RESTORING POWER:

Cutting bills & carbon emissions with Demand Management

A report for the Total Environment Centre

Institute for Sustainable Futures

UNIVERSITY OF TECHNOLOGY SYDNEY

The support of the Consumer Advocacy Panel for this research is gratefully acknowledged.

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DO

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FIVE KEY ACTIONS FOR CLEANER, MORE AFFORDABLE ELECTRICITY

This report recommends five key measures to facilitate lower electricity bills and carbon emissions through greater use of demand management

1. Australian Energy Market Commission (AEMC) to amend the National Electricity **Rules** to make it clear that providing incentives to network businesses is desirable to overcome barriers to efficient network demand management (DM).
2. Australian Energy Regulator (AER) to establish an effective DM Incentive **Scheme** (DMIS) that drives network DM wherever it will reduce costs to consumers.
3. Distribution network businesses to set DM **targets**, in collaboration with regulators.
4. Distribution network businesses to **report** clearly and consistently on their DM activities and outcomes.
5. AER to provide effective and efficient DM performance **incentives** to network businesses.

Foreword

Affordable energy is crucial to the Australian community. Transitioning to efficient, clean energy is essential to sustaining prosperity for future generations.

The Australian electricity market has been failing on both these objectives. The reasons for this failure are complex, but sensible, effective reforms are available.

Creating an affordable and sustainable electricity system is possible, but requires urgent change. This change involves putting citizens' and consumers' interests, especially their long-term interests, back at the heart of the electricity market. To do this would help to fulfil the National Electricity Market's original objective of serving 'the long-term interests of consumers'.

Demand management means helping customers to reduce their electricity demand as an alternative to building infrastructure. Using demand management wherever it is less costly than new power lines, substations and power stations is a key element in restoring power to the people in the electricity market.

This report presents a practical agenda to achieve this.

Jeff Angel, CEO, Total Environment Centre

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SUMMARY: UNLOCKING SAVINGS THROUGH NETWORK DM

Demand management (DM) involves helping customers reduce their electricity demand as an alternative to building infrastructure. It is a key element in restoring power to consumers in the Australian electricity market. Urgent action to increase demand management by networks is needed in order to reduce pressure on consumers' electricity bills, and to meet the challenges of climate change and the technological evolution away from a centralised supply of electricity.

INTRODUCTION

This report presents reform proposals to drive a large increase in cost-effective network demand management in the Australian electricity industry. These proposals are designed to help consumer representatives and their allies to advocate cutting customer costs and carbon emissions. The Total Environment Centre (TEC) has commissioned the Institute for Sustainable Futures (ISF) to prepare this report.

This report builds on previous research that outlines how the current regulatory framework creates significant barriers to the uptake of DM by distribution network service providers (DNSPs). In particular, it supports the conclusion of the Australian Energy Market Commission (AEMC) that reform of regulatory incentives for DM by distribution network service providers (DNSPs) is needed. Encouraging DNSPs, who are responsible for a large share of electricity costs, to undertake DM to reduce peak demand is also likely to encourage greater DM by other parts of the electricity supply industry.

This report proposes that the key next step is a request to the AEMC for a rule change to replace the *Demand Management and Embedded Generation Connection Incentive Scheme* (DMEGCIS) with an effective incentive scheme that will drive DM in areas of network constraint wherever it is less costly than network infrastructure expenditure. *Section 1: Proposals* outlines a specific rule change proposal, an associated draft DM Incentive Scheme (DMIS) structure, and complementary policy measures to ensure that regulatory reform is effective.

What is network demand management?

Demand management (DM), also known as demand-side management, refers to activities that lower or shift the demand for electricity as an alternative to providing additional supply. Electricity demand management is usually undertaken by utilities responsible for ensuring reliable and adequate supply of electricity, where moderating demand is more cost-effective than increasing supply. DM measures are generally characterised as peak load management, energy efficiency or distributed generation.

While network DM is generally focused on reducing peak electricity demand in constrained parts of the grid, there are various ways of achieving this. DM measures are generally categorised as energy efficiency, peak load management or distributed generation. Examples of DM include:

Energy efficiency

- Information and education activities to help customers reduce energy waste;
- Subsidies to replace inefficient lights or equipment;
- Free installation of weather stripping to reduce leaks around doors/windows;
- Second refrigerator buyback projects.

Peak load management

- Offering householders cash incentives to reduce demand at peak times;
- Time-of-use pricing to reward customers who shift demand away from peak periods;
- Funding support for battery storage (e.g. in support of local solar panels);
- Shifting discretionary loads like pool pumps, storage water heating and EV charging.

Distributed Generation

- Incentives to install solar panels in network constrained areas;
- Subsidies for installation of cogeneration or trigeneration;
- Occasional use of diesel standby generators to support the grid (or other DM);
- Use of landfill gas or bioenergy from waste to relieve local network constraints.

For examples of network DM applied in Australia, see Appendix E.

WHY WE NEED TO INCREASE DM IN AUSTRALIA

Section 2 of this report highlights the importance of demand management. There are economic, environmental and technological imperatives for urgent action to increase the application of DM in our electricity system.

Recent rapid increases in electricity prices have largely been the result of historically high levels of investment in our electricity network, particularly in NSW and Queensland. The high levels of investment are the result of a ‘supply side’ focus on increasing electricity demand, stronger reliability standards and the replacement of aging network infrastructure.

The AEMC has identified substantial demand management opportunities in the Australian electricity system, opportunities that could lead to savings of $4–$12 billion over the next ten years.[1] These savings, if passed on to electricity consumers, could result in bill reductions of between $120 and $500. Yet a range of regulatory and other barriers is preventing the timely take-up of this opportunity by DNSPs.

Flow-on effects from the reduced demand for electricity generation, such as lower prices in the wholesale energy market, would mean that further reductions in costs to consumers could arise.

While aggregate electricity consumption in the National Electricity Market (NEM) has decreased in recent years, both electricity consumption and peak demand are expected to increase over the next decade.[2] Failure to build cost effecitve DM capacity now would leave energy consumers more exposed to risks of another price shock, if peak demand growth accelerates or market conditions change.

The environmental imperative is also clear. Australia has one of the most carbon intensive economies in the world. If we are to meet our international obligations to emission reduction and play our part in avoiding dangerous climate change, then our electricity system will need to decarbonise quickly over the coming decade.

Technological change is providing ways to achieve emissions reduction as well as increase the efficiency of our current electricity systems. The take-up of distributed generation (such as solar photovoltaic panels) is already impacting on the electricity system. This trend is likely to accelerate, particularly when combined with emerging energy efficiency and energy management technologies and electric vehicles and battery storage.

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Why we need network DM

- Electricity prices more than doubled between 2007 and 2013[3]
- Network charges now make up half of the average Australian electricity bill according to the Department of Resources, Energy and Tourism.[4]
- Networks are investing more than $40 billion in electricity distribution and transmission networks in the current 5 year regulatory period.[5]
- An estimated one-third of the current investment in Australian networks is to cater for growth, and in particular, growth in peak demand.
- The Productivity Commission estimates that peak demand events occur for less than forty hours per year (or less than 1% of the time) yet they account for approximately 25% of the average residential bill.[6]
- Current demand management is equal to less than 2% of NEM-wide peak demand[7] and only about 1% of the generation capacity in the NEM.[8]
- It is estimated that $2.2 billion per year of avoidable network costs are being passed on to consumers Australia-wide.[9]
- The economic cost savings of peak demand reduction in the NEM are estimated to be between $4.3 billion and $11.8 billion over the next ten years. This translates into approximately $500 of savings per customer each year in South Australia and Queensland, $350 in New South Wales and $120 in Victoria.[10]

STATUS: WHERE WE ARE AT

Section 3 considers the current status of DM. According to the latest available estimates, demand management reduced demand for electricity by approximately 700MW in Australia in 2010–11, and about half of this was from network DM projects. While this is almost double the amount from 2009–10, it is still very low in an electricity system with more than 45,000 MW of generation capacity, and represents only about 2% of total peak demand. [11]

The size and uptake of the current demand management incentive scheme is also low. The total allowance available in the current regulatory period is $36.5 million across the 13 DNSPs operating in the NEM. The yearly allowance ranges between $100,000 and $1 million depending on the size of the DNSPs. Only 13% of this has so far been claimed.

There are currently numerous institutional barriers to efficient uptake of DM in the NEM. These include: regulatory barriers, cultural bias, imperfect information, split incentives, payback gaps, inefficient pricing and the confusion generated by the interplay of the other barriers. Specific issues with regulation include the lack of an overarching policy imperative, a bias towards network augmentation over DM, inflexible deterministic reliability criteria and disincentives for DM.

Several reform processes have recently been implemented or are currently in train to respond to the above problems. However, while important, these reforms do not yet comprehensively address all of the barriers to DM.

OPPORTUNITIES: WHAT CAN WE DO

Section 4 outlines options for the reform of incentives for DM. Some important reforms have emerged from the recent array of inquiries into DM and network efficiency. However, most of these reforms are still far from being implemented and there are also some key gaps which need to be addressed.

This report identifies five priority actions to support efficient network DM:

1. Australian Energy Market Commission to amend the National Electricity Rules to make it clear that providing incentives to network businesses is desirable to overcome barriers to efficient network DM.
2. Australian Energy Regulator to establish an effective DM incentive scheme (DMIS) that drives DM wherever it will reduce costs to consumers.
3. Distribution network businesses to set DM targets, in collaboration with regulators.
4. Distribution network businesses to report clearly and consistently on their DM activities and outcomes.
5. Australian Energy Regulator to provide effective and efficient DM performance incentives to network businesses.

Watt's in a name? DMIS vs. DMEGCIS

The current legislation instructs the AER to develop a *Demand Management and Embedded Generation Connection Incentive Scheme* (DMEGCIS), to provide incentives for DNSPs to 'implement efficient non-network alternatives, or to manage the expected demand for standard control services in some other way, or to efficiently connect embedded generators'. For brevity, this report adopts the earlier and simpler term, *Demand Management Incentive Scheme* (DMIS).

This is not intended to imply that issues around connecting distributed generation and storage are unimportant and nor is it intended downplay the related challenges. Important work on these issues is currently under way (e.g. the Climateworks et al. rule change on connecting embedded generators).[9] Distributed generation and storage are included in the definition of demand management above, and the proposed scheme outlined here is intended to remove the current disincentives that mean DNSPs can be financially disadvantaged by connecting distributed generation.

1 PROPOSALS: DM REGULATORY REFORM & OTHER MEASURES

This section presents key changes to ensure network DM is used wherever it will benefit consumers. The proposed reforms include three elements:

- **A change to the National Electricity Rules to support network DM**
- **A reformed DM Incentive Scheme (DMIS),** to be established by the Australian Energy Regulator
- **Complementary policy reforms,** to be adopted by government**.**

While these proposals are not definitive, they are intended provide a specific, concrete foundation for debate and an impetus for urgent reform.

PROPOSED NEW DM INCENTIVE SCHEME RULE

Draft specification for the proposed rule change to reform application of the existing Demand Management and Embedded Generation Connection Incentive Scheme.

Note: This proposed Rule Is modelled closely on the draft specifications from the AEMC 'Power of Choice' report. The edits which show how this rule varies from the AEMC's proposal are included in Appendix B, whilst Appendix A contains the current Rule as it stands. *Notes in the pink boxes provide explanatory text to the proposed Rule.*

Objective: The objective of this proposed rule change is to reform the current demand management incentive scheme to support appropriate incentives for distribution network service providers (DNSPs) to pursue efficient demand management (DM). The incentive scheme will be developed with an overarching objective and supporting principles. The AER should have sufficient discretion to develop the detailed design of the scheme – which may contain multiple mechanisms – and the flexibility to adapt the application of the scheme to the individual circumstances of each distribution business.

Application: Proposed rule change to replace current National Electricity Rules clause 6.6.3.

Objective of DMIS

To incentivise efficient DM projects and pricing by network businesses

1. Demand Management Incentive Scheme

- The AER shall publish an incentive scheme or schemes (*demand management incentive scheme or DMIS*) to provide incentives for DNSPs to implement efficient DM options.
- DM options include 'DM projects' which involve the DNSP offering assistance, funding or other incentives (financial or otherwise) to encourage consumers to reduce or shift demand, and 'price-based DM', which involves changing the structure of network pricing to encourage DM. DM projects may also include a price-based component.
- The scheme must be applied in a manner consistent with the following objective: *'to provide an appropriate return to the network businesses for DM projects which deliver a net cost saving to their consumers'*:

- DM projects are defined as any conscious use by the DNSP of non-network solutions including demand response, energy efficiency or embedded or distributed generation to reduce load at risk, improve reliability or defer the expenditure of capital on the network.

Efficient DM
The DMIS as developed by the AER will need to contain criteria for efficient DM.

- Efficient DM is defined for the purposes of the incentive scheme as any DM project that delivers a net benefit to consumers as a whole, regardless of where in the electricity supply value chain those benefits arise.

- The AER has the option to include the DMIS as part of the DNSPs distribution determination. The application of the scheme can differ by DNSP.
- The AER can amend the incentive scheme in accordance with the distribution consultation procedures.
- The demand management incentive scheme must be applied in a manner consistent with the following principles:

DM projects criteria

  - DM projects should address (current and/or anticipated) network issues in order to qualify for inclusion in the incentive scheme (potential network issues include: network supply capacity, reliability, asset replacement and changing demand or local generation patterns).
  - Expenditure on DM projects approved under this scheme must be treated equitably with other network expenditure approved under the determination process.

Incentivising DM 'over the long term'

  - Notwithstanding the above, consideration of funding for qualifying DM projects shall recognise the need to incentivise network DM over the long term, and not just for the forthcoming regulatory period.
  - Payments to customers or other providers of DM services under the scheme should reflect consideration of timing to smooth the bill impact on consumers.
  - The scheme design should be as simple as practicable to apply, such that it is easy to understand, implement and administer for all market participants.
  - The scheme should contribute to achieving a material change that maximises in the amount of efficient DM in the market.

Reporting on DM project outcomes

- As one purpose of the incentive scheme shall be to build capability among DNSPs in planning and implementing DM, the scheme should include requirements regarding the monitoring of DM project outcomes and publication of results as a means for maximising the impact of the incentive scheme expenditures.

Requirements of DM incentive scheme

- In developing the demand management incentive scheme, the AER must have regard to:
  - where available, past experience (in Australia and internationally) including costs, benefits and outcomes for comparative DM services;
  - the need to consider in the cost-benefit assessment the value to customers participating in the DM project of any significant additional cost or benefit of their participation (including the electricity they would have

used or wasted except for that participation);

- range of market benefits permitted under the regulatory investment test for distribution;
- the effect of the particular control mechanism to which the DNSP is subject on incentives to adopt or implement efficient non-network alternatives;
- the extent a distributor is able to offer efficient pricing structures;
- any possible interaction with other incentive schemes;
- the need to develop an efficient, fair and competitive market for DM services;
- the willingness of customers to pay for any increases in costs or prices resulting from the implementation of the scheme; and
- the distribution of any benefits of reduced costs or bills resulting from the implementation of the scheme.

AER to specify information required

- The AER shall decide what information is needed from the DNSPs to monitor the application of the demand management incentive scheme and to verify outcomes.
- The AER shall publish the demand management incentive scheme no later than nine months after the commencement of this rule.

2. Calculation of the share of non-network market benefits and DM performance incentives

DNSPs may retain some non-network market benefits of DM

The AEMC 'Power of Choice' review noted that the average maximum incentive that can be earned by the network business in the USA is about 11 per cent of net benefits. Ausgrid proposed a 30% cap while other network businesses suggested no cap at all.
The AEMC proposed the maximum percentage share should be a matter for the AER to decide. The 50% maximum proposed here leaves much discretion to the AER while also providing some guidance. While this might seem unduly generous to DNSPs, it is arguably essential in order to balance the longstanding bias in favour of network infrastructure and against DM.

- Recognising the barriers to network DM, the AER shall provide DNSPs with incentives to undertake efficient DM.
- Under the scheme, the DNSP is permitted to retain a share of associated non-network related market benefits of DM as determined by the AER, if
  a) the network has made a material contribution to this DM, and
  b) the DM is unlikely to have been delivered without this network support.
- The share of associated non-network related market benefits retained by the DNSP must be proportional to the net benefits delivered to the market.
- The maximum percentage of non-network related market benefits which can be retained by DNSPs shall be determined by the AER but should not exceed 50% (the actual percentage can vary by business and by time).
- Any standardised values for non-network benefits used to calculate the value of the incentive must be broadly consistent with the RIT-D guidelines.
- Methodologies used to determine the extent of the consumer demand response should be consistent with baseline consumption methodologies approved for the demand response mechanism proposed for the wholesale market where the circumstances are similar, except where the DNSP can provide justification for a different value being used.

DM Innovation Allowance to support research and development

3. Innovation Allowance

- The AER shall establish a DM innovation allowance scheme for research and development activities related to DM.
- The innovation allowance scheme shall provide funding for, and an incentive to, DNSPs to undertake activities that will increase their knowledge regarding (a) the ability of different approaches (both technology- and pricing-based) to achieve useful and reliable demand reductions, (b) the costs of those approaches, and (c) their impacts (if any) on network systems operations.
- The AER has the flexibility to determine the amount of the innovation allowance for each distribution business (noting that these amounts could vary by business and over time).
- The AER has the discretion to develop the design of the innovation allowance scheme subject to the scheme being simple for it and the DNSPs to administer (i.e., that its associated transaction costs are appropriate).
- Businesses must provide all relevant information and data arising from such pilots/trials approved under this scheme to the AER in a timely manner and that all such information be available for publication unless reason for confidentiality is established to the satisfaction of the AER
- Results of the projects approved under this scheme must be published in the DNSP's distribution annual planning report.

DNSPs able to recover lost revenue

The original AEMC rule change includes foregone profit. However, recovery of foregone ***revenue*** *instead of* ***profit*** *will provide a financial incentive for DNSPs to undertake DM and to deliver DM at efficient cost.*

4. Include allowance for foregone revenue under the DMIS

- In order to treat DM equally with other network expenditure, the AER shall ensure that allowance is made to allow DNSPs to recover revenue lost as a consequence of the DNSP undertaking any approved DM project. (Note: in the case of DNSPs operating under a revenue cap control mechanism, there will not be foregone revenue.)
- Revenue lost by the DNSP is only recoverable in relation to DM projects undertaken by the DNSP.
- In calculating foregone revenue, the AER must have regard to the tariff structure of the DNSP.

5. Capital and Operating Expenditure Objectives

- Amend NER Clauses 6.5.6 (a) to (c) and 6.5.7(a) to (c) to enable the AER to consider potential non-network benefits when assessing the efficiency of proposed DM activities included in business revenue proposal.

PROPOSED NEW DM INCENTIVE SCHEME

This section proposes a reformed DMIS for DNSPs to be established by the AER following the rule change process. This scheme would replace the current very modest and ineffective Demand Management and Embedded Generation Connection Incentive Scheme (DMEGCIS). The following proposals are not intended to be definitive. Instead, they provide a framework and a focus for debate and consultation on the development of a DMIS. The notes in the pink boxes provide explanatory notes to the proposed DMIS.

Summary

The rule change above is intended to clarify the intent of the NER relating to DM. However, to have an impact, the above DMIS rule must be enacted by the AER by establishing a DM Incentive Scheme (DMIS). This section proposes key elements that such a scheme should include.

Note

Of the nine principles listed here, only 'efficiency' and 'reliability' are specifically mentioned in the National Electricity Objective (NEO). However, it can be argued that each of the other seven is consistent with serving the 'long-term interests of consumers' aspect of the NEO.[13]

Objective: *The overarching objective of this Demand Management Incentive Scheme (DMIS) is to provide appropriate incentives for distribution network service providers (DNSPs) to pursue efficient demand management (DM) projects and pricing.*

The supporting principles of the DMIS include:

- ***Efficiency**: The Scheme is intended to maximise the application of cost-effective DM in support of the long-term interests of consumers.*
- ***Fairness**: The Scheme is intended to provide an equitable distribution of the benefits and costs of DM between DNSPs, their customers , their shareholders, and DM service providers, and between consumers who participate and non-participating consumers.*
- ***Sustainability:** The Scheme should enhance environmental sustainability.*
- ***Simplicity**: Recognising that complexity creates cost and erodes efficiency, the scheme should be as simple as possible, consistent with its objective and these principles.*
- ***Transparency**: Recognising that improving efficiency over time depends on shared learning, and fairness depends on accountability, the operation of this scheme should be based on transparency and clear, concise and consistent reporting.*
- ***Competitive neutrality**: The Scheme should ensure that DM options and service providers are not disadvantaged relative to network or centralised generation options and service providers.*
- ***Reliability:** The Scheme should support a balanced approach to electricity supply reliability, reflecting the preferences and interests of customers and reflecting the potential of DM to support and enhance reliability.*
- ***Foresight:** The Scheme should respond to current and anticipated market and technology developments.*
- ***Flexibility:** The Scheme contains multiple elements – and is intended to be flexible in order to accommodate the individual circumstances of each DNSP.*

Criteria for efficient DM

Criteria: For the purposes of this Scheme, DM projects are characterised as follows:

- DM projects are any deliberate uses by the DNSP of non-network solutions including demand response, energy efficiency, embedded or distributed generation or energy storage to reduce load at risk, improve reliability or defer or avoid the expenditure on network infrastructure and electricity supply.
- Efficient DM is defined as any DM project that delivers a net benefit to consumers, regardless of where in the electricity supply value chain those benefits arise.
- DM projects should address (current and/or anticipated) network issues in order to qualify for inclusion in the incentive scheme. Network issues may include: network supply capacity, reliability, asset replacement and changing demand or local generation patterns.
- DM projects may be identified either through the DNSP regulatory proposal, the R IT –D process or through the DNSP's Demand Side Engagement Strategy.
- DM projects must be subject to a transparent measurement and verification process which clearly demonstrates the associated outcomes, costs and benefits.

Form of control: 'decoupling'

Economic regulation that links the revenue of the DNSP to the volume of electricity consumed by its customers (e.g. price caps) can be a powerful disincentive to DM by DNSP. 'Decoupling' revenue from energy consumption addresses this disincentive.

1. Form of control (Decoupling DNSP revenue from electricity consumption)

The AER shall ensure that the regulatory form of control provides equal treatment of DM relative to network investment (i.e. it should provide a 'level playing field').

This should be achieved either through a revenue cap (*as is currently applied in Queensland and as is proposed for NSW for the next regulatory period*), or in the absence of a revenue cap, an alternative form of decoupling, such as a D-Factor (*although this is much more complex and has had very limited success in NSW*).

DM Plans vs. 'Demand Side Engagement Strategy'

The National Electricity Rules (NER) were recently changed to require DNSPs to publish a 'Demand Side Engagement Document' (NER, clause 5.13.1).

Unlike the Demand Side Engagement Document, the DM Plan would include the DNSP's proposed DM options for implementation, and for budget and target outcomes, and would do so in parallel with developing plans for network investment in their regulatory proposal.

2. Regulatory proposals and DM Plan

Each DNSP shall submit as part of its as regulatory proposal a proposed DM Plan. The proposed DM Plan should include DM projects and pricing it proposes to implement and annual targets in terms of reductions below 'business as usual' for: peak demand, energy consumption, capital expenditure and customer bills. It should also include the expected impact on network charges.

The proposed DM Plan should include a budget of proposed capital and operating expenditure to implement it.

The AER shall evaluate the proposed DM Plan in relation to other network expenditure and determine whether: the proposed DM is efficient; the targets are sufficient; and the proposed expenditure is prudent.

AER shall approve proposed DM expenditure considered prudent and include it as part of the DNSP's regulatory determination.

DM targets & nominated DM performance Targets

It can be argued that peak demand is not the best criterion for nominated performance targets, as it does not take account of the value of the specific network investment avoided by DM or the value of savings to customers. However, as it is a relatively simple criterion, it is suggested here as the best basis for nominated performance targets in the first instance.

3. DM targets and 'Nominated Performance Targets'

The AER shall consider the DNSP's DM Plan in assessing overall DNSP expenditure proposals and where considered appropriate, adopt the DNSP's proposed annual DM targets for the purpose of awarding the DNSP a DM performance incentive. These targets shall be referred to as the annual DM Nominated Performance Targets.

If the DNSP has not specified DM targets, or if the AER considers the proposed DM targets are not appropriate, the AER may consult with the DNSP to set alternative DM Nominated Performance Targets for the DNSP.

The Nominated Performance Targets (NPTs) shall be based on reductions in peak demand as a result of DNSPs implementing DM options. The AER shall specify whether the DNSP's Nominated Performance Targets shall be based on:

- network-wide coincident peak demand or the sum of diversified (local) peak demand;
- summer or winter peak demand , or a composite of both; and
- reduction in peak demand below 'business as usual', or reduction in peak demand directly attributed to DNSP DM activity, or a composite of both.

In considering DM targets, the AER shall take account of any announced policy of the Standing Committee on Energy and Resources in relation to DM or DM targets.

DM performance reporting

4. Reporting DM performance

Each DNSP shall submit to the AER an annual DM performance report advising of performance against targets and criteria, including:

1. ***Peak demand and energy consumption vs. business as usual forecast**:* How do peak summer and winter demand (MWp) and annual energy consumption (GWh p.a.) in the past five years compare to the business-as-usual levels forecast in their network pricing determinations?
2. ***DM performance:*** How much have coincident peak summer and winter demand (MWp) and annual energy consumption (GWh p.a.) been reduced across the DNSP's network system in the current year as a result of DM options that the DNSP has supported over the past five years?
3. ***Savings:*** By how much have the DNSP's capital and operating expenditure been reduced (or increased) as a consequence of points 1 and 2? By how much have customer energy bills been reduced in the current year as a result of points 1 and 2?
4. ***Revenue and price impact:*** What has been the impact on DNSP revenue and network charges of DM options undertaken over the past five years?

Based on an assessment of the annual DNSP DM performance reports, the AER shall determine the annual deemed DM Performance (DMP) of demand reduction for each DNSP relative to its Nominated Performance Target.

5. DM performance incentives

The AER shall specify a performance threshold (for example, 80%) for the annual DM Nominated Performance Target. Where a DNSP's actual DM performance exceeds the performance threshold in a given year, the DNSP shall be permitted to recover through their network charges in the subsequent year an additional DM Performance Allowance.

The DM Performance Allowance shall be calculated as follows:

DMPA = DMP(t) x WACC x CAPEX PDC,

where:

DMPA is the DM Performance Allowance

DMP(t) = DMP - Ө.NPT

i.e. the Peak Demand Reduction performance (DMP) beyond the performance threshold (Ө) of their Nominated Performance Target (NPT)

WACC = the Weighted Average Cost of Capital

CAPEX PDC = RAB/PD

i.e. the Capital Expenditure 'Peak Demand Coefficient' (CAPEX PDC), the DNSP's Regulated Asset Base (RAB) divided by its the network-wide peak demand (PD)

The DM Performance Allowance is intended to allow the DNSP to 'earn a return' on efficient DM expenditure performance equivalent to the financial return on network investment. The CAPEX PDC is intended to reflect the average value of avoided network capex per unit of peak demand reduction achieved through DM.

The DM Performance Allowance will be available to DNSPs based on the annual DM performance report relative to their DM Performance Target.

The DM Performance Allowance will be available for DM Performance above a minimum performance threshold (such as for example 80% of the annual DM Performance Target) and up to DM performance cap (such as for example, 150% of the annual DM Performance Target). The DM performance cap shall also be specified by the AER.

The non-network market benefits of DM shall be considered by the AER in setting the DM Performance Allowance.

DM performance incentives

The DM performance incentive is intended to create a direct financial incentive for DNSPs to undertake DM comparable to the incentive to earn a return on additional network investment.

This incentive in effect allows the DNSPs to recover a share of the benefits of DM that would otherwise accrue to customers or retailers. By allowing DNSPs a share in these 'non-network market benefits', it is intended to deliver efficient DM and its benefits that would otherwise be lost to the market altogether.

The DM Performance Allowance is only payable on performance beyond a given threshold as recovery of DNSP's DM expenditure should in the main, be incorporated into the normal expenditure recovery mechanisms of the regulatory determination.

Earning a return on DM

If linking the 'Peak Demand Coefficient' to the size of a DNSP's existing Regulated Asset Base (RAB) is considered to penalise DNSPs with smaller RABs due to more efficient past network investment, then a uniform national CAPEX PDC could be applied instead.

6. Opex/capex offset

Opex/capex trade offs

The AER shall ensure that the DNSP will not be disadvantaged if it increases operating expenditure on DM, if such increased operating expenditure is more than offset by reductions in capital expenditure.

DM benefits between regulatory periods

This provision ensures that if a DNSP avoids building infrastructure in the current regulatory period by undertaking efficient DM instead, then their profitability in the next regulatory period will not be reduced. The DNSPs will not be disadvantaged while consumers will benefit from lower overall costs.

It is recognised that this issue will need to be considered in concert with setting appropriate regulated rates of return for investment for DNSPs. There have been many suggestions that the weighted average cost of capital (WACC) has long been set too high which has exacerbated incentives for network businesses to over-invest in infrastructure.

7. Inter-period rollover

The AER shall take account of current and future capital expenditure deferred or avoided through DM in setting allowable revenue for DNSPs in its regulatory determinations. In doing so, the AER shall ensure that DNSPs undertaking DM are not disadvantaged relative to what their allowable revenue would have been had they further invested in network instead of undertaking DM.

DM Innovation Allowance

The existing Innovation Allowance is retained as a relatively minor part of the new broader DMIS.

8. DM Innovation Allowance

In each DNSP regulatory determination, the AER shall establish a DM Innovation Allowance (DMIA) to provide funding for, and an incentive to, DNSPs to undertake activities that will increase their own and their stakeholders' knowledge regarding:

a) the ability of technology- and pricing-based approaches to achieve useful and reliable demand reductions;
b) the costs of those approaches; and
c) their impacts (if any) on network systems' operations.

While the DMIA will not be the main means of supporting network DM, it shall be an important component of the DMIS to support innovative and experimental DM for which it is difficult to anticipate outcomes.

The funding for the DMIA for each DNSP shall be set by the AER at a level commensurate with the opportunity for such innovative DM to benefit the long-term interests of consumers.

COMPLEMENTARY POLICY REFORM: TARGETS, REPORTING, INCENTIVES AND OBJECTIVES

In order to give the AEMC and AER greater confidence in implementing the proposed rule and proposed DMIS, four clarifications of government policy are desirable.

The above proposed DMIS rule change and the proposed DMIS are regulatory changes. If adopted, these reforms are likely to significantly increase the uptake on network DM to the benefit of energy consumers and network owners. The AER can only adopt a DMIS consistent with the National Electricity Rules, and the AEMC can only adopt a rule change consistent with explicit government policy. This policy is set out most powerfully by the National Electricity Law and other legislation and is articulated by federal, state and territory ministers, in particular through the Standing Committee on Energy and Resources.

It would appear that the above proposed reforms are consistent with existing policy, so no change in law or policy is required to adopt them. However, both the AER and AEMC are by nature cautious institutions that are careful not to be seen to be 'making policy'. In order to give the AEMC and AER greater confidence to facilitate these reforms, four clarifications of government policy reform are desirable. In each case, the form of clarification could range from a simple statement of policy intent to more substantive measures.

In each case, the best channel for policy clarification would be via the Standing Committee on Energy and Resources. However, if this is impractical for some reason, then the federal government (or even state or territory governments) could act.

The proposed DMIS structure above incorporates three of the four desired clarifications. However, should these not be addressed through the final DMIS, they will require complementary measures. To the extent that they are not incorporated, the following discussion suggests some additional steps that could be taken to implement them.

The four key elements requiring clarification are:

1. DM targets
2. DM performance reporting
3. DM incentives
4. DM policy objectives.

1. DM targets

It is commonplace for organisations and governments to set explicit targets in pursuit of a stated objective. If a DM incentive scheme is intended to support DM, then it follows that DM targets in some form should apply to DNSPs. The softest way of applying such targets would be for government to state that DM targets are a desirable component of a DMIS. Even this simple statement would be valuable in giving the AEMC and AER more confidence and clarity in establishing an effective DMIS.

However, there is a very wide spectrum of further steps that governments could take, such as (in rough order of increasing stringency):

- specify the preferred time period (e.g. annual targets) or the units for measurement of DM targets (e.g. MW peak demand, $ value of customer savings, etc.)
- ask DNSPs to nominate their own voluntary targets
- convene a discussion with DNSPs and other stakeholders, potentially via the AER's Consumer Challenge Panel, to consider appropriate collective targets,
- set an indicative level for targets (e.g. 3000 MW or $1 billion p.a. by 2017)
- set indicative targets for individual DNSPs
- state that if appropriate targets are not set (and met), then mandatory targets will be imposed
- legislate to impose mandatory targets (it should be noted that this option is likely to be the most complex and time consuming).

The AER does effectively accept performance levels for reliability and service levels in making its five-yearly network revenue determinations, so to seek and consider DM targets from DNSPs would be within its current responsibilities. However, the AER has previously stated that the setting of targets is a broader policy decision that goes beyond the AER's responsibilities in respect of applying chapter 6 of the NER to DNSPs.[14] For this reason government policy guidance on targets would be helpful.

For further discussion of possible DM targets see the *Investing in Savings* report.[15]

2. DM performance reporting

Equally important to setting targets to achieve an organisational objective is measuring and reporting performance in pursuit of that objective. While this should be self-evident, there has hitherto been no formal or standardised performance reporting in relation to network DM in Australia.

Again, the simplest policy clarification in this regard would be for government to note that public reporting of DM performance by DNSPs would be desirable in the context of a DMIS.

Beyond this, there is a range of further steps that governments could take, such as:

- inviting DNSPs and other stakeholders to participate in a collaborative consultation process to refine the detailed reporting template and guidelines
- specifying the period and format for DM performance reporting (such as those indicated in point 4 in the Proposed DMIS above)
- collating DNSP performance reporting into an annual consolidated national report on network DM
- benchmarking DM performance in Australia against international practice.

The AER's recently established Consumer Challenge Panel could play a valuable role in advising and reviewing in relation to DM performance reporting. For further discussion of DM performance reporting see the *Investing in Savings* report.[16]

3. DM incentives

While it might seem self-evident that a DM Incentive Scheme should include specific financial incentives, clarification of government policy relating to DM incentives would be helpful. As a minimum, it would be valuable for there to be a clear government statement recognising that cost-effective DM, including energy efficiency, in the Australian electricity market is under-utilised as a result of a number of regulatory, cultural and other barriers, and specific incentives to redress these barriers are warranted.

Such a statement would give confidence to the AER to establish specific incentives for DM in the DM Incentive Scheme.

Stronger policy of support for DM incentives could include establishing incentives directly, including through the new federal government's direct action policy to reduce carbon emissions. Other options for DM incentives are included in the *Investing in Savings* report.[17]

However, provided the DMIS establishes effective financial incentives, the need for additional complementary incentives may be obviated.

4. Clarifying DM policy objectives

The failure of electricity regulation in Australia to support cost-effective DM is partly due to an absence of clear government policy commitment in support of DM. Indeed, the deliberate exclusion of the environment as an element in the National Electricity Objective (NEO) may have inadvertently encouraged this neglect by encouraging regulators to disregard DM as primarily an environmental matter, in spite of its clear economic benefits.

To remove this uncertainty, the Federal Minister for Energy, either in his/her own right or through the Standing Committee on Energy and Resources, could request that the AER take all reasonable steps within its power, and consistent with the National Electricity Rules, to facilitate cost-effective network DM. (Similar requests could be made to the Western Australian Economic Regulatory Authority (ERA) and the Northern Territory Government in relation to the regulation on network DM in those jurisdictions.)

A more compelling way to clarify government policy intent in this area would be to amend the NEO to include explicit reference to demand management and environmental criteria for the long-term interests of consumers, in addition to the existing technical and price criteria.[18]

In contrast to Australia, several overseas electricity markets currently have embedded social and environmental objectives. Examples include:

- The UK, where the principal regulator, the Office of Gas and Electricity Markets (OFGEM) is required to observe the following electricity market objective:

  The Authority's principal objective is to protect the interests of existing and future consumers in relation to gas conveyed through pipes and electricity conveyed by distribution or transmission systems. The interests of such consumers are their interests taken as a whole, including their interests in the reduction of greenhouse gases and in the security of the supply of gas and electricity to them.[19]

- Canada, where the Canadian National Energy Board, the body tasked with regulating energy development in the Canadian public interest, has defined public interest as:

  Inclusive of all Canadians and refers to a balance of economic, environmental and social considerations that changes as society's values and preferences evolve over time.[20]

However, to effect such a change in Australia would likely take quite some time to achieve and governments and regulators have for many years resisted such suggestions.

Whether clarification of DM policy objectives is required in practice depends on how the AEMC and the AER choose to interpret the National Electricity Rules and the National Electricity Objective. The requirement to protect the long term interests of consumers and to promote economic efficiency should be sufficient to drive the AEMC to pursue the adoption of cost-effective DM as proposed in the rule change and DMIS as outlined in this report. However, if the AEMC and/or the AER judge that current policy and legislation is not sufficient to justify reducing costs to consumers through effective DM, then they should clearly and specifically identify this policy deficiency, so that government can rectify it.

2 IMPORTANCE: WHY WE NEED TO ACT ON NETWORK DM

High levels of investment in electricity network infrastructure have led to high electricity bills and a carbon intensive economy. The pressure on electricity bills, plus the twin pressures from climate change and rapid technological change, makes urgent action on demand management imperative.

THE ECONOMIC IMPERATIVE

Demand management has been under-utilised in Australia for many years. Consequently, peak demand, investments in network infrastructure and electricity prices have all been rising.

Expenditure on electricity network infrastructures have increased sharply: in the current five-year regulatory period more than $45 billion is being invested. This amount is larger than expenditure on the National Broadband Network (and over a shorter timescale), yet until recently has not been subject to the same level of scrutiny. An estimated one-third of the current investment in the networks is to cater for growth, and in particular, growth in peak demand, despite peak demand events occurring for less than forty hours per year (or less than 1% of the time).[21]

Electricity prices have doubled between 2007 and 2013 as DNSPs recoup their investment from consumers, with network charges now making up half of the average Australian electricity bill (see Figure 1 and 2 over the page).

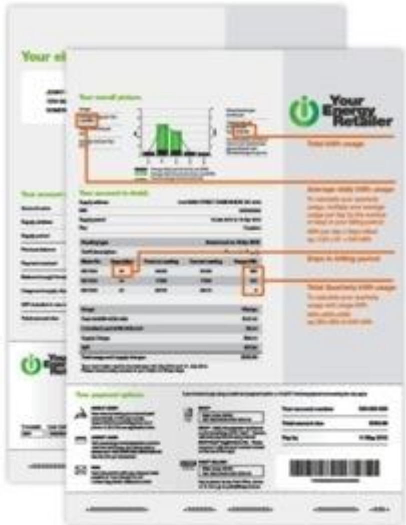
What is peak demand?

Peak demand (or peak loads) is a measure of the highest points of instantaneous use of electricity in a year. Peaks generally occur on particularly hot or cold days, when consumers use a lot of electricity to heat or cool buildings. Electricity networks must be built to reliably accommodate these peaks, even if this capacity is only needed for very short periods of time.

The cost to consumers may continue to increase unless a greater emphasis is placed on demand management to meet peak demand.

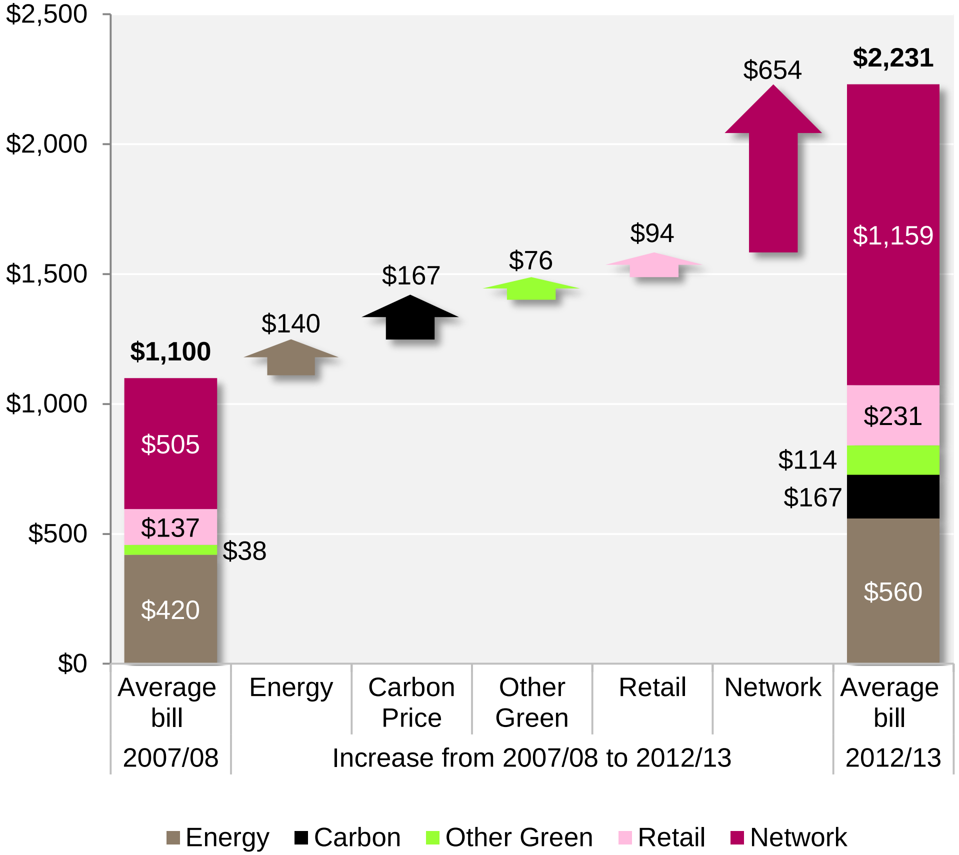
Despite a recent decline in total electricity consumption, peak demand growth is projected to continue to increase over the next decade[22], placing further upward pressure on electricity networks, and therefore on electricity prices and bills.

At the same time, as electricity demand becomes ‘peakier’ (i.e. it is characterised by periods of higher maximum demand compared to average demand) the investment that is made to augment the network becomes less economically efficient. This has been noted in the recent dramatic decline in electricity network productivity.[23]



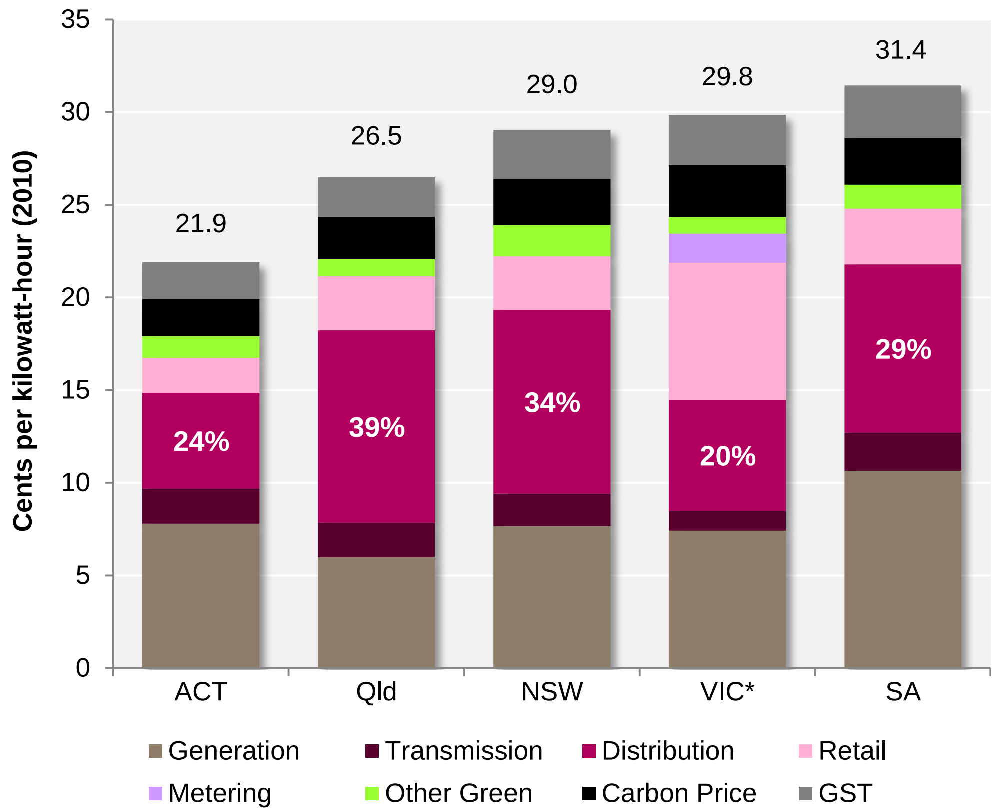
Even if consumers reduce their electricity consumption, electricity prices will continue to rise (at least in the short term), as DNSPs continue to recover their “sunk” network infrastructure investments over a smaller sales volume. Moreover, if electricity consumption falls, DNSPs are likely to recover the associated decline in revenue by increasing the daily fixed charge component on bills, further reducing consumers’ capacity to control electricity bills. Encouraging DNSP’s to invest in DM instead of more supply infrastructure can give customers more control over their bills and DNSPs greater control over their costs.

Figure 1: Components of a typical NSW electricity bill, 2007/08 and 2012/13*



Source: IPART (2012) Review of regulated retail prices and charges for electricity 2013 to 2016.
** It is understood that GST is included in the cost figure for each component, though this is not made explicit.*

Figure 2: Components of electricity prices by state, 2011/12



*Source: AEMC Future Possible Retail Electricity Price Movements, 2010; Treasury modelling (*Vic = 2012 calendar year)*

Figure 1 shows the network cost component of an average bill in NSW more than doubling over the last five years (an increase of $654, from $505 in 2007/08 to $1,159 in 2012/13). Figure 2 shows that the network cost component is also substantial in other states, particularly in Queensland and South Australia, though it makes up a smaller proportion of the overall cost in ACT and VIC. Figures 1 and 2 also show the relatively small contribution of the carbon price and other green initiatives to electricity price and bill increases.

There are substantial opportunities for demand management in Australia. Uptake of these opportunities could lead to savings of $4–12 billion over the next 10 years, which could save consumers between $120 and $500 on their electricity bills each year.

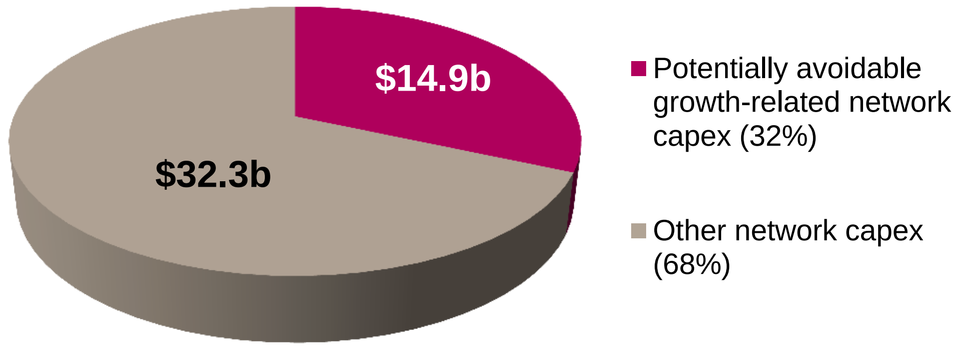
Australia is currently experiencing an unprecedented level of electricity network investment with over $45 billion of capital expenditure (capex) in the period 2010 to 2014[24]. As indicated in Figure 3, about one third of this capex is identified as augmentation or "growth related". Much of this growth related capex is potentially avoidable or deferrable by using DM to reduce demand growth. The remainder of this capex is primarily driven by other factors such as replacement of ageing infrastructure or changes to reliability standards. Some of this investment is also potentially avoidable though DM.

According to the Australian Energy Market Commission (AEMC), it is estimated that the 'economic cost savings of peak demand reduction in the National Electricity Market (NEM) is likely to be between $4.3 billion to $11.8 billion over the next ten years … which equates to between 3 per cent and 9 per cent of total forecast expenditure on the supply side'.[25] These savings include cost reductions associated with avoided network capital expenditure. The upper and lower ranges of these figures and their composition are shown in Figure 4. The main contributing factors underlying the two scenarios are demand-based pricing (efficient pricing and demand response) and energy efficiency.

Assuming these cost savings are passed on to customers, total network charges should fall as the need for network augmentation to meet peak demand falls. The extent of the savings to customers will be different across jurisdictions of the NEM, with regions with strong peak demand growth expected to benefit the most. For the AEMC review, Frontier Economics forecast savings of approximately $500 per consumer per annum in South Australia and Queensland, $350 in New South Wales and $120 in Victoria.[26]

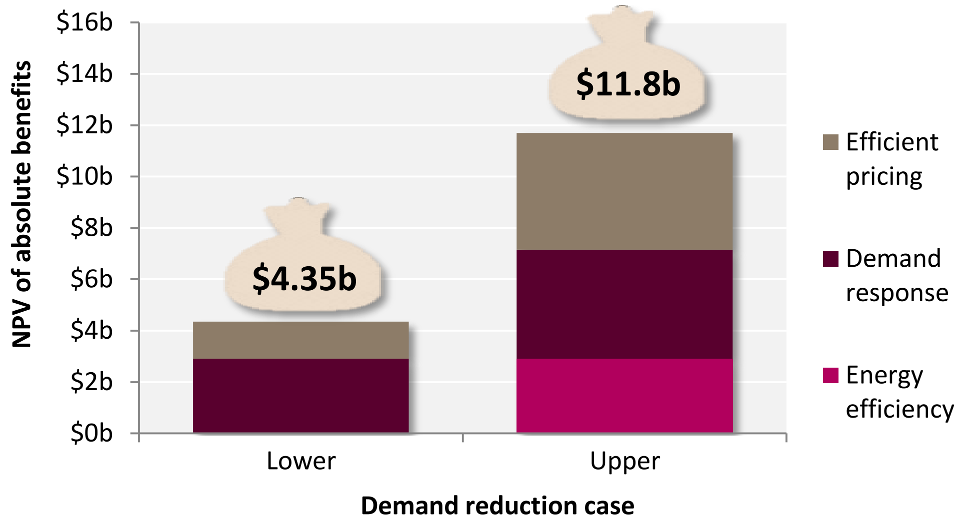
Increased peak demand management will also have implications for the price of electricity generation. If peak demand decreases and electricity consumption in peak times is shifted to other times, this has the impact of flattening the demand curve.[27] The price of electricity generation is determined in half-hour blocks on a bidding process. Fewer periods of peak demand, and therefore fewer half-hour periods of very high electricity generation prices in the wholesale electricity market (prices can rise to $13,100 per MWh[28]) will reduce the average wholesale electricity price. This would also flow through to customers as a reduced electricity generation component in electricity tariffs.

Figure 3: Network capital expenditure 2010 -2014 ($ 2010)



Source: ISF, Australian Decentralised Energy Roadmap, 2011.

Figure 4: Total benefit of demand reduction in the NEM 2013/14 to 2022/23



Source: AEMC Power of Choice Review Final Report, 2012

THE ENVIRONMENTAL IMPERATIVE

The impacts of climate change will be dramatic if global carbon emissions do not peak by 2020.[29] This makes the need to shift to cleaner energy options even more urgent. The response required to address climate change will need to go beyond the incremental, piecemeal approach adopted so far.

In May 2013, carbon dioxide levels of 400 parts per million (ppm) were recorded for the first time. There is scientific agreement that global emissions need to remain below 450 ppm if we are to have a 50% chance of avoiding a more than 2 degrees global average temperature rise. Baseline projections for business-as-usual puts carbon concentrations at 685ppm by 2050, placing the world in danger of average global temperature rises of between 3 to 6 degrees by 2100.[30]

We are already seeing the impacts of this elevated level of greenhouse gases in the form of increased temperatures, impacts on rainfall, extreme weather, sea level rise and health impacts. The Climate Commission notes that Australia is one of the most vulnerable developed countries to climate change.[31]

To avert the most severe projected impacts of climate change, global emissions need to reduce rapidly to near zero by 2050 and emission levels need to peak by 2020. This makes the current decade a critical period for emissions reduction.

Australia has one of the most carbon intensive economies in the world, and the continued supply side focus to electricity has exacerbated this, with the electricity sector accounting for 35% of Australia's national greenhouse gas emissions.[32] Energy-related carbon emissions in Australia are 18 tonnes per capita, well above the OECD average of 10.6 tonnes per capita. To deliver its share of global emission reductions, Australia will need to decarbonise its electricity systems rapidly.

Increasing our energy efficiency, by using less energy and reducing peak demand is one of the lowest cost forms of carbon abatement. And using DM to support energy efficiency while avoiding energy infrastructure costs is one of the most cost effective ways of delivering energy efficiency.

THE TECHNOLOGICAL IMPERATIVE

The electricity sector is at a turning point: disruptive technological change including the widespread adoption of solar panels (photovoltaics), improved energy efficiency of appliances and buildings and, soon, electric vehicles (EVs) and energy storage is fundamentally changing our requirements of electricity networks.

Australia's current electricity system developed as a centralised system consisting of a limited number of large-scale electricity generators and a network to take electricity supply from the small number of generators to customers. The business model involves providing 'kilowatt-hours' to consumers, with charges mostly based on the total volume of electricity used. This total volume and therefore total revenues have generally increased annually. At the same time, peak demand has also increased, which has increased the amount of network required.

This situation is changing rapidly. The volume of electricity generated by large coal fired power stations and flowing through the main grid has steadily declined since 2007, while the amount of distributed generation has also increased, particularly in the form of solar panels. The AEMO estimates that the jump in solar power in 2012 (from 1.5 to 2.7TWh) accounted for about 1/3 of the reduced output from the NEM.[33]

The ability of consumers to generate electricity from the sun, combined with the ability to store their electricity for later use (e.g. through batteries and EVs) may soon provide a viable alternative to our current centralised supply system.

These changes in supply, combined with demand-side technologies such as more efficient appliances and buildings and energy management technologies, have led to a fall in overall demand and energy sales for centralised energy utilities. The continued adoption of decentralised electricity solutions will require major changes to the business models of Australia electricity suppliers. Encouraging DNSPs to develop and support network DM as a business opportunity is crucial to managing this transition.

3 STATUS: DM AND THE NATIONAL ELECTRICITY MARKET

DM is intended to be used in the National Electricity Market where it is the most efficient way of providing electricity services to consumers. However, the actual amount of DM in the National Electricity Market is relatively low, due to a variety of barriers. Despite several attempts to deal with this problem, current responses to the low uptake of DM do not effectively address these barriers.

THE INTENT AND OPERATION OF ELECTRICITY LEGISLATION AND REGULATION

All activities undertaken by DNSPs are governed by the legislation and regulations that control the National Electricity Market (NEM). The legislation, overseen by the Australian Energy Market Commission (AEMC), and the economic regulation instigated by the Australian Energy Regulator (AER) operate at various levels, and incorporate both the original intent and the actual operation of the rules in relation to demand management.

At the highest level, the National Electricity Law (NEL) and the **National Electricity Rules** (NER) guide the whole National Electricity Market. Underneath the Rules, sits the **economic regulatory framework** that controls the supply- and demand-side activities of the DNSPs. The framework includes one specific provision for an **incentive scheme for demand management**. The intent and action of each of these three elements is discussed in the following sections.

The National Electricity Objective places the long-term interests of consumers at the heart of the operation of the National Electricity Market, but is silent on the role of demand management in achieving this.

The NEL and NER govern the way the Australian electricity market operates. The NEL sets out the National Electricity Objective (NEO) as follows:

> *The objective of this Law is to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—*
>
> *(a) price, quality, safety, reliability and security of supply of electricity; and*
>
> *(b) the reliability, safety and security of the national electricity system.*

Energy market institutions such as the AEMC, the AER and the AEMO are required to take account of the NEO in the exercise of their various powers.

Missing from the criteria important to consumers' long-term interests are environmental performance and the protection of vulnerable consumers and the two key means to meet these missing criteria: energy efficiency and demand management.[34] The focus on electricity price rather than electricity bills has also obstructed an balanced consideration of DM.

Current economic regulation of the NEM intends for DM to be used wherever it is the least-cost option. However, in practice the regulatory framework hinders DNSPs from retaining avoided or deferred capital expenditure savings from DM activities, leading to a preference for network investment.

The intent of current economic regulation is for DNSPs to use the most efficient means of servicing electricity demand, regardless of whether it is a supply- or demand-side solution.

However the AEMC, in its recent 'Power of Choice' review, found that the current regulatory arrangements may be discouraging DNSPs from pursuing economically efficient DM projects, resulting in a preference for network capital investment. The review stated that some of the factors contributing to this preference for capital investment include:

- the regulatory frameworks for assessing and approving operating expenditure (opex) and capital expenditure (capex)
- differing financial returns of opex and capex
- the ways in which allowed costs are recovered through tariff structures.[35]

Specifically, current regulations treat DM projects differently, depending on whether or not they are included in a DNSP's regulatory proposal for a regulatory control period. If a DNSP proposes a DM option in its regulatory proposal (as capital or operating expenditure) it is able to recover the costs of implementing the DM option, but not any capital expenditures that might be avoided (e.g. network augmentation expenditure).

If, however, the DM option was not included in the regulatory proposal, but was identified during the regulatory control period, then the direct implementation costs are not recoverable, but any savings from successful deferral or avoidance of capex are retained by the NSP until the end of the control period. Additionally, any deferred or avoided opex is retained for a period of five years under the Efficiency Benefit Sharing Scheme (EBSS). However, while DM costs might be incurred in this regulatory period, it is expected that deferred capital expenditure would occur in subsequent regulatory periods. Therefore, DNSPs are not currently likely to be able to retain the majority of any capital expenditure savings resulting from DM.

The current DM Incentive Scheme is comprised of an innovation allowance plus the potential recovery of foregone revenue. It is designed to supplement, rather than provide a source of funding for, DM projects.

The AER currently has two jurisdictional demand management incentive schemes (DMIS) operating in the 2009–2014 regulatory control period (Vic, QLD/SA and NSW/ACT). The current DMIS mainly comprises the Demand Management Innovation Allowance (DMIA), and in NSW, continuing the D-factor scheme developed by the Independent Pricing and Regulatory Tribunal of NSW (IPART). The current DMIS is therefore essentially a small innovation allowance.

Demand Management Innovation Allowance (all jurisdictions)

The DMIA consists of two parts: a) an annual ex-ante allowance in the form of a fixed amount of additional revenue and b) a foregone revenue recovery mechanism to balance any reduction in the quantity of energy sold that is directly attributable to non-tariff DMIA projects.

The DMIA for VIC/QLD/SA DNSPs makes explicit that it aims to complement the broader regulatory framework, and is not designed to be the sole, or even primary, source of funding for demand management expenditure. Instead, the DMIA is designed to supplement a DNSP's approved capital and operating expenditure in a regulatory control period.

D-Factor (NSW only)

The D-Factor ('D' for demand management) was introduced by the Independent Pricing and Regulatory Tribunal of NSW (IPART – the NSW economic regulator) in 2004 in order 'to ensure that these regulatory barriers [to DM] are removed'.[36]

The D-Factor operates by allowing DNSPs to increase their prices slightly to recover any loss of revenue arising from lower energy sales, as a result of DNSPs undertaking DM measures. The D-factor also allows the DNSPs to recover the direct cost of undertaking DM measures, provided this does not exceed the value of savings in network costs due to the measures.

THE ACTUAL PERFORMANCE OF DM IN THE NEM

Only a very low proportion of peak demand is currently met through demand management in Australia.

Despite a lack of comprehensive national reporting on demand management, there is evidence that there has been some recent progress by network businesses in relation to DM, although this has mainly been confined to Queensland.

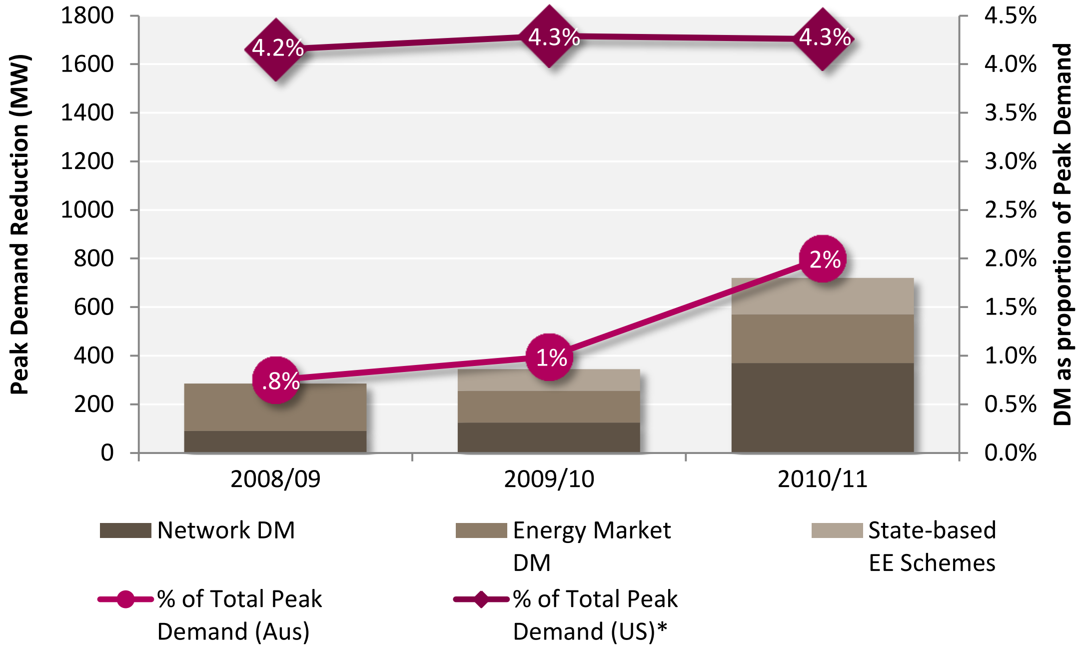
The latest available figures, from the 2011 *Survey of Electricity Network Demand Management in Australia*[37], identify just over 350MW of demand reduction from network DM projects in Australia in 2010/11. This was a substantial increase on 2009/10 figures (126MW), but still small in an electricity system that has more than 45,000 MW of generation capacity.

However, electricity distributors are not the only source of demand management within the electricity system. Electricity retailers also instigate demand management activities, while state government energy efficiency schemes also contribute to reducing peak demand. The estimated peak savings achieved by retailers' activities and schemes in 2010/11 were about 350MW – approximately equal to that achieved by networks.[38]

However, the total value of network and non-network DM activities currently only equates to about 2% of total peak demand, as shown in Figure 5. Whilst an increase on previous years, this is still somewhat lower than performance in the US, where demand management meets 4.3% of total peak demand.

(In addition to these estimates, there is a significant volume of DM in the form of residential off peak electric storage water heaters that operate in the low demand period overnight instead of peak demand periods. However, it is debatable how much this technology contributed in practice to reduced electricity peak demand. In the absence of off peak electric water heaters much of this load would likely have shifted to gas water heating, which would also not contribute to peak electricity demand.)

Figure 5: Peak demand reduction compared to total peak demand



Source: ISF, NEM Report Card, 2011

** US figures are for calendar years 2008, 2009 and 2010.*

The current Demand Management Incentive Allowance provides very limited financial incentive, and has a low uptake.

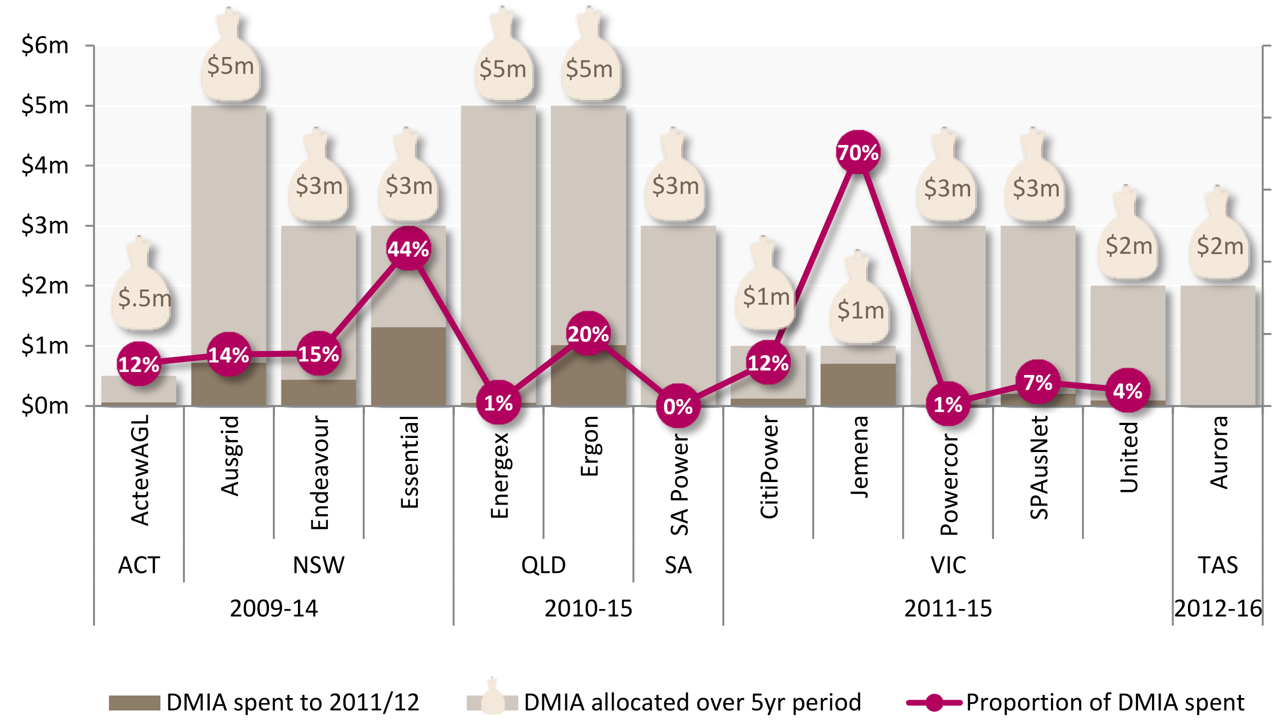
The Demand Management Innovation Allowance is quite limited in scope, currently providing between $100,000 and $1 million for each network for DM each year for five years, as shown in Figure 6 to the right.

The Productivity Commission believes that unless other market changes result in a substantial increase in commercially viable demand management, the innovation allowance needs to be increased.[39]

The most recent AER report on DMIA expenditures states that non-Victorian DNSPs claimed $2.2 million in DMIA expenditures in 2011–12, just over twice the amount in 2010–11, while Victorian DNSPs claimed $5.6 million in 2012, approximately equal to the amount claimed in 2011.[40]

However, despite this increase, approved DMIA expenditure from 2009–10 to 2011–12 accounts for just 14% of the total allowance available to the non-Victorian DNSPs in their current regulatory control periods, and 11% for Victorian DNSPs, equalling approximately 13% of the total $36.5 million available across the NEM. This demonstrates that even where money is actually allocated specifically for the purpose, there has often been a low uptake of it by DNSPs. This suggests that an effective DM Incentive Scheme needs to go beyond simply making a small monetary allowance for DM. An effective DMIS is likely to require other elements such as targets, comprehensive reporting, clear accountability and significant incentives as proposed in this report.

Figure 6: Demand Management Innovation Allowance: allocation and expenditure



Source: AEMC Power of Choice Review Final Report, 2012

BARRIERS TO DM

The disparity between the intent of the above legislation and regulation for DM in the NEM on the one hand and networks' actual performance on the other can be attributed to a number of barriers to the uptake of efficient DM, including regulatory issues, cultural bias, imperfect information, split incentives, payback gaps, inefficient pricing and confusion.

There are many barriers to the increase of efficient DM in the NEM. These can be classified into seven categories of barriers, as shown in Figure 7. Within each of these categories are specific problems relating to the use of DM by DNSPs, as shown Table 1 to the right. These are discussed individually over the page.

Figure 7: Categories of barriers to demand management

Regulatory barriers	The biasing of regulation against distributed energy resources
Cultural bias	Insufficient attention given by individuals and organisations to energy use
Imperfect information	Lack of access to relevant information
Split incentives	Benefits spread across numerous stakeholders
Payback Gap	Gap in acceptable payback periods between energy consumers and suppliers
Inefficient pricing	Failure to reflect costs (including environmental costs) properly in energy prices
Confusion	Additional barriers created by the interplay of the other six types of barriers

Table 1: Specific barriers facing DNSPs in the implementation of DM

Barrier category	Specific problem
Regulatory barriers	Lack of overarching policy imperative
	Bias towards network augmentation over DM
	Higher reliability criteria neglecting DM
	Lack of appropriate incentives for DM
Cultural bias	Favouring of supply-side solutions
	Lack of experience and confidence in DM
Imperfect information	Lack of comprehensive reporting of network DM
Split incentives	Disaggregated supply chain spreads costs/benefits unevenly
Payback gap	DNSPs able to recover network capital expenditure over say 40 years but unable to recover expenditure in customer energy savings that would pay back in 2 or 3 years
Inefficient pricing	Price structures that don't reflect cost structures
Confusion	Complex interaction of the above barriers obstructing effective reform

A more detailed discussion of barriers to DM is available in:

- Dunstan, et al, *Institutional Barriers to Intelligent Grid*[41]
- Dunstan, et al, *Barriers to demand management: A survey of stakeholder perceptions.*[42]

Regulatory barriers

Lack of overarching policy imperative: National Electricity Objective

Previous research by ISF[43] found that the National Electricity Objective (NEO) does not contain a broad enough range of criteria to meet the 'long-term interests of consumers'. In a survey of stakeholder perceptions of barriers to demand management, there was strong agreement that the lack of a DM/environmental objective in the National Electricity Law was a barrier to the uptake of DM. [44]

Bias towards network augmentation: Economic regulation

The current economic regulatory regime hinders DNSPs from retaining avoided or deferred capex savings from demand management activities, which encourages DNSPs to invest in network augmentation instead of DM. At the same time, capital expenditure is strongly rewarded through a high weighted average cost of capital (WACC) [45].

Further, the use of price caps rather than revenue caps in some jurisdictions can encourage DNSPs in these areas to favour network investment over DM, leading to high network costs. Price caps also encourage DNSPs to 'over-recover' revenue, which can indirectly give DNSPs an incentive to overinvest in their networks.[46] At the same time, they create strong disincentives for DM, as reduced demand and consumption reduces a DNSP's revenue.

On the other hand, a revenue cap means a DNSP cannot earn extra revenue simply by selling additional electricity. Instead, revenue caps encourage DNSPs to reduce costs in order to maximise the profit from their allowed revenue, thereby incentivising DM wherever it is a lower cost option than network investment.

Lack of appropriate incentives: DM Incentive Scheme

During the preliminary work conducted by AER last year in agreeing to an incentive scheme for NSW DNSPs, stakeholders noted a number of problems with the scheme, including: *'the current scheme failed to create sufficient incentives for long-term structural change'; 'the lack of funding provided under the DMIA reduced its effectiveness' and 'demand side actions and technologies should be incentivised based on the actual reduction in electricity demand (particularly peak demand) it brings'.*[47]

High risk/penalty for failure: Higher reliability criteria

Regulatory requirements for reliability standards encourage DNSPs to plan, maintain and operate their networks to minimise power outages. High reliability criteria can drive network investment and augmentation and encourage redundancy in the network.48 NSW and QLD have recently raised the reliability standards that electricity networks must meet as part of their network license conditions, and include deterministic criteria. Increasing reliability by even a small margin in an already reliable electricity system such those which supply most parts of Australia is quite expensive, and this drives network charges higher.

In addition, penalties apply in all jurisdictions if DNSPs fail to meet reliability targets. This can increase DNSPs' actual or perceived risks associated with using DM to defer network augmentation in cases where the DM might affect reliability. This is more likely to occur if the DNSP lacks experience or confidence.

Cultural bias

Favouring of supply side solutions

The current culture of DNSPs generally favours centralised, supply side solutions rather than DM. In response to regulatory incentives, the business structure of NSPs is built around capital expenditure. This means that not only are the reward and incentive structures for key decision-makers geared to network augmentation solutions, but so are the 'shared knowledge', 'common sense' and conventions of these decision-makers. This impedes the ability of DNSPs' planning processes and procedures to generate network DM solutions.[49] However, this culture can change. For example, anecdotal evidence suggests that the internal business culture within Queensland DNSPs shifted significantly in recent years towards a more balanced approach to DM as regulatory and policy barriers to network DM were removed.

Limited experience and confidence in DM

This supply-side culture has led to a lack of experience and expertise in DM, and an associated lack of confidence in DM options. DNSPs therefore often attribute a high risk that DM will not deliver on the performance criteria they require. When this is coupled with limited data on successful DM solutions, the analysis of DM generally receives such an adverse risk-weighting that they are rarely assessed as preferred to network augmentation. This is exacerbated in jurisdictions with deterministic reliability criteria, as discussed above.

Imperfect information

Lack of comprehensive reporting of network DM

At present, there is no comprehensive system for measuring and reporting network DM. The only comprehensive assessment of electricity network DM to date was the 2011 Survey of Electricity Network Demand Management in Australia.[50]

DNSPs are required to report annually on the outcomes of DM activities undertaken through the Demand Management Innovation Allowance, but as shown earlier, this is a very small amount of DM.

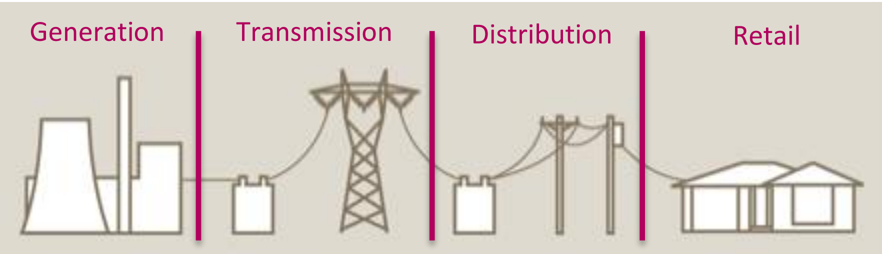
Split incentives

Disaggregated supply chain spreads costs/benefits unevenly

The electricity market in Australia has four main components: generation, transmission, distribution and retail (described as the 'supply chain'), shown in Figure 8. These different components are generally compartmentalised, and are usually owned by different companies.

As the costs and benefits of DM are felt differently at different stages of the supply chain, they are therefore spread unevenly amongst the different stakeholders. This can mean that stakeholders who implement DM options, and therefore accrue the costs, can have trouble capturing the benefits, while other stakeholders will receive benefits without contributing to the costs.

Figure 8: Elements in the electricity supply chain



Source: Adapted from The Energy Supply Chain, Energy Efficiency Exchange (eex.gov.au)

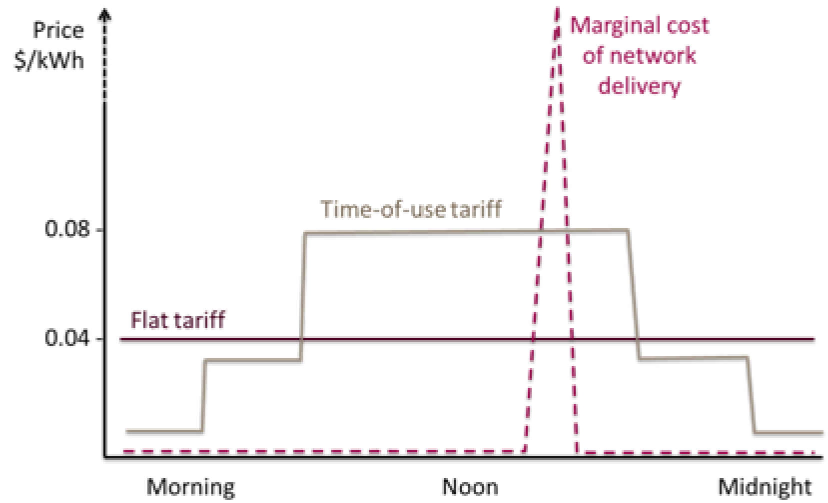
Inefficient pricing

Price structures that do not reflect cost structures

The cost of electricity supply varies dramatically from time to time and place to place depending on the capacity of the infrastructure at particular times and places. An increase in the use of electricity at peak time in a constrained part of the network can increase costs dramatically if it necessitates augmenting infrastructure, while use at other times or in other unconstrained locations may impose little if any additional cost.

However, these varying cost structures are generally not reflected in current price structures. Instead, network tariffs are generally based around a relatively small, fixed daily charge and a usage charge based on total volume of electricity used (usually a 'flat' tariff at a set cents-per-kilowatt-hour price, or a time-of-use tariff with a number of 'stepped' prices as shown in Figure 9). This means that the total 'cost' of electricity supply is 'smeared' across all users through the creation of an average 'price' for a tariff which is given to everyone, everywhere. As current tariffs are generally not cost reflective, there is little price incentive to consumers to act in ways that reduce the total costs of supply.

Figure 9: Price verse cost of electricity supply



CURRENT RESPONSES TO IDENTIFIED PROBLEMS

Because of the sharp rise in electricity prices over the last five years, more attention has recently been paid to barriers to DM and several reform processes are under way. However, these do not comprehensively address all the key barriers to demand management.

Following the public outcry over sharply increasing electricity bills, 2011 saw the beginning of a number of a targeted national efforts aimed at addressing some of the issues in the electricity market that were putting upward pressure on household bills. For example, the Council of Australian Governments' (COAG's) Standing Council on Energy and Resources (SCER) established an Energy Market Reform Working Group (EMRWG) and the AEMC initiated its Power of Choice Review. The Productivity Commission Review of Electricity Network Regulatory Frameworks was particularly critical of current regulatory practice.[51]

Table 2 outlines the various recent or existing reform processes and the specific problems that they attempt to address (more detail on these various responses is provided in the following pages). As can be seen, not all of the specific problems and general barriers will be addressed by these reforms, and in some cases, the reforms only partly or ineffectively address the problem.

Table 2: Current responses to the barriers inhibiting demand management

Barrier type	Specific problem	Current response
Regulatory barriers	Lack of overarching policy imperative	n/a
	Bias towards network augmentation over DM	AER Better Regulation Expenditure Incentives workstream AER Rate of Return & Expenditure Forecast Assessment workstreams
	Higher reliability criteria	COAG/SCER commitment to new national framework for best-practice reliability standards
	Lack of appropriate incentives for DM	AEMC Power of Choice recommendation for reform of the DMEGCIS and AER Better Regulation Power of Choice workstream
Cultural bias	Favouring of supply-side solutions	n/a
	Lack of experience and confidence in DM	Review of DM Innovation Allowance
Imperfect information	Lack of comprehensive reporting of network DM	Network Expansion Framework (*limited reporting)*
Split incentives	Disaggregated supply chain spreads costs/benefits unevenly	AEMC Power of Choice proposed reform of the DMEGCIS
Payback gap	DNSPs able to recover network capital expenditure over say 40 years but unable to recover expenditure in customer energy savings that would pay back in 2 or 3 years	AEMC Power of Choice proposed reform of the DMEGCIS
Inefficient pricing	Price structures that do not reflect cost structures	AEMC Power of Choice recommendation for pricing principles to guide network tariff structures SCER/IPART Distribution Network Pricing Arrangements rule change request
Confusion	Complex interaction of the above barriers obstructing effective reform	Numerous reviews but practical outcomes yet to be seen

AEMC 'Power of Choice' review

The AEMC's 'Power of Choice' review (Mar 2011 to Nov 2012) analysed reform options for the National Electricity Market to help consumers better manage their energy use, and to encourage electricity companies to better facilitate consumer choice and invest more efficiently. It was the third stage in a review of DM, which it referred to as demand side participation (DSP).

The final report of the Review proposed a number of reforms. The two reforms of particular relevance to DM are:

- provide networks with an allowance for revenue foregone as a result of undertaking DM activities instead of traditional capex projects
- develop a set of pricing principles to guide network tariff structures.

In addition, the report recommended changes to the current demand management and embedded generation connection incentive scheme (DMEGCIS) to provide an appropriate return on DM projects that deliver a net cost saving to consumers, and a minor change to the NER which makes it clear that AER can consider non-network market benefits when assessing efficiency of expenditure. [52]

COAG and SCER energy market reform

The Council of Australian Governments' (COAG's) Standing Council on Energy and Resources (SCER) is responsible for pursuing priority issues of national significance in the energy and resources sectors, and for progressing key reform elements of the former Ministerial Council on Energy and the Ministerial Council on Mineral and Petroleum Resources.

SCER established an Energy Market Reform Working Group (EMRWG) to identify, consider and respond to priorities for energy market development, particularly focusing on some of SCER's Priority Issues of National Significance.[53]

In December 2012, COAG endorsed a package of national energy market reforms developed collaboratively by SCER to respond to the current challenges of rising electricity prices.[54]

The main element of the reform package relevant to demand side participation is around actions to reduce electricity peaks, specifically:

> *Agreement to provide for greater demand-side participation to make it easier for consumers to reduce demand, particularly at peak periods, to minimise the need for new investment in energy infrastructure – drawing on the AEMC's Power of Choice review.* [55]

In addition, the package includes elements around rule changes to limit over-investment in networks, including:

> *Commitment in-principle to a new national framework of best-practice reliability standards which give added weight to the interests of consumers and in-principle agreement to transfer reliability setting to the Australian Energy Regulator;*
>
> *Early implementation of new rules that will ensure investment by network businesses is more efficient; and*
>
> *A public consultation process to improve the Limited Merits Review Regime to minimise the risk of 'cherry-picking' by network businesses while also ensuring review arrangements provide an effective back-stop for business.*[56]

As part of this reform package, SCER asked the Australian Energy Market Operator (AEMO) to begin work to develop a new option for demand side resources to participate in the wholesale market for electricity, and to develop a new category of market participants for non-energy service provision.[57] SCER also agreed to task the AEMC with investigating the implications of differences between actual and forecast demand within the operation of the network regulatory frameworks by May 2013, and to task AEMO to develop demand forecasts which could be used by the AER to inform its future regulatory determination processes.[58]

In January 2013, SCER agreed 'in principle' to submit a rule change request to amend the demand management incentive scheme, but has not yet done so.

Distribution Network Expansion Framework

The AEMC recently made a Rule establishing a national framework for electricity distribution network planning and expansion, including new demand side obligations for distribution businesses.[59]

The new Rule was an effort to address information barriers to demand-side responses. When information about the need for, and nature of, network investment is not provided in a timely and accurate way, it is more difficult for demand-side alternatives to be developed. DM service providers need sufficient time to consider the identified need, determine if DM can address the identified need, and determine the costs and benefits of participation.

This rule requires DNSPs to have greater regard to DM potential, and to publish more information to help potential DM providers to identify DSP opportunities and understand their value and operating requirements. Businesses will also be required to engage more with DM service providers. The rule consists of two new arrangements: 1) an annual planning and reporting process, and 2) a distribution project assessment process, both of which commenced on 1 January 2013.

The AEMC notes that the impact of the Rules will depend on the extent to which customers and DM service providers find the information useful. There is a possibility that the information provided may not be comprehensive enough to allow demand-side participants to understand the nature of the network problems that need to be addressed. Further, DM participants may not be provided with sufficient time to propose legitimate alternatives. Both of these scenarios would reduce the utility of the new requirements.[60]

AER Better Regulation program

AUSTRALIAN ENERGY REGULATOR

The AER implemented the *Better Regulation* program of work to ‘deliver an improved regulatory framework focused on promoting the long-term interests of electricity consumers’.[61] The program has a series of workstreams to cover such things as assessment of expenditure proposals, calculation of allowed return on assets, allocation of costs and engaging with consumers.

The purpose of the Power of Choice workstream is ‘ensuring network companies are innovating and exploring demand management solutions’. The workstream will explore how best to adapt AER regulatory processes to make a positive contribution to increasing demand management.

The workstream has three components:

1. *Network incentives, including the Demand Management and Embedded Generation Connection Incentive Scheme (DMEGCIS)* – arising from Power of Choice.
2. *Regulatory investment test for distribution (RIT-D)* – arising from the network planning and expansion framework rule determination.
3. *Efficient and flexible network pricing* – arising from Power of Choice.

The first two of these components are dependent on rule change requests not yet submitted to the AEMC, so the initial focus of the workstream will be on contributing to the AEMC rule change processes when they begin.

In addition to the work being undertaken under the Power of Choice workstream, another AER workstream is also developing expenditure incentive and rate-of-return guidelines (as required by the revised National Electricity Rules). This workstream is reviewing existing incentives for efficient capex. Part of the review is to move towards neutrality between capex and opex incentives.[62]

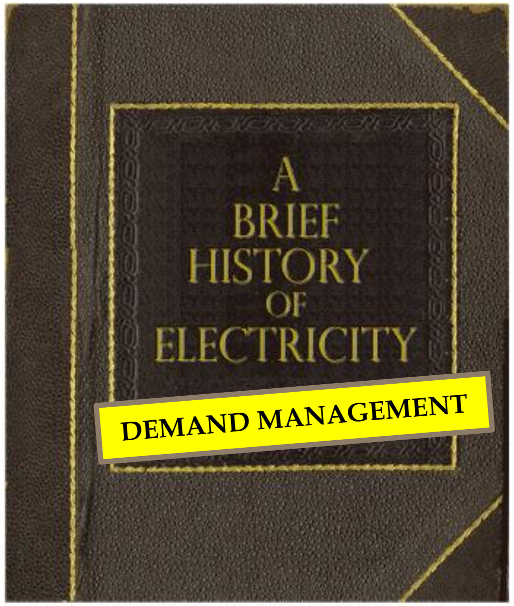
These four elements are discussed in detail in Appendix D.

HISTORICAL CONTEXT OF ACTION TO SUPPORT DM

Current responses to the barriers inhibiting demand management should be considered in the historical context of over two decades of attempts to increase the use of demand management in Australia.

The chronic neglect by the electricity supply industry of DM as a lower cost and more environmentally benign strategy, has been a significant feature of public discourse in Australian at least since the Victorian Parliamentary Inquiry into 'Electricity Supply and Demand beyond the mid-1990s' in 1987–88.

Despite two-and-a-half decades of debate, and tens of billions of dollars invested in power stations and electricity networks, demand management remains marginalised in Australia.[63] If the current round of reform to support DM is to succeed where previous attempts have failed, it is important for policy makers and regulators to understand the history of past attempts at reform.



Timeline of efforts to address electricity DM in Australia

- 1985: ➔ Based on Inquiry into Electricity Generation Planning (McDonnell Enquiry), NSW Government responds to over-building of power stations with strategic planning approach including DM.
- 1987: ➔ Victorian Parliament Inquiry into high bills and poor reliability results in Utility DM Action Plan from 1990 to 1994
- 1992: ➔ National Grid Protocol includes environment as a key component and equal treatment of supply- and demand-side resources (demand management/energy efficiency)
- 1995: ➔ NSW Government reform of electricity market results in Sustainable Energy Development Authority to promote energy efficiency and renewable energy. DM included as NSW regulatory objective in Electricity Supply Act and IPART Act
- 1998 ⬅ Environment and DM marginalised from National Electricity Code (replacing 1992 National Grid Protocol).
- 2002 ➔ NSW IPART Inquiry into DM recommends Demand Management Fund. Introduction of D-factor.
- 2005 ⬅ National Electricity Law (replacing 1998 National Electricity Code) fails to incorporate environment energy efficiency or DM in National Electricity Objective.
- 2005 ➔ NSW Demand Management Fund established as Energy Savings Fund.
- 2007 ⬅ NSW Energy Savings Fund subsumed into Climate Change Fund.
- 2011 ➔ Queensland Energy Conservation and Demand Management Plan establishes targets for network businesses Ergon and Energex
- 2012 ➔ AEMC 'Power of Choice' report recommends establishment of new DM Incentive Scheme

4 OPPORTUNITIES: POLICY SOLUTIONS TO FACILITATE DM

The benefits of Network DM and barriers to efficient DM are now better understood in Australia than ever before. Moreover, the available policy solutions to overcome these barriers now relatively clear. This section outlines the key policy measures required to facilitate cost-effective electricity network DM.

POSSIBLE SOLUTIONS

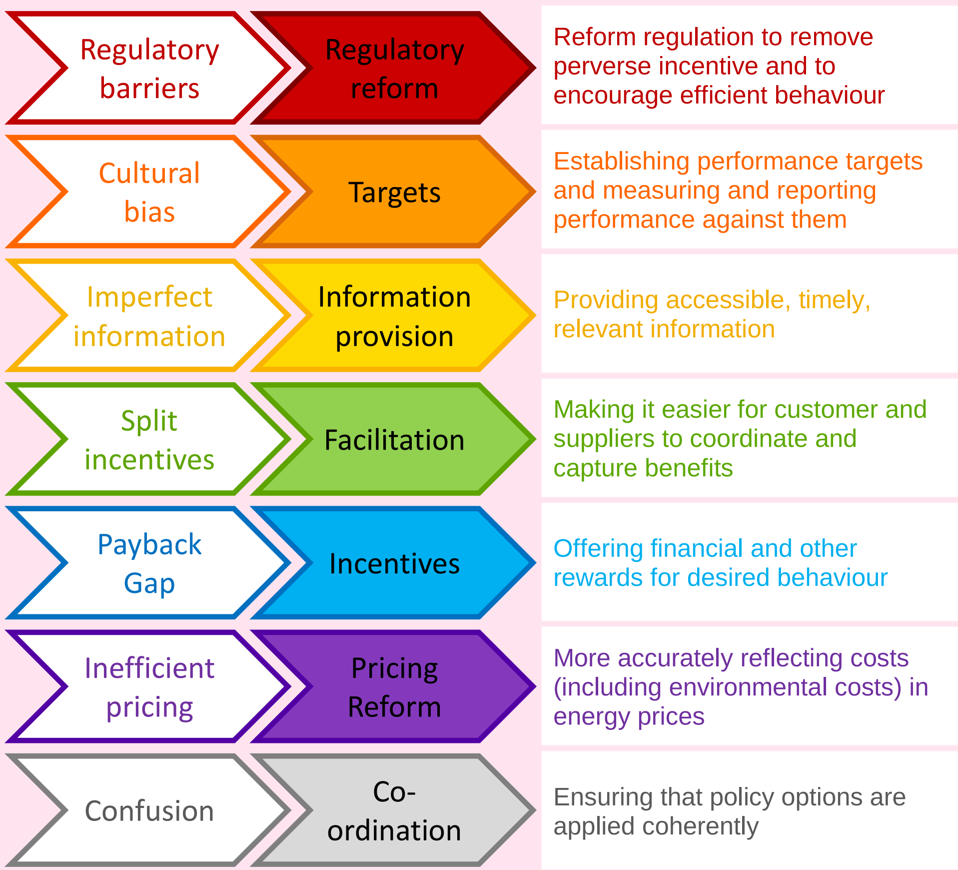
There are some positive reforms to support DM occurring in response the recent array of inquiries into the electricity market. However, most of these reforms are still not fully implemented, and there are also some key gaps which need to be addressed.

The previous section divided barriers to efficient DM into seven categories. Similarly, the policy tools available to address these barriers can be divided into seven categories, as illustrated in Figure 10 to the right.

While each policy tool loosely corresponds to a particular barrier, it is important to note that a given policy tool is not always the best response to its corresponding barrier. For example, while in some cases regulatory reform may be the best response to regulatory barriers, in other circumstances incentives or information provision may be a more effective response. Therefore, a degree of informed judgement is required to most effectively apply these tools.

The need for such strategic judgment is illustrated in the 'policy palette' in Figure 10. This figure categorises 20 possible policy tools that could be used to address barriers to DM and how they relate to each other. While this is not an exhaustive list of policy options, even 20 is too many policy tools to pursue at once.

Figure 10: Barriers and possible policy solutions



PROPOSED REFORMS

The seven categories of tools in the policy palette address the seven types of institutional barriers described above. Applying a suite of policy tools targeted at the specific barriers is likely to be more effective than a single policy tool.[64]

The key reforms required to stimulate an economically efficient level of network DM include:

a) **Decoupling network business profits from electricity sales:** Reform economic regulations which financially penalise network businesses that reduce their electricity sales volume by supporting DM.

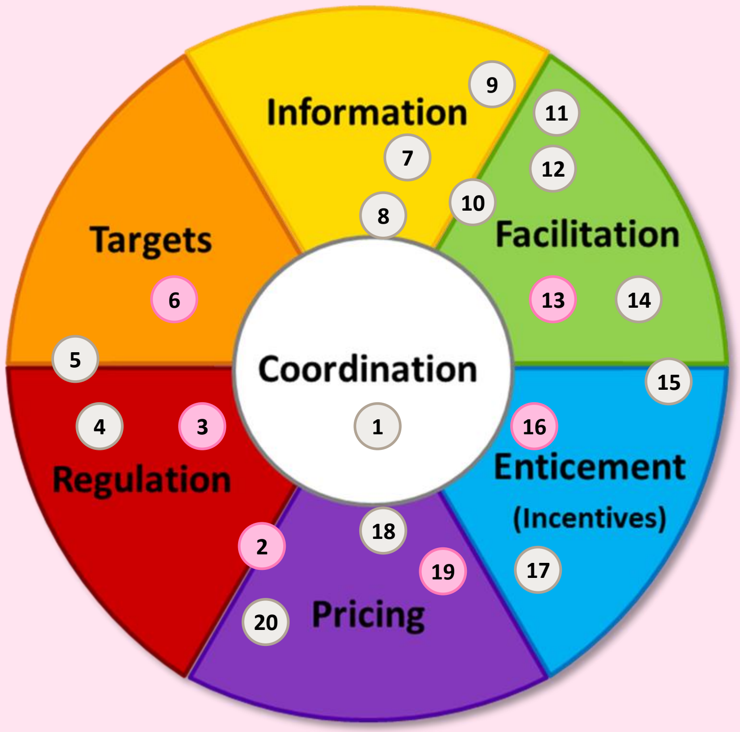
b) **Setting annual targets for DM:** DNSPs to work collaboratively with regulators to nominate performance targets for DM. These targets would provide a basis for paying performance incentives to DNSPs.

c) **DNSPs establishing plans for DM:** DNSPs to develop DM plans for each regulatory control period that include options to meet or exceed their proposed DM targets. These plans would feed into and would be adjusted according to the DNSPs annual planning process. The plans would complement the DM Engagement Strategy produced under the Network Planning and Expansion Rule by outlining the specific DM options and projects are being considered and developed. Such plans would also assist in the RIT D process. The plans would form the basis of budget allocations included in DNSPS' regulatory proposals.

d) **DNSPs making specific budget allocations for DM:** DNSPs to include specific budget allocations for undertaking efficient DM in their regulatory proposals. This budget allocation should also include proposals to use the Demand Management Innovation Allowance but ***exclude*** the DM Performance Allowance.

e) **DM Performance reporting:** DNSPs to produce comprehensive annual reports on their DM activities and outcomes. The reporting should include: actual versus forecast peak demand and energy consumption, DM performance, savings, and revenue/price impact.

Figure 11: The Policy Palette



Source: ISF, 20 Policy Tools for Developing Distributed Energy, 2009

The key reforms target 6 of the 20 Policy Tools for Developing Distributed Energy:

1) DM Coordination Agency
2) Decouple electricity sales from network profits
3) Reform National Electricity Rules
4) Streamline DG Licensing
5) Extend retailer EE targets
6) DM targets & reporting
7) Resource assessments & case studies
8) DM handbook & advisory service
9) Network planning info
10) Annual DM review
11) Energy audits & technical support
12) Training & skills development
13) Streamline network negotiation process
14) DM Ombudsman
15) Public recognition & awards
16) DM Incentives
17) Reform feed-in tariffs
18) Carbon Price
19) Cost reflective pricing
20) Network support payments

f) **Incentives for good DM performance:** The AER to provide a DM performance allowance to DNSPs as an incentive to undertake efficient DM. This performance allowance is offered in recognition of existing regulatory and non-regulatory barriers to DM, and to return a share of the non-network market benefits of DM to DNSPs.

The performance allowance should be based on achieving or exceeding a specified threshold of the nominated DM targets. The proposed formula for the DM performance allowance is set out above in *Section 1: Proposals*, while a worked example is provided in Appendix C.

An example of how a performance allowance might work, assuming a minimum performance threshold of 80% of target and a performance cap of 150% of target, is shown in Table 3 to the right.

No penalty is proposed to be applied for failure to meet the performance threshold.

g) **Fair treatment of DM in National Electricity Rules** including changing the National Electricity Rules to require and allow DM options to be implemented wherever they are cheaper than network augmentation. This includes:

- allowing the benefits of avoided network investment to be rolled over from one regulatory period to the next, just as returns on investment in network infrastructure can be rolled over from one period to the next
- opex/capex offset to allow DNSPs to recover increased operating expenditure on DM where this would more be more than outweighed by avoided capital expenditure.

Table 3: Calculation of performance incentive

Size of incentive payment ($m) relative to target and actual performance (MW or MVa)

$ Million	Target (MW or MVA)																				
Actual (MW or MVa)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	1	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	1	2	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	1	2	3	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	1	2	3	4	5	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0
80	0	1	2	3	4	6	5	4	3	1	0	0	0	0	0	0	0	0	0	0	0
90	0	1	2	3	4	6	7	5	4	3	2	0	0	0	0	0	0	0	0	0	0
100	0	1	2	3	4	6	7	7	6	4	3	2	1	0	0	0	0	0	0	0	0
110	0	1	2	3	4	6	7	8	7	6	4.8	4	2	1	0	0	0	0	0	0	0
120	0	1	2	3	4	6	7	8	9	8	6	5	4	3	1	0	0	0	0	0	0
130	0	1	2	3	4	6	7	8	9	9	8	7	5	4	3	2	0	0	0	0	0
140	0	1	2	3	4	6	7	8	9	10	10	8	7	6	4	3	2	1	0	0	0
150	0	1	2	3	4	6	7	8	9	10	11	10	9	7	6	5	4	2	1	0	0
160	0	1	2	3	4	6	7	8	9	10	11	12	10	9	8	6	5	4	3	1	0
170	0	1	2	3	4	6	7	8	9	10	11	12	12	11	9	8	7	5	4	3	2
180	0	1	2	3	4	6	7	8	9	10	11	12	13	12	11	10	8	7	6	4	3
190	0	1	2	3	4	6	7	8	9	10	11	12	13	14	12	11	10	9	7	6	5
200	0	1	2	3	4	6	7	8	9	10	11	12	13	15	14	13	12	10	9	8	6

$0-5m $5-10m $10-15m

Based on a table prepared by Matthew Serpell, CitiPower/ Powercor

h) **DM Innovation Allowance:** provided to support more uncertain, innovative DM, to increase the amount of commercially viable DM options in the market. The Productivity Commission believes that the innovation allowance should be increased from its current low level.[65]

i) **Better information on network constraints and avoidable costs** including easily accessible, standardised, up-to-date and relevant demand and network planning information to assist customers and DM service providers to anticipate, understand and respond to network DM opportunities.

As reforms are implemented, it is hoped that they will result in both a levelling of the regulatory playing field between network augmentation and DM, and a substantial increase in the amount of commercially viable DM options available in the market. If this occurs, the provision of an innovation allowance and performance incentives may become unnecessary. However some barriers, such as split incentives/ non-network market benefits may remain well into the future. Other elements set out above, such as plans, budget allocation and reporting will always remain important.

STATUS OF NETWORK DM POLICY SOLUTIONS

The current status of policy tools in relation to network DM is summarised in Table 4. There are significant differences in how the various tools are designed and applied in each state and territory.

However, there are some very useful precedents to be drawn on. In particular, it can be seen that Queensland currently has the most comprehensive policy support for network DM and this is reflected in Queensland having the highest level of network DM activity in Australia.

Table 4: Current status of network DM policy tools

Existence of DM policy tools by state

Elements		NSW	VIC	QLD	SA	ACT	TAS	WA
Decoupling	Rev Cap	✘	✘	✓	✘	✓	✓	✓
	D factor	✓	✘	na	✘	✘	na	✓
Targets		✘	✘	✓	✘	✘	✘	✘
Plans		✘	✘	✓	✘	✘	✘	✓
Budget allocation		✘	✘	✓	✓	✘	✘	✓
Performance Reporting		✘	✘	✓	✘	✘	✘	✘
Performance Incentives		✘	✘	✘	✘	✘	✘	✘
Rollover (b/w periods)		✘	✘	✘	✘	✘	✘	✘
Opex/Capex offset		✘	✘	✘	✘	✘	✘	✘
Innovation Allowance		✓	✓	✓	✓	✓	✓	✘

CONCLUSION: A DM BREAKTHROUGH FOR CONSUMERS?

The potential for DM to reduce costs to electricity consumers has been well recognised in Australia for over two decades. Despite occasional attempts by regulators and policy makers in most states over this period to unlock this potential, the adoption of DM remains patchy at best, particularly in relation to network DM. This failure to encourage cost-effective DM has been a significant contributor to the dramatic increase in electricity prices and bills over the past five years.

The recent escalation in electricity prices has led to an unprecedented level of scrutiny of electricity network investment and renewed recognition of the importance of DM. This policy attention provides a unique opportunity to deliver reform that finally and effectively addresses the barriers to cost-effective DM. The single most important opportunity is to reform the Demand Management Incentive Scheme, as proposed by the AEMC.

This report seeks to provide a practical agenda for achieving this reform as summarised in the box opposite. Such reform could:

- reduce total costs to consumers and networks
- moderate and lower energy bills
- reduce carbon emissions
- assist the economy in the transition to decentralised energy technologies.

While all five key actions opposite can and should be pursued together as a package, the logical first step is to propose a DM rule change to the AEMC. The success of this rule change process will be the first and most crucial test of whether DM and its benefits for consumers will finally be realised.

FIVE KEY ACTIONS FOR CLEANER, MORE AFFORDABLE ELECTRICITY

In summary the key actions that are proposed in this report to support network DM are:

1. Australian Energy Market Commission (AEMC) to change the National Electricity Rules to clarify that incentives should be available to network businesses to overcome actual and perceived barriers to network demand management (DM).
2. Australian Energy Regulator to establish an effective DM incentive scheme (DMIS) that drives DM wherever it will reduce costs to consumers.
3. Distribution network businesses to set targets for DM, in collaboration with regulators.
4. Ensure transparent DM reporting activities by network businesses.
5. Provide effective DM performance incentives to network businesses.

APPENDICES

A. EXISTING DM RULE AND DM INCENTIVE SCHEME DESIGN

B. RULE CHANGE PROCESS AND PROPOSED DRAFT RULE

C. NOTES ON PROPOSED DM INCENTIVE SCHEME

D. CURRENT REFORM PROCESSES

E. EXAMPLES OF NETWORK DM

F. DM SCHEME PRECEDENTS

G. NOTES AND REFERENCES

A1. EXISTING DM RULE

The following is an extract of the *National Electricity Rules (Version 55), Chapter 6: Economic Regulation of Distribution Services*, p.658-659

6.6.3 Demand management and embedded generation connection incentive scheme

(a) The AER, may in accordance with the distribution consultation procedures, develop and publish an incentive scheme or schemes (demand management and embedded generation connection incentive scheme) to provide incentives for Distribution Network Services Providers to implement efficient non-network alternatives, or to manage the expected demand for standard control services in some other way, or to efficiently connect Embedded Generators.

(b) In developing and implementing a demand management and embedded generation connection incentive scheme, the AER must have regard to:

(1) the need to ensure that benefits to electricity consumers likely to result from the scheme are sufficient to warrant any reward or penalty under the scheme for Distribution Network Service Providers;

(2) the effect of a particular control mechanism (i.e. price – as distinct from revenue – regulation) on a Distribution Network Service Provider's incentives to adopt or implement efficient non-network alternatives;

(3) the extent the Distribution Network Service Provider is able to offer efficient pricing structures;

(4) the possible interaction between a demand management and embedded generation connection incentive scheme and other incentive schemes under clauses 6.5.8, 6.5.8A, 6.6.2 and 6.6.4;

(5) the willingness of the customer or end user to pay for increases in costs resulting from implementation of the scheme; and

(6) the effect of classification of distribution services, as determined in accordance with clause 6.2.1, on a Distribution Network Service Provider's incentive to adopt or implement efficient Embedded Generator connections.

(c) The AER may, from time to time and in accordance with the distribution consultation procedures, amend or replace any scheme that is developed and published under this clause.

(d) [Deleted]

A2. EXISTING DM INCENTIVE SCHEME

The following is a summary of the structure of the Demand Management Incentive Scheme (DMIS), as set out in the AER's *Demand management incentive schemes for the ACT and NSW 2009 distribution determinations: Final Decision* (2008); *Demand Management Incentive Scheme: Energex, Ergon Energy and ETSA Utilities, 2010–15* (2008); and *Demand Management Incentive Scheme: Jemena, CitiPower, Powercor, SP AusNet and United Energy, 2011–15* (2009).

Overview

The current objective of a DMIS is to 'provide incentives for DNSPs to implement efficient non-network alternatives or to manage the expected demand for standard control services in some other way'.

The DMIS for the current regulatory control period is in the form of a demand management innovation allowance (DMIA). In addition, in NSW, the DMIA is accompanied by a D-Factor. The DMIA consists of two parts:

Part A: an annual ex-ante allowance in the form of a fixed amount of additional revenue.

Part B: a foregone revenue recovery mechanism to balance any reduction in the quantity of energy sold that is directly attributable to non-tariff DMIA projects.

Demand Management Innovation Allowance (DMIA)

The DMIA aims to provide incentives for DNSPs to conduct research and investigation into innovative techniques for managing demand so that, in the future, demand management projects may be increasingly identified as viable alternatives to network augmentation. It aims to increase the current stock of knowledge and experience with network demand management, to encourage greater consideration of non-network alternatives to augmentation in the decision-making processes of DNSPs.

The DMIA for VIC/QLD/SA DNSPs is explicit about aiming to complement the broader regulatory framework, and is not designed to be the sole, or even primary source of funding for demand management expenditure in a regulatory control period. Instead, the DMIS is designed to supplement a DNSP's approved capital and operating expenditure.

DMIA Part A - Allowance

The dollar amounts that the AER will allow ACT and NSW DNSPs to recover under the DMIA are broadly proportionate to the relative sizes of the DNSPs' annual revenues. Projects and programs eligible for approval under this scheme must meet all of the specified DMIA criteria.

The allowance commences at the beginning of each regulatory year. In the second regulatory year of the subsequent regulatory control period, when results for regulatory years one to five of the regulatory control period are known, a single adjustment will be made to return the amount of any underspend or unapproved amounts to customers. This ensures that the scheme remains neutral in terms of the expenditure profile within the period to which it has applied.

ACT/NSW DNSPs must submit annual public reports on the outcomes and expenditure of the DMIA, which will be published by the AER to help enhance industry knowledge of demand management. This information will also form the basis of an assessment by the AER of compliance with the DMIA criteria, and the DNSP's entitlement to recover expenditure under the DMIA.

DMIA Part B – Foregone revenue recovery

Part B allows a DNSP – whose direct control services are subject to a form of control at least partially dependent on energy sold (such as a weighted average price cap or average revenue cap) – to recover any forgone revenue resulting from a reduction in the quantity of electricity sold that is directly attributable to the implementation of a non-tariff demand management program approved under part A of the DMIA. This is to offset the disincentives associated with sales-volume-related forms of control.

DNSPs are unable to recover forgone revenue resulting from demand management programs funded out of their regulatory allowance, or reductions in revenue resulting from government policy changes in relation to demand.

Where a demand management project results in reductions in revenue that extend beyond the end of that project, the DNSP may apply to recover the forgone revenue each regulatory year after the end of the project, up until the end of the next regulatory control period.

Approved forgone revenue will be provided to a DNSP in the second regulatory year of the subsequent regulatory control period.

NSW D-Factor

The NSW D-Factor is identical to that set out by IPART in 2004. The purpose of the D-factor, as promulgated by IPART, is to reduce regulatory barriers to demand management in NSW. In particular, it is designed to overcome the barriers associated with the weighted average price cap form of regulation applying in NSW.

The weighted average price cap control formula includes a D-factor that allows DNSPs to recover:

- approved non-tariff-based demand management implementation costs, up to a maximum value equivalent to the expected avoided distribution costs (as defined in the determination)
- approved tariff-based demand management implementation costs
- approved revenue foregone as a result of non-tariff-based demand management activities.

The D-factor does not allow DNSPs to explicitly recover costs associated with ‘learning by doing’ demand management projects (i.e. DNSPs will only be able to recover the costs of such projects where they are able to demonstrate that there is an expected deferral benefit that exceeds these costs).

NSW DNSPs must submit a D-factor proposal as part of their regulatory proposals for assessment by the AER. The AER will assess these factor proposals against IPART’s D-factor guidelines which were adopted by the AER.

Due to the lag in the D-factor mechanism and to ensure the appropriate incentives remain for the duration of the regulatory control period 2009–14, relevant expenditures undertaken in this period will be recoverable during the regulatory control period 2014–19, regardless of whether the D-Factor is continued in the subsequent control period.

B1. AEMC RULE CHANGE PROCESS

The following is a summary of the AEMC Rule Making Process, set out in full in *Division 3 of Part 7 of the National Electricity Law - Procedure for the making of a Rule by the AEMC.*

Guidelines for requesting a rule change

- Any person (such as an individual, company or Government) may request the making of a Rule (need to clarify coalition).
- A request must be made in writing to the AEMC and contain the information prescribed in section 92 of the NEL & the Regulations, including at a minimum:
  - a description of the proposed Rule (in narrative form as distinct from the drafted rules)
  - a statement of the nature and scope of each issue(s) concerning the existing Rules and an explanation of how the proposed Rule will address this issue or issues (Statement of Issue)
  - an explanation of how the proposed Rule would or would be likely to contribute to the achievement of the national electricity objective
  - an explanation of the expected benefits and costs of the proposed change and the potential impacts of the change on those likely to be affected.
- The request can be lodged online through the AEMC website or in hardcopy.
- The request must be on the letterhead of the proponent, signed and dated.

Rule change process

There are generally four stages to the National Electricity Rules' (Rules) Rule making process once a request for a rule change is submitted.

Stage 1: Initial consideration of a request for the making of a Rule

The AEMC is only required to 'initiate' a Rule change request (i.e. proceed with the next steps in the Rule making process in respect of the request) if the AEMC considers that:

- the minimum content requirements described above have been met
- the request appears not to be misconceived or lacking in substance
- the subject matter of the request appears to be for or with respect to a matter in respect of which the AEMC may make a rule.

Stage 2: Consultation on a proposed Rule

The AEMC will commence public consultation on the proposed rule by publishing a notice of the request and the draft Rule, along with an invitation for written submissions. The closing date for submissions will be at least four weeks from date of the notice.

The AEMC may (but is not required to) hold a public hearing on the proposed Rule before it makes a draft Rule determination.

Stage 3: Draft Rule determination (may include draft Rule) and further consultation

Generally, within ten weeks after the closing date for submissions on the proposed Rule, the AEMC will publish a draft Rule determination, and if relevant, a draft Rule (this may be different to the proponent's proposed Rule, if the AEMC believes it is a more preferable Rule).

Included with the determination will be an invitation for written submissions. The closing date for submissions will be at least six weeks from date of the notice.

Any person may request the AEMC to hold a public hearing on the draft Rule determination. The request must be in writing within one week from publishing of the draft rule determination.

If the AEMC decides to hold a public hearing on the draft Rule determination, the hearing must not be later than 3 weeks after the publishing of the draft rule determination.

Stage 4: Final Rule determination and if relevant, making of an amending Rule

Generally, within six weeks after the closing date for submissions on the draft determination, the AEMC will publish a final Rule determination.

If the AEMC, in its final Rule determination, determines to make an amending Rule, it will make the amending Rule as soon as practicable after the publication of the final Rule determination.

The commencement date of the amending Rule will be set out in the amending Rule and may be the date the AEMC makes the amending Rule or a later date. The AEMC will consolidate the amending Rule into a new version of the Rules when the amending Rule commences operation.

B2. AEMC DRAFT SPECIFICATIONS FOR NETWORK INCENTIVES AND PROPOSED DRAFT RULE

The following is an extract from the *AEMC Power of Choice Draft Rule Change Specifications*, (from the *Power of Choice Final Report Draft Specifications*, p.34-37) showing the changes that have been made to arrive at the Proposed Rule set out in Section 1.

5 Network incentives

Draft specification for the proposed rule change to reform application of the demand management and connecting embedded generation incentive scheme.

Objective: The objective of this proposed rule is to ~~To~~ reform the current demand management incentive scheme to ~~provide the possibility of~~ support appropriate incentives for distribution network service providers (DNSPs) to pursue efficient ~~DSP~~ demand management (DM) ~~projects~~. The incentive scheme will be developed with an overarching objective and supporting principles. The AER should have sufficient discretion to develop the detailed design of the scheme – which may contain multiple mechanisms – and the flexibility to adapt the application of the scheme to the individual circumstances of each distribution business.

Application: Proposed rule change to replace current clause 6.6.3

1. Demand Management Incentive Scheme

- The AER shall publish an incentive scheme or schemes (*demand management incentive scheme or DMIS*) to provide incentives for DNSPs to implement efficient ~~DSP~~ DM options.
- DM options include ‘DM projects’ which involve the DNSP offering assistance, funding or other incentives (financial or otherwise) to encourage consumers to reduce or shift demand, and ‘price-based DM’, which involves changing the structure of network pricing to encourage DM. DM projects may also include a price-based component.
- The scheme must be applied in a manner consistent with the following objective: *‘to provide an appropriate return to the network businesses for ~~DSP~~ DM projects which deliver a net cost saving to their consumers ~~to support efficient demand management by networks~~’*:
    - *~~DSP~~ DM projects are defined as any conscious use by the DNSP of non-network solutions including demand response, energy efficiency or embedded or distributed generation to reduce load at risk, improve reliability or defer the expenditure of capital ~~to augment~~ on the network.*
    - *Efficient ~~DSP~~ DM is defined for the purposes of the incentive scheme as any ~~DSP~~ DM project that delivers a net benefit to consumers as a whole, regardless of where in the electricity supply value chain those benefits arise.*
- The AER has the option to include the ~~demand management incentive scheme~~ DMIS as part of the DNSPs distribution determination. The application of the scheme can differ by DNSP.
- The AER can amend the incentive scheme in accordance with the distribution consultation procedures.
- The demand management incentive scheme must be applied in a manner consistent with the following principles:
    - ~~DSP~~ DM projects should ~~must~~ address ~~an underlying~~ (current and/or anticipated) network issue in order to qualify for inclusion in the incentive scheme (potential network issues include: network supply capacity, reliability, asset replacement and changing demand or local generation patterns)

- Expenditure on ~~the~~ DM projects approved under this scheme must be treated ~~the same as~~ equitably with other network expenditure approved under the ~~normal expenditure~~ determination process.
- Notwithstanding the ~~item 2~~ above, ~~that the~~ consideration of funding for qualifying ~~DSP~~ DM projects shall recognise the need to incentivise network~~s~~ DM over the long term and not just for the forthcoming regulatory period.
- Payments to customers or other providers of DM services ~~any reward available~~ under the scheme should reflect ~~the~~ consideration of timing ~~of benefits in order~~ to smooth the bill impact on consumers.
- The scheme design should be as simple as practicable to apply, such that ~~the incentive design~~ it is easy to understand, implement and administer for all market participants.
- The scheme should contribute to achieving a material change that maximises ~~in~~ the amount of efficient ~~DSP~~ DM in the market.

- As one purpose of the incentive scheme shall ~~could~~ be to build capability among DNSPs in planning and implementing ~~DSP~~ DM, the scheme should include requirements regarding the monitoring of ~~DSP~~ DM project outcomes and publication of results as a means for maximising the impact of the incentive scheme expenditures.
- In developing the demand management incentive scheme, the AER must have regard to:
  - Where available, past experience (in Australia and internationally) including costs, benefits and outcomes ~~market rates~~ for comparative ~~DSP~~ DM services;
  - the need to ~~include~~ consider in the cost-benefit assessment the value to customers participating in the ~~DSP~~ DM project of any significant additional cost or benefit of their participation (including the electricity they would have used or wasted except for that participation);
  - the range of market benefits permitted under the regulatory investment test for distribution;
  - the effect of the particular control mechanism to which the DNSP is subject on incentives to adopt or implement efficient non-network alternatives;
  - the extent a distributor is able to offer efficient pricing structures;
  - any possible interaction with other incentive schemes;~~ and~~
  - the need to develop an efficient, fair and competitive market for DM services;
  - the willingness of customers to pay for any increases in costs or prices resulting from the implementation of the scheme; and
  - the distribution of any benefits of reduced costs or bills resulting from the implementation of the scheme.
- The AER shall decide what information is needed from the DNSPs to monitor the application of the demand management incentive scheme and to verify outcomes.
- The AER shall publish the demand management incentive scheme no later than nine months after the commencement of this rule.

2. Calculation of the share of non-network market benefits

- Recognising the barriers to network DM, the AER shall provide DNSPs with incentives to undertake efficient DM.
- Under the scheme, the DNSP ~~network~~ is permitted to retain a share of associated non-network related market benefits of DM as determined by the AER, if
  a) the DNSP has made a material contribution to this DM, and

b) the DM is unlikely to have been delivered without the DNSP's support.

- The ~~value of the incentive~~ share of associated non-network related market benefits retained by the DNSP must be proportional to the net benefits delivered to the market.
- ~~We propose that t~~The maximum percentage of non-network related market benefits which can be retained by ~~network businesses~~ DNSPs shall be determined by the AER but should not exceed 50% (the actual percentage can vary by business and by time).
- Any standardised values for non-network benefits used to calculate the value of the incentive must be broadly consistent with the RIT-D guidelines.
- Methodologies used to determine the extent of the consumer demand response should be consistent with baseline consumption methodologies approved for the demand response mechanism proposed for the wholesale market where the circumstances are similar, except where the DNSP can provide justification for a different value being used.

3. Innovation Allowance

- ~~Introduce a new clause which permits t~~The AER shall establish a DM ~~to approve an~~ innovation allowance scheme for research and development activities related to ~~DSP~~ DM.
- ~~Note that t~~The ~~objective of the~~ innovation allowance scheme shall ~~should be to~~ provide funding for, and an incentive to, DNSPs to undertaken activities that will increase their knowledge regarding (a) the ability of different approaches (both technology and pricing based) to achieve useful and reliable demand reductions, (b) the costs of those approaches, and (c) their impacts (if any) on network systems operations.
- The AER ~~should have~~ has the flexibility to determine the amount of the innovation allowance for each distribution business (noting that these amounts could vary by business and over time).
- The AER ~~should have~~ has the discretion to develop the design of the innovation allowance scheme subject to the scheme being simple for it and the DNSPs to administer (i.e., that its associated transaction costs are appropriate).
- Businesses must provide all relevant information and data arising from such pilots/trials approved under this scheme to the AER in a timely manner and that all such information be available for publication unless reason for confidentiality is established to the satisfaction of the AER
- Results of the projects approved under this scheme must be published in the DNSP's distribution annual planning report.

4. Include allowance for foregone ~~profit~~ revenue under the DMIS

- In order to treat DM equally with other network expenditure, the AER shall ensure that allowance is made to allow DNSPs to recovery revenue lost as a consequence of the DNSP undertaking any approved DM project. (Note, in the case of DNSPs operating under a revenue cap control mechanism, there will not be foregone revenue.)
- Revenue lost by the DNSP is only recoverable in relation to DM projects undertaken by the DNSP.
- ~~Lost revenue can be used as a starting point for calculation of lost profit associated with any approved DSP project.~~
- In calculating foregone ~~profit~~ revenue, the AER must have regard to the tariff structure ~~and costs~~ of the DNSP ~~network business~~.

5. Capital and Operating Expenditure Objectives

- Amend NER Clauses 6.5.6 (a) to (c) and 6.5.7(a) to (c) to enable the AER to consider potential non-network benefits when assessing the efficiency of proposed ~~DSP~~ DM activities included in business revenue proposal.

Issues for the Rule change process to consider ***(as noted by the AEMC)*****:**

1. What should be the maximum cap for the proportion of non-network related markets benefits which can be retained by the network businesses? *With respect to the share of network benefits this is likely to be determined by the capital expenditure incentive scheme applied to the DNSP.*
2. Should the ability of networks to seek funding under the demand management incentive scheme be limited to the distribution determination process or should the businesses be able to seek funding within the regulatory period as well? *One of the advantages of* ~~DSP~~ DM *projects is that they can have a shorter lead time than a capital works programme – sometimes less than a year. One of the disadvantages is that it is difficult to pin down specific costs a long way ahead of time – customers are generally not willing or able to commit to participate in a scheme years ahead of seeing any benefits from it.*
3. What risks to the network businesses could arise from the AER's ability to impose performance standards and fines/penalties for non-compliance? What is the magnitude of these risks and therefore their potential impacts on the ability of the proposed incentive mechanisms to achieve their objectives?
4. Should the AER be required to develop and provide deemed standardised values for the non-network market benefits? If not, should the scheme specify how such values should be developed for use in the scheme by the network businesses and how they will be evaluated by the AER?
5. What should the name of the revised scheme be?

C. NOTES ON PROPOSED DM INCENTIVE SCHEME

DM Performance Allowance Example

The following is a worked example of the proposed formula for the DM performance allowance, set out above in *Section 1: Proposals.*

Nominated Performance Target (NPT) = 100MW (or 100MVA) in say, 2016

Performance threshold (ϴ) = 80%

Peak Demand Reduction (DMP) = 110MW

DMP(t) = DMP – ϴ. NPT

= 110 – (80% x 100)

= 30 MW

i.e. the Peak Demand Reduction beyond the performance threshold (ϴ) of NPT

RAB = $10 billion

Peak Demand (PD) = 5000 MW

CAPEX PDC = RAB/ PD = $10b/ 5000 MW = $2m/MW

i.e. the Capital Expenditure 'Peak Demand Coefficient' (PDC) – the DNSP's Regulated Asset Base (RAB) divided by its the network-wide peak demand

WACC = 8%

DMPA = DMP(t) x WACC x CAPEX PDC

= 30MW x 8% x $2/MW

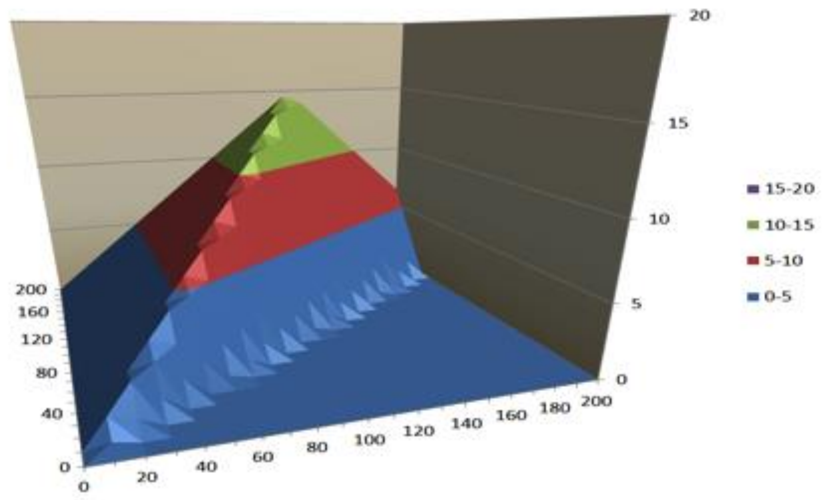
= $4.8 million

Note: DNSPs are also recovering DM costs through AER-approved expenditure in DM plans.

Value of Performance Allowance with respect to DM target and actual performance:

$ Million	Target (MW or MVA)																				
Actual (MW or MVa)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	1	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	1	2	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	1	2	3	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	1	2	3	4	5	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0
80	0	1	2	3	4	6	5	4	3	1	0	0	0	0	0	0	0	0	0	0	0
90	0	1	2	3	4	6	7	5	4	3	2	0	0	0	0	0	0	0	0	0	0
100	0	1	2	3	4	6	7	7	6	4	3	2	1	0	0	0	0	0	0	0	0
110	0	1	2	3	4	6	7	8	7	6	4.8	4	2	1	0	0	0	0	0	0	0
120	0	1	2	3	4	6	7	8	9	8	6	5	4	3	1	0	0	0	0	0	0
130	0	1	2	3	4	6	7	8	9	9	8	7	5	4	3	2	0	0	0	0	0
140	0	1	2	3	4	6	7	8	9	10	10	8	7	6	4	3	2	1	0	0	0
150	0	1	2	3	4	6	7	8	9	10	11	10	9	7	6	5	4	2	1	0	0
160	0	1	2	3	4	6	7	8	9	10	11	12	10	9	8	6	5	4	3	1	0
170	0	1	2	3	4	6	7	8	9	10	11	12	12	11	9	8	7	5	4	3	2
180	0	1	2	3	4	6	7	8	9	10	11	12	13	12	11	10	8	7	6	4	3
190	0	1	2	3	4	6	7	8	9	10	11	12	13	14	12	11	10	9	7	6	5
200	0	1	2	3	4	6	7	8	9	10	11	12	13	15	14	13	12	10	9	8	6

$0-5m $5-10m $10-15m



D. AER DEMAND MANAGEMENT REFORMS

Reform of DMIS

In 2011 the National Energy Rules (NER) were amended to allow the Australian Energy Regulator (AER) to develop and publish a new incentive scheme for demand management and embedded generation. The scheme is currently termed the Demand Management and Embedded Generation Connection Incentive Scheme (DMEGCIS). The Rules state that the DMEGCIS is to 'provide incentives for Distribution Network Service Providers to implement efficient non-network alternatives, or to manage the expected demand for standard control services in some other way, or to efficiently connect Embedded Generators'.

In 2012, as part of the Regulatory Determination for 2014–2019 for NSW and ACT, the AER proposed amendments to its demand management incentive scheme applying to network businesses. The main proposals were a name change, a broadening of the scope of the scheme to include embedded generation, and removal of the D-factor scheme. The proposed demand management and embedded generation connection incentive scheme (DMEGCIS) was therefore intended to function in the next regulatory control period in the same manner as the DMIS in this regulatory period, including:

- a demand management innovation allowance provided as annual ex-ante allowance
- provisions to enable DNSPs to recover revenue foregone that is directly attributable to a non-tariff demand management project approved under above (does not apply to revenue caps). [66]

Work on this proposal was halted when it became clear that the Australian Energy Market Commission's (AEMC) 'Power of Choice' review would include recommendations on the form the DMEGCIS should take.

Following the release of the 'Power of Choice' report, the AER released a DMEGCIS information paper in March 2013, proposing that the previous reform process from 2012 be closed off, with the current scheme maintained for the current regulatory period, and for a one-year transition period in the following regulatory period, while the reform process is finalised.

Given the recent election, and the delay until the next SCER meeting, it is possible that SCER will not submit a rule change request until the end of the year. Once the rule change request is submitted, the AEMC will begin consultations around the proposed rule. Once initiated, a rule change request process generally takes a minimum of six months. Once the AEMC finalises the rule change process, the AER will then begin its own formal consultations, which will take a further four months approximately to conclude.

This means there is a distinct possibility that the new form of the DMEGCIS will not be decided upon in time for the NSW/ACT Regulatory determination for 2015–2019.[67] If this is the case, the AER has indicated they will request a Transitional Rule from the AEMC allowing it to introduce the new DMEGCIS partway through the regulatory control period for NSW/ACT and other jurisdictions as necessary.

Should the AEMC wait for the SCER Rule Change Request, the current demand management incentive schemes could continue to operate in their current form until the end of the next regulatory periods in 2020.

Table 5: Indicative reform process

Step	Time frame*
SCER submits rule change request	Approx 6 months
AEMC initiates rule change request process	Min. 6, possibly 12+ months
AER undertakes informal consultations and participates in AEMC consultations	As per above
AEMC finalises rule change process, likely resulting in a request for the AER to develop a new DMIS in accordance with changed Rule(s).	
AER initiates formal process to develop DMIS	Approx. 4months
DMIS introduced during AER Determinations, or as specified by transitional rule	
Total	**18–24 months**

** Timeframes are 'best guesses' based on current information.*

Regulatory investment test for distribution (RIT-D)

Electricity distribution companies undertake numerous investment projects each year to augment parts of their networks. The AEMC's Final Rule Determination, 'Expansion Network Framework', requires the AER to develop and publish a new Regulatory Investment Test for Distribution (RIT-D) to replace the current regulatory test for distribution projects. The RIT-D is designed to take place before significant distribution network investment decisions are made and will apply to all projects over $5 million.[68]

The AER aims to develop the RIT-D in a way that ensures RIT-D proponents duly assess all credible options (including both network and non-network options) before choosing the most cost-effective option available to meet consumer demand. Application guidelines will be developed by the AER to guide RIT-D proponents in applying the RIT-D, and will include a specific methodology for valuing classes of benefits. The aim is to enhance transparency and consistency in investment decision-making.

The effectiveness of the RIT-D in facilitating DM will depend on how the guidelines are written, including whether and how 'benefits' are assessed. In any case, if NSPs do not face balanced incentives for undertaking DM then the effectiveness of the RIT-D in encouraging efficient uptake of DM will be limited. Furthermore, the RIT-D will only apply to projects over $5m and evidence to date shows that there are (and are likely to continue to be) many projects that fall under this threshold.

An issues paper was released by the AER in January 2013, followed by public submissions in February 2013. The final RIT-D and its application guidelines was scheduled for release by 31 August 2013.

Distribution network pricing rules

The AEMC has proposed changes to pricing principles to ensure prices are cost reflective. This includes requiring more consultation to give retailers and consumers more control in developing pricing tariffs (particularly the structure/nature of tariffs).

As discussed above, SCER's decision regarding specific recommendations related to flexible (i.e. time-of-use) pricing was to leave control over pricing models to jurisdictional governments. SCER has however, agreed 'in principle' to changes to the pricing principles and have agreed to submit a rule change proposal to the AEMC. From the AER's point of view, the reforms to efficient pricing in the Rules should result in more detailed pricing reviews. The AER will likely also have an expanded role which will include advising on pricing principles and setting out detailed guidelines on how the consultation with retailers and consumers will need to occur. The AER plans to participate in the AEMC consultation following submission of the rule change request.

These more cost reflective tariffs could play out in different ways. For example, as some networks have invested heavily in network infrastructure, there may be a temptation to shift charges from volume-related components into fixed-charge components. This would likely reduce consumers' capacity to reduce bills through energy savings and therefore reduce their level of interest DM programs. On the other hand, flexible pricing may encourage DM by promoting more peak focused cost-reflective Time of Use (TOU) tariffs.

Expenditure Incentives Review

These guidelines will set out how the AER will improve incentives for electricity network businesses to ensure efficient capital expenditure, so customers only fund the investment necessary to provide a safe and reliable network.

As part of this, the AER is also reviewing the incentives for efficient operating expenditure. In particular, it is considering revisions to the current efficiency benefit sharing scheme that applies to the approach that network businesses take to expenditure assessments.

The review aims to address the following issues with the current capex incentives:

- the imbalance between capex and opex incentives
- the incentive for efficient capex declines over the regulatory control period, encouraging overspending in later years
- that NSPs can choose to ignore the incentive of obtaining revenue savings, knowing that any capex spend will ultimately be rolled into the Regulated Asset Base, with the majority of future/ongoing costs being passed onto consumers.

An issues paper was released in March 2013, with stakeholder consultations expected in late May 2013. Guidelines are expected to be finalised by November 2013.[69] The issues paper addresses both 'ex ante' measures put in place at the beginning of a regulatory control period to properly incentivise efficient capex, and 'ex post' measures to apply at the end of a regulatory control period, to correct for inefficient capex spending. The AER has expressed its preference for ex ante measures to remain the principal method for incentivising, but is proposing to consider ex post measures where a significant capex overspend has occurred and where the ex post assessment has uncovered clear cases of inefficiency or imprudent behaviour by the NSP.

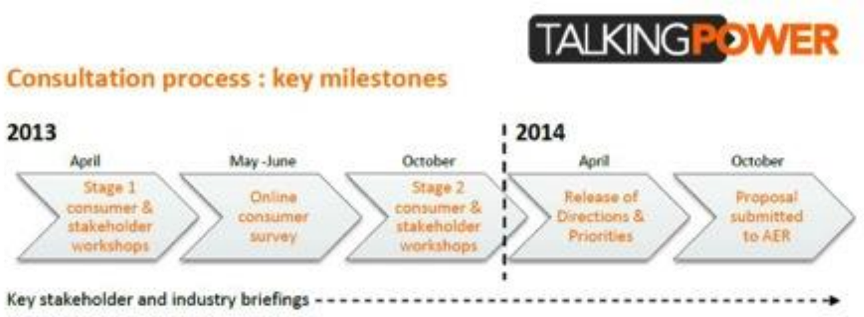
The AER's proposal for the primary capex ex ante measure is a continuous, asymmetric Capital Expenditure Sharing Scheme (CESS). The continuous nature of the scheme would ensure constant incentives in each year of the regulatory control period, and the asymmetric nature (e.g. greater penalty than reward) would provide stronger protection for consumers. The reward for underspending by NSPs would be 20–30% of the discrepancy either way, while the penalty would be greater than 30%.[70]

E. EXAMPLES OF NETWORK DM

'Talking Power' enhances consumer engagement

As network businesses enter a future characterised by significant changes in government policy, network and consumer-side technology, industry regulation and retail price reform, greater participation of consumers in decision-making will deliver better outcomes.

SA Power Networks is South Australia's sole electricity distributor, delivering power to more than 835,000 homes and businesses across the state. As it prepares its plans for managing the state's electricity distribution network in the 2016–2020 regulatory period, SA Power Networks has commenced extensive community consultation in an innovative engagement program called *Talking Power*.



Talking Power is focused on SA Power Networks' residential and commercial customers, and aims to listen to and understand their views, needs and priorities for the distribution network. A comprehensive engagement plan, to take place over 2013 and 2014, will feature consumer and stakeholder workshops, an online consumer survey and regular stakeholder updates.

Realising that it is important for customers to have a clear communication channel throughout the process, the *Talking Power* website will support every stage of the engagement process. This will be the one-stop shop for all things regarding SA Power Networks' 2016–2020 regulatory proposal.

www.talkingpower.com.au

The Smart Home Family

The Smart Home was built by Ausgrid and Sydney Water to test what life is like for a family living with the latest energy- and water-efficient technologies. The Smart Home is being tested by a real family, in real time with information broadcast via the internet.

The Smart Home is now being tested by its second family and follows the success of the original family. Everyone uses energy differently, and this second trial enables Ausgrid to see how the home performs with a different family. This family is among the first to trial technologies to be tested in the Australian Government's $100 million Smart Grid, Smart City project. The home showcases more than 20 energy- and water-efficient appliances, efficient lighting and a standby power device.

The Smart Grid, Smart City demonstration project trials new technologies designed to make the electricity grid more efficient and give households more information and control over their energy use and costs.

This Smart Home allows the wider community to share the experience and is an opportunity to learn and plan for the future of energy use in Australia.

smartgrid smartcity

www.smarthomefamily.com.au

www.smartgridsmartcity.com.au

Information at your fingertips – web portals

Jemena's *Electricity Outlook* is a free self-service web portal that gives smart meter customers greater control of their electricity use and power bills.

Combined with advanced metering technology, *Electricity Outlook* enables consumers to better understand their usage and costs on a daily basis. The compare function on the portal also allows consumers to determine if they have the retail price-offering that best suits their consumption needs.

In the short term the web portal also allows consumers to notice unexpected levels of use and take immediate action by switching off appliances if they choose. In the long term, the web portal can arm households with the information they need to make a long-term investment in technologies that change their energy use.

Jemena distributes electricity to more than 320,000 customer sites and is playing a key part in the roll-out of advanced metering technology in Victoria, having installed more than 177,000 smart meters in its network area.

www.jemena.com.au

Positive Payback – it pays to save

In South East Queensland, Energex provides 59% of its customers with a demand management service, with features such as off-peak power for hot water, pool filtration and air conditioning.

Energex's latest initiative is the Positive Payback Program which rewards customers for buying and using energy-efficient appliances.

Customers can receive gift cards for choosing PeakSmart air conditioners. These air conditioners have a device which automatically reduces energy use at times of peak demand, saving the customer money and easing demand on the grid. Other customers can choose to install the device in their existing units.

Thanks to a partnership of networks, manufactures and retailers, more than 129 PeakSmart models are now available to customers. Altogether, some 30,000 customers are involved in one or more of the air conditioner and pool pump programs and this, along with commercial and industrial programs, has resulted in more than 100 MVA of load being removed from Energex's summer peak demand.

Importantly, information collected from the peak demand programs has provided detailed facts and figures for use by the Commonwealth Government's Equipment Energy Efficiency Committee review into 'smart appliances'.

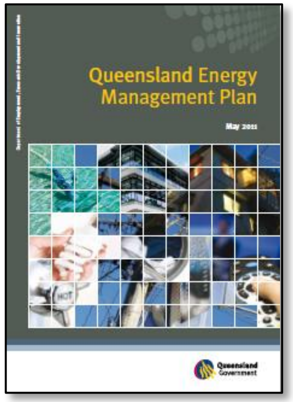
Reducing the surges in peak demand created by air conditioners allows network businesses to defer costly upgrades to network capacity for the benefit of all customers.

www.energex.com.au/sustainability/rewards-for-air-conditioning-pools-and-hot-water

F. DM SCHEME PRECEDENTS

Queensland Energy Conservation and DM program

This program was implemented in 2011. The DM targets are not legislated, but guided by policy direction from government.



Main elements of the scheme are:

- It aims to help avoid the equivalent of 1000 MW, saving more than $3.5 billion in avoided network and generation costs.
- Part of these savings will come from DM targets adopted by distributors of 144 MW (Energex) and 103 MW (Ergon).
- Initial funds ($47 million) were provided by the Qld Government. Subsequent program cost recovery was sought and approved via AER (~$220million).
- If performance targets are not met, the AER may disallow cost recovery.

Achievements

- In both 2011–12 and the previous year, Energex's DM programs are meeting its targets in its key commercial/industrial initiatives (42.6 and 26.1 MVA compared to targets of 42 and 26 MVa respectively) and exceeding them by almost double in its residential DM initiatives (23.4 and 15.4 MVA compared to targets of 12.5 and 8 MVa respectively).[71]
- In 2011–12, Ergon DM activities delivered 36MW of demand reductions, exceeding the 25MW target set for the year. With 17MW of peak demand reductions the previous year, Ergon is well positioned to achieve its target of 103MW saving by 2015.[72]

South Australian DM Fund[73]

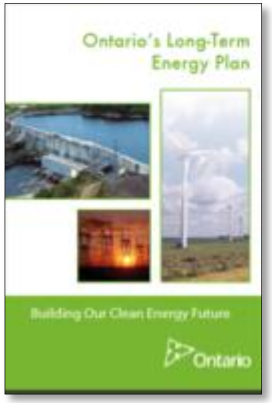
ESCOSA, the state's electricity regulator, developed a demand management framework based on a cost–benefit analysis that outlined power factor correction, standby generation, residential direct load control and aggregation as potentially applicable demand management measures for the South Australian market. South Australia's sole distributor, ETSA Utilities, was required to work closely with ESCOSA on the demand management program, and was subject to specific reporting requirements for each initiative.

The main elements of the initiative are:

- ESCOSA provided an allowance of $20 million for a range of pilot demand management initiatives in the 2005–10 Distribution Price Determination.
- Allowances for demand management are treated as operating expenditure, and are not imputed into demand forecasts, capex or the regulatory asset base. The classification of these initiatives as opex is a decision based on their 'pilot nature'.

Ontario Electricity Conservation and Demand Management Program

Legislation introduced in 2009 allowed the setting of Conservation and Demand Management (CDM) targets for distributors as a condition of licence.



The main elements of the program are:

- Overall targets issued by Minister:
  1,330MW between2011 and 2014
  6,000 GWhpa between 2010 and 2014.
- Individual targets set by the Energy Board, following advice from the Power Authority (advice based on direct consultation with distributors).
- Results are achieved through the use of province-wide CDM programs made available by the Power Authority.
- DM costs are recovered via a regulatory structure.
- Performance incentives accrue to networks once 80% of their CDM target is reached (max 150%).

Achievements

- Overall in 2011, distributors reported spending a total of $94,129,770 on CDM programs across Ontario to achieve 215,651 kW of peak demand savings
- Most distributors achieved at least 10% of their overall target in their first year. Four distributors achieving over 60%, another four over 30% and seven over 20%.

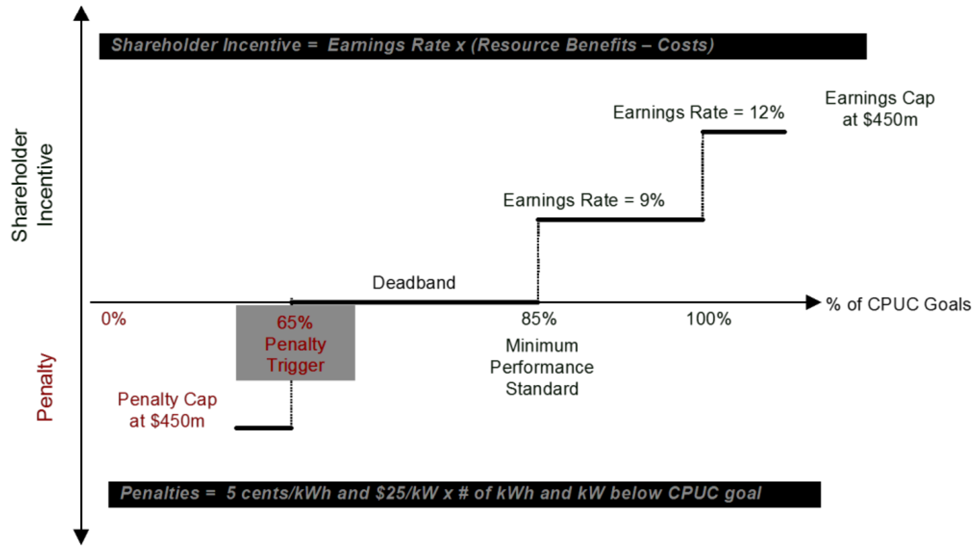
California efficiency savings and demand reduction targets

California implemented broad legislation in 2006 to set an overall target of 10% reduction in consumption within 10 years. It also required the California Energy Commission (CEC), the California Public Utilities Commission (CPUC) and other interested parties to develop a state-wide estimate of all cost-effective electricity and natural gas savings and to develop efficiency savings and demand reduction targets for the next 10 years.

The main elements of the scheme are:

- CPUC built on existing peak demand targets for 2004–2013 for each of the three investor-owned electrical utilities, extending these out to 2020. Targets from 2012 to 2020 total 4.5GW across the three utilities.
- The required energy savings will be primarily met through incentive programs for utility customers but utilities can also count energy savings from government policies such as state building codes, federal and state appliance standards and state-wide market transformation efforts.

Californian incentive/penalty mechanism: Utility ratepayers and shareholders 'share the savings' from EE programs. Financial rewards are balanced by penalties for poor performance, tied to Commission-adopted kW, kWh and therm savings goals.



Other International schemes[74]

Region	Target	Legislated?	Funding	Penalties/Rewards
Colorado, US	5% of 2006 peak demand by 2018	Legislation provides minimum targets but authorised Public Utility Commission to revise goals and establish interim targets	Tariff riders on customer bills	Disincentive offset and performance incentive
Delaware, US	15% of 2007 peak electric demand by 2015 (2011 = 52MW, 2015 = 392 MW)	Targets set in legislation	TBD but may include volumetric charge to customers	Unknown
Florida, US	Summer: 3,024 MW Winter: 1,937 MW (cumulative from 2010–2019)	Public Service Commission sets goals	Unknown	None at this stage.
Illinois, US	0.1% reduction in peak demand each year for 10 years (EY 2009–2019)	Legislation sets overall annual targets	Cost-recovery tariffs	Non-compliance with plans requires utilities to make contribution to the Energy Efficiency Trust Fund
Maine, US	100 MW reduction in peak load electricity consumption by 2020	Targets set in the Act	Cost-recovery rates with limits	Unknown
Maryland, US	From 2007 level, 5% reduction in per capita peak demand by 2011, 10% by 2013, and 15% by 2015	Targets set in legislation	Cost-recovery rates with no specific limits	Unknown
Missouri, US	Annual 1% peak reduction, cumulative reduction of 9% by 2020, increasing by 1% each year thereafter	Cumulative target set in legislation, annual targets set by Public Service Commission	TBD	Unknown
Ohio, US	1% reduction in peak demand in 2009, 0.75% reduction in peak demand each year through 2018	Targets set in legislation	Unknown	Non-compliance will result in forfeiture to be paid to the Advanced Energy Fund
Pennsylvania US	No current targets. Previous targets were savings of 4.5% by May 31, 2013, measured against actual peak demand from June 2007–May 2008	Targets set in legislation	Reconcilable adjustment clause to rates	Failure to achieve targets is punishable by fines.

Rhode Island, US	Summer: Range from 18,512 kW in 2011 to 32,759 kW in 2014; Winter range from 17,197kW in 2011 to 30,432 kW in 2014	Public Utilities Commission sets targets	Volumetric rate surcharge	Unknown
Texas, US	30% of electric demand growth in 2013 0.4% of each company's peak demand	Individual targets set in legislation	Included in customer tariffs, as monthly or volumetric basis	Performance bonus for exceeding goal within cost imit.
Vermont, US	Summer peak savings: 60,800 kW (three-year goal for 2012–2014). No winter peak target.	Public Service Board set targets following submissions by utilities and workshop with a number of stakeholders including Utilities.	Volumetric charge on customer bills	Positive performance awards for meeting stretch KPIs, and forfeiture of portions of performance award for failing to meet other minimum QPIs.

Other countries that have implemented DM targets or similar initiatives that may impact on peak demand include: Belgium, Brazil, Denmark, France, Italy, Thailand and the United Kingdom*
(*see Total Environment Centre, 2012, *Demand management targets for networks in the National Electricity Market (Discussion Paper)*

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