



Centre for Energy and  
Environmental Markets

**CEEM submission to the  
Productivity Commission's  
*Draft Report on Energy Efficiency***

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# Preamble

The Australian Government has asked the Productivity Commission to conduct an inquiry into the economic and environmental potential offered by improved energy efficiency. The Productivity Commission released a draft report in April 2005.

This inquiry submission by the UNSW Centre for Energy and Environmental Markets draws upon a range of energy policy work in electricity restructuring, energy efficiency and environmental markets over the last decade by researchers now associated with the Centre. More details of the Centre and this work can be found at the CEEM website – [www.ceem.unsw.edu.au](http://www.ceem.unsw.edu.au).

Our submission focuses on end-use energy efficiency in the Australian stationary energy sector and, particularly, the electricity industry. We first provide an overview of energy efficiency within the context of broader decision making within the energy industry, and discuss the implications this has for the Productivity Commission's Draft Report. We then comment upon the specific 'key points' made in the Draft Report drawing upon this earlier discussion – note, therefore, that there is considerable overlap between the two main sections of our submission.

## Overview

*The role of the stationary energy sector* is to deliver desired stationary end-use energy services to society. While *energy efficiency* has many possible interpretations, the energy efficiency of this process can be usefully measured as the level of end-use energy services delivered per unit of primary energy 'consumed' by the supply-side of the sector. The economic efficiency of this process can be measured as the societal benefits delivered by a chosen mix of energy services against the costs incurred delivering these. However, costs must be interpreted more broadly than just the direct costs incurred to deliver those services.

The cost-effectiveness of this process for an individual is a measure of the private benefits they derive from chosen energy services against the costs of obtaining these, both in terms of purchased end-use equipment and in buying the energy required to run this equipment.

*Decision making within the stationary energy sector* is shaped by the:

- physical realities of energy networks; in particular for electricity, supply and demand must exactly balance at all times yet there is no cost effective storage of electricity and instantaneous transmission and distribution from all generators to all end-use equipment
- the long-lived and capital intensive nature of the assets involved – certainly on the supply-side with generally large power stations and extensive networks, but also on the demand-side, particularly with respect to the building stock,
- energy's role as an essential public good,
- incomplete markets – certainly on the demand-side with present market arrangements but also in terms of future industry participants who will be impacted by present investment decisions,
- very significant longer-term externalities such as climate change,
- information failures – particularly on the demand-side given the industry's complexity, and
- low interest that many end-users have in their stationary energy decisions given that it involves such a small proportion of their expenditure.



*Decision making in the sector* comprises policy settings and regulatory outcomes as well as direct participant decisions. All of these decisions, and their associated decision makers, interact in important yet complex ways. This is not an industry in which end-users are fully autonomous decision-makers.

*Competitive markets, alone, are insufficient* to manage such a complex mix of highly coordinated as well as decentralised decision making by governments, regulators and participants. They will also struggle to effectively manage the uncertainties and risks of such issues as monopoly infrastructure investment, energy security and climate change. For all these reasons, energy markets, and particularly the electricity sector, are best characterised as ‘designer’ markets, and policy makers have a vital role to play in their efficient operation, and alignment of individual energy consumer motivations and behaviour with societal objectives

*Government policy objectives in the stationary energy sector* generally revolve around the efficient provision of energy services to meet essential needs and permit ongoing societal welfare and progress, some level of accessibility for all members of society given its role as an essential public good, security of supply and environmental sustainability. The economic potential and actual take-up of end-use energy efficiency will largely be driven by this wider energy market context.

*Power system operators* also play a vital role in this industry and bear important aspects of the risk that would otherwise be carried by end-users. End-users lose autonomy as a consequence.

### ***Do end-users undertake cost-effective energy efficiency?***

Given the incompleteness of energy markets in terms of fully encompassing decision-making in the electricity industry, it would be remarkable if end-user decision makers generally undertook cost-effective levels of energy efficiency. The vast majority of research in this area finds that they do not.<sup>1</sup> The Draft Report, however, argues against this proposition, stating “Firms and households generally implement energy efficiency improvements that are cost effective for them.”<sup>2</sup> This may sometimes be true in the very narrow sense of the decisions that they are left to make, but is not an adequate description of the context in which end-users operate. That is why this statement is a radical departure from the usual conclusions that most analysts reach about this issue. However, rather than investigate why other analysts have reached different conclusions, the Productivity Commission Draft Report assumes that the conventional wisdom is wrong.

The Draft Report claims that “the benefits of energy efficiency improvements may be overstated and the costs of adoption underestimated. The real (energy efficiency) gap is likely to be much smaller than it appears.”<sup>3</sup> This argument is not well supported by the work cited in the report but this does raise important issues regarding the risks and transaction costs that may face end users in making more energy efficient choices and the broader decision-making context in which they operate.

However, the Draft Report misses the key implications of previous research into these questions – policy actions by governments can improve the context for end-user decision-making, and reduce the relevant transaction costs. Rather than maintaining the existing dysfunctional decision-making framework, these lessons provide a clear case for improving the context in which end-use decision-makers operate.

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<sup>1</sup> The literature is voluminous – see for example the work of the IEA, IPCC, EU, US DoE, Australian Greenhouse Office and UK Government.

<sup>2</sup> The first ‘Key Point’ made in the Draft Report, page xx.

<sup>3</sup> The fourth ‘Key Point’ made in the Draft Report, page xx.

For example, individual assessments of cost effectiveness are based on some view on future energy availability and prices. This view will certainly be conditioned by expectations of future government policy settings. Why should end-users invest in efficiency when governments continue to guarantee plentiful low-cost energy? Indeed, how meaningful is privately cost-effective decision making in that context? We feel these issues need to be better covered by the Productivity Commission.

More generally, the terms of reference for this inquiry specifically task the Productivity Commission to investigate the potential for energy efficiency improvements which are cost effective for individuals arising from actions include energy market restructuring and a range of energy efficiency policies.<sup>4</sup> This reflects the understanding that the private cost effectiveness of energy efficiency is in many ways better viewed as a policy outcome than a policy target – government measures that change energy pricing, stimulate product or process redesign, drive market transformation and set new expectations can change what is privately cost effective. The Draft Report, however, almost entirely fails to address this key issue focussing, instead, on their views that the cost-effectiveness gap is small, and therefore possible gains from policy intervention are also small.

### ***What is the best energy efficiency policy response?***

In our view, the Draft Report is greatly weakened by its failure to acknowledge both that many end-users are not currently choosing cost effective energy efficiency options because of the context in which they make decisions, and that government policy could be altered to improve this situation and reduce transaction costs. The starting point for the Draft Report is, after all, that “the economic and environmental gains of government intervention are probably quite modest, especially after taking account of the cost of interventions.”<sup>5</sup> The Draft Report therefore suggests that the policy default should be no intervention and that, in particular, uncertainties in policy outcomes are an argument against taking action. Furthermore, light handed approaches should be favoured.

These findings seem to us to be flawed because they consolidate existing market distortions and policy failings rather than reduce them. As noted earlier, present energy markets are highly regulated and have significant government involvement. An argument for not taking policy action on energy efficiency is therefore not an argument against government intervention; only an argument against one type of government intervention. For example, the draft NSW White Energy Directions paper “reveals how the Government plans to tackle NSW’s burgeoning demand for electricity, which is being fuelled by the popularity of air-conditioners.... The first stage of the plan is to upgrade the existing [government owned] power plants.”<sup>6</sup> Here, a failure of policy intervention on energy efficiency with regard to air-conditioners is simply driving policy intervention on the supply-side. As previously indicated, why should end-users invest in energy efficiency measures if they see that the government will pre-empt their decisions in this way?

In the electricity industry, governments find it easier to intervene on the supply-side than the demand-side so default government intervention is asymmetric. The Productivity Commission therefore appears to be arguing for what is effectively greater government intervention on the supply-side. We assume this is not intentional. Regardless, it highlights the limits to individual end-user decision making autonomy in the energy sector.

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<sup>4</sup> Point 4 of the ‘Scope of the Inquiry’ in the Terms of Reference, pp. v.

<sup>5</sup> *Draft Report*, p. XLII.

<sup>6</sup> “More coal will burn to feed air-con frenzy”, *Sydney Morning Herald*, 21 May 2005, p. 1.

Given that this bias towards supply-side intervention exists and is unlikely to change in the near term, it seems unreasonable to argue that there shouldn't be intervention on the demand side as part of a balanced strategy of moving towards reduced government intervention in the longer term. The public interest would, in fact, be served by doing so, as it would allow governments to escape from the endless cycle of intervention that they are currently in. The difficulty is that governments feel bound to reassure end-users that governments will address the key issues in energy provision. This is illustrated by the supply-side bias in the present NSW government policy development process.

Some of the Draft Report's recommendations on the role of energy market reform, better termed energy industry restructuring,<sup>7</sup> do highlight the need for changes in energy markets. However, they don't take a broader enough perspective on decision-making in the electricity industry to correctly place energy efficiency policy in that context. In reality, there are sound reasons why energy efficiency policies are required as part of an electricity industry restructuring strategy.

The Draft Report seems to take the view that acknowledged weaknesses in present policy measures such as MEPS and building regulations somehow means that they shouldn't be used. However, no policy mechanism will ever be perfect, and perfection can't be the goal of policy development. The real questions are whether doing nothing represents even greater policy failure and, if it does, are there any other policy options that are demonstrably better. The Draft Report does not properly address these questions.

Again, in terms of managing risk, all policy making is done in an environment of uncertainty and uncertainty itself does not necessarily constitute a reason not to act. In the case of energy efficiency, policies that drive more energy efficiency than strictly cost-effective for individuals might still be justified in terms of wider risk management issues, such as greenhouse and energy security policy concerns.

In summary, the light handed responses and information provision policy measures favoured in the Draft Report for energy efficiency are clearly asymmetric with the continuing heavy handed government intervention on the supply-side of the energy industry. Furthermore, they suggest that the Productivity Commission has failed to understand the importance of coherent adaptive frameworks for policy development that support a societal transition to a more desirable outcome.

Such approaches use sequential regulatory phases to promote innovation, technology assessment and, finally, diffusion of best technologies. The required policy measures might be voluntary measures with government encouragement at the frontier of energy efficiency, financial incentives to drive wider adoption of best available technologies and, finally, regulation to drive the laggards to minimum levels of performance. These policies will likely work far better together in a coherent policy framework than they would if implemented alone. In the Australian context, such a framework would highlight the key role of innovation and importance of driving dynamic efficiency – arguably far more important than productive or allocative efficiency – as well as the use of regulation to drive adoption of best available technologies.

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<sup>7</sup> The word 'reform' has positive connotations that may not be warranted by some of the changes proposed under the umbrella term of 'energy market reform'. It is therefore somewhat questionable terminology for those undertaking policy analysis.

## Responses to the Report's key points

- *Firms and households generally implement energy efficiency improvements that are cost effective for them — most do not deliberately waste energy. But energy has been cheap and is only a small percentage of total outlays for most Australian firms and households.*

As noted earlier, the finding that “Firms and households generally implement energy efficiency improvements that are cost effective for them” is based on an incomplete understanding of the context in which end-use decision-making is taking place. The Productivity Commission has chosen to disregard a wide body of research into this issue in its Draft Report, and will need to do a far better job of justifying this conclusion if it is to be carried through to the final report.

Furthermore, linking this statement to the one immediately following “- most do not deliberately waste energy” may be potentially confusing. The vast body of research finding that firms and households often fail to implement cost-effective energy efficiency doesn't imply that these energy users are deliberately wasting energy. Ignorance of, or limited attention to, their options would suffice.

The low percentage of income spent by many end-users on stationary energy certainly represents a poor motivation for them to explore energy efficiency options. However, this actually makes a strong case for policy interventions that enable these end-users to choose cost-effective options without great effort or associated transaction costs – for example, through MEPS.

- *Australian circumstances contrast with the relatively higher energy prices and/or harsher winters of the major overseas economies. Australia must achieve the right level of energy efficiency for its own context.*

Australia certainly has certainly enjoyed low energy prices compared with many other nations up to the present time. However, this situation may not continue into the future. The relevant context now includes increasing summer temperatures, energy security and climate change concerns. For example, Australia has the highest per-capita greenhouse emissions in the world and this is clearly relevant to energy efficiency policy. We are now entering a carbon-constrained world and the level of concern is reflected in recent statements by Australia's Chief Scientist calling for Australia to reduce its level of climate change emissions by 50% by 2050 and 80% by 2100<sup>8</sup>.

- *Many governments see energy efficiency improvements as a low-cost means of reducing emissions of greenhouse gases, and thereby slowing global climate change. But increasing energy efficiency is only one of the possible ways to address global climate change.*

While energy efficiency is only one of a range of greenhouse responses, it is a particularly important one. As the UK Government notes, “The cheapest, cleanest and safest way of addressing all our goals is to use less energy.”<sup>9</sup> It is difficult to envisage that we can achieve the major (50-80%) global emissions reductions that appear likely to be required over the

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<sup>8</sup> ABC News on Line, 19/5/05

<sup>9</sup> UK DTI, *Energy White Paper*, 2003.

coming century in order to protect the climate without significant improvements in energy efficiency.<sup>10</sup> The Productivity Commission, with its processes “driven by concern for the wellbeing of the community as a whole” cannot simply ignore this issue.

- *Current levels of energy efficiency are below the levels that might appear (to an outsider) to be privately cost effective. But the benefits of energy efficiency improvements may be overstated and the costs of adoption underestimated. The real gap is likely to be much smaller than it appears.*

It is certainly possible that some studies over-estimate the benefits of energy efficiency improvements and underestimate the costs of adoption. It is also possible that studies may do the reverse, particularly should political considerations drive some of the chosen assumptions that are always involved with such modeling efforts. As with any modeling involving predictions – for example, of user behaviour and future energy prices, there are important uncertainties in any findings. It is unclear to us, however, how the Draft Report can therefore conclude that the real energy efficiency gap is likely to be much smaller than it appears. More attention should be paid to alternative explanations for this gap.

Importantly, and as the IEA notes<sup>11</sup>, the private cost effectiveness of energy efficiency is largely a policy outcome itself – policies that stimulate product or process redesign, market transformation and new expectations can, themselves, change what is privately cost effective. For example, the risks and transaction costs of undertaking energy efficiency options beyond standard practice may be significant. However, government policy can reduce such risks and costs – for example, through regulation that effectively removes the decision from individual end-users and drives rapid uptake of the new option.

- *The most important barriers to improving energy efficiency appear to be a failure in the provision of information; and the different incentives facing those who take decisions about installing energy-efficient products (heaters, air conditioners, etc) and those who might benefit from using them.*

It is unclear why the Draft Report believes that information and split incentives are the most important barriers to improving energy efficiency. Much of the work into barriers has also stressed that the generally low motivation amongst end-users, and effort required to seek out and undertake energy efficiency options are major issues. These also impact on the value of decision makers negotiating to resolve split incentives as suggested in the Draft Report. The Draft Report classifies these under ‘other barriers and impediments’ and states that these transaction cost and low motivation barriers generally don’t warrant policy intervention.<sup>12</sup> Again, it is unclear why this is – some transaction costs are easily reduced through regulation and therefore represent ‘market failure’ barriers amenable to policy intervention.

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<sup>10</sup> See, for example, the IPCC *Third Assessment Report*, 2001.

<sup>11</sup> See, for example, IEA presentations at their *Workshop on Energy Efficiency: Past Development and Future Potential* held in April 2004.

<sup>12</sup> pp. xxvi.

- *Some regulatory responses to these problems are appropriate. But the Commission favours light-handed responses and information provision wherever possible, rather than overly prescriptive and intrusive approaches.*

We would have hoped that the Productivity Commission favoured the most effective policy responses, light-handed or otherwise, that would provide a sound transition path to a less intrusive industry model. As noted earlier, the light handed responses and information provision policy measures favoured in the Draft Report for energy efficiency are clearly asymmetric with the heavy handed government intervention regularly demonstrated in the supply-side of the energy industry. There is a real risk that the Draft Report will consolidate this biased, intrusive intervention rather than reduce it.

Furthermore, a coherent adaptive policy framework that maximises our chances of an effective and efficient policy response to energy efficiency is likely to require sequential regulatory phases to promote innovation, technology assessment and, finally, diffusion of best technologies. The required policy measures might be voluntary measures with government encouragement at the frontier of energy efficiency, financial incentives to drive wider adoption of best available technologies and, finally, regulation to drive the laggards to minimum levels of performance. These policies will likely work far better together in a coherent policy framework than they would if implemented alone.<sup>13</sup>

- *Mandatory measures — such as minimum performance standards — override consumer and producer sovereignty, and are inconsistent with the proposition that the energy efficiency improvements they promote are privately cost effective.*

End-user sovereignty is under much greater threat from the present asymmetry in government policy interventions towards the supply-side of the energy industry than energy efficiency regulations such as MEPS.

We are also not clear why the Productivity Commission argues they are also inconsistent with the proposition that they promote privately cost-effective actions – the vast majority of work here and internationally on MEPS disagrees. The Cato Institute study that the Draft Report draws upon so extensively appears to have some serious failings. In particular, arguments that the impact of MEPS should be assessed with respect to the implied discount rates of end-users when making energy efficiency choices are in error because this actually represents one of the market failures that MEPS are intended to correct.<sup>14</sup>

Similarly, the Draft Report's case against building energy efficiency regulations also seems weak and ignores the large body of research that supports their value. The claim that such regulations limit innovation is particularly questionable. The work of Porter and others has highlighted the role that environmental regulation can play in actually driving innovation.<sup>15</sup> Furthermore, the construction industry in Australia has been widely identified as currently low on innovation.<sup>16</sup>

<sup>13</sup> See, for example, Varone, "Energy efficiency: the challenges of policy design," *Energy Policy*, 2001.

<sup>14</sup> ACEEE, Critique of the CATO Institute Study, March 2004.

<sup>15</sup> Michael Porter of Harvard University, argues that stricter environmental policies encourage firms to cut waste, increase efficiency, and invest in more efficient production technologies. According to Porter, reasons for firms not undertaking these steps regardless include lack of awareness of potential savings, the risk that environmental investments won't remain valuable and often low motivation to act. Regulation can help counter all of these barriers.

<sup>16</sup> See, for example, the work of ACIRRT at the University of Sydney. They have identified a hierarchy in the innovation intensity of Australian industries and construction is classified within the low innovation group.



Also, the value of these approaches does not rely on every single consumer benefiting from them. Disadvantage to a small number of consumers who might rationally choose a low efficiency option does not necessarily outweigh the advantages of regulations for most users. The key role of regulation in energy efficiency policy development seems to be much better dealt with in other work including, for example, the UK Energy White Paper which includes higher building and product standards in its major energy efficiency policy proposals.

- *A sufficient case has not been made for the imposition of a national energy efficiency target and tradeable obligations. There would be many practical difficulties in defining and administering the scheme and complying with the obligations placed on regulated entities.*

We agree that there are weaknesses in proposals for a national energy efficiency target and tradeable obligations. The NSW Greenhouse Gas Abatement Scheme demonstrates some of the problems in implementing such approaches.<sup>17</sup>

Financial incentives have a useful but necessarily limited role to play generally. For example, such incentives seem likely to have limited impact when offered to decision makers that are already ignoring cost-effective options. We also agree that financial incentives should not generally be offered to end-users in order to have them take cost effective efficiency actions – small end-users might be the exception.

However, we differ from the Draft Report in what conclusions can be drawn from this. Rather than an excuse for inaction, we would argue that these considerations actually make a strong case for regulating energy users to act on cost effective efficiency options such as required by the present MEPS, building regulations and Victorian EPA scheme.

- *The nine point National Framework for Energy Efficiency (Stage One) measures, recently endorsed by the Ministerial Council on Energy, should be deferred until independent evaluations of existing energy efficiency programs have been undertaken.*

We strongly disagree with this recommendation. The nine NFEE measures recently endorsed by the MCE represent extremely conservative energy efficiency policy steps. The acknowledged uncertainties and potential inadequacies in their impacts are no excuse for inaction. Policy perfection is an unrealistic goal, and possible policy failings in the NFEE measures have to be compared against the demonstrated serious failings of existing arrangements, not idealized conceptions of what might work best.

As noted earlier, inaction on energy efficiency policy seems likely to actually drive heavy-handed government intervention on the supply-side of the energy industry. Similarly, it would heighten end-user expectations that the government will continue to solve all problems in the energy sector by intervening on the supply-side.

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<sup>17</sup> A number of our papers critiquing the NSW Greenhouse Scheme are available on the CEEM website – [www.ceem.unsw.edu.au](http://www.ceem.unsw.edu.au).

- *Whatever the merit of the various educative, suasive and regulatory approaches to encourage or mandate greater energy efficiency, they continue to conflict with the signals given to energy users by Australia's relatively low energy prices.*

We agree – low energy prices are an outcome of current energy policies and may no longer be a realistic expectation in a carbon-constrained world. Energy prices that better reflect the true costs and value of energy supply including externalities such as energy security and climate change will play a useful role in driving greater energy efficiency. They will, however, not be sufficient in themselves. A coherent energy efficiency enhancement strategy will still be required.

- *Some energy efficiency measures may not be privately cost effective, and yet may generate net public benefits because of their environmental outcomes. Those measures may prove to be sound public policy, but they should also be considered against other means of achieving the environmental objectives more directly.*

We agree – however, such assessments are difficult to do well given all of the uncertainties involved, and policy options are always constrained by imperfect existing policy arrangements and the wider context in which such policy making is done.

Such assessments have already been widely undertaken by National Governments and others including the IPCC and the IEA. There is near unanimous agreement that energy efficiency can play a vital role in meeting our economic, social and environmental energy policy objectives. The Productivity Commission might wish to read and reference a little more widely in this area.