ENERGY REGULATION

TECHNICAL PAPER 6

APEEL

The Australian Panel of Experts on Environmental Law

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1 For a more detailed analysis of the issues it addresses see N Gunningham and M Bowman, 'Energy Regulation for a Low Carbon Economy' (2016) 33 *Environmental Planning and Law Journal* 2.

About APEEL

The Australian Panel of Experts on Environmental Law (APEEL) is comprised of experts with extensive knowledge of, and experience in, environmental law. Its membership includes environmental law practitioners, academics with international standing and a retired judge of the Federal Court. APEEL has developed a blueprint for the next generation of Australian environmental laws with the aim of ensuring a healthy, functioning and resilient environment for generations to come. APEEL's proposals are for environmental laws that are as transparent, efficient, effective and participatory as possible. A series of technical discussion papers focus on the following themes:

1. The foundations of environmental law
2. Environmental governance
3. Terrestrial biodiversity conservation and natural resources management
4. Marine and coastal issues
5. Climate law
6. Energy regulation
7. The private sector, business law and environmental performance
8. Democracy and the environment

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Summary and Recommendations

Executive Summary

This *Technical Paper* aims to map and critically evaluate Australia's energy regulation landscape with a view to: (a) characterising strengths and weaknesses in Australia's current energy regime; and (b) recommending policies that can encourage and facilitate Australia's transition to a low-carbon economy. It argues that no single policy instrument can deliver a sustainable energy future, but that a range of measures can all make important contributions, including carbon pricing, mandatory renewable energy targets, energy efficiency measures, and capital subsidies for constructing or installing renewable energy technologies and storage capabilities. In contrast, the Turnbull government's *Direct Action Plan* is unlikely to play any substantial role in achieving a transition to a low-carbon economy and many of the government's other policies are antithetical to that objective.

Specific recommendations include:

Meeting energy needs while simultaneously transitioning to a low carbon economy is the central challenge of energy governance. To deliver on these twin goals APEEL recommends the next generation of Australian energy laws and regulation should incorporate the following:

6.1 Key Policy Tools for a Low-Carbon Transition:

(a) impose a price on carbon;

(b) introduce or reinforce renewable energy and low-carbon incentives;

(c) reinstate a robust and certain Renewable Energy Target (RET);

(d) maintain or extend the role of the Clean Energy Finance Corporation (CEFC);

(e) facilitate energy efficiency and storage capacity;

(f) remove fossil fuel subsidies; and

(g) supply side measures to limit fossil fuel extraction to discharge Australia's fair contribution to meeting the global carbon budget.

6.2 Policy Design Guidelines:

(a) develop complementary combinations of policy tools; and

(b) promote policy stability to encourage further investment in renewables.

HOW TO CONTRIBUTE TO THE APEEL PROJECT

APEEL invites you to provide your responses to the ideas and recommendations presented in this paper. This will assist the development of our final proposals for the next generation of Australian environmental laws.

We look forward to your engagement on specific reform options as the APEEL journey progresses.

Please send your responses to: admin@apeel.org.au or go to www.apeel.org.au where you can do so online.

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1. Introduction: towards an energy revolution?

Traditionally, governments took the view that the principal role of energy policy was to secure the supply of reliable and affordable energy. However, there is a growing recognition of the need for what the International Energy Agency (IEA) calls an 'energy revolution', and for energy policies to facilitate a rapid transformation to a low-carbon, efficient and environmentally benign system of energy supply.[1] The urgency of doing so was underlined by the *Paris Agreement*, and by the increasingly alarming science as to the pace of climate change.[2] Since energy production and consumption accounts for approximately 65% of all greenhouse gas (GHG) emissions,[3] achieving such a transformation of the energy sector is becoming a key pillar of GHG mitigation strategy.

Fundamental to achieving such an energy revolution is government policy and the instruments it uses to achieve its objectives. As a convenient shorthand, this paper refers to these as energy 'regulation', a term which is broadly conceived and includes government interventions that are: prescriptive (variously termed 'direct' or 'command and control' regulation); 'steering' mechanisms such as economic incentives and disincentives; and reporting mechanisms. This paper describes 'energy' to include: electricity generation (whether from fossil fuels or renewables) and the practice and potential for promoting and harnessing 'clean energy' (renewables, clean technology and energy efficiency as measured by carbon emissions). The paper does not discuss the decarbonisation of energy consumed for transportation, nor does it examine nuclear energy regulation in Australia given that no electricity production currently comes from nuclear sources.

As energy regulation takes on new roles it becomes closely entwined with climate change law and with a number of the mechanisms described in Australian Panel of Experts on Environmental Law, *Climate Law* (Technical Paper 5, 2017). This *Technical Paper* is confined to a discussion as to what is distinctive about these mechanisms in terms of energy regulation while exploring in more detail other instruments that are energy-specific.

1.1 The current regulatory landscape

Meeting energy needs while simultaneously transitioning to a low carbon economy is the central challenge of energy governance. Notwithstanding the merits of a global or regional approach, the principal instruments of energy regulation have been developed mostly at national or sub-national levels. It is regulation at these levels that is the subject of the following discussion.

1.2 Governmental priorities: deregulation, competition and efficiency

As is apparent from the 2015 *Energy White Paper*, the federal government's priorities in terms of energy policy are deregulation, competition and efficiency. However, the assumption that the principal aim of the energy regime should be economic efficiency and that the best way to achieve this is through a competitive and untrammelled market, thereby meriting deregulation and privatisation, is questionable. Given the urgency of climate change mitigation, it is equally important that the energy regime facilitates a rapid transformation to a low-carbon economy. Deregulation and the unconstrained market can be seriously detrimental to that goal.[4]

1 International Energy Agency, *World Energy Outlook 2008* (2008), 37.
2 See for example, the recent reports and statements of the World Meteorological Organization, available at <https://public.wmo.int/en/media/press-release/global-climate-breaks-new-records-january-june-2016>.
3 International Energy Agency, *Emissions from Fuel Combustion* (2009) <http://www.wri.org/publication/content/8601>; Global CCS Institute 2011, *Energy Fact Sheet* <http://www.globalccsinstitute.com/publications>.
4 L Godden and A Kallies, 'Electricity Network Development: New Challenges for Australia' in MM Roggenkamp, L Barrera-Hernandez, D N Zillman and I Del Guayo (eds), *Energy Networks and the Law: Innovative Solutions in Changing Markets* (Oxford University Press, 2012), 298.

Amongst the issues that government policy in general, and the *Energy White Paper* in particular, conveniently sidesteps is how energy policy might compensate for the fact that current renewable technologies are substantially disadvantaged when compared to fossil fuels. Not only do the latter benefit from substantial government subsidies, but they also gain advantage from economies of scale and ease of connection with existing electricity transportation networks designed for their use. For example, generation is commonly located adjacent to coal mines, but a long way from where many renewable sources are likely to be located. Moreover, there have also been legislative changes that have allowed for increased market concentration that advantages incumbent players and decreases competition.[5]

Crucially, without government intervention, it will be difficult to integrate intermittent generation from renewable energy providers and to facilitate their connecting to either a transmission or distribution network. Scaled up renewable energy can only be transported to consumers if generators have adequate grid access and networks are adjusted and extended to facilitate this, including through a shift from centralised to distributed forms of electricity generation. In the absence of government intervention with regard to all of the above, existing 'path dependencies'[6] for infrastructure development are likely to become further entrenched, placing additional barriers in the way of the growth of renewables.

In summary, without the reform of network regulation, the growth of renewable energy in Australia will be stunted.[7] Government intervention is required at most nodal points along the energy pipeline, particularly to facilitate transmission investment decisions, augment emerging renewable energy and low-carbon markets, and expedite grid-level storage.

5 Ibid.
6 T Daintith, *Finders Keepers? How the Law of Capture Shaped the World Oil Industry* (Routledge, 2010), ch 1.
7 T Wood and T Edis, *No Easy Choices: Which Way to Australia's Energy Future?* (Grattan Institute, 2012) 11, 21 <http://grattan.edu.au/wp-content/uploads/2014/04/124_energy_no_easy_choices.pdf>.

2. Energy regulation: policy options

So what key policy options in energy regulation can facilitate a timely transition to a low-carbon economy? In this section, the *Technical Paper* examines the current regulatory approaches in Australia and recommends options that can facilitate a low-carbon transition and in terms of placing a price on carbon, other market-based and economic instruments, energy efficiency and direct regulation.

2.1 Direct Action vs. carbon pricing

As discussed in Australian Panel of Experts on Environmental Law, *Climate Law* (Technical Paper 5, 2017), Australia commenced a carbon pricing mechanism in July 2012 under the *Clean Energy Act 2011* (Cth). Yet notwithstanding the strength of the evidence in favour of such market-based mechanisms,[8] this scheme and supporting legislation were repealed in 2014. Instead, the Coalition Government instigated a *Direct Action Plan* as its principal mechanism to cut emissions to 5% below 2000 levels by 2020. However, for reasons discussed in *Technical Paper 5*, the *Direct Action Plan* is not only misleadingly named, but also unlikely to facilitate the requisite carbon emissions within the required timeframe. In short, Direct Action 'is inequitable, inefficient, and unlikely to lower emissions at a pace that is sufficient'[9] to genuinely kick-start an energy transition to a low-carbon economy and consistent with the aspirations of the *Paris Agreement*. In stark contrast, the policy tool of pricing carbon provides a potentially efficient and effective mechanism for reducing carbon emissions (although as discussed at 3.1.2 below, this should only be as one component of a broader instrument mix).

2.2 The Rise and Fall (and Rise) of the Renewable Energy Target

The current Coalition Government also inherited the Renewable Energy Target (RET). This was created in 2001 as a means of promoting renewable energy technology and investment.[10] It creates a market for tradable certificates for renewable energy generation. Electricity generators may then purchase certificates to such a value as will enable them to meet the RET.[11] As such, the RET is quantity-driven and generation-based and requires a minimum threshold of renewably sourced electricity to be generated by a certain date.

Due to the RET, electricity utility companies have sought to increase supplies of renewable energy, which in turn has incentivised investment in renewable energy sources and enlarged renewable energy and clean technology markets. Utilities prove compliance with RET requirements through the use of tradeable renewable energy credits for large-scale projects and solar credits for small-scale projects.

Standards such as the RET are both effective and efficient, because, while prescribing socially preferred outcomes, they leave the means of achieving them up to regulatees, thereby providing incentives for least cost solutions. This appears to be the case in practice as well as in theory, with the available evidence suggesting that the RET is one of the most cost effective emissions reductions policies available.[12]

To date, GHG emissions have been reduced by 22.5 million tonnes of carbon dioxide as a direct consequence of the RET. This is equivalent to 10% of Australia's annual electricity emissions.[13] Into the future, the RET will continue to reduce carbon emissions by up to 58 million tonnes (2015–2020), a figure equal to annual emissions from all of

8 Ibid, and see references therein.
9 J Hewson, *Why there's no room for agnostics in the climate change debate* (World Economic Forum, Agenda, 30 July 2015) <https://agenda.weforum.org/2015/07/why-theres-no-room-for-agnostics-in-the-climate-change-debate/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+world-economic-forum-blog+%28Forum%3ABlog%29>.
10 N Durrant, *Legal Responses to Climate Change* (Federation Press, 2010) 127.
11 *Renewable Energy (Electricity) Act 2000* (Cth) Part 2.
12 Petra Stock, *'Giga-What? Explaining Australia's Renewable Energy Target'* (Climate Council of Australia, 2015) <http://www.climatecouncil.org.au/uploads/2251bb7f97f127289efc9a8a3566c2c1.pdf>.
13 Ibid 1.

Australia's passenger cars and light commercial vehicles.[14] The RET has also been successful from an economic and investment standpoint. To date, more than 400 additional large-scale renewable power stations have been built,[15] and nearly 1.4 million rooftop solar photovoltaic systems have been installed.[16]

Contrary to the prevailing view in the Coalition Government, another benefit of the RET is that it reduces wholesale electricity prices and delivers a net financial benefit in the long term. This reduction in wholesale electricity prices is now acknowledged and is brought about through the merit order effect - an artefact of the current electricity market.[17]

Also of note is the finding of the Australian Energy Market Commission that the RET currently accounts for only approximately 4% of a consumer's bill, and that this will decrease to 3% in 2015/16.[18] Furthermore, the RET has driven down the cost of wholesale energy, far offsetting the costs of the scheme.

Similarly, as the Australian Energy Market Operator has reported, the widespread uptake of small-scale solar photovoltaic systems and solar hot water (incentivised by the small-scale RET) has contributed to overall reductions in demand, leading to the reduction of wholesale prices.[19] Modelling by ROAM Consulting has reached a similar conclusion.[20]

Yet, notwithstanding the overall success of the RET, legislative amendments were passed on 23 June 2015 that revised the target substantially downwards despite the threat that this causes both to the renewables industry and its investment community.[21] In addition to concerns that this lower target is insufficient to incentivise jobs and investments in the renewable sector, the amended RET legislation now includes wood waste burning of logged forests as a renewable source (something critics regard as entirely spurious).

It is clear that a robust and certain RET is required as part of the policy matrix for a low-carbon transition. Indeed, at a time when the federal government lacks leadership in this regard by both weakening the RET and abolishing the carbon price, Australian states and territories have an opportunity to step in and provide stable investment environments for renewable energy. At state level, South Australia and the Australian Capital Territory (ACT) both have ambitious RETs, with the former committed to a 50% renewable target for 2025 and the latter aiming to supply 90% of electricity consumed in the ACT from renewable sources by 2020. South Australia also has a detailed Renewable Energy Plan,[22] which aspires to make that state the most attractive investment destination for renewable energy. It contemplates regulation to provide renewable energy developers with access to Crown land subject to pastoral leases, and to support the design and implementation of community-owned solar. For a summary of state initiatives see Table 1 below.

14 Ibid 11.
15 Climate Change Authority *Renewable Energy Target Review Report* (Australian Government, Canberra, 2015) 18 <,http://www.climatechangeauthority.gov.au/files/files/reviews/ ret/2014/review.pdf>.
16 Clean Energy Regulator, '*Small-Scale Installations by Postcode*' (Australian Government, Canberra, 2015) <http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations>.
17 D McConnell, 'Electricity Prices Fall: Renewable Energy Deserves Merit', *The Conversation* (12 April 2013) <https://theconversation.com/electricity-prices-fall-renewable-energy-deserves-merit-13300>.
18 Australian Energy Market Commission, '*Residential Electricity Price Trends Report*' (Australian Energy Market Commission, 2013) <http://www.aemc.gov.au/Media/docs/2013-Residential-Electricity-Price-Trends-Final-Report-723596d1-fe66-43da-aeb6-1ee16770391e-0.PDF>.
19 Australian Energy Market Operator, *National Electricity Forecasting Report*, (Australian Energy Market Operator 2013) 1-3.
20 J Gilmore and C Giacomantonio, '*Renewable Energy Target Policy Analysis*', ROAM Consulting Pty Ltd for the Clean Energy Council (2014).
21 S Small, 'Stand-Off Continues on Australia's Renewable Energy Target', *ABC News* (16 March 2015) <http://www.abc.net.au/pm/content/2015/s4198744.htm>; see also ABC News, 'Renewable Energy Target Resolution Needed to Improve Regional Investment Opportunities Says AWU', *ABC News* (4 May 2015) <http://www.abc.net.au/news/2015-05-04/union-calls-for-renewable-energy-target-resolution/6441864>.
22 Government of South Australia, *A Renewable Energy Plan for South Australia* (Renewables SA, 2011) <http://www.renewablessa.sa.gov.au/files/111019-renewable-energy-plan-for-south-australia.pdf>.

TABLE 1*:* KEY STATE AND TERRITORY DEVELOPMENTS IN RENEWABLE ENERGY

The states have historically led the way on emissions and renewable energy policy, influencing national action. For example, in 2004 and 2006 respectively, South Australia and Victoria introduced state based renewable energy targets in response to a low 2% federal target.

Due to the ambivalent federal policy environment, South Australia is now the most desirable market in Australia for investment. Since 2003, there has been $5.5 billion invested in renewable energy in South Australia, with nearly half occurring in regional areas.

South Australia sources over 36% of its electricity from renewable sources and 25% of South Australian homes have solar PV panels. South Australia has installed more large-scale renewable capacity since 2001 than any other state.

With effective renewable energy policies, South Australia has moved from having little renewable energy a decade ago to installing the most renewable energy since 2001 on a total and per capita basis.

The ACT also has effective emissions reduction targets and a renewable energy target of 90% by 2020. Other than South Australia and the ACT, no other Australian states have a current target to increase renewable energy.[23]

Source: *The Australian renewable energy race: Which States Are Winning or Losing?* **The Climate Council of Australia, 2014.**

2.3 Feed-in tariffs

2.3.1 Feed-in tariffs

All sub-national jurisdictions have introduced some form of feed-in tariff (FIT). In broad terms, such schemes seek to accelerate investment in renewable energy technologies by paying a guaranteed tariff to large renewable energy producers (for example, wind farms and biogas producers) and/or small ones (for example, domestic solar photovoltaics). The general aim is to set a price for each individual renewable technology, reflecting its particular level of costs to produce and provide sufficient incentive for such production. In other words, FITs provide cost-based compensation to renewable energy producers and sufficient certainty through long-term contracts to make their investments commercially viable.[24]

Currently, FITs are the most widely used policy in the world for accelerating renewable energy deployment, and there are a considerable number of success stories. For example, there is evidence that, in the European context, FITs have not only been more effective than tradable certificate schemes (see *Mandatory Obligation Schemes* below), but also more efficient,[25] although the latter claim is contestable.[26] A great deal depends on the design of individual regulatory schemes with the evidence suggesting that they are most likely to succeed where they involve 'the combination of long-term fixed price or premium payments, network connections, and guaranteed purchase of all RE [Renewable Energy] electricity generated'.[27]

23 At the time of writing, Victoria is considering such a target.
24 M Mendonça, D Jacobs and B K Sovacool, *Powering the Green Economy – the Feed-In Tariff Handbook* (Earthscan, Oxford UK, 2009).
25 V Lauber, 'Tradeable Certificate Schemes and Feed-In Tariffs: Expectation vs Performance' in V Lauber (ed) *Switching to Renewable Power* (Earthscan, 2012).
26 For a contrary view see Australian Government Productivity Commission, *Carbon Emission Policies in Key Economies: Productivity Commission Research Report* (2011) 81 <http://www.pc.gov.au/inquiries/completed/carbon-prices/report/carbon-prices.pdf>; A Macintosh, 'Searching for Public Benefits in Solar Subsidies: A Case Study on the Australian Government's Residential Photovoltaic Rebate Program' (2011) 30 *Energy Policy* 3199, 3207 arguing that subsidising photovoltaic (PV) energy systems (whether by feed-in-tariffs or other subsidies) achieves a relatively small reduction in emissions at an exceptionally high average abatement cost, while providing disproportionate benefits to the relatively wealthy.
27 Intergovernmental Panel on Climate Change (IPCC), *The IPCC's Fifth Assessment Report (AR5)* (2014) 23.

It is also the case that 'inevitably [feed-in tariff] rates are set at higher levels than would be necessary to induce the least-cost mix of renewables and the overall resource cost of using a particular level of renewables will be higher than under a [renewable energy certificate] scheme'.[28] For reasons such as these, some jurisdictions continue to favour tradable certificates (green certificates).

Moreover, FITs appear to be considerably more effective than government grants. For example, in the same three-and-a-half year period during which the Australian federal solar grant program produced nothing, the German FIT scheme delivered over 100 times the capacity of one proposed Australian project.[29] Indeed, some have argued that grant-tendering schemes have been so ineffective that 'if governments tried to use them to meet Australia's target of a 5% reduction in emissions over 2000 levels by 2020 they would need to spend another AU$100bn'.[30]

The various state schemes appear to have been effective in facilitating unprecedented growth of distributed generation on the network with consumers generating their own electricity mostly in the form of rooftop solar photovoltaic panels in recent years.[31] Indeed, rapid reductions in photovoltaic prices combined with higher electricity prices in Australia have ensured considerable growth in consumer demand for electricity generation from renewable sources.[32]

2.3.2 Mandatory obligation schemes

Certain jurisdictions have adopted mandatory obligation schemes that, for the most part, include provision for tradeable certificates documenting the amount of energy being saved in tandem with an obligation to achieve a specified level of energy savings, subject to a financial penalty if this is not achieved (known internationally as 'white certificates').[33] Specifically, a range of state-based 'mandatory obligation' schemes require duty holders (usually energy retailers) to meet certain targets with regard to the use of renewable energy or energy efficiency.

This mechanism has several advantages. The combination of an obligation with a market mechanism allows competition in the delivery of energy services towards the targets and should guarantee that energy savings will occur in the most cost-effective manner.[34] The experience of a number of existing schemes suggests that they are flexible and effective in delivering considerable energy savings in practice as well as in theory.[35]

Nevertheless, they are not problem-free. Certificate markets take time to develop and become established,[36] and are therefore impractical if policymakers require demonstrable short-term energy savings. Additionally, certificate schemes must represent accurate, verifiable and credible energy saving data without which they will lack credibility.[37] Such data may demonstrably be available for a standard fluorescent lightbulb, however when energy savings are dependent on, amongst other factors, installation conditions and time-dependent factors, then maintaining credibility becomes difficult and resource intensive. For example, the associated energy savings from high efficiency windows depends on the window's characteristics, its installation, weather conditions and the occupant's temperature preferences. Since market systems depend heavily on certificate credibility and buyer trust, uncertainties surrounding the energy savings a certificate represents can threaten a certificate program's viability. However, notwithstanding these challenges, well-designed white certificate schemes are a cost-effective and efficient mechanism though which to achieve greater energy efficiency.[38]

28 Australian Government Productivity Commission, above n 27.
29 D McConnell, 'Not Dead Yet: Flagship 'Collapse' Only Part of Australia's Solar Story', *The Conversation* (10 February 2012).
30 J Daley, and T Edis, 'Markets Still Best Option to Reduce Greenhouse Gas Emissions' (Grattan Institute, 2011) <http://grattan.edu.au/news/markets-still-the-best-option-to-reduce-greenhouse-gas-emissions>.
31 Department of Industry and Science (Cth) '*Mandatory Obligation Schemes, Energy Efficiency Exchange*' <http://eex.gov.au/business-support/grants-funding/mandatory-obligation-schemes/>.
32 Department of the Prime Minister and Cabinet, *Renewable Energy Target Scheme - Report of the Expert Panel* (2014).
33 See generally Department of Industry and Science (Cth), above n 32.
34 M Pavan, 'Tradable White Certificates: Experiences and Perspectives' (2012) 5 *Energy Efficiency* 83, 83.
35 D Crossley, 'Tradeable Energy Efficiency Certificates in Australia' (2008) 1 *Energy Efficiency* 267; M Pavan, above n 35, 83; L G Giraudet, L Bodineau and D Finon, 'The Costs and Benefits of White Certificates Schemes' (2012) 5 *Energy Efficiency* 179, 189; M Tansue and F A Felder 'Comparison of Energy Efficiency Incentive Programs: Rebates and White Certificates' (2010) 18 *Utilities Policy* 103, 103.
36 M Tansue and FA Felder, 'Comparison of Energy Efficiency Incentive Programs: Rebates and White Certificates' (2010) 18 *Utilities Policy* 103, 106.
37 Ibid.
38 Giraudet, Bodineau and Finon, above n 36, 180; L A Mundaca and L Niej 'A Multi-Criteria Evaluation Framework for Tradeable White Certificate Schemes' (2009) 37(11) *Energy Policy* 4557, 4557.

2.4 Energy efficiency

In principle, energy efficiency should provide considerable opportunity for 'win-win' outcomes or at the very least, for realising a reduction in carbon emissions at a low cost,[39] and indeed usually at a substantially lower cost than most other carbon emission reduction technologies.[40]

However, energy efficiency, notwithstanding the extent to which it often provides win-win solutions and a cost-effective means of reducing GHG emissions, has not been immune from the deregulatory agenda of the federal government. Under the 'cutting red tape' agenda, the *Energy Efficiency Opportunities (Repeal) Act* (Cth) was passed in 2014, with only Greens senators in opposition. As the Energy Efficiency Council has pointed out, the repeal is a backwards step given that the original *Energy Efficiency Opportunities Act 2006* (Cth), which required reporting to raise the profile of a business's opportunities and performance, was regarded by the IEA as world-class and had considerable economic and environmental benefits which far exceeded costs.[41]

Nevertheless, the *National Strategy on Energy Efficiency (*the *Strategy)*, a ten-year strategy (from 2009-2020) under which a package of 37 measures to improve energy efficiency had been established, remains current. The *Strategy* contemplates a variety of measures embracing all sectors of the economy and aims to:

- address market failures and other barriers that impede the take-up of energy efficiency opportunities;
- help households and businesses to reduce their energy consumption and costs;
- develop and adopt new energy efficient technologies, and enhanced innovation in energy-using products and processes; and
- enable governments to demonstrate leadership through energy efficiency within their own operations.[42]

The *Strategy* is underpinned by an *Intergovernmental Agreement* (*National Partnership Agreement on Energy Efficiency 2009*) that specifies action to be taken by the Commonwealth, states and territories to maximise cost-effective energy efficiency gains across the economy.

Notwithstanding the 'win-win' nature of many energy efficiency opportunities in the abstract, regulatory intervention is commonly required to facilitate their uptake, given the often considerable barriers confronting those who might wish to take advantage of them. As the IEA has pointed out, these barriers include: **imperfect information** (for example, when a consumer buys an appliance, but there is insufficient or inaccurate information provided on the energy performance of the product); **principal-agent problems** (for example, landlords are commonly responsible for buying electrical appliances such as refrigerators for their properties, but it is only the tenant who will benefit from reduced electricity bills from buying energy efficient products); and **behavioural failures** (for example, personal decisions made by consumers that appear not to be economically rational).[43] It is also commonly the case that 'the initially higher purchasing costs will be recouped only in the longer term, and this longer-term horizon apparently does not inform purchasing decisions'.[44]

Notwithstanding these obstacles, there are a variety of policy mechanisms that might be used to facilitate, incentivise or mandate improved energy efficiency. This paper addresses below the most significant available options, including direct fiscal incentives, informational regulation, and direct regulation.

39 See generally Department of Climate Change and Energy Efficiency (Cth), *Report of the Prime Minister's Task Group on Energy Efficiency* (July 2010) <http://www.thefifthestate.com.au/wp-content/uploads/2010/10/report-of-the-prime-ministers-task-group-on-energy-efficiency.pdf>.

40 ClimateWorks Australia, *Energy Efficiency* <http://climateworks.com.au/sectors/energy-efficiency>.

41 Energy Efficiency Council, Submission 14 to Senate Standing Committee on Economics, *Inquiry into the Energy Efficiency Opportunities (Repeal) Bill 2014* 20 June 2014 <http://www.eec.org.au/policy-advocacy/overview#/submissions>.

42 Department of Finance, *National Strategy on Energy Efficiency* (2010) <https://www.finance.wa.gov.au/cms/Public_Utilities_Office/Energy_Initiatives/National_Strategy_on_Energy_Efficiency.aspx>.

43 See International Energy Agency (IEA), *Summing Up the Parts: Combining Policy Instruments for Least-Cost Climate Mitigation Strategies* (2011) <http://www.iea.org/papers/2011/Summing_Up.pdf>; International Energy Agency (IEA), *Combining Policy Instruments for Least-Cost Climate Mitigation Strategies (2010);* Australian Government Productivity Commission, above n 27.

44 E Woerdman, M Roggenkamp, and M Holwerda (eds), *Essential EU Climate Law* (Edward Elgar, 2015) 178.

2.4.1 Direct fiscal incentives

Direct fiscal incentives in various forms can play an important role. Studies in the European Union[45] suggest that increasing energy taxes 'can provide benefits that exceed the costs by a relatively wide margin and energy taxation thus appears to be a cost-effective way of improving energy-efficiency in the economy'.[46] Energy efficiency subsidies may also generate energy savings exceeding that of energy taxation and in some cases, substantially.

Incentives can also be used as a mechanism to encourage electricity consumers to reduce their consumption at times of peak demand, something that is crucial given that as peak demand increases, power generators have an incentive to expand the grid and the amount of electricity generated, with a commensurate increase in carbon emissions. If instead the load can be spread, such increased generation capacity can be avoided. Here the most obvious mechanism to encourage consumption in off-peak periods is differential pricing of electricity ('time of use' pricing) in conjunction with information about the savings available from running appliances at non-peak times plus 'smart meters' that enable consumers to receive information about their energy use and cost in 'real time'. Accompanying such measures with the provision of 'smart technology' such as appliances (dishwashers, washing machines, hot water heaters etc) capable of being programmed remotely to function at non-peak times can also realise considerable energy savings.

2.4.2 Informational regulation

Informational regulation involves the state encouraging or requiring the provision of information about energy impacts, but *without* directly requiring a change in those practices. This approach relies upon incentives and public opinion as the mechanisms to bring about improved energy performance. In terms of carbon policy, its most important manifestation is product labelling and certification with regard to energy performance, an approach that has been adopted in numerous countries, in part because of the relative ease of measuring energy and quantifying benefits and costs. Such initiatives may involve endorsement or warning labels, or may provide consumers with comparative information with regard to energy consumption, cost and attributes of a product – popularly termed 'eco-labelling'.

There is considerable literature documenting the outcomes achieved by this type of informational regulation.[47] It is clear from various studies that many schemes have a readily discernible effect in the aggregate.[48] For example, in Europe, consumers both understand and make use of the labels; and a substantial proportion of total consumer purchases appear to be influenced by the information provided.[49] In light of the low costs involved in establishing and maintaining such a scheme, eco-labelling appears to be a very cost-effective policy option.

However, there are limitations on the efficacy of this type of informational regulation. Most fundamentally, the success of labelling initiatives depends on consumer preference for more energy-efficient products. This appears to be determined not just by prevailing community attitudes towards environmental issues, but also by economic conditions and some products will lend themselves more readily to labelling than others.[50] For example, washing machines may be more amenable to this form of regulation than light bulbs. Light bulb purchases are low-involvement, impulse purchases and the energy efficiency of the product was inextricable from other valued product attributes, such as the aesthetic quality of the light produced.[51]

45 BIO Intelligence Service, *A Study on the Costs and Benefits Associated with the Use of Tax Incentives to Promote the Manufacturing of More and Better Energy-efficient Appliances and Equipment and the Consumer Purchasing of these Products* (2008) <http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/economic_studies/summary_costs_benefits_bio_en.pdf>.

46 K Kosonen and G Nicodeme, *The Role of Fiscal Instruments in Environmental Policy, Directorate-General for Taxation and Customs Union* (European Commission Working Paper, Luxembourg, 2009) 29 <http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_papers/taxation_paper_19.pdf>.

47 G Gallastegui, 'The Use of Eco-Labels: A Review of The Literature' (2002) 12 *European Environment* 316.

48 European literature summarised by K Sammer and R Wuestenhagen, 'The Influence of Eco-Labelling on Consumer Behaviour: Results of a Discrete Choice Analysis for Washing Machines' (2006) 15(3) *Business Strategy and the Environment* 185.

49 J Winward, P Schiellerup and B Boardman, *Cool Labels - The First Three Years of the European Energy Label* (Environmental Change Unit, University of Oxford, 1998).

50 Sammer and Wuestenhagen, above n 49.

51 Ibid.

2.4.3 Direct regulation

While in many circumstances energy efficiency can be facilitated or incentivised by relatively non-intrusive mechanisms, there nevertheless remains a sub-category of situations where other types of instruments (usually direct regulation) may be more appropriate. In particular, this is the case with regards to energy efficiency in buildings. There can be no doubt that improving energy efficiency at the time of construction will provide substantial energy savings, but it is extraordinarily difficult to provide builders with incentives (in the absence of mandatory energy efficiency standards) to build more energy efficient housing or commercial buildings. This is because, although this would be cost effective over the lifetime of the building, such measures will add to the construction price and provide no comparable benefit to the builder (it being subsequent owners/renters who would benefit from such energy efficiency measures). Mandatory minimum energy efficiency standards in buildings (commercial and domestic) are the most obvious means of overcoming this problem.[52] There are equally strong arguments in favour of minimum performance standards for appliances.[53]

2.4.4 Other energy efficiency initiatives

A number of other energy efficiency strategies also remain in place. For example, the Commonwealth, in conjunction with the states and territories, has continued to implement national Minimum Energy Performance Standards (MEPS) to achieve emissions reductions in circumstances where a price signal alone is unlikely to be effective, including energy rating labelling requirements for a wide range of products and equipment. For example, it is illegal to sell certain types of air conditioners unless they meet national MEPS. Certain informational tools, such as energy rating labels to increase awareness of the benefits of energy efficient appliances, also continue to operate.

At a state level, there are also a variety of energy efficiency programs, although some jurisdictions have been much more active than others.[54]

2.5 The role of innovative statutory entities

An innovation in terms of economic incentives policy, is the creation of a government-supported statutory entity to leverage private finance for energy efficient and low-carbon solutions. In 2013, the Clean Energy Finance Corporation (CEFC), which operates under the *Clean Energy Finance Corporation Act 2012* (Cth) section 8(1), commenced the funding of projects that use a commercial approach to overcome market barriers and mobilise investment in renewable energy, energy efficiency and low emissions technologies. Its mission is 'to accelerate Australia's transformation towards a more competitive economy in a carbon constrained world, by acting as a catalyst to increase private sector investment in emissions reduction'.[55] Industry players have identified its 'strong potential to play an important role' given its certain source of funding and lower rate of return than other financial lenders.[56]

Another innovative example of an Australian statutory entity is the Australian Renewable Energy Agency (ARENA),

52 J Van der Heijden , *Governance for Urban Sustainability and Resilience: Responding to Climate Change and the Relevance of the Built Environment* (Edward Elgar, 2014); J Van der Heijden, 'Regulatory Failures, Split-Incentives, Conflicting Interests and a Vicious Circle of Blame: The New Environmental Governance to the Rescue?' (2015) 58 *Journal of Environmental Planning and Management* 6, 1034. See also International Energy Agency (IEA), *Modernising Building Energy Codes* (United Nations Development Programme, 2013). In terms of Australian standards see in particular the National Construction Code, which imposes residential minimum energy efficiency standards for new buildings, although these are widely breached. Minimum energy efficiency standards for new residential buildings are also imposed in most states and territories.

53 Minimum energy performance standards have been in place since 1999 with regard to refrigerators, air conditioning and certain other appliances. More recently, the *Greenhouse and Energy Minimum Standards Act 2012* (Cth) established nationally consistent standards for appliances more broadly.

54 Government of South Australia, *South Australia Strategic Plan* (Department of the Premier and Cabinet (SA), 2011) <https://www.sa.gov.au/topics/water-energy-and-environment/energy/government-energy-efficiency-initiatives>.

55 Clean Energy Finance Corporation (CEFC), *Annual Report 2013-2014* (2014) <http://www.cleanenergyfinancecorp.com.au/reports/annual-reports/files/annual-report-2013-14.aspx>.

56 Baker & McKenzie, 'Client Alert: Structure and approach of the Clean Energy Finance Corporation' (Client Alert, Baker & McKenzie, 2012).

which was established to make renewable energy solutions more affordable (for example, the provision of grants) and thereby increase the amount of renewable energy used in Australia. It has currently committed over AU$1 billion to more than 200 projects.[57]

Both of these entities have considerable potential for effectiveness, efficiency, and also equitable access to markets. However, both are under threat of abolition, or at the very least, of much diminished roles, notwithstanding their commercial success and future potential.[58] While the federal government was unsuccessful in securing the passage of the *Australian Renewable Energy Agency (Repeal) Bill* into law in 2014, it remains hostile to the organisation's existence and role**,** as it does to that of the CEFC.

57 Department of Industry and Science (Cth), above n 32, 58.
58 Ibid.

3. Recommendations

In terms of its capacity to shift the nation towards a low-carbon economy, Australia's energy regime is seriously inadequate. Notably absent are credible economic incentives such as pricing carbon, and a coherent energy efficiency policy. Instead, there is the government's flagship policy, Direct Action, which is unlikely to prove effective, efficient or equitable. Australia also lacks measures to limit fossil fuel extraction to a fair contribution to meet the global carbon budget to limit mean global temperature rises to for 2° C or 1.5° C. It also lacks recognition in policy goals that stabilising mean global temperature rises at 2° C or 1.5° C accepts the risk of severe impacts on iconic ecosystems such as the Great Barrier Reef.[59]

Against this backdrop, what approach is most likely to lead to a transition to a low-carbon economy, consistent with the IEA's exhortations? To this end, APEEL recommends seven key policy tools and two over-arching considerations that should guide policy design. The seven policy tools are: (1) carbon price; (2) incentivise renewable energy and low-carbon initiatives; (3) reinstate a robust and certain Renewable Energy Target (RET); (4) support the Clean Energy Finance Corporation (CEFC); (5) facilitate energy efficiency; (6) remove fossil fuel subsidies; and (7) a supply side measure to limit fossil fuel extraction to meet Australia's fair contribution to meeting the global carbon cycle. The two policy design guidelines are: (a) use complementary combinations of policy tools; and (b) provide policy stability for increased investment.

3.1 Key policy tools for a low-carbon transition

3.1.1 Impose a price on carbon

Imposing a price on carbon (whether through a payment for damage caused - misleadingly, but widely referred to as a tax - or a trading or hybrid mechanism) has considerable advantages and should be central to any regulatory reform.[60] Pricing carbon penalises GHG-intensive corporations and projects and internalises the cost of carbon emissions consistent with the polluter pays principle and in a cost-effective manner.[61] It does so through disincentivising mid-to-long term financial support for carbon-intense sectors; and by incentivising engagement with renewable and clean technology companies and investments, encouraging a shift towards existing low-carbon fuels and technologies and incentivising the development of new ones, while also encouraging energy efficiency. It is also the case that the use of such a market mechanism, if carefully designed and underpinned by a sufficiently strong political constituency as to resist emasculation, would be a flexible and efficient means of delivering agreed carbon reductions. If coupled with appropriate compensating mechanisms for the most disadvantaged (for example, disadvantaged consumers who would otherwise pay higher electricity prices) it would also be equitable. Notwithstanding some advantages in principle, a payment for damage caused (widely, but erroneously stigmatised as a 'carbon tax') is generally considered to be politically toxic in the Australian context and a hybrid would likely suffer the same fate, leaving the only credible option as an emissions trading scheme. Pragmatists might consider time is better spent ensuring that such a scheme is carefully crafted as well as learning from the mistakes of similar initiatives in other jurisdictions, rather than canvassing the merits of 'taxes' or hybrids.

59 See Australian Panel of Experts on Environmental Law, *Marine and Coastal Issues* (Technical Paper 4, 2017) for the impact climate change is having on the marine and coastal environments; see Australian Panel of Experts on Environmental Law, *Climate Law* (Technical Paper 5, 2017) for more on the *Paris Agreement's* long-term temperature goal.

60 See Australian Panel of Experts on Environmental Law, *The Private Sector, Business Law and Environmental Performance* (Technical Paper 7, 2017) for more on carbon and other pricing mechanisms.

61 See L Xynas, 'Climate Change Mitigation: Carbon Tax - is it the Better Answer for Australia' (2011) 26 *Australian Tax Forum* 339; W Gumley and N Stoianoff, 'Carbon Pricing Options for a Post-Kyoto Response to Climate Change in Australia' (2011) 39 *Federal Law Review* 131; F Jotzo, 'Australia's Carbon Price' (2012) 2 *Nature Climate Change* 475; F Jotzo, 'Keep Australia's Carbon Pricing' (2013) 505 *Nature* 38; S Waddell, 'By How Much Will a 'Price on Carbon' Actually Lower Australia's Emissions? Towards Climate Accountability for Greenhouse Gas Emissions Abatement' (2013) 16 *Australasian Journal of Natural Resources Law and Policy* 1. See also Australian Government Productivity Commission, above n 27.

3.1.2 Introduce or reinforce renewable energy and low-carbon incentives

The virtues of pricing carbon has led some economists to argue that, if appropriately designed, this mechanism can achieve a transformation to a low-carbon economy without the need for other mechanisms intended to achieve the same goal.[62] For example, in the Australian context, Garnaut, in his influential contribution to the energy policy debate, has asserted that 'no useful purpose is served by other policies that have as their rationale the reduction of emissions from sectors covered by the trading scheme. The Mandatory Renewable Energy Target should be phased out'.[63]

However, whatever the merits in theory, it would be unwise to adopt such a monocular approach in the messy world of energy policy as it is actually practised. In particular, taxes or trading schemes are *not* sufficient in and of themselves to achieve a transformation of the energy sector in the constrained time period which the science suggests remains available for effective mitigation.[64] There are a number of reasons why this is the case. Some of these relate to limitations in the design of particular schemes while others concern the inherent limitations of such incentive-based mechanisms. As regards the former, the prices generated by carbon markets may be too low (or insufficiently stable) to send effective signals to major carbon emitters to shift to lower emitting technologies. Moreover, the incentives provided by carbon markets may be 'fuzzy' - involving such market imperfections as monitoring, enforcement and asymmetric information problems, all of which may constrain some emitters from responding to price signals or worse, may generate fraud, speculation or rent seeking.[65]

But beyond the above imperfections lie other limitations which are more fundamental. In particular, as the Organisation for Economic Co-operation and Development (OECD) points out, 'carbon pricing does not address the large market failures undermining R&D [research and development] in climate mitigation, such as incompatibility with existing infrastructure'.[66] Nor will market mechanisms, such as emissions trading, be sufficient to encourage and facilitate the investment, development and dissemination of low-carbon technologies within the relatively short time frame available.[67]

For all the above reasons, additional policies to incentivise investment in and uptake of renewables, clean technology and energy storage technology by private actors are also required.[68] Such policies may take the form of hard economic incentives such as tax credits, and/or grants or FITs, but only where these do not conflict with other policy instruments and not where they are demonstrably cost-inefficient. They might also take the form of complimentary 'soft' behavioural and cognitive incentives such as mandatory disclosure of material climate risks of listed investment; or other informational regulation that facilitates company rankings regarding GHG emissions reductions. These types of regulation are low interventionist and often politically palatable.

62 For example: 'cap and trade schemes should provide assurance of meeting an overall emissions target at least cost. It follows that, if we assume a perfect economy with no market failures, any instruments which directly or indirectly interact with a carbon ETS will raise overall abatement costs while providing no additional contribution to emission reductions': S Sorrell and J Sijm, 'Carbon Trading in the Policy Mix' (2003) 19 *Oxford Review of Economic Policy* 3, 420, 434; see Australian Panel of Experts on Environmental Law, *The Private Sector, Business Law and Environmental Performance* (Technical Paper 7, 2017) for more information on the use of the tax system as a potential tool for incentivising improvements to environmental performance.

63 R Garnaut, *Garnaut Climate Change Review* (Cambridge University Press, 2008) xxxii; R Garnaut, *Update Paper 6: Carbon Pricing and Reducing Australia's Emissions*, (Update Paper, Garnaut Climate Change Review, 2011).

64 See for example, United States Government Accountability Office, *Testimony before the Subcommittee on Energy and Environment, Committee on Energy and Commerce, House of Representatives: Observations on the Potential Role of Carbon Offsets in Climate Change Legislation* (Statement of John Stephenson, Director Natural Resources and Environment, Washington DC, March 5, 2009) <http://www.gao.gov/new.items/d09456t.pdf>; this is not to deny the importance of energy taxes or to suggest that they do not play an important role, but rather that they are necessary, but not sufficient to mitigate climate change.

65 *The Economics of Climate Change Mitigation* (Report, OECD, 2009) 20-21. See also N Sachs, 'Greening Demand: Energy Consumption and US Climate Policy' (2009) 19 *Duke Environmental Law and Policy Forum* 295, 295-320; Sachs argues that barriers to effective market signals include principal-agent divergence of interests, high implicit discount rates used in purchase of energy-using products, inadequate information on energy pricing and usage by individuals and lack of incentives for utilities to undertake investments in efficiency measures.

66 *The Economics of Climate Change Mitigation*, above n 66, 20-21.

67 Ibid; see also R Sims, *Can Energy Technologies Provide Energy Security and Climate Change Mitigation?* (NATO Science for Peace and Security Series C: Environmental Security, Springer, 2009) ch 4.

68 M Bowman, *Banking on Climate Change: How Finance Actors and Transnational Regulatory Regimes are Responding* (Kluwer Law International, 2014) ch 6; see also Australian Panel of Experts on Environmental Law, *The Private Sector, Business Law and Environmental Performance* (Technical Paper 7, 2017).

3.1.3 Reinstate a robust and certain Renewable Energy Target (RET)

The RET has substantially facilitated the shift towards a low-carbon economy in Australia[69] and is an essential element of a low-carbon emissions strategy. Yet since its inception in 2001, the RET has undergone several changes, which has created uncertainty for investors. The clarity finally achieved in 2009 (with the decision that 20% of Australia's electricity supply must come from renewable sources by 2020) gave investors the necessary confidence to support the growth of the renewables sector.[70] For these reasons, investor groups recommended in 2012 that the government leave the RET scheme unaltered until 2030 in order to safeguard renewable energy investment plans, both current and future.[71] The federal government's decision to downgrade that target has once again created uncertainty concerning the future of the RET, threatening Australia's capacity to attract renewable energy investment and the sector's future development. A higher target should be re-introduced and locked in for the medium to long term.[72]

3.1.4 Maintain or extend the role of the Clean Energy Finance Corporation (CEFC)

By 30 June 2014, the CEFC had successfully built a diversified portfolio of AU$931 million and realised total project value of over AU$3.2 billion by leveraging other funds at more than $2.20 for every dollar of its own investment. The Corporation states that these investments, once constructed and operational, will contribute to over 4.2 million tonnes of carbon dioxide equivalent abated annually and at a negative cost (positive return) of $2.40 per tonne.[73] Whilst there is certainly room for a higher leverage ratio,[74] the Corporation is fulfilling a valuable role in facilitating investment in renewable energy and energy efficiency.

3.1.5 Facilitate energy efficiency and storage capacity

Energy efficiency is in many ways the most attractive pillar of the energy policy mix, offering more 'low hanging fruit' and opportunities for win-win or low cost outcomes, notwithstanding that there remain obstacles to realising some of these opportunities. Direct fiscal incentives (energy taxes and energy efficiency subsidies and tax breaks) and incentives for load spreading (from peak to off-peak consumption via 'time of use' pricing) both have value in improving energy efficiency. So too do various forms of informational regulation from mandated product labelling and certification with regard to energy performance, which could sensibly be modelled on the mandatory EU Energy Label, which has resulted in substantial increases in the purchase of energy efficient products and in the development of such products to meet growing market demand. There also remains an important role for direct regulation, as for example, with regard to energy efficiency in buildings where there are opportunities for major energy efficiency gains, but builders lack incentives to realise them.

Importantly, smart grids and energy storage play a particular role in supporting renewable energy whose input to the grid is highly variable and unpredictable. They do so via their contribution to distribution automation and demand response, smart metering, more advanced forecasting technologies and in the longer term, distributed storage mechanisms and the development of micro-grids.[75] Indeed, developments in storage technology will be a game changer. If solar and/or wind power can be economically stored then it can be released on command, which remedies the issue of on-demand electricity supply despite inconsistent generation (when the wind is not blowing and the sun is not shining) and thus puts renewable energy at parity with traditional sources. There is a serious possibility

69 For a comparison with other G 20 countries see *Fact Check: How Does Australia's Renewable Energy Target Compare With What Other G20 Countries Are Doing?* 2014, The Climate Institute, <http://www.climateinstitute.org.au/verve/_resources/TCI_HowDoesOurRETCompareToG20_Factcheck_September2014.pdf>.

70 Investor Group on Climate Change (IGCC), *IGCC submission to Review of the Renewable Energy Target Scheme,* (IGCC, 2012).

71 Ibid.

72 See Australian Panel of Experts on Environmental Law, *The Private Sector, Business Law and Environmental Performance* (Technical Paper 7, 2017) for more on incentives to adopt renewable technologies.

73 Clean Energy Finance Corporation (CEFC), *Chair's Report: 2013-2014 Annual Report* (2014) <http://www.cleanenergyfinancecorp.com.au/reports/annual-reports/files/annual-report-2013-14.aspx>.

74 For example, the UK's equivalent Green Investment Bank has a 3:1 ratio; and the World Bank's Clean Technology Fund has an 8:1 leverage ratio. See respectively, Green Investment Bank, *Summary of Transactions*, <http://www.greeninvestmentbank.com/media/25380/gib_ar_transactions_250714.pdf>; and, World Economic Forum, *The Green Investment Report: The Ways and Means to Unlock Private Finance for Green Growth* (World Economic Forum, 2013) 21.

75 International Renewable Energy Agency (IRENA), *Smart Grids and Renewables: A Guide for Effective Deployment*, (November 2013) <https://www.irena.org/DocumentDownloads/Publications/smart_grids.pdf>.

that innovations such as Tesla's lithium ion and lithium air battery systems, which store solar power during the day for use at night, will bring cost-effective domestic scale storage within ten years.[76] Grid-level storage (installed by utilities) is currently being piloted with an estimated roll-out of two to three decades.[77] According to a 2015 Climate Council report, Australia will likely be one of the biggest markets for battery storage due to its high cost of electricity and the large number of households installing solar panels.[78] Indeed, the potential value of this market in Australia alone has been estimated by Morgan Stanley at $24billion.[79] Regulation that incentivises investment in and research and development for these technologies can expedite their roll-out at scale and put Australia in a global leadership position.

3.1.6 Remove fossil fuel subsidies

Although there is a clear need to augment alternative energy markets, Australian federal policy support for fossil fuels is high, dwarfing the expenditure on programs that support renewable energy. For example, a 2014 Australian Conservation Foundation report estimated that these subsidies would amount to some $47 billion over the next four years,[80] with the Fuel Tax Credit scheme accounting for $27.9 billion of this sum. Indeed, even as new technologies approach parity with fossil fuels, they remain unable to compete effectively with them due to hidden, but substantial fossil fuel subsidies and power generation arrangements that are structured to support fossil fuels and tend to lock out renewable energy technologies.[81]

While subsidies can be effective in achieving policy goals (for example, increasing use of and investment in a new energy source) they are notoriously inefficient as they usually cost far more than the benefits they deliver and are also a drain on public revenue.[82] Fossil fuel subsidies create particular policy distortions by rewarding investment in high emission activities and carbon-intensive projects in Australia, which in turn inhibits growth in the renewable energy and clean technology markets. Indeed, without substantial government support for the fossil fuel industry, and coal in particular, a growing number of new ventures would be economically unviable and would not proceed. A controversial example is that of Adani's proposed Carmichael mine in the Galilee Basin.[83]

Fossil fuel subsidies also increase demand for fossil fuels by keeping prices artificially low and in so doing, encourage more carbon emissions. Accordingly, removing such subsidies is crucial. Doing so would enhance energy security, reduce GHG emissions and air pollution *and* bring economic benefits.[84] Moreover, the fall in the price of oil and gas provides a once-in-a-generation opportunity for politicians to remove these subsidies and to 'fix bad energy policies' relatively painlessly.[85]

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76 See generally TESLA, *Powerwall* (2015) <https://www.teslamotors.com/POWERWALL>; and, A Young, 'Lithium Air Battery Breakthrough Could Lead to Replacement of Lithium Ion Batteries', *International Business Times* (online), 1 November 2015 <http://www.ibtimes.com/lithium-air-battery-breakthrough-could-lead-replacement-lithium-ion-batteries-2164268>.

77 However, there are challenges here. It is the network providers that are part of this trialling of storage options. This is changing their role from transmission into the generation space. This is currently problematic from the point of view of the overall legislative structure of the market. It makes them a competitor to current generation businesses which is prohibited by legislation. Encouragement of storage for the purposes of reducing emissions needs to be carefully thought through. Some transmission businesses are working with government in this space to ensure its current compliance with legislation. However, in the long-term there may well need to be significant legislative change as storage technologies improve.

78 Climate Council, *Powerful Potential: Battery Storage for Renewable Energy and Electric Cars* (2015) <https://www.climatecouncil.org.au/uploads/ebdfcdf89a6ce85c4c19a5f6a78989d7.pdf>.

79 RenewEconomy, *Morgan Stanley Sees 2.4m Australia Homes with Battery Storage* (2015) <http://reneweconomy.com.au/2015/morgan-stanley-sees-2-4m-australia-homes-with-battery-storage-20668>. McKinsey has estimated that the 'economic impact' or value of energy storage globally could be between $90 - $635 billion a year by 2025 (depending on how fast it is applied to cars): McKinsey Global Institute, *Disruptive Technologies: Advances that Will Transform Life, Business, and the Global Economy* (2013) <http://www.mckinsey.com/insights/business_technology/disruptive_technologies>.

80 Australian Conservation Foundation, *Fossil Fuel Subsidies* <http://www.acfonline.org.au/be-informed/climate-change/fossil-fuel-subsidies>. Internationally, rich western countries and the world's leading developing nations are spending up to US $200bn a year providing such perverse incentives, which not only distort costs and prices: OECD, 'OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015' (OECD, September 2015) <http://www.oecd.org/environment/oecd-companion-to-the-inventory-of-support-measures-for-fossil-fuels-2015-9789264239616-en.htm>.

81 See H T Anker, B E Olsen and A Rønne (eds), *Legal Systems and Wind Energy: A Comparative Perspective* (Kluwer Law International, 2009); see also E Woerdman, M Roggenkamp, and M Holwerda, above n 45, ch 6.

82 There may be exceptions, as with 'merit goods and services' which are said to generate positive externalities (increased social benefits). For example, a subsidy of embryonic renewable energy technologies. Examples might be justified both because that technology cannot gain ready access to existing energy networks, and provides a public benefit in terms of clean (low carbon) energy.

83 See for example, S Smail, 'Qld Treasury Repeatedly Warned Against Carmichael Coal Mine, Documents Reveal' *ABC News* (1 July 2015) <http://www.abc.net.au/pm/content/2015/s4265585.htm>.

84 International Energy Agency, above n 44, 13.

85 The Economist, 'Seize the Day', *The Economist* (online), 17 January 2015 <http://www.economist.com/news/leaders/21639501-fall-price-oil-and-gas-provides-once-generation-opportunity-fix-bad>.

Unfortunately, Malcolm Turnbull, notwithstanding pressure from the large majority of developed nations, has refused to commit Australia to any reduction of fossil fuel subsidies, notwithstanding pressure to do so during the lead up to the *Paris Agreement*.[86]

3.1.7 Supply side measures to limit fossil fuel extraction to discharge Australia's fair contribution to meeting the global carbon budget

In the absence of substantial deployment of carbon capture and storage, the remaining carbon budget to limit mean global temperature rises to 2° C requires 35% of global oil reserves, 52% of global gas reserves and 88% of global coal reserves to remain unburnt.[87] Allocating this carbon budget across regions may require 95% of remaining Australian coal reserves to remain unburnt.[88] Further research is required to determine, for instance, whether current approved coal extraction already exceeds 5% of remaining Australian reserves. It appears highly likely that this is the case for both a carbon budget to limit mean global temperature rises to 2° C or 1.5° C. If this is correct, the logical consequence is that a moratorium on new coal mines is required, including mines exporting coal.

While GHG emissions from burning Australian oil, gas and coal that is exported are not counted as Australian emissions under the accounting framework established under the *United Nations Framework Convention on Climate Change* (*UNFCCC*), the location of emissions makes no difference to their impact on the atmosphere and climate systems. Australia controls a major part of the globe's supply of fossil fuels, particularly of coal, and, therefore, Australia is in a position to effect supply side controls that have a global significance. More broadly, extraction of all fossil fuels, including for exports, should be limited to Australia's fair contribution to meeting the global carbon budget to limit mean global temperature rises to levels required to protect iconic ecosystems such as the Great Barrier Reef.

3.2 Policy Design Guidelines

3.2.1 Develop complementary combinations of policy tools

There is considerable evidence that complementary combinations of policy instruments are likely to work better than stand-alone tools.[89] For example, consumers may have insufficient information about the energy-saving capacity of a particular appliance, in which case informational regulation via energy labelling may usefully complement tax instruments which reduce the cost of such appliances. Similarly, a 2015 International Renewable Energy Agency study found that when energy efficiency and renewable energy potentials are combined, total global energy demand can be reduced by 25% by 2030.[90] However, it is equally the case that some instrument combinations can be counterproductive. For example, previous Australian state and territory FITs that overlapped with a RET did not lead to any additional abatement, added to the total financial cost of meeting the target, and 'could have actually led to higher emissions than if there had been no FIT schemes'.[91] Accordingly, in designing energy regulation, it is imperative to be mindful of the overall policy package and to ensure its internal coherence.

86 See for example, T Arup, 'Paris UN Climate Conference 2015: Australia Rejects Fossil Fuel Pledge' *Sydney Morning Herald* (online), 1 December 2015 <http://www.smh.com.au/environment/un-climate-conference/paris-un-climate-conference-2015-australia-rejects-fossil-fuel-pledge-20151130-glbw4s.html>.

87 C McGlade and P Ekins, 'The Geographical Distribution of Fossil Fuels Unused When Limiting Global Warming to 2° Degrees' (2015) *Nature* 517, (7533) 187-190, Table 1, 189.

88 Ibid.

89 N Gunningham, P N Grabosky, and D Sinclair, *Smart Regulation: Designing Environmental Policy* (Clarendon Press, 1998) ch 6; D Buchan, *Expanding the European Dimension in Energy Policy: The Commission's Latest Initiatives* (Oxford Institute for Energy Studies, 2011) <http://www.oxfordenergy.org/wpcms/wp-content/uploads/2011/10/SP_23.pdf>.

90 International Renewable Energy Agency (IRENA), *Synergies Between Renewable Energy and Energy Efficiency a Working Paper Based on Remap 2030* (August 2015); International Renewable Energy Agency (IRENA) *Energy Efficiency Vital To Doubling Global Share Of Renewables* (2015) <http://Irenanewsroom.Org/2015/08/11/Energy-Efficiency-Vital-To-Doubling-Global-Share-Of-Renewables/>.

91 Australian Government Productivity Commission, above n 27, 83.

3.2.2 Promote policy stability to encourage further investment in renewables

The *Energy White Paper* states that it is desirable to give 'industry and consumers certainty in energy policy';[92] yet government policy has produced quite the contrary effect. The climate policy framework implemented in Australia in 2011 included a carbon price, a RET, compulsory reporting of intensive corporate GHG emissions, and the CEFC. That regime was recommended by experts to investor networks around the world as 'investment grade' and apt to provide 'investors with real confidence when investing in areas such as renewable energy'.[93] However, in less than three years, the legal and regulatory landscape was altered radically. As noted by Deutsche Bank, 'as investors, we essentially look for transparency, longevity and certainty (TLC) in assessing the potential success of policies'.[94] The current federal government's approach scores poorly on all of the Bank's criteria, but is particularly weak in terms of the last two. As a result, investor enthusiasm has shifted elsewhere, notwithstanding Australia's natural abundance of renewable energy sources. Restoring a stable and incentivising investment environment for the long term is essential. As the National Committee on Fuels and Energy pointed out in 2012: 'The transition to a low CO2 emission economy … will be driven by long-term investment decisions. … Australian policy and market consistency will be a critical determinant of the capacity for Australia to access [international capital] investment funds, and the cost of those funds'.[95]

92 Department of Industry and Science (Cth), above n 32, 64.
93 R Sullivan, *Investment-Grade Climate Change Policy: Financing the Transition to the Low-Carbon Economy* (Institutional Investor Group on Climate Change, the Investor Network on Climate Risk, the Investor Group on Climate Change Australia/New Zealand and the United Nations Environment Programme Finance Initiative, 2011) 15.
94 Deutsche Bank, *Investing in Climate Change 2010: A Strategic Asset Allocation Perspective* (Deutsche Bank, 2010) 10.
95 National Committee on Fuels and Energy, *Discussion Paper on Australia's Energy Options and Strategies* (Issues Paper on Australia's Energy Options and Strategies Executive Summary, National Committee on Fuels and Energy, 2012) 1.

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