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Total Environment Centre

Submission to the

Australian Energy Market Commission Transmission Framework Review Issues Paper

Final Version with changes from MCE*

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*This submission has been reviewed by staff of the MCE as part of a process of checking ‘factual’ matters. TEC has cooperated with this process under objection as it is inappropriate practice to vet submissions from public advocacy groups; will take up valuable MCE resources; and bring the Advocacy Panel process into disrepute.

Introduction and Recommendations

Total Environment Centre (TEC) welcomes the opportunity to submit to the Australian Energy Market Commission's Transmission Frameworks Review. The National Energy Market (NEM) is a crucial area of energy policy, especially in light of rising electricity prices and the threat of, and response to, anthropogenic climate change.

This submission relates in particular to Questions 1, 3, 5 and 9 of the Issues Paper. We address Question 6 separately at the end of our submission. We have also addressed, separately, the scope of the Issues Paper which we believe to be unnecessarily narrow to the exclusion of consideration of demand-side participation (DSP).[1]

Total Environment Centre makes the following recommendations:

- If it is to achieve the goals of the NEO and satisfy the directives of the MCE, the AEMC must incorporate equal consideration of both demand-side and supply-side participation in the Transmission Framework Review, and transmission network planning and investment decisions.

- To address the massive absence in current frameworks for demand-side participation, the Transmission Frameworks Review should target transmission networks as significant facilitators of demand-side participation. This will allow the AEMC to fully meet the goals of the National Electricity Objective (NEO), particularly:
    - to relieve congestion,
    - to facilitate the efficient use of electricity,
    - to improve network reliability, and
    - to promote efficient investment decisions which thoroughly consider both demand-side and supply-side options to reduce unnecessary price increases for consumers.

  This would reflect the MCE's "support for equal consideration of supply-side and demand-side options and implications as part of all future AEMC reviews", as well as the AEMC's intention to fully include demand-side and supply-side options in their considerations on the Transmission Frameworks Review.

- To address the barriers faced by new generators when entering the market, Total Environment Centre recommends a 'sliding scale' GTUOS that advantages low carbon technologies.

[1] The terms 'demand-side participation' and 'demand-side options' in this submission refer to demand management, demand-side response, load shifting, energy efficiency, distributed generation, and other options outlined on page 10 of this submission.

1. Total Environment Centre analysis of the Issues Paper and Current Transmission Frameworks

The AEMC requests stakeholder views as to:

- **whether we [AEMC] have identified the scope of the issues appropriately;**
- **whether there are other issues that should be considered; and**
- **which issues are most material.**

Total Environment Centre strongly advises the AEMC that the scope of issues has not been appropriately identified.

In section 1.2, the Issues Paper states:

> "We note the MCE's support for the equal consideration of supply-side and demand-side options and implications as part of all future AEMC reviews. In the Transmission Frameworks Review, we intend to consider the arrangements applying to both generation and load, and this will therefore fully include the demand-side as well as the supply-side."

The Issues Paper, however, is focused on how much the transmission network should be 'built out' in response to perceived increases in congestion. The mention of demand-side options, by contrast, is almost non-existent. Demand-side options, despite their ability to both solve problems with congestion and minimise total system costs, are never considered at the same level. The scope of the issues presented in the Paper, therefore, is myopic to the point where outcomes from the NEM will be both economically inefficient as well as against the long term interests of consumers, and are therefore inconsistent with the achievement of the NEO.

The central premise of the Transmission Frameworks Review Issues Paper is that, in the future, congestion on the transmission network will increase, both as a result of increased consumer demand and from an increase in remote renewable generation, which itself is a result of a suite of parallel government energy policy including a carbon price and a mandatory renewable energy target. This premise is flawed, as will be demonstrated later in this paper.

This 'crisis' is mentioned frequently throughout the Issues Paper and the solution proposed is that capacity of the physical network needs to be expanded. For instance, the Issues Paper states that it is a given that:

> "Substantial new investment in all stages of the electricity supply chain *is required* over the next decade in order to maintain secure and reliable electricity supplies." (italics our emphasis)

We take issue with this premise and the proposed 'solution' and their prominence in this Issues Paper in comparison to demand-side options. Despite AEMC's intention for full inclusion of both supply-side and demand-side options in this review, not much has changed since IPART made its comment in 2002, regarding demand-side participation that:

> "To a large extent, one of the major obstacles continues to be a culture which favours traditional 'build' engineering solutions and which pays little more than lip service to alternative options."[2]

If they are to have reference to the NEO in their decision-making, transmission network planners need to consider network expansion amongst a suite of options including demand management, energy efficiency and local generation, and select the one which best minimises total system costs and serves the long term interests of consumers. Instead, given network expansion is presented as the inevitable, sole solution to congestion under the current framework, the question instead becomes 'how much capacity should we build?'

While the Issues Paper does discuss that it is not economically efficient to build out *all* capacity, and building excess capacity can result in unwanted costs for the market, this is still based on a framework of determining the degree of capital investment and expansion required. It does not take into account the benefits of energy efficiency and demand management, and fails to heed the directive of the MCE to consider transmission investment in a holistic manner. In addition, it also fails to treat all technologies equally by dismissing non-network solutions at the expense of more infrastructure.

The Issues Paper prevents the achievement of the NEO because it fails to consider the incorporation of demand-side participation into the Transmission Network Service Provider (TNSP) planning process at the same level as supply-side options. This is despite the MCE directive to attempt a 'holistic' assessment of transmission investment, network operation and management of network congestion. By assessing demand management and energy efficiency in isolation to supply-side measures through the Demand-Side Participation Review, the AEMC is making precisely this mistake. Planning the transmission network without due consideration to demand management and energy efficiency will deliver a badly planned network and very sub-optimal economic outcomes, particularly as ABARE predicts they will comprise 55% of technological efforts to reduce greenhouse gas emissions by 2050.[3]

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[2] IPART Foreword, Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services, Oct 2002.

[3] ABARE (2007) "Technology: Toward a Low Emissions Future", *ABARE Research Report 07.16*, Commonwealth of Australia, Canberra. Available at: http://www.abare.gov.au/publications_html/climate/climate_07/technology.pdf

1.1 Partial interpretation of the NEO

The Issues Paper interprets the NEO with an unjustified bias towards reliability and security at the expense of electricity prices and the efficient operation and use of electricity services.

By fearfully reacting to reliability and security objectives through the pursuit of supply-side investment, the Review creates a barrier to achieving the other elements of the NEO. Inefficient use of energy is economically inefficient *ceteris paribus*. Given this, the sheer level of underinvestment in demand-side options constitutes neglect of the NEO directive to promote 'efficient operation and use of electricity services'.

Ultimately, the transmission planning framework, and frameworks for the NEM in general, should be amended to incorporate greater investment in demand-side options.

1.2 Perverse incentives driving inefficient network expansion

This focus on meeting peak consumer demand for electricity yields sub-optimal economic outcomes under the present transmission framework, and will continue to do so unless the rules regulating generation and network investment within the NEM are improved.

It is not true that the more electricity supplied to the market, the better the economy, and by inference so too society. People do not want electricity *itself*: they want the outputs or services that it can provide. If these outputs can be provided more efficiently and at lower cost, then this can only be in the long term interests of consumers.

The primary reason for such underinvestment in demand-side options is because for many actors in the NEM, increased profits are directly linked to increased sales of electricity. As the McLennan Magasanik Associates assessment of the NEM for the Garnaut Climate Change Review notes:

> "The incentives provided in the regulatory framework encourage network owners to grow their assets. The prices that networks are allowed to charge are directly related to the value of the asset base. That is, the higher the asset value, the higher the average prices may be. New entrants offering solutions that replace network assets are thus often faced with unsympathetic network operators. This includes solutions that lower peak demand or provide distributed generation. Often these solutions may be more economic and environmentally friendly but encounter significant connection barriers."[4]

[4] Chin, Lionel, et al. (2008) *Final Report to Garnaut Climate Change Review: NEM Market Failures and Governance Barriers for New Technologies*, McLennan Magasanik Associates, Melbourne, p. 23 Available at: http://www.garnautreview.org.au/CA25734E0016A131/WebObj/NationalElectricityMarketFailuresandGovernanceB

1.3 Parallel Energy Policy and the role of the NEM

We are asked to consider the current transmission planning frameworks "particularly in light of the anticipated impacts of climate change policies". However, the AEMC has been directed by the MCE to conduct a "holistic" examination of transmission investment, network operation and management of network congestion, as well as work towards the minimisation of transmission network costs in the long term interests of consumers. Therefore, it should not just consider how these policies are impacted by a renewable energy target and carbon price: it should also consider its role in facilitating these parallel energy policies.

Under the current frameworks, the NEM inhibits attempts in parallel energy policy, such as a renewable energy target or carbon price, to address the externality of anthropogenic greenhouse gas emissions. If these parallel policies are inhibited, they will be less effective. If they are less effective, they add to total economic costs for the whole economy, because they will either be less successful in addressing their objectives, or will have more resources allocated to them in order for them to be achieved (i.e. a carbon price will need to be higher).

This misalignment of energy policy can be seen in the 2009 MMA analysis conducted for Total Environment Centre on the role of the NEM in responding to climate change policies (Figure 1):

arriersforNewTechnologies/$File/National%20Electricity%20Market%20Failures%20and%20Governance%20Barriers%20for%20New%20Technologies.pdf

Figure 1: Comparison of goals of the NEM, CPRS and RET[5]

Scheme: ► Objectives ▼	NEM	CPRS	RET
Global response to emission reduction	No	Yes: indirectly through setting an example in emission reduction policy	Yes: indirectly through setting an example in renewable energy policy
Local response to emission reduction	No	Yes: the issue of permits guarantees local emission reduction	Yes: the target itself guarantees local emission reduction
Ecological sustainability	No	Yes: implied by emission reduction	Yes: implied by reduction in carbon emission from thermal power displaced
Economic efficiency	Yes	Yes: cost effective emission reduction	Yes: traded certificates provide for coordination of investment to minimise costs
Efficient prices	Yes	Yes: implied by cost-effective emission reduction	Yes: traded certificates provide for transparent pricing and cost discovery
Addressing disadvantage	No	Yes: for those adversely affected by the Scheme	No
Quality of supply	Yes	Yes: implied by processes for emission measurement	Yes: implied by standards for certificate recognition and supported by the penalty regime
Reliability of supply	Yes	Not applicable	Not applicable
Security of supply	Yes	Not applicable	Not applicable
Safety in production and delivery	Yes	Not applicable	Not applicable

Parallel energy policy such as a renewable energy target and carbon price seeks to address the largest market failure facing humanity – the failure to factor in anthropogenic greenhouse gas emissions as an externality in transactions of goods and services. If the NEM does not change its frameworks to also take into account this externality, it will block the effects of these parallel energy policies, leading to sub-optimal economic outcomes. Therefore, we take issue with the narrow interpretation of the 'long term interests of consumers' as excluding long term energy prices which will be inflated by carbon costs unnecessarily driven by poor TNSP regulation.

[5] Stockton, Jim, et al. (2009)

1.4 Future demand trends

Total Environment Centre also disputes the claim that demand for electricity will always increase. For example, TransGrid provides the Australian Energy Market Operator (AEMO) with NSW energy forecasts for use in its Electricity Statement of Opportunities (ESOO): while TransGrid's recently released 2010 Annual Planning Report (APR) forecasts electricity consumption levels as having increased due to improving economic conditions, these still remain lower than the levels projected in their 2008 APR. It must also be recognised that TransGrid consistently overestimate electricity consumption forecasts, as can be seen from their APRs dating back to 2005.[6]

In contrast, the Institute for Sustainable Futures' report, *Meeting NSW Electricity Needs in a Carbon Constrained World* points out that:

> Rather than an energy shortfall, there is the possibility of a surplus of electricity generation potential of more than 12,000 GWh by 2019/20...[7]

Indeed, ABARE predicts that 12% of the reduction of greenhouse gas emissions in Australia will come from decreases in demand (output demand changes). **[8]**

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[6] http://www.transgrid.com.au/network/np/Pages/default.aspx
[7] Chris Dunstan and Jay Rutovitz for Institute for Sustainable Futures, Meeting NSW Electricity Needs in a Carbon Constrained World, 2009, p. v, Available at: http://igrid.net.au/sites/igrid.net.au/files/images/Meeting%20NSW%20Electricity%20Needs%20in%20a%20Carbon%20Constrained%20World%20%28June%202009-1%29.pdf
[8] ABARE (2007), p.87

1.5 Application of the NEO in the current transmission frameworks

> **Question 1 Application of the NEO**
>
> **Do frameworks governing electricity transmission allow for the minimization of total system costs and for overall efficient outcomes in accordance with the NEO? What evidence, if any, is there to demonstrate that this is or is not the case?**

In light of the above discussion, we can now answer the first specific question posed to stakeholders in the Issues Paper:

Current frameworks prevent the minimisation of total system costs and achievement of overall economic efficiency in accordance with the NEO because they do not adequately factor in demand side response options in network planning.[9] This is reflected in the analysis of market failures in the NEM completed by McLennan Magasanik Associates for the Garnaut Review:

> "While originally designed to be a two sided market, the NEM has developed mainly as a supply side market with little or no participation from the demand side."[10]

[9] Stockton, Jim, et al. (2009) *Role of the NEM in responding to climate change policies: Report to Total Environment Centre*, McLennan Magasanic Associates, South Melbourne. Available at: http://www.tec.org.au/component/docman/doc_download/344-nem-mma-briefing-note

[10] Chin, Lionel, et al. (2008)

2. Benefits and reliability of Demand-side participation in managing congestion

Demand-side participation (DSP) is a suite of- are actions which change the demand on an electricity system. These measures include, but are not limited to[11]:

- direct load control;
- distributed generation, including standby generation and cogeneration;
- demand response;
- energy efficiency;
- fuel substitution;
- interruptible loads;
- integrated DSM projects;
- load shifting;
- power factor correction;
- pricing initiatives, including time of use and demand-based tariffs; and
- smart metering.

DSP relieves congestion on both transmission and distribution networks at lower costs than building 'poles and wires' solutions, and allows for TNSPs and DNSPs to achieve reductions in peak demand spikes, which prevent unnecessary network demand and minimize overall network costs. By doing this, DSP also prevents unnecessary price rises for consumers, increases reliability, and potentially lowers GHG emissions and carbon costs.

2.1 Contribution of demand-side participation in climate change mitigation strategy

Demand Management measures, in particular energy efficiency, are predicted to be the primary tools used to reduce anthropogenic greenhouse gas emissions in future abatement strategies. This is critical when considering the long term interests of consumers as, increasingly, electricity prices will be directly impacted by the cost of carbon (and are already affected by the cost of carbon reduction policies).

In its 2009 World Energy Outlook, the International Energy Agency (IEA) states that energy efficiency "offers the biggest scope for cutting emissions" amongst all energy-related emission abatement options:

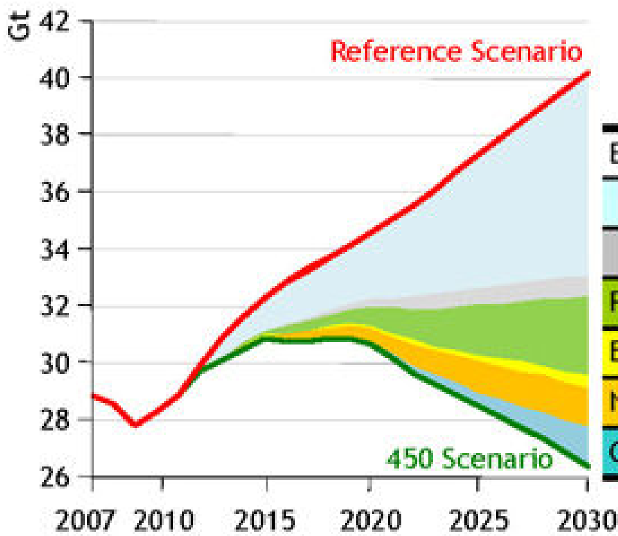
> End-use efficiency is the largest contributor to CO_2 emissions abatement in 2030, accounting for more than half of total savings in the 450 Scenario, compared with the Reference Scenario. Energy-efficiency investments in

[11] Crossley, David (2008) *Evaluation and Acquisition of Network-driven DSM Resources, Research Report No 4 Task XV of the International Energy Agency Demand Side Management Programme, Second Edition 14 October 2008* Energy Futures Australia, Hornsby Heights. Available at: http://www.ieadsm.org/Files/Tasks/Task%20XV%20-%20Network%20Driven%20DSM/Publications/IEADSMTaskXVResearchReport4_Secondedition.pdf

buildings, industry and transport usually have short pay-back periods and negative net abatement costs, as the fuel-cost savings over the lifetime of the capital stock often outweigh the additional capital cost of the efficiency measure, even when future savings are discounted. Decarbonisation of the power sector also plays a central role in reducing emissions. Power generation accounts for more than two-thirds of the savings in the 450 Scenario (of which 40% results from lower electricity demand).[12]

The IEA predicts Energy efficiency measures to comprise 65% of CO2 abatement in 2020, and 57% in 2030, as seen in Figure 2.

Figure 2: IEA future energy supply mix.[13]

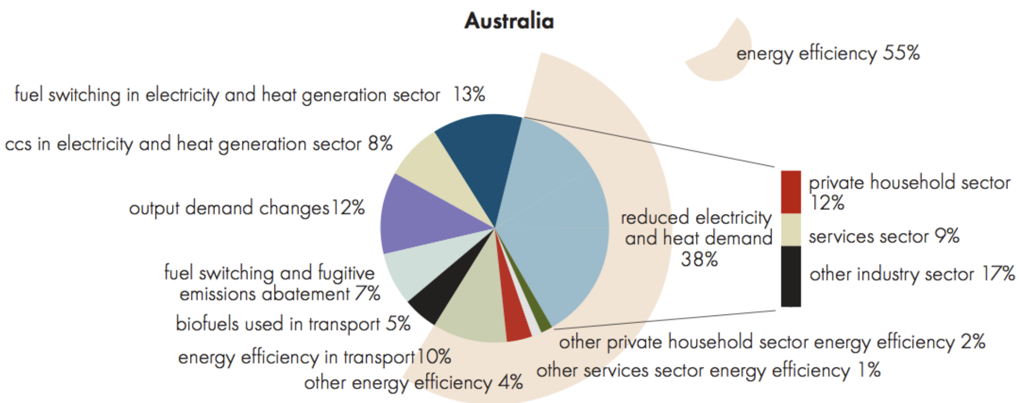


	Abatement ($Mt\ CO_2$)		Investment ($2008 billion)	
	2020	2030	2010-2020	2021-2030
Efficiency	2 517	7 880	1 999	5 586
End-use	*2 284*	*7 145*	*1 933*	*5 551*
Power plants	*233*	*735*	*66*	*35*
Renewables	680	2 741	527	2 260
Biofuels	57	429	27	378
Nuclear	493	1 380	125	491
CCS	102	1 410	56	646

[12] IEA (2009) *World Energy Outlook 2009: Executive Summary* International Energy Agency, France, p.8 Available at: http://www.worldenergyoutlook.org/docs/weo2009/WEO2009_es_english.pdf
[13] IEA (2009) *World Energy Outlook 2009: World Abatement of Energy-related CO2 Emissions in the 450 Scenario* http://www.iea.org/country/graphs/weo_2009/fig9-2.jpg

In its 2007 publication *Technology: Toward a Low Emissions Future*, ABARE predicts energy efficiency to comprise 55% of technological abatement of GHG emissions (Figure 3):

Figure 3: Greenhouse gas abatement in the ABARE enhanced technology scenario, relative to the reference case at 2050, percentage contribution, by source[14]



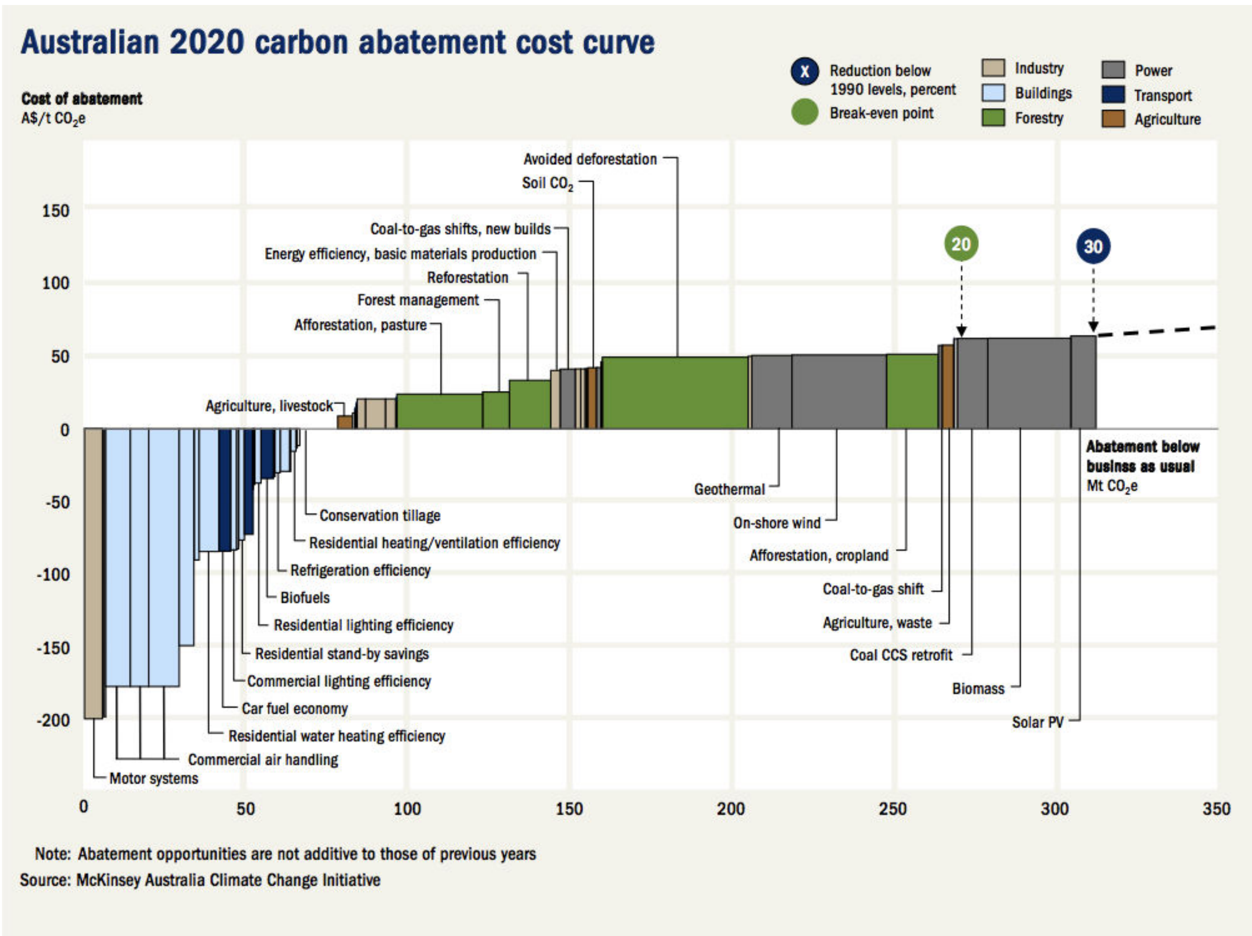
[14] ABARE (2007), p.87

2.2 Cost effectiveness of Demand-side Options

2.2.1 Cost effectiveness of Demand-side Options in greenhouse gas reduction

Demand management measures are extremely cost effective ways of reducing greenhouse gas emissions. Indeed, DM actions often deliver savings greater than the cost of their investment. This can be seen in the cost curve below:

Figure 4: Australian 2020 carbon abatement cost curve[15]



[15] Stephan Görner and Liana Downey (2008) *An Australian Cost Curve for Greenhouse Gas Reduction* McKinsey Australia Climate Change Initiative, McKinsey & Company. Available at: http://www.mckinsey.com/locations/australia_newzealand/knowledge/pdf/1802_carbon.pdf

Prices for demand management measures were also outlined by the NSW government in their 2005 NSW Greenhouse Plan (figure 4). All the electricity-related energy efficiency measures are cost negative.

Figure 5: Summary of a selection of NSW Greenhouse Gas Abatement Options[16]

Technology type	Potential $MtCO_2e$ pa	Cost $/ tCO_2e
Energy efficiency		
Commercial energy efficiency	4.6	-$25
Industrial energy efficiency	3.4	-$16
New/renovated home efficiency	2.9	-$20
Existing home energy efficiency	0.80	-$58
Automobile energy efficiency	1.5	$0
Automobile usage reduction	0.7	-$18
Renewable electricity generation		
Wind	2.4	$20
Small hydroelectric	0.2	$11
Photovoltaics	0.3	$273
Solar thermal	0.5	$43
Solid Waste and wet biomass	3.3	$8
Dry biomass	1.7	$38
Biofuels - biodiesel and ethanol	0.1	$265

Technology type	Potential $MtCO_2e$ pa	Cost $/ tCO_2e
Lower emission fossil-fuel electricity generation		
Large industrial cogeneration	1.6	-$2
Mid size cogeneration	1.8	$16
Combined cycle gas (base load)	2.2	$25
Mine waste methane electricity generation	4.9	$6
Upgrade existing coal plant	1.2	-$12
Geosequestration at coal generator	4	$40
Industrial process	0.6	-$3
Land use change and management		
Reduction in land clearing	6.8	$0
Soil carbon sequestration	0.5	$0
Forest sequestration*	3.1	$0
Forest sequestration	4	$5
Forest sequestration	5.4	$15
Forest sequestration	7.3	$30

2.2.2 Peak demand savings

The potential for peak demand savings is even greater. As indicated in the various state AER TNSP and DNSP determinations, demand related capex accounts for a high proportion of National Electricity Market network expenditure. This is growth that could be avoided by energy efficiency and demand management. If the savings are not harnessed, electricity consumers will have to pay for many billions of dollars of avoidable network costs, as well as the costs of additional, unnecessary generation and future carbon costs.

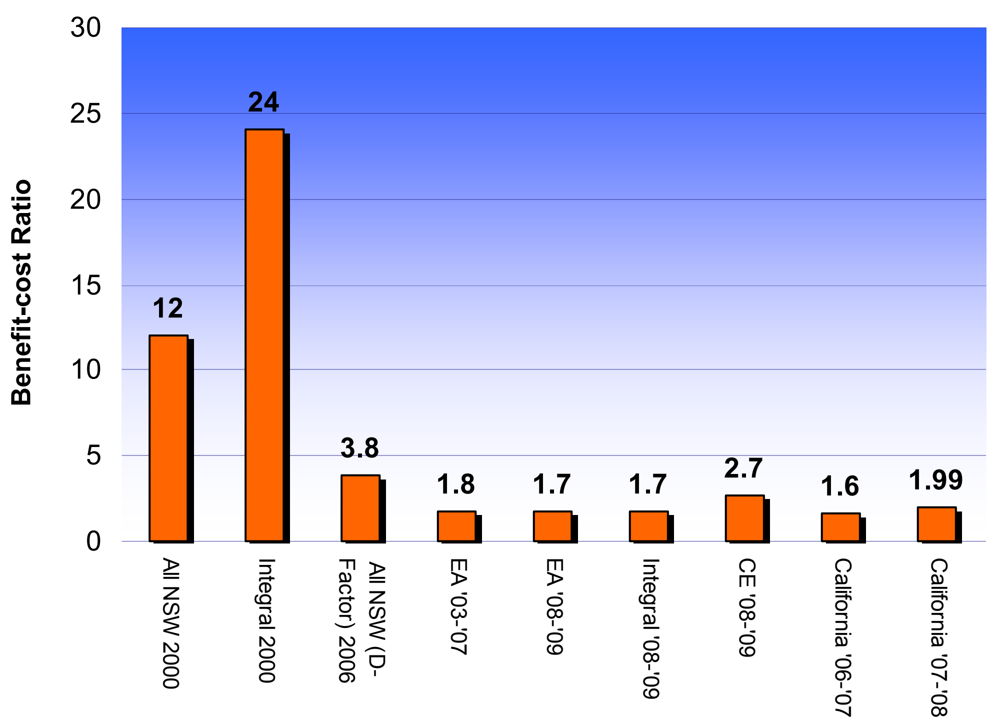
[16] The NSW Greenhouse Office (2005) *NSW Greenhouse Plan* The Cabinet Office of the Government of New South Wales p. 15 Available at: http://www.environment.nsw.gov.au/climatechange/greenhouseplan.htm

One of the key barriers that must be overcome to transform regulator myopia on DM is the way in which cost-effectiveness is defined. Australian network companies and regulators currently calculate the cost-effectiveness of DM on the narrowest of terms. Excluded from their calculations are:

- Avoided distribution costs
- Avoided generation costs
- Avoided future carbon costs

Instead, the only value recognised is that of deferring or avoiding an upcoming, local augmentation compared to estimated build costs. Even when defined within such narrow boundaries, actual experience has demonstrated DM's cost-effectiveness in NSW and elsewhere. The following graph demonstrates the cost-effectiveness of NSW network DM.

Figure 6: Cost-effectiveness of Network DM Since 2000[17]



(Any value greater than one indicates that benefits have exceeded costs)

Research conducted by the Institute for Sustainable Futures in 2007 for Total Environment Centre has shown that actual distribution network DM undertaken with IPART's 'D-Factor' between 2004 and 2006 was almost four times more cost-effective

[17] Benefits for NSW network DM do not include the benefits of avoided generation or transmission infrastructure. NSW and Californian DM benefits do not include avoided carbon costs. See Appendix A for data and references.

than augmentation, delivering a benefit to cost ratio of 3.8 to 1. DM costs were $5.1 million, while the expected avoided network cost was reported as $19.3 million.[18]

In 1999-2000 DM investments by all the NSW distributors delivered a benefit to cost ratio of over 12 to 1. This involved $5 million of expenditure that delivered $62 million in operating and capital cost savings.[19] A highlight was in 1999-2000 when Integral Energy's DM achieved a benefit to cost ratio of 24 to 1, with DM costs of $1.2 million for $29 million of capital investment deferral.[20] DM carried out by NSW networks in 2008-09 shows more moderate benefits.

Figure 7: Cost-effectiveness of NSW Distribution Network Demand Management

Network	Year	DM spending $m	Opex and Capex Savings	Benefit to Cost Ratio	Tonnes GGE Reductions
All	1999-00	5	62	12 :1	
Integral	2000	1.2	29	24 : 1	
All (D-factor only)	2004-06	5.1	19.3	3.8 : 1	
EnergyAustralia[21]	2003-07	5	9	1.8 : 1	
IntegralEnergy	2004-07				
EnergyAustralia[22]	2008-09	7.9	13.4	1.7 : 1	2,421 - 1 yr 2,201 - 9 yrs
IntegralEnergy[23]	2008-09	1.3	2.2	1.7 : 1	2,762 pa
Country Energy[24]	2008-09	10.3	27.9	2.7 : 1	40,538 – 20 yrs
Californian Utilities Verified[25]	2006-07	1,353	2,190	1.6 : 1	3,417,782
Californian Utilities Projected[26]	2006-08	2,724	5,419	1.99 : 1	1,419,025

[18] Institute for Sustainable Futures for Total Environment Centre, Win Win Win 2008 p. 5

[19] IPART, (2002*) Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services, Final Report*, p. 62.

[20] ibid p. 61.

[21] Energy Australia, *Regulatory Proposal 2009-20014*, p. 104, Available at: http://www.aer.gov.au/content/index.phtml/itemId/728473

[22] EnergyAustralia, *Network Performance Report*, 2008-09, p. 78, Available at: http://www.energyaustralia.com.au/Common/Network-Supply-and-Services/Network-regulation-and-reports/~/media/Files/SPR/Network%20Reports%20and%20Plans/0809NetworkPerformanceReportFinal.ashx

[23] Integral Energy (2009) *Electricity Network Performance Report, 2008-09*, Nov 2009, p. 41, Available at: http://www.integral.com.au/wps/wcm/connect/6b981200405ac16eb201badccb7f5ab5/ENPR+2008-2009++FINAL+FOR+DWE.pdf?MOD=AJPERES

[24] Country Energy, *Electricity Network Performance Report, 2008-09*, p. 27, Available at: http://www.countryenergy.com.au/wps/wcm/connect/0396f08040b59982a6c1f7d4a66842a1/CE_NPR_2008_09.pdf?MOD=AJPERES

[25] California Public Utilities Commission (2009) *Energy Efficiency and Conservation Programs: Report to the Legislature*, p. 27-28 at: http://docs.cpuc.ca.gov/PUBLISHED/GRAPHICS/104470.PDF. Cost-effectiveness includes avoided generation, transmission and distribution costs. Benefits are costs of supply-side resources avoided or deferred and costs include measures and installations as well as administration of programs. Programs are cost-effective when the value of total energy savings for ratepayers is greater than the total cost to ratepayers.

[26] Ibid

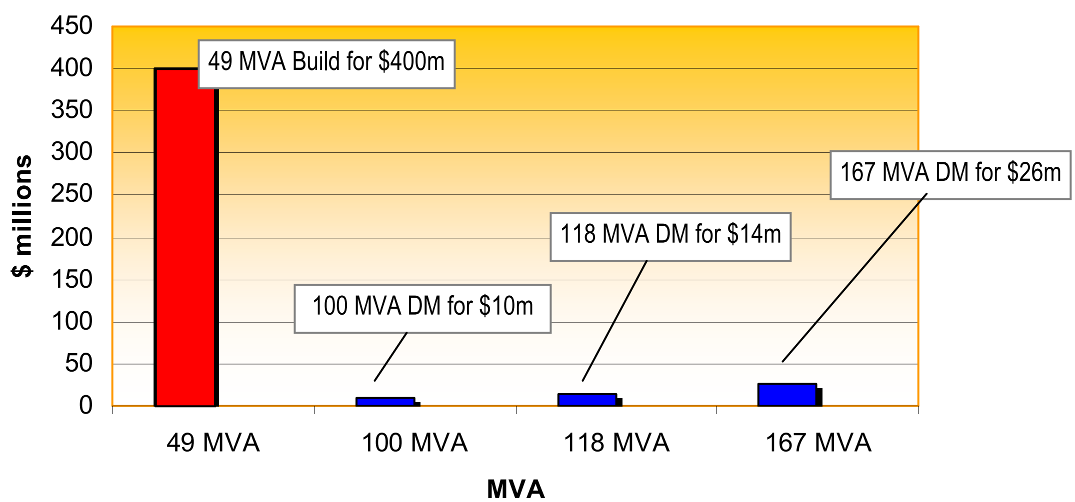
The experience in California demonstrates that energy savings still deliver almost double the return on the investment after 30 years of aggressive energy efficiency activity. This indicates that there would still be exceptionally good value DM available in NSW and across the NEM for many years.

With respect to TNSP demand management, the IEA notes the example of TransGrid's Wollongong – Sydney – Newcastle augmentation where:

> In May 2008 the Australian Energy Regulator approved a pass through of AUD21.9 million for 350MW of network support to defer the conversion of the two existing 330 kV transmission lines to operate at 500 kV. It is expected that the provision of network support through non-network projects will defer the AUD327 million conversion project by a year.[27]

This represents a significant 15:1 benefit to cost ratio. TNSPs EnergyAustralia (EA) and TransGrid (TG) are currently not required to report DM expenditure and savings. This makes it difficult to fully assess the cost-effectiveness of their programs. However, as part of the current MetroGrid project, EA and TG have undertaken analysis of DM opportunities. The following graph illustrates the radically superior financial benefits that DM is projected to deliver compared to the augmentation alternatives.

Figure 8: MetroGrid Cost of Augmentation versus DM



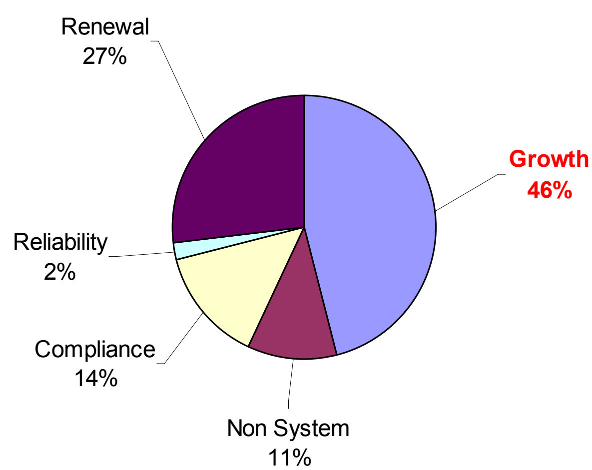
Based on 2 years of investigations, TG and EA have concluded that compared to a 49MVA augmentation to meet the summer demand in 2012-13 costing $400 million, DM could deliver double the amount of DM for one year at a mere 2.5% of this cost,

[27] Crossley, David (2008)

100MVA for $10 million.[28] Charles River Associates go further to project 118 MVA of DM for $14 million or 167 MVA of DM for $26 million, using a variety of DM techniques.[29] These savings could be replicated across the NEM if transmission frameworks were adequately incentivised TNSPs to reap the vast untapped potential of DM.

Soaring rates of peak demand point to this potential. DNSPs such as Integral Energy in NSW, for example, have spiraling rates of unnecessary growth related capital expenditure. The graph below shows that 46% of Integral Energy's planned $2,953 million capital expenditure over the next 5 years is just to meet new – avoidable – growth.[30]

Figure 9: Components of Integral Energy's Capital Expenditure Program[31]



Peak demand spikes are a particular problem that could be alleviated, at least in part, by energy efficiency. In bringing down the overall level of consumption, energy efficiency also reduces peaks. Peak demand in the TransGrid/EnergyAustralia area of Inner Sydney Metropolitan indicates how infrequently maximum capacity is exceeded:

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[28] Energy Australia and TransGrid, (2009*) Demand Management Investigation Report- Sydney Inner Metropolitan Area* p.22, Available at: http://www.transgrid.com.au/network/nsdm/Documents/Demand%20Management%20Investigation%20Report%20-%20Sydney%20Inner%20Metropolitan%20Area.pdf

[29] Ibid, p.3-4

[30] Integral Energy (2008) *Presentation on Regulatory Proposal to the Australian Energy Regulator 2009 to 2014*, p. 28.

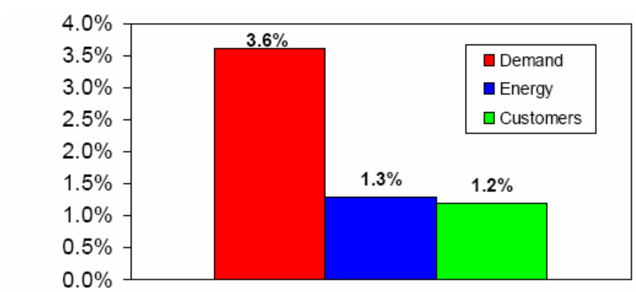
[31] Integral Energy (2008) *Regulatory Proposal to the Australian Energy Regulator 2009 to 2014*, p. 10

Figure 10: Peak Demand in the Inner Sydney Metropolitan Area[32]

Year	Top 50 MW	Top 100 MW
2005/06	1 day, 4 hrs total	2 days, 7 hrs total
2006/07	1 days, 0.5 hrs total	2 days, 3 hrs total
2007/08	1 days, 2.5 hrs total	2 days, 9 hrs total
2008/09	4 days, 8.5 hrs total	6 days, 21.5 hrs total

These spikes that drive expensive, inefficient augmentations not only occur infrequently, but are growing disproportionately compared to overall energy consumption. For 2009-2014 Integral forecasts peak demand growth (3.6% pa) to be three times higher than both growth in customer numbers and energy consumption (1.2% and 1.3% pa respectively), as illustrated below.[33] As Integral admits, the differing growth rates between peak demand compared to customer numbers and energy consumption contribute to upward pressure on tariffs.[34]

Figure 11: Integral Energy Average Yearly Growth 2009-2014[35]



In the residential sector, Energy Australia forecasts an even greater disparity between peak demand and consumption, with consumption growing at only 0.1% and peak

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32 Energy Australia, and TransGrid (2009). *Demand Management Investigation Report- Sydney Inner Metropolitan Area*, p.4 Available at: http://www.transgrid.com.au/network/nsdm/Documents/Demand%20Management%20Investigation%20Report%20-%20Sydney%20Inner%20Metropolitan%20Area.pdf

33 Integral Energy (2008) *Regulatory Proposal to the Australian Energy Regulator 2009 to 2014*, p. 9

34 Ibid.

35 Ibid. p. 18.

demand growing at 3.7%, as illustrated below. As IPART has noted, the cost of providing distribution peak load can be around 400 times the cost of baseload.[36]

Figure 9: Demand growth in EnergyAustralia's network area (2009-14)[37]

2.3 Reliability of Demand-side Options

The reliability of demand-side options measures has been recognized by a wide range of developed and developing countries, including the United States, France, New Zealand, Austria, Greece, Norway, Belgium, Italy, South Africa, Canada, India, Spain, Denmark, Japan, Sweden, Korea, the United Kingdom, Finland, and the Netherlands.[38] In the United States, for example, independent system operators and regional transmission operators responsible for the operation of electricity transmission systems "are now routinely implementing market-based processes to acquire DSM resources to maintain and improve overall system reliability at the regional level."[39] In fact demand-side participation is considered so important for reliability and security in the US that it has been integrated in the federal energy security program.[40]

The reliability of demand-side participation is also recognized in Australia. In 2005 for example, TransGrid identified transmission network limitations affecting the supply to the Newcastle–Sydney–Wollongong load area, the risks of which were met by the supply of 350MW of demand-side options, including local generation. "This is the largest known contract for network support signed by a TNSP in Australia and possible worldwide." [41]

The system put in place by TransGrid through the contracting of demand response and local generation proved reliable when tested – the 50MW firm capacity of the 350MW total was supplied by Energy Response. It was tested for three hours and met the 50MW target every half hour without fail.[42]

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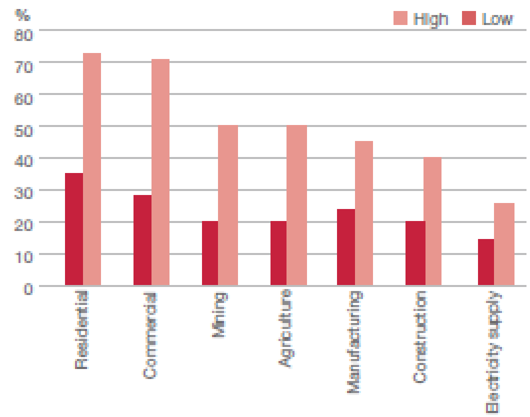
[36] IPART. (1999). *Regulation of network service providers - Discussion Paper DP-34* ; IPART. 2002. *Inquiry into the role of demand management and other options in the provision of energy services - Interim Report, review report no. 02-1*, p. 6
[37] EnergyAustralia. (2008). *Regulatory Proposal*, p. 43.
[38] IEA (2009)
[39] Crossley, David (2008) Evaluation and Acquisition of Network-driven DSM Resources, Research Report No 4 Task XV of the International Energy Agency Demand Side Management Programme, Second Edition 14 October 2008 Energy Futures Australia, Hornsby Heights. p.33
[40] The Federal Energy Regulatory Commission Staff (2010) *National Action Plan on Demand Response*. United States Government. Available at: http://www.ferc.gov/legal/staff-reports/06-17-10-demand-response.pdf
[41] Crossley, David (2008) pp. 12-13
[42] Michael Zammit, Energy Response, personal correspondence with Total Environment Centre

2.3 Available Reserves for Demand-side response in Australia

According to the most comprehensive review of energy efficiency potential in Australia, energy use could be reduced by up to 70% in the residential and commercial sectors immediately using currently available technologies, with an average payback period of four years, and immediate economic benefits:

Figure 10: Percentage cost-effective energy consumption reduction potential across different sectors[43]



The vast potential that this and other analyses indicate is beginning to materialise in the real world. Recent reports from the Commonwealth Government Energy Efficiency Opportunities audit program have already identified over $736 million in annual net financial benefits through energy efficiency initiatives, with just 226 companies having registered for the program at the time the *First Opportunities* report was published.[44]

A more recent ClimateWorks Australia report has identified energy efficiency opportunities from the industrial sector totaling 17 million tonnes of CO2-e and $1.7 billion in savings by 2020 from industrial energy efficiency alone.[45]

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[43] Energy Efficiency and Greenhouse Working Group, National Framework for Energy Efficiency (NFEE). 2003. Towards a National Framework for Energy Efficiency – Issues and challenges discussion paper, p.4. http://www.ret.gov.au/Documents/mce/energy-eff/nfee/_documents/nfee_discussio.pdf

[44] Department of Resources, Energy and Tourism. 2010. *First Opportunities: A Look at Results from 2006-2008 for the Energy Efficiency Opportunities Program,* p.ix-x. http://www.ret.gov.au/energy/Documents/energyefficiencyopps/PDF/EEO_FirstOpportunitiesReport_2010_FINAL.pdf

[45] 47% of total industry emissions reduction potential at average net savings of A$100 per tCO2-e. ClimateWorks Australia. 2010. *Low Carbon Growth Plan for Australia,* p.48. http://www.climateworksaustralia.com/Low%20Carbon%20Growth%20Plan.pdf

3. Locational Pricing

Question 6 Network charging for generation and loads

Is a price signal of locational network costs for generators required to promote overall market efficiency? Would there be any consequential impacts on transmission pricing arrangements for load?

We agree with the basic theory behind Generator Transmission Use of Service (GTUOS) charge, if a price signal of locational costs for generators can be shown to lead to overall market efficiency. However, this charge must be applied to both new entrants and existing generators in order to prevent the GTUOS from becoming a barrier to new entrants.

The NEM makes a point of not discriminating between different types of fuel sources because, it claims, this will lead to greater competition of the market. However, in practice, incumbent fossil fuel generators are advantaged over new entrant (often renewable) generators because market prices fail to factor in the negative externality of greenhouse gas emissions and other issues.

> "The NEM was established around existing generators and their capabilities. New entrants, however, were subject to certain technical requirements including those regarding control equipment and the ability to meet ancillary services which the older existing generators did not have to meet. This additional requirement means that the cost structure of new entrants are likely to be higher than that of existing generators placing them at a cost disadvantage.
>
> The NEM is designed to be technology neutral. This means that renewable technology and embedded generation must be able to compete with more established fossil fuel fired generation technology in accessing the market without assistance. This places these technologies at a disadvantage given its higher cost structure. While often renewable generation technology has very low marginal costs (e.g. solar and wind generation technologies), the capital costs are significantly greater than conventional generation technologies."[46]

Locational charging to only new entrants would, in effect, further advantage fossil-fuel generating technologies over renewables. An external carbon price (which at an appropriate level is, in any case, a long way off) is not guaranteed to provide an adequate measure for change given the market failures within the NEM, as addressed previously. We note that it is not economically sound to believe locational charges will

[46] Chin, Lionel, et al. (2008)

lead to economic efficiency in the presence of the externality of greenhouse gas emissions.

If a GTUOS is deemed necessary, it must take these existing advantages to fossil fuel industries into account, and, importantly, charge both new entrants and incumbents. We recommend a ‘sliding scale’ GTUOS that advantages low carbon generation technologies.

4. TEC’s Recommendations

Total Environment Centre makes the following recommendations:

- If it is to achieve the goals of the NEO and satisfy the directives of the MCE, the AEMC must incorporate equal consideration of both demand-side and supply-side participation in the Transmission Framework Review, and transmission network planning and investment decisions.

- To address the massive absence in current frameworks for demand-side participation, the Transmission Frameworks Review should target transmission networks as significant facilitators of demand-side participation. This will allow the AEMC to fully meet the goals of the National Electricity Objective (NEO), particularly:
    - to relieve congestion,
    - to facilitate the efficient use of electricity,
    - to improve network reliability, and
    - to promote efficient investment decisions which thoroughly consider both demand-side and supply-side options to reduce unnecessary price increases for consumers.

This would reflect the MCE’s “support for equal consideration of supply-side and demand-side options and implications as part of all future AEMC reviews”, as well as the AEMC’s intention to fully include demand-side and supply-side options in their considerations on the Transmission Frameworks Review.

- To address the barriers faced by new generators when entering the market, Total Environment Centre recommends a ‘sliding scale’ GTUOS that advantages low carbon technologies.