to limit risks and uncertainty faced by network businesses in pursuing demand management as an alternative to network build options. This support should include funding for pilots and trials.

This would improve understanding of the potential scope for demand management to defer network expenditure, as well as improve business confidence and expertise in demand management through capability building. Key to this support is that trials are genuine, in that they do not occur in live situations (ie. where they are relied upon to address a constraint). They must therefore not be linked to specific network investment deferral.

Recommendation 18

The Australian Energy Market Commission and the Australian Energy Regulator consider appropriate mechanisms and incentives to support network demand management pilots and trials, which will build network businesses' experience in demand management options to defer network expenditure.

Community understanding of network demand management issues and opportunities

Many factors contribute to current peak electricity demand issues. Many customers are unaware of their contribution to peak demand growth and actions they can take to limit this contribution. The scope for demand management programmes may be limited where customers are suspicious of demand management proponents and interpret demand management programmes negatively, either as signals of inadequacy of government or private investment, or as assaults against personal sovereignty.

There are many ways that community understanding of peak electricity demand can be improved. These can include direct campaigns to increase customer awareness and understanding, but also education programmes for service providers such as tradespeople, builders and designers. Appliance manufacturers and retailers could be better informed of the contribution appliances may make to peak load growth.

Education programmes on the balance between price, service and demand can assist in improving community understanding of the reasons behind demand management programmes and the benefits available for customers in taking part in these programmes. Educating service providers and appliance manufacturers and retailers can also help limit factors contributing to peak load growth, offsetting the need for network investment *or* demand management programmes.

Recommendation 19

Governments consider their role in educating the community, including customers, tradespersons, builders, service providers and appliance manufacturers and retailers, on energy use and peak demand issues.

Demand management information to the market

Distribution businesses are required in many jurisdictions to develop and publish information to assist demand management proponents in identifying potential opportunities for demand management, or siting of embedded generators. In some cases, this information requirement is augmented by requirements to actively seek proponents for particular projects through expressions of interest.

Significant differences occur between jurisdictions over:

- the level of expected investment at which alternative network options must be considered
- the level of detail of information on upcoming constraints and proposed augmentations and that are being considered
- how the market is informed on these potential projects
- the planning timeframe over which potential future projects must be considered, and
- whether the distribution business must actively seek demand-side alternatives or is only required to provide information to the market.

These differences can lead to confusion amongst demand management proponents as to the information disclosure and decision making procedures that apply in a particular jurisdiction.

There may be a case for streamlining of these different jurisdictional approaches by developing a single national approach for providing planning and demand management information to the market. A nationally consistent approach could simplify processes for proponents and facilitate understanding amongst distributors of the potential for demand management programmes in their network areas.

It is critically important, however, that these planning requirements do not impose costs that are disproportionate to the benefits expected from the regime. The single most effective way to encourage demand management is to ensure that the regulatory regime provides incentives for network businesses to investigate and adopt these options. Information to the market may improve the transparency of network business activity, but not the underlying economic case for adopting demand management alternatives to network investment.

Recommendation 20

The Australian Energy Market Commission should consider developing a nationally consistent information disclosure and planning regime for network businesses that is proportionate to the expected benefits of that regime.

7. AREAS OF POLICY INTERSECTION

Introduction

Demand management policy and regulatory approaches potentially intersect with a number of other key policy areas currently being pursued by the Council of Australian Governments, the Ministerial Council on Energy, and national, state and territory governments.

Key areas of policy intersection include electricity retail price regulation, provision of advanced metering, and energy efficiency and greenhouse initiatives. The scope and implications of these policy intersections are considered in this section.

Retail prices

Price regulation

Domestic electricity retail prices are currently regulated in all jurisdictions. In many cases, the regulated retail prices are not cost reflective, and there are very few locational or temporal price signals. This lack of cost reflective pricing means that many customers do not experience the true costs of supply. This means that customers that may otherwise be prepared to offer efficient demand management services if they experienced their true cost of supply, have no incentive to do so as they receive no price signal.

The provision of more cost-reflective prices to all customers would significantly improve the efficiency of the market and case for demand management. There are many social, policy and political issues that arise, however, when considering the impact of cost reflective prices on many small and rural communities.

Transparent, government funded community service obligations can address the issues of disparate prices while allowing customers to see the true costs of energy. Community service obligations should include assistance for those in financial hardship.

Recommendation 21

Australian governments should consider moving towards more cost-reflective pricing structures for domestic customers, supported by transparent community service obligations to assist those in financial hardship.

Retail pricing

The final electricity price offered to customers is made up of a number of components. It includes:

- the wholesale cost of electricity
- transmission and distribution network tariffs, and
- a retail margin.

While some of the elements that make up the final retail price, such as the distribution network tariffs, may include time-of-use or other cost-reflective price signals, these price signals are not always passed through to customers in the final retail tariff offering. This may be because of retailer marketing choices, customers' preference for simpler tariffs, or because the retail business does not have the capacity to process more complex billing arrangements.

This dilution of price signals can undermine incentives for customers to manage their demand or take part in demand management programmes offered by distribution businesses. As such, removing any barriers or disincentives for retailers to reflect distribution tariff price signals in their final tariff offerings would support network demand management programmes by providing greater incentives for customers to take part in those programmes.

Recommendation 22

The Ministerial Council on Energy should consider removing any barriers or disincentives for retailers to pass through time-of-use and other cost-reflective distribution price signals in their final retail tariffs.

Capacity pricing

Current pricing structures for smaller customers usually involve a limited capacity component with the majority of charges taken up by a usage component. This usage component is generally not charged with reference to time of use.

Capacity-based pricing is arguably a more efficient form of pricing for network services, as investment in the network is mostly driven by capacity rather than throughput. Introduction of this pricing approach would provide more incentives for customers to engage in demand management activities such as load control, load cycling and capacity limitation to manage capacity charges. Significant regulatory pricing reform is required to move to this type of pricing approach. Further, while load control, load cycling and capacity limitation can be initiated without the use of advanced metering, advanced metering with time-of-use tariffs would assist in driving customer uptake of these approaches as they assist in providing incentives to move to capacity pricing.

Recommendation 23

Australian governments and the Australian Energy Regulator should consider the case for moving towards more emphasis on capacity pricing as a more efficient form of network pricing.

Advanced metering

Advanced metering is expected to provide scope for distribution and retail businesses to offer more efficient prices that signal the costs of energy usage and the provision of peak load capacity. In turn, this is expected to encourage customers to respond to time-of-use price signals, leading to a reduction of energy consumption at times of peak prices.

As noted in an earlier section describing the different types of demand management, this type of price-based demand response may deliver only limited opportunities for *network* demand management. There are two reasons for this.

The first reason is that the more efficient pricing structures potentially available through advanced metering are unlikely to reflect the highly location-specific and temporal constraints that drive network demand management. Prices are more likely to reflect the longer term marginal costs of supply related to time-of-use, limiting the potential price fluctuations, price shocks and equity issues that may arise from direct marginal cost pricing of network constraints. This will limit the ability of prices to deliver network demand management.

The second reason is that price-based demand response may not be sufficiently firm, and therefore may not be able to be relied upon to defer network expenditure in all possible circumstances (though it may deliver some improvements in net system reliability in some circumstances).

Encouragingly, there is some evidence to suggest time-of-use and capacity based pricing signals do assist in providing customers with sufficient incentives to enrol in demand management programs that assist in network demand management, as noted in the previous section on capacity pricing.[5]

Advanced metering with remote communications capabilities also provides some scope for remote load control. Widespread provision of this capacity would represent a broad-based approach to demand management infrastructure investment, which, as noted above, would require specific regulatory support.

In the case of remote load control through advanced metering, appliances are separately wired through the meter, or there is a communications link between the appliance and the meter. The capacity within the appliance, however, is a separate capability that must be retrospectively fitted to high energy use appliances such as air conditioners, but may also be built into these appliances in the future.[6] The specification of this demand management control capacity is the subject of a current process through Australian Standards.

Recommendation 24

The Ministerial Council on Energy and Australian Energy Regulator note the potentially limited scope for price-based demand response through advanced metering to deliver network demand management.

Energy efficiency and greenhouse emission reductions

Energy efficiency and greenhouse issues are increasingly gaining political and policy attention.

Demand management, as well as advanced metering, are being looked into as possible sources of energy and greenhouse reductions. As noted above, however, caution should be exercised in ensuring that the demand management and advanced metering approaches adopted are appropriate to achieving these aims.

[5] FERC, *Demand Response & Advanced Metering*, August 2006, pg. 15.

[6] These appliances can also receive direct communications, without using the meter or meter-based communications capacity.

The nature of environmental demand management approaches, particularly in the absence of a pricing mechanism for greenhouse gas emissions, is that any action is likely to be subject to significant free-rider effects. This means that regulatory intervention may be appropriate to ensure that efficient, community-wide energy efficiency programmes are adopted, particularly in the lead up to the introduction of a price for carbon. A similar issue was also addressed in Section 3 with respect to support for demand management projects that lead to system-wide efficiency benefits.

In the event that governments decide to develop specific incentives or programmes for energy efficiency or greenhouse gas reductions, distribution businesses may be an appropriate agent for such activity, due to their direct connection to the customer and significant project management capability.

8. IMPLEMENTATION OF DEMAND MANAGEMENT POLICY AND REGULATORY APPROACHES IN THIS PAPER

Introduction

The demand management policy and regulatory approaches outlined in this policy paper are likely to take time to implement. They require significant changes to established policy and regulatory approaches to allow the integration of demand management and demand side resources into normal operation of the energy market. Alongside policy reform, regulatory frameworks and practices must change to address the specific reliability and investment needs of demand management, to allow its further integration into business planning.

Network businesses need to learn and adapt to new approaches that give rise to possible new revenue streams through demand management aggregation, energy efficiency, and broad-based provision of demand management infrastructure services, as well as using that infrastructure themselves to manage load growth investment and reliability. Customer understanding and acceptance of demand side approaches, in particular time of use prices and remote load control, is likely to take time, though current trials suggest that customers are prepared to accept these developments where they deliver pricing or other benefits to the customer and/or the community.

The following Sub-section sets out some specific implementation issues that are likely to arise in moving towards an energy market and energy delivery processes that include greater levels of demand management by businesses and the community, as well as some industry and regulatory transitional issues.

Positive incentives for demand management

Demand management projects require significant business commitment and investment in consumer education to be successful.

The recommendations outlined in this paper are directed at achieving a balanced policy and regulatory approach to demand-side and investment options, so that policy and regulatory issues do not undermine the ability of demand-side resources to compete with infrastructure investment options on an even basis.

There appears to be a case, however, for positive incentives for demand management to be put in place to build expertise in Australia and facilitate the development of a demand management service provider market.

These positive incentives could be achieved in a number of ways. For example, specific demand management projects could be encouraged through dedicated project funds and grants. This may be particularly appropriate where the benefits of demand management are likely to accrue to the wider community, or where there are significant gains to be made through education, training and information dissemination from the demand management project.

Another approach could involve positive incentives through the regulatory regime to pursue demand management projects. The New South Wales D-factor approach limited recognition of demand management projects to an upper cost threshold equivalent to the value of deferred network expenditure. A higher threshold for demand management projects, perhaps also taking account of contributions that these projects make to other types of demand management, could also be adopted to support a wider set of possible demand management projects.

Specific incentives targeted at increasing the value of demand management options, including enhanced or accelerated cost recovery could be developed to assist in the development of demand management capability within network businesses and facilitate the development of a demand management service provider market.

Recommendation 25

The Ministerial Council on Energy consider introducing specific positive incentives for demand management to assist in the development of demand management capability within network businesses and facilitate the development of a demand management service provider market.

Transitional issues

Network businesses are currently undertaking a variety of demand management activities to manage load growth and as part of network planning and risk management. These activities are supported by various regulatory and policy frameworks and decisions, and can involve significant investment in research and technology development.

It is important that in moving to the new national policy and regulatory environment for network businesses (which is intended to include support for demand management approaches) that current investments are not stranded. Particularly important is ensuring that investments based on current regulatory mechanisms are not undermined by a transition to a new regulatory mechanism, and that the move from jurisdictional to national regulation does not create additional risks to cost recovery for current demand management projects. For example, current jurisdictional efficiency benefit sharing regimes support demand management projects into the future, and are important to justify investment, and should not be undermined with the transfer of functions to the Australian Energy Regulator.

Recommendation 26

In the lead up to development and implementation of policy and regulatory mechanisms recommended in this paper, the Ministerial Council on Energy should ensure that current investments in demand management are not stranded, by ensuring that current jurisdictional demand management incentives and mechanisms continue in place until better, more integrated national approaches are developed.

ATTACHMENT A

DEMAND MANAGEMENT

ATTACHMENT A: SUMMARY OF ENA POLICY RECOMMENDATIONS

Network demand management policy focus

ENA recommendation 1

The Ministerial Council on Energy commit to adopting policy and regulatory approaches to support the development of the skills and capabilities of network businesses to pursue network demand management options.

ENA recommendation 2

The Ministerial Council on Energy commit to implementing the reforms necessary to deliver a balanced policy and regulatory framework that allows network businesses to adopt efficient network and non-network options on an equal basis.

ENA recommendation 3

The policy and regulatory framework must balance demand management objectives against the other obligations on network businesses by:

- ensuring regulatory return is appropriate where network businesses pursue demand management approaches
- managing the regulatory risk faced by network businesses in pursuing demand management
- ensuring the regulatory regime appropriately balances competing objectives
- providing clear guidance as to the expectations of governments on the behaviour and approaches of the regulator and businesses.

ENA recommendation 4

The Ministerial Council on Energy and the Australian Energy Regulator adopt specific policy and regulatory approaches to support efficient investment in both constraint-specific and broad-based network demand management.

ENA recommendation 5

The Ministerial Council on Energy and the Australian Energy Regulator adopt specific policy and regulatory approaches that allow network businesses to aggregate demand response resources on a commercial open access basis to deliver potential network, retail and environmental demand management benefits.

ENA recommendation 6

The Ministerial Council on Energy ensure that policy decisions to pursue specific demand-related outcomes, such as the rollout of smart meters, are supported by clear cost recovery mechanisms reflecting potential misalignment of costs and benefits accruing to another part of the supply chain.

ENA recommendation 7

The Ministerial Council on Energy and the Australian Energy Regulator adopt specific policy and regulatory approaches that recognise the contribution that network demand management can make to system reliability.

ENA recommendation 8

The Australian Energy Regulator recognise and accommodate the interrelation between demand management policies and approaches, and those for reliability and network planning.

Economic regulation

ENA recommendation 9

Until such a time that the regulatory model evolves to adequately address demand management incentives as part of an integrated model, the Ministerial Council on Energy, Australian Energy Market Commission and the Australian Energy Regulator should adopt specific policies and mechanisms to support network demand management and remove or neutralise disincentives to demand management embedded in the current regulatory approach.

ENA recommendation 10

The Ministerial Council on Energy direct the Australian Energy Market Commission to conduct an in depth industry review of appropriate rules and economic regulatory mechanisms to support network demand management for possible future inclusion in the *National Electricity Rules*.

ENA recommendation 11

The Australian Energy Regulator recognise efficient demand management capital and operating costs incurred by distribution businesses as part of approved capital and operating expenditure.

ENA recommendation 12

The Australian Energy Market Commission consider including in the *National Electricity Rules* appropriate mechanisms for balancing the differing economic incentives between capital and operating expenditure which influence network business decisions to pursue demand management options as an alternative to network augmentations.

ENA recommendation 13

The Australian Energy Market Commission consider including in the *National Electricity Rules* a mechanism to balance the infrastructure investment risks faced by network businesses when they invest in non-network options, such that the risk is identical to investing in network options. A possible mechanism to achieve this may be a demand management cost pass through mechanism.

ENA recommendation 14

The Australian Energy Market Commission consider including in the *National Electricity Rules* a mechanism to allow the recovery of foregone revenue from demand management projects for businesses operating under the price cap form of regulation.

ENA recommendation 15

The Australian Energy Market Commission consider including in the *National Electricity Rules* a mechanism to ensure that incentives to pursue demand management arising from access to efficiency benefits are independent of the time of the next price review.

Network planning and reliability

ENA recommendation 16

The Ministerial Council on Energy note the importance of a stable policy and regulatory environment to integrating demand management options into energy supply planning and development.

ENA recommendation 17

The Australian Energy Market Commission consider appropriate mechanisms to manage the reliability risks imposed by demand management projects that mean that distribution businesses are not disproportionately penalised for adopting demand management projects to defer network expenditure.

Improving information and understanding

ENA recommendation 18

The Australian Energy Market Commission and the Australian Energy Regulator consider appropriate mechanisms and incentives to support network demand management pilots and trials, which will build network businesses' experience in demand management options to defer network expenditure.

ENA recommendation 19

Governments consider their role in educating the community, including customers, tradespersons, builders, service providers and appliance manufacturers and retailers, on energy use and peak demand issues.

ENA recommendation 20

The Australian Energy Market Commission should consider developing a nationally consistent information disclosure and planning regime for network businesses that is proportionate to the expected benefits of that regime.

Areas of policy intersection

ENA recommendation 21

Australian governments should consider moving towards more cost-reflective pricing structures for domestic customers, supported by transparent community service obligations to assist those in financial hardship.

ENA recommendation 22

The Ministerial Council on Energy should consider removing any barriers or disincentives for retailers to pass through time-of-use and other cost-reflective distribution price signals in their final retail tariffs.

ENA recommendation 23

Australian governments and the Australian Energy Regulator should consider the case for moving towards more emphasis on capacity pricing as a more efficient form of network pricing.

ENA recommendation 24

The Ministerial Council on Energy and Australian Energy Regulator note the potentially limited scope for price-based demand response through advanced metering to deliver network demand management.

Implementation of demand management policy and regulatory approaches in this paper

ENA recommendation 25

The Ministerial Council on Energy consider introducing specific positive incentives for demand management to assist in the development of demand management capability within network businesses and facilitate the development of a demand management service provider market.

ENA recommendation 26

In the lead up to development and implementation of policy and regulatory mechanisms recommended in this paper, the Ministerial Council on Energy should ensure that current investments in demand management are not stranded, by ensuring that current jurisdictional demand management incentives and mechanisms continue in place until better, more integrated national approaches are developed.

ATTACHMENT B

DEMAND MANAGEMENT

ATTACHMENT B: SUMMARY OF JURISDICTIONAL REGULATORY FRAMEWORKS

Jurisdiction	Distribution Licence	Distribution Code	Current Price Determination	Other instruments
Australian Capital Territory	No DM-specific obligation • DNSP must develop and implement an ongoing programme to cost effectively minimise losses; and • a limit of power factor of 0.9 is imposed on customers through the service and installation rules, as well as inclusion of loss considerations in the economic assessment of transformer procurement.		*Revenue cap* Focus on tariff-based demand management, including greenpower initiatives. Specifically rejects the establishment of a DM fund.	
New South Wales	Obligation to investigate DM options to avoid or postpone the expansion of the network. Distribution businesses must also prepare and publish reports in relation to these investigations.		*Price cap* D-Factor mechanism Allows businesses to recover: • approved non-tariff based DM implementation costs up to the value of expected avoided distribution costs; • approved tariff-based DM implementation costs; and • distribution business' revenue foregone arising from non-tariff based DM projects.	Code of Practice for Demand Management Non-mandatory code to assist distribution businesses in interpreting the broad requirement to investigate DM in the NSW distribution licence. Climate Change Fund (formerly the Energy Savings Fund) The NSW Department of Environment and Climate Change administered fund to provide financial support for marginal projects or untrialled DM, EG and energy efficiency technologies. $200 million over 5 years.
Northern Territory			*Price cap*	

Jurisdiction	Distribution Licence	Distribution Code	Current Price Determination	Other instruments
Queensland			*Revenue cap* ENERGEX granted $14.5M of DM-related OPEX, primarily to reduce asset utilisation levels to those recommended in the Somerville report.	
South Australia	Obligation to investigate DM options to avoid or postpone the expansion of the network. To support the price determination, ETSA is also required to: • undertake DM activities as directed by ESCOSA, or which it has received funding through a determination, • prepare reports on DM investigations and measures carried out, and • comply with any applicable guideline (see Other Instruments)		*Revenue cap* DM project funds ETSA utilitiies granted $20 million in operating expenditure for a number of specific DM projects and pilots. Projects include kVA tariffs, standby generation, direct load control, critical peak pricing and DM aggregation. Efficiency carry-over There is an efficiency carry-over mechanism in place for all CAPEX and OPEX efficiencies.	Guideline Number 12: DM for Electricity Distribution Networks Requires ETSA utilities to consider non-network alternatives before commencing augmentation projects that have an estimated capital cost of $2 million or more and to publish an annual planning report and conduct consultations on eligible major projects.
Tasmania		Obligation on regulator to ensure the regime gives alternatives to capital investment due consideration. Regulator must also consider right of DNSP to recover reasonable costs arising from payments made to DGs for DM. DM expenditure will be approved where benefits outweigh costs. DNSP must submit to regulator an annual Distribution System Planning Report detailing forecast demand and expected investment for the following five years. The report must include options for DM and assessment of possible projects.	*Revenue cap* Efficiency carry-over There is an efficiency carry-over mechanism in place for OPEX efficiencies.	

Jurisdiction	Distribution Licence	Distribution Code	Current Price Determination	Other instruments
Victoria		Each DNSP required to publish annually both a joint Transmission Connection Planning Report and an Individual Distribution System Planning Reports, including opportunities for DG and DM. Interested parties then submit proposals for alternatives to the network investment proposed in the reports.	*Price cap* ESC explicitly rejects SA and NSW DM approaches. $600K allowance for DNSPs for DM benefits that accrue in a subsequent regulatory period Efficiency carry-over There is an efficiency carry-over mechanism in place for DM-related CAPEX efficiencies, and all OPEXefficiencies.	Advanced Metering Rollout Focus on AIMRO to deliver deferral of network expenditure through price signals that lead to peak shifting.
Western Australia		Electricity Networks Access Code A Regulatory Test applies to all large investments (greater than $15 million). Proposals are considered as standalone projects, with specific project consultation. The Regulatory Test is deemed to be satisfied if the regulator is satisfied that the augmentation maximises the net benefits after considering alternatives.	*Revenue cap*	

Energy Networks Association
Member Companies