

Dr Kerry Schott
Chair, Energy Security Board
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8 March 2018

Re: National Energy Guarantee Draft Design Consultation Paper

Dear Dr Schott

This paper sets out the Energy Efficiency Council’s (EEC) response to the National Energy Guarantee (NEG) Draft Design Consultation Paper (hereafter ‘the Consultation Paper’).

The EEC welcomes the Consultation Paper’s focus on demand response, and congratulates the Energy Security Board (ESB) for already having a significant and positive impact on the energy debate in Australia. The EEC has written to Australia’s governments encourage them to collaborate in good faith on the development of the NEG.

However, the NEG must be *explicitly* complemented and linked to other measures if it’s going to have a positive impact on the National Electricity Market (NEM).

Energy management, which includes both energy efficiency and demand response, is the largest and cheapest form of reliable capacity in the electricity sector. The International Energy Agency (IEA) estimates that energy efficiency has delivered more capacity to global energy markets than any other fuel or type of generation. This means that tapping the potential of energy management is central to reliability and affordability.

Energy management is also the largest and cheapest form of greenhouse gas abatement in the electricity sector. The IEA estimates that energy efficiency delivered 75 per cent of abatement in the global energy sector between 2014 and 2016. Going forward, ClimateWorks estimates that energy efficiency can deliver as much abatement in Australia as the shift to renewable generation. Attempting to reduce emissions in the electricity sector while ignoring energy efficiency will fail to deliver abatement at the lowest cost.

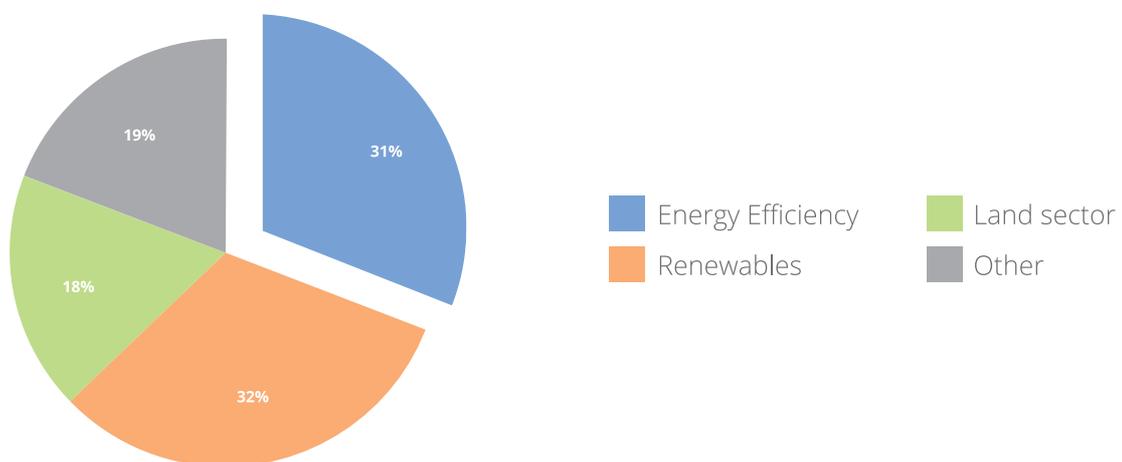


Figure 1. Abatement potential in Australia to 2030

Source: ClimateWorks Australia and WWF 2015, *A prosperous, net zero pollution Australia starts today*.

CSIRO's 2017 *Low Emission Technology Roadmap* considered a number of scenarios for the future of Australia's energy market. CSIRO found that scenarios with ambitious energy productivity (a measure of energy efficiency) improvements resulted in lower wholesale electricity prices and delivered lower energy bills to households than any other scenario. This was partly because the degree to which Australia improves its energy productivity determines the requirement for reducing generation emissions. CSIRO estimated that:

- If ambitious action is taken on energy productivity, around 52 per cent of electricity will need to come from renewable generation by 2030 to meet Australia's target to reduce greenhouse gas emissions by 26-28 per cent by 2030.
- If energy productivity improves by only 40 per cent by 2030 (the current national energy productivity target), around 70 per cent of electricity must come from renewable generation by 2030 to meet Australia's greenhouse commitments.

Recommendations for the Energy Security Board

Energy management has often been an afterthought in energy policy, with some regulators incorrectly viewing it as a consumer response to prices that is independent of the electricity system's rules. In fact, the rules and regulations of the NEM strongly impact energy management, and energy management has a profound impact on the NEM. The failure of many policy makers to understand this basic concept can be simply demonstrated – until recently, most projections of energy demand failed to consider the impact of major energy efficiency programs, resulting in inaccurate demand forecasts which contributed to overinvestment in electricity network infrastructure.

We believe that the ESB has a major role to play not only directly facilitating demand response and energy efficiency, but also advocating for programs outside the NEM, such as minimum standards for buildings and appliances. If we fail to unlock the huge potential of energy management and coordinate it with supply-side measures, we will fail to ensure that electricity is reliable, sustainable and affordable.

The EEC recommends that the ESB:

1. Advise COAG to fund and enhance the National Energy Productivity Plan

The current design of the NEG's Emission Guarantee aims to drive improvements in the emissions intensity of generation and won't deliver increased energy efficiency. However, we know that the NEG needs to either directly drive energy efficiency or be complemented by other policies to ensure that energy bills remain affordable during the transition in the electricity sector.

The COAG Energy Council's National Energy Productivity Plan (NEPP) sets out measures to improve energy efficiency, but has fallen off track. The NEPP currently lacks both the funding and governance model it needs to ensure that we meet even the current target to improve energy productivity by 40 per cent by 2030, let alone the more ambitious target that we need to transition our energy sector at lowest cost.

The ESB should recommend that the COAG Energy Council commit funding and set up an effective governance model to deliver an enhanced NEPP. If the ESB doesn't recommend an enhanced NEPP and work to ensure synergies between the NEPP and the NEM, the Emission Guarantee will have to be completely redesigned.

2. Ensure that the Reliability Guarantee is only triggered in extreme circumstances and can be supported by demand response

The EEC supports the proposal that the Reliability Guarantee should act as a ‘backstop’ mechanism that is only triggered in the case that there is a substantial risk that reliability standards won’t be met. The EEC has concerns that the Reliability Guarantee would both increase complexity and entrench market power in the NEM, resulting in higher prices for consumers. Ensuring that the Reliability Guarantee is only triggered in extreme circumstances will both buy time to refine its design and minimise its potentially negative impacts on the NEM.

However, the ESB needs to ensure that participants can use demand response to meet their Reliability Guarantee targets in the event that it is triggered. The EEC welcomes the ESB’s strong commitments to ensure that demand response can participate in the Reliability Guarantee.

3. Drive priority energy market reforms to enable demand response

In order to ensure that the Reliability Guarantee isn’t triggered, the ESB needs to reform the NEM to unlock the potential for demand response during normal operation of the energy market. In particular, we urge the ESB to ensure the rapid introduction of two measures that were recommended by the *Finkel Review* and are currently being considered by the Australian Energy Market Commission’s *Reliability Frameworks Review*, specifically:

- A mechanism to facilitate energy users, aggregators and retailers selling demand response into the wholesale energy market; and
- A strategic reserve that can be used in instances of multiple generator or network failures.

4. Set up a program to unlock energy management within and outside the NEM

The reforms discussed above would substantially improve demand side participation in the NEM, but more reforms are required. Numerous reviews have identified a serious supply-side bias in the NEM, such as the 2002 *COAG Energy Market Review* led by Warwick Parer AM. On page 174, the *Parer Review* states:

“The Panel found that there is a relatively low demand side involvement in the NEM because:

- *the NEM systems are supply side focussed*
- *the demand side cannot gain the full value of what it brings to the market*
- *residential consumers do not face price signals.”*

It is deeply concerning that there has been limited progress in addressing these issues in the last 16 years. We strongly recommended that the ESB make ‘correcting the supply-side bias in the NEM rules and regulations’ a major priority. The ESB will also need to collaborate with other organisations (e.g. building regulators) to address issues that are outside their direct remit but have a strong impact on the NEM, both to unlock the potential of energy management and ensure that it is delivered in a way that delivers the maximum benefit to the NEM.

Recommendations for the Commonwealth Government

The EEC recommends that the Commonwealth Government

1. Fund energy efficiency measures through the National Energy Productivity Plan

The implementation of the NEPP is being held back by a lack of funding and inefficient governance process. As a result, Australia's annual rate of energy productivity improvement fell sharply in 2015-16 to 0.4 per cent, well below the 15-year average of 1.7 per cent. This means that Australia is not on target to meet its current target to improve energy productivity by 40 per cent by 2030.

2. Set an ambitious '*Generation Emissions Intensity Target*' for the NEG and raise the '*National Energy Productivity Target*'

The Consultation Paper recommends that the Commonwealth Government set an '*Electricity Emissions Target*' for the NEG. However, this mechanism would actually be an '*Emissions Intensity Target for Electricity Generation*', as the total emissions from the electricity sector are a product of the emissions intensity of generation and total energy use. For clarity, it is vital that the Government give the NEG target the correct title of a '*Generation Emissions Intensity Target*'.

The NEG needs to be politically stable to provide policy certainty to investors, which means that the '*Generation Emissions Intensity Target*' needs to be set at a level that is credibly in line with Australia's target to reduce total emissions by 26 to 28 per cent. To do this, the Government will need to consider the abatement potential from other measures in the electricity sector (e.g. energy productivity) and in other sectors.

CSIRO recently undertook this exercise through the *Low Emission Technology Roadmap*, and noted that the National Energy Productivity Target would need to be raised to avoid having to set an incredibly aggressive renewable energy target. However, even with a strong energy productivity target, it appears that the '*Generation Emissions Intensity Target*' will need to be set at a level that ensures that at least 40 per cent of generation comes from zero-emission energy sources by 2030.

Summary

The EEC looks forward to working closely with the ESB and the Commonwealth Government to develop the NEG and associated energy management measures. I would like to seek a meeting with Dr Schott to discuss these matters, and can be contacted on 0414 065 556 or rob.murray-leach@eec.org.au.

Yours sincerely



Rob Murray-Leach
Head of Policy



energy efficiency
COUNCIL

**Energy Efficiency Council submission to the
National Energy Guarantee
Draft Design Consultation Paper**

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1. Overview

This submission does not provide detailed responses to the questions set out in the Consultation Paper because there are other, more fundamental issues that we believe need to be addressed in the design of the National Energy Guarantee (NEG) and its links to other mechanisms.

The way that homes and businesses use energy has a profound impact on Australia's electricity system. While this point is self-evident, the demand-side of the energy market has often been an afterthought in energy policy, with negative impacts on the reliability and affordability of our electricity system.

A number of major reports have recently concluded that improvements in energy efficiency are critical to energy security, affordability, economic growth and sustainability. The International Energy Agency's *Energy Efficiency Market Report 2017* found that:

- Energy productivity accounted for 75 per cent of the stabilisation of global greenhouse gas emissions from the energy sector in 2014-16. In contrast, investments in renewable generation and the shift in generation from coal to gas collectively delivered less than 25 per cent of the global stabilisation of emissions.
- Energy efficiency improvements since 2000 have reduced average household energy bills in many developed nations by between 10 and 30 per cent.
- The UK and France were only able to meet their gas security targets due to improvements in energy efficiency.
- Global improvements in energy efficiency in 2016 increased global GDP by an estimated AUD \$2.8 trillion – twice the size of the entire Australian economy.

Both the Finkel Review and CSIRO's *Low Emission Technology Roadmap* came to similar conclusions about the benefits of energy efficiency and need for action. The COAG Energy Council has already endorsed Recommendation 6.10 of the Finkel Review, namely:

Governments should accelerate the roll out of broader energy efficiency measures to complement the reforms recommended in this Review.

The NEG or any other mechanism that attempts to improve the reliability and sustainability of the NEM must consider how it will either directly support or positively interact with the demand-side of the market.

2. Energy Management is Capacity

Homes and businesses don't directly consume electricity - they use it for 'energy services' such as warm showers, cool homes and computing. Using energy efficiently reduces the amount of electricity that is required to deliver these energy services. For example, an LED light delivers the same service (light) as an old 'incandescent' bulb but uses over 80 per cent less energy. Similarly, altering the pattern of energy use (e.g. demand response) can deliver energy services with dramatically lower costs.

Put simply, energy management is a form of electricity capacity. Different forms of energy management provide different forms of capacity, in the same way that different forms of generation provide different forms of capacity. For example:

- Baseload - Improving the efficiency of an appliance that operates 24 hours a day delivers baseload capacity. Minimum standards for fridges alone deliver the equivalent capacity of half of the former Hazelwood generator.
- Variable - Improving the energy efficiency of appliances that operate during some periods of the day, such as residential air conditioning, provides capacity that varies over the day but in highly predictable ways.
- Peaking - Demand-response provides capacity in periods when demand significantly exceeds supply, such as heatwaves and generator failures.

Calling energy management 'capacity' isn't a poetic turn of phrase. Demand-side measures are formally considered as part of the energy market in many jurisdictions. Demand response provides around 10 per cent of the capacity in several large electricity markets, and even more in some smaller markets. Improvements in the way that energy savings are measured and verified means that other forms of energy management are now starting to be formally considered as reliable capacity, with around 6 per cent of the capacity market in New England being delivered just by energy efficiency.¹

However, energy management delivers far more capacity than has been formally integrated into energy market mechanisms. Analysis of 11 IEA member countries from 1974 to 2010 found that energy efficiency investments had avoided 64 exajoules of energy consumption, which was larger than the supply provided by electricity and natural gas combined (see Figure 2 overleaf).² As a result, the IEA now terms energy efficiency 'the First Fuel'.

The extraordinary potential for energy management to deliver capacity is only just starting to be understood. For example, following tsunami damage to the Fukushima Daiichi Nuclear Plant in 2011, Japan closed almost all of its nuclear generation capacity. Emergency energy conservation measures gradually transitioned to energy efficiency and demand response measures that delivered energy services with far less energy input. As a result, Japan managed to replace over 10 per cent of its electricity capacity by reducing demand in just a couple of years – an extraordinary feat.

¹ Liu, Y. (2017), Demand response and energy efficiency in the capacity resource procurement: Case studies of forward capacity markets in ISO New England, PJM and Great Britain, in *Energy Policy* 100, pp. 271-282.

² IEA 2013 *Energy Efficiency Market Report 2013*, Paris

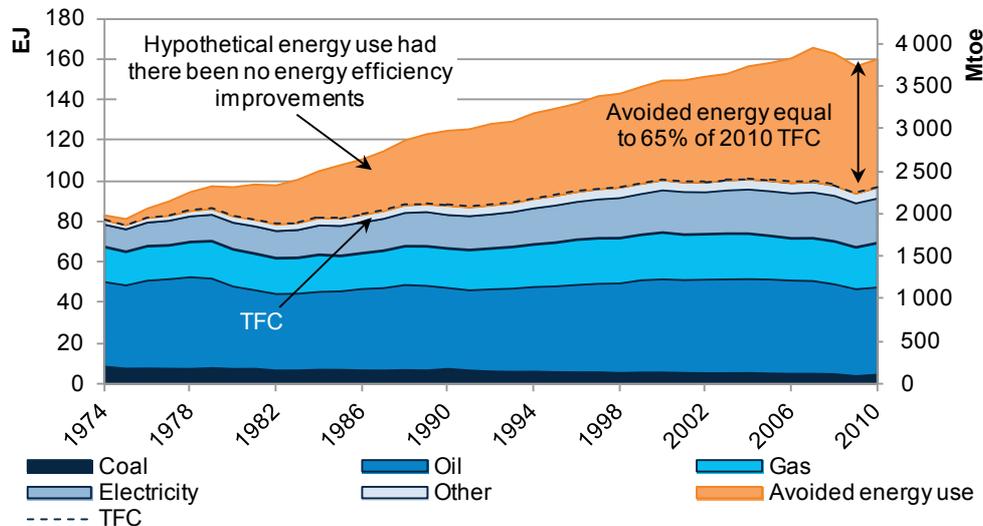


Figure 2. Energy efficiency in 11 countries provided more ‘capacity’ than any other fuel

Source: IEA 2013 Energy Efficiency Market Report 2013, Paris

Australia could meet homes and businesses needs for energy services at much lower cost by unlocking our untapped energy savings potential. Tapping this potential will improve both the affordability and reliability of our electricity system during the transition to lower emission forms of generation.

Many policy makers view energy management as a consumer response to prices that is independent of the system rules and regulations. However, the level of energy management activity is strongly influenced by market rules and regulations, and energy management strongly impacts the market.

Therefore, governments around the world are increasingly not just facilitating energy management, but actively planning for it through ‘*integrated resource planning*’. Under this approach, policy makers use markets and other policies (e.g. minimum standards for buildings) to drive investment in the optimum combination of demand-side and supply-side capacity.

The ESB has a critical role in ensuring that Australia invests in the appropriate level of energy management to deliver to ensure that electricity services are affordable, reliable and sustainable. This will require:

- **Measures within the electricity sector**, such as demand response mechanisms and energy efficiency schemes. The ability to formally include energy management in energy markets is increasing with the increased sophistication of metering, measurement and verification; and
- **Measures outside the electricity sector**, such as energy efficiency standards for appliances, which the ESB should encourage.

3. Reliability Guarantee

Energy management plays a critical role in both reliability and affordability.

Many forms of energy management provide far more reliable capacity than generation. For example, if inefficient streetlights are replaced with efficient lights, the risk is effectively zero that these lights will suddenly require as much energy as they used to consume. In contrast, even the most reliable form of generation has a reasonable risk of not supplying electricity at some point.

Similarly, a well-designed portfolio of demand response measures can provide extremely reliable capacity. While an individual site may not be able to reduce its demand on a particular day, a retailer or aggregator with a significant portfolio can be confident of reducing demand.

Energy management provides highly reliable capacity at typically much lower costs than generation. Appliance standards often deliver capacity at negative costs, and utility energy efficiency programs typically deliver capacity at around half the cost of generation.

‘Baseload’ energy efficiency measures and demand response place downward pressure on wholesale electricity prices by reducing the tightness of supply-demand balance. Energy management also reduces network peaks, reducing the cost of building and maintaining network assets and therefore electricity bills. We need generation to meet energy users requirements for energy services, but combining demand-side and supply-side measures will help to meet consumers’ needs at the desired reliably level at the lowest cost.

Ideally, reliability should be primarily delivered through efficient market mechanisms, such as a demand response mechanism in the wholesale energy market.

The EEC supports the proposal that the Reliability Guarantee should act as a ‘backstop’ mechanism that is only triggered in the case that there is a substantial risk that reliability standards won’t be met. The EEC has concerns that the Reliability Guarantee would both increase complexity and entrench market power in the NEM, resulting in higher prices for consumers. Ensuring that the Reliability Guarantee is only triggered in extreme circumstances will both buy time to refine its design and minimise its potentially negative impacts on the NEM.

However, the ESB needs to ensure that participants can use demand response to meet their Reliability Guarantee targets in the event that it is triggered. The EEC welcomes the ESB’s strong commitments to ensure that demand response can participate in the Reliability Guarantee.

4. Emissions Guarantee

Energy efficiency must be central to Australia's strategy to reduce emissions in the electricity sector. Energy efficiency accounted for 75 per cent of the stabilisation of global greenhouse gas emissions from the energy sector in 2014-16. In contrast, investments in renewable generation and the shift in generation from coal to gas collectively delivered less than 25 per cent of the global stabilisation of emissions.

Going forward to 2030, energy efficiency can deliver as much abatement as the shift to renewable generation - over 30 per cent of Australia's total abatement potential (Figure 1). Moreover, energy management will deliver these reductions at negative cost, with appliance standards expected to deliver abatement at around minus \$118 per tonne of avoided emissions.

Energy efficiency can, in some ways, be considered a zero-emissions form of capacity. However, the impact of energy efficiency on greenhouse gas emissions is affected by the emissions-intensity of electricity supply. Energy efficiency measures will deliver particularly large reductions in emissions in the next decade, as the current emissions-intensity of generation is currently very high. This means that a rational strategy to reduce emissions should deploy energy management as early as possible, when it will deliver abatement at much lower cost than low-emissions generation.

National Energy Productivity Plan

While the EEC congratulates the ESB for highlighting the important role that demand-response can play in ensuring the reliability of energy supply, we note that energy efficiency isn't covered at all in the discussion around reducing emissions, and the NEG is not designed to drive any abatement through energy efficiency.

We strongly urge the ESB to advise COAG to complement the NEG with strong action on energy efficiency. If the ESB doesn't do this, then the Emissions Guarantee will have to be completely redesigned, for example from an emissions-intensity scheme to a total cap on emissions that incorporates both generation emissions intensity and energy efficiency.

The current vehicle for national action on energy management is the COAG Energy Council's National Energy Productivity Plan (NEPP). The NEPP sets out a series of measures to improve energy efficiency, but has fallen off track as it lacks both the funding and governance model in needs to ensure that we meet even the current target to improve energy productivity by 40 per cent by 2030. We urge the ESB to recommend that the COAG Energy Council commit funding and set up an effective governance model to deliver an enhanced NEPP.

Setting an Emissions Intensity Target for Electricity Generation

We note that the ESB proposes that the Commonwealth Government set an '*Electricity Emissions Target*' for the NEG. However, this mechanism would actually be an '*Emissions Intensity Target for Electricity Generation*', as the total emissions from the electricity sector are a product of the emissions intensity of generation and total energy use. For clarity, it is critical that the Government give the NEG target the correct title of a '*Generation Emissions Intensity Target*'.

The NEG needs to be politically stable to provide policy certainty to investors, which means that the *'Generation Emissions Intensity Target'* needs to be set at a level that is credibly in line with Australia's target to reduce emissions by 26 to 28 per cent. In order to do this, the Government will need to consider the abatement potential from other measures in the electricity sector (e.g. energy productivity) and in other sectors.

CSIRO recently undertook this exercise through the *Low Emission Technology Roadmap*, and noted that the National Energy Productivity Target would need to be raised to avoid having to set an incredibly aggressive renewable energy target. However, even with a strong energy productivity target, it appears that the *'Generation Emissions Intensity Target'* will need to be set at a level that ensures that at least 40 per cent of generation comes from zero-emission energy sources by 2030.