TOWARDS LOW EMISSIONS IN THE ELECTRICITY GENERATION SECTOR: CREATING A COHERENT LEGAL MODEL FOR AUSTRALIA

Shol Blustein*

Australia’s efforts to transition to a low-emissions economy have stagnated following the successive defeats of the Carbon Pollution Reduction Scheme. This failure should not, however, be regarded as the end of Australia’s efforts to make this transition. In fact, the opportunity now exists for Australia to refine its existing arrangements to enable this transition to occur more effectively. The starting point for this analysis is the legal arrangements applying to the electricity generation sector, which is the largest sectoral emitter of anthropogenic greenhouse gas emissions in Australia. Without an effective strategy to mitigate this sector’s contribution to anthropogenic climate change, it is unlikely that Australia will be able to transition towards a low-emissions economy. It is on this basis that this article assesses the dominant national legal arrangement – the Renewable Energy Target – underpinning the electricity generation sector’s efforts to become a low-emissions sector.

1. INTRODUCTION

The release of a number of high profile scientific reports published during the last decade have propelled the issue of anthropogenic climate change into the mainstream of social and political discourse. The *Fourth Assessment Report*, the most prominent of these reports, concluded that the environmental, economic and health dangers posed by anthropogenic climate change are “unequivocal” and that “there is [a] very high [likelihood that] ... global atmospheric concentrations of [greenhouse gases] have increased markedly as a result of human activities.”

Economic reports also inform the developing climate change consciousness in Australia and overseas. The dominant message advanced in these reports is that without timely and decisive action to mitigate anthropogenic climate change, the economic and environmental

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* Shol Blustein, BA/LLB (Hons) Monash University. PhD Candidate, Faculty of Law, Queensland University of Technology and Climate Change Research Analyst, Minter Ellison Lawyers. The views expressed in this article are those of the author and do not reflect the organisations with which he is affiliated. The author would like to thank Damien Cooling for reviewing drafts of this article and for his comments.

2 Intergovernmental Panel on Climate Change, n 1, p 2.
3 Intergovernmental Panel on Climate Change, n 1, p 37.
impacts of this problem will likely be exacerbated.\textsuperscript{5} These reports also consider a range of regulatory approaches to address this problem and conclude that a single market-based\textsuperscript{6} regulatory instrument is essential to “facilitate the big switch away”\textsuperscript{7} from those activities that contribute to anthropogenic climate change.

It is on the basis of these economic and scientific reports that in 2008 the Australian Government developed the Carbon Pollution Reduction Scheme (CPRS). The purpose of the CPRS was to deliver a regulatory framework which could enable a structured and progressive shift in the Australian economy towards a lower anthropogenic greenhouse gas emissions base. The CPRS, relying predominantly on the recommendations set out in the Garnaut Review, supported an economy-wide cap-and-trade scheme\textsuperscript{8} which uses market forces to incentivise the transition away from the anthropocentric activities that produce anthropogenic greenhouse gas emissions. Following three failed attempts and significant cross-party negotiation, the CPRS has been removed from the Labor Government’s strategy to decarbonise the Australian economy. Despite this, it is likely that a cap-and-trade scheme will re-emerge as the preferred approach to mitigate anthropogenic climate change in Australia.


\textsuperscript{6} Market-based mechanisms mean “aspects of law or regulations that encourage behaviour through market signals, rather than through explicit directives regarding pollution control levels or methods ... [which can be described] as harnessing market forces” (see Robert N Stavins, ‘Market-Based Environmental Policies: What Can We Learn from U.S. Experience and Related Research?’ in Jody Freeman and Charles D Kolstad (eds), Moving to Markets in Environmental Regulation: Lessons from Twenty Years of Experience (2007) 19, p 19).


\textsuperscript{8} A cap-and-trade scheme relies on the creation of privately owned ‘pollution rights’ which permit the holder to emit predetermined amounts of anthropogenic greenhouse gases. The predetermined levels of permitted emissions correspond with an aggregate nation-wide cap on these emissions. The pollution rights are assigned a value and are distributed (either by auction or by free allocation) to liable firms. At the end of each specified compliance period, firms must provide to the regulatory authority the number of pollution rights corresponding to their anthropogenic greenhouse gas emissions for that period. Failure to do so incurs a penalty. To provide flexibility, a secondary market is created where the pollution rights can be traded between entities. This encourages firms for which abatement measures are relatively inexpensive to reduce their anthropogenic greenhouse gas emissions and sell their excess pollution rights to firms for whom it is more expensive to reduce these emissions (see: John H Dales, Pollution, property and prices: An essay in policy-making and economics (1968)).
Despite the Labor Government’s reliance on an economy-wide approach to shift Australia towards a low-emissions base, this approach is not the only method that can be used to decarbonise Australia’s economy. It is on this basis that this article moves away from considering the application of a large-scale whole-of-economy regulatory approach to lower Australia’s anthropogenic greenhouse gas emissions base. Instead, this article focuses on the electricity generation sector9 and, more particularly, the dominant legal arrangement applying to decarbonise this sector.

The electricity sector poses the greatest challenges to Australia’s ambitions to shift to a low anthropogenic greenhouse gas emissions base while also providing the greatest opportunity to achieve this transition in the foreseeable future. In terms of the opportunities, the authors of the Zero Carbon Australia Stationary Energy Plan10 note that Australia can fully decarbonise its base load stationary energy sector (both electricity and heat) by 2020 through the deployment of commercially available renewable technologies.11

On the other hand, the available data reflects the challenges to make this shift. In 2008, the stationary energy sector emitted 51 per cent of Australia’s anthropogenic greenhouse gas emissions, of which the electricity sector contributed 68 per cent.12 Further, the Australian Government noted that the emissions from the stationary energy sector “are projected to average 293 Mt CO₂-e per annum over the Kyoto period (2008-2012)[, which] represents a 50 per cent increase over the 1990 level”.13 This challenge is compounded by the fact that renewable sourced electricity contributes only 6.5 per cent of the electricity currently generated for public consumption in Australia.14 Together, these factors provide compelling reasons why the shift in Australia towards a low anthropogenic greenhouse gas emissions base must begin with the electricity sector.

When considering the strategies to minimise the contribution of the electricity sector to anthropogenic climate change, it is important to recognise the “panoply of difficulties”15 presented by this issue. The most important of these is Australia’s (and, more generally, the world’s) growing thirst for electricity, which must be satisfied to ensure Australia’s continued

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9 The electricity generation sector is hereafter referred to as the electricity sector. Further, the reference to the electricity sector is only a reference to the large-scale electricity generation activities which form part of Australia’s electricity generation sector and, on this basis, distributed and residential generation facilities are not included in this definition.


11 Wright and Hearps, n 10.

12 ‘Tracking to Kyoto and 2020’ (Department of Climate Change, Commonwealth of Australia, 2009), p 19.

13 Department of Climate Change, n 12, p 19.


economic prosperity. Put differently, this means that when designing an effective transitional strategy for Australia, it is necessary to maintain an adequate and secure supply of electricity which is capable of meeting growing demand. To do so, it is therefore important that the transition towards a low-emissions electricity sector occurs without disrupting Australia’s supply of electricity.

While significant emphasis must be placed on the electricity sector’s efforts to decarbonise, it is important to recognise that no single economic sector offers a complete solution to the problem of anthropogenic climate change. This means that significant efforts, particularly in relation to the transport and agricultural sectors (which are the next largest emitting sectors in the Australian economy) remain necessary to avoid the dangerous tipping points which scientists contend will occur if effective and timely mitigation of anthropogenic climate change does not occur.

This article considers these and other related issues. It begins by considering the emergence of the national, State and Territory approaches to mitigating the electricity sector’s contribution to anthropogenic climate change. This overview provides the historical context for the emergence of the national legal approach to decarbonising the electricity sector. The article then considers the emergence and operation of the dominant legal approach operating at the national level in Australia – the Renewable Energy Target (RET) scheme – to decarbonise the electricity sector.

In the next section the article moves away from the Australian context to consider the design features of the dominant legal mechanisms developed to decarbonise the electricity sectors in foreign domestic jurisdictions. The mechanisms considered are quota based systems.

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16 In relation to the growing global demand for electricity, the International Energy Agency has projected that global electricity production will increase substantially by 2050 (based on business as usual growth). This means that if fossil fuel sourced energy remains the primary global fuel source for electricity generation, the already troublesome contribution of this sector to anthropogenic climate change will continue to escalate (see: 'Energy Technology Perspectives 2010: Scenarios and Strategies to 2050' (International Energy Agency, 2010), p 103).

17 'National Energy Security Assessment' (Department of Resources, Energy and Tourism, Australian Government, 2009), p 5. Related to the shift away from fossil fuel sourced electricity is the requirement to upgrade Australia’s electricity grid to make it capable of connecting and transmitting new low-emissions sourced electricity.

operating in conjunction with tradable green certificate schemes and price-based feed-in tariff mechanisms. The purpose of this section is to consider the optimal design features of these legal mechanisms. By doing this, this section is able to inform the development of an effective legal framework to decarbonise the Australian electricity sector.

Finally the author considers the role of electricity-centric legal mechanisms within the context of a whole-of-economy cap-and-trade scheme. The purpose of this analysis is to emphasise that legal arrangements applying to the electricity sector need to coexist with broader economy-wide measures in order to enable a structured and progressive shift in the Australian economy towards a lower anthropogenic greenhouse gas emissions base.

2. THE EMERGENCE OF REGULATION TO DECARBONISE THE ELECTRICITY SECTOR IN AUSTRALIA

Australia’s efforts to mitigate the electricity sector’s contribution to anthropogenic climate change began in 1992 with the ratification of the United Nations Framework Convention on Climate Change. In the same year, the Gas and Electricity Combining Efficiency and Greenhouse report was issued by the Senate Standing Committee on Industry, Science and Technology. One of the central recommendations made by this report was for the Australian electricity sector to mitigate its contribution to anthropogenic climate change by increasing the use of “natural gas ... for power generation”. To do so, this report notes that targeted government intervention is required to displace the dominance of coal-fired electricity generation.

Following the publication of the Gas and Electricity Combining Efficiency and Greenhouse report, numerous studies have considered the mechanisms available for governments to mitigate the electricity sector’s (and, more generally, Australia’s) contribution to anthropogenic climate change. These reports generally conclude that a national economy-wide cap-and-

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19 These mechanisms are hereafter referred to as quota based mechanisms or quota schemes.
23 In 1997 the Inter-Governmental Committee on Ecological Sustainable Development (the ICESD) released a discussion paper on directions for a National Greenhouse Gas Strategy. In response, the Productivity Commission (formerly the Industry Commission) submitted that a cap-and-trade scheme is the most appropriate regulatory measure to reduce Australia’s contribution to anthropogenic climate change at least cost (see: ‘Submission to the ICESD on the National Greenhouse Strategy’ (Productivity Commission, 1997)). In 2004 the National Emissions Trading Taskforce (the NETT) took effect as a collaboration of all Australian states and territories to consider the application of a national cap-and-trade scheme in Australia. In 2007 the NETT concluded that a national cap-and-trade scheme is the most appropriate mechanism to mitigate Australia’s anthropogenic climate change (see: ‘Possible design of a national greenhouse gas emissions trading scheme: Final framework report on scheme design’ (State and Territory officials from the National Emissions Trading
trade scheme is the most appropriate form of regulation to achieve this objective.\textsuperscript{24} Despite the consistent views put forward in these reports, Australia continues to debate the efficacy of a cap-and-trade scheme together with other market-based and prescriptive\textsuperscript{25} regulatory mechanisms to assist with Australia’s decarbonisation.

Pre-dating most of these debates, the Generator Efficiency Standards (GES) were introduced in 2000. These standards are commonly regarded as the first major Commonwealth Government initiative to reduce the electricity sector’s contribution to anthropogenic climate change. The objective of the GES was to achieve a “movement towards best practice in the efficiency of fossil-fuelled electricity generation, and to deliver reductions in the greenhouse gas intensity of energy supply.”\textsuperscript{26} This program imposed reporting requirements and efficiency improvements on large-scale electricity generation facilities.\textsuperscript{27} The GES also included performance standards for new generation plants.

While the scope of this article is limited to the national efforts to decarbonise the electricity generation sector, a number of Australian States and Territories have also developed legal approaches to support the deployment of renewable electricity. In 2003, the New South Wales-based Greenhouse Gas Reduction Scheme (GGAS) was implemented.\textsuperscript{28} This scheme uses a baseline-and-credit approach\textsuperscript{29} to reduce anthropogenic greenhouse gas emissions associated

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\textsuperscript{24} Productivity Commission, n 23; State and Territory officials from the National Emissions Trading Taskforce, n 23; Garnaut, n 4; ‘Options for moving towards a lower emission future’ (AGL Energy Limited, Frontier Economics, World Wildlife Fund Australia, 2006); ‘Carbon Pollution Reduction Scheme: Australia’s Low Pollution Future’ (Australian Government, 2008).


\textsuperscript{27} \textit{Generator Efficiency Standards} (2010) Department of Sustainability, Environment, Water, Population and Communities, Australian Government <http://www.environment.gov.au/settlements/ges/index.html> at 4 October 2010. The GES applied to existing power stations that met had: (i) 30 Megawatt electrical capacity or above; (ii) 50 Gigawatt hour per annum electrical output; and (iii) a capacity factor of five per cent or more in each of the last three years.

\textsuperscript{28} \textit{Electricity Supply (General) Regulations 2001} (NSW); \textit{Electricity Supply Act 1995} (NSW).

\textsuperscript{29} Under a baseline-and-credit scheme, each firm is permitted to emit up to a certain baseline level of anthropogenic greenhouse gas emissions. This baseline may be derived from historical emissions or from a performance standard that specifies the permitted ratio of emissions to output. Firms can create emission credits by emitting less than their baseline emissions, which can then be banked or sold to firms who exceed their baselines. Like a cap-and-trade, a baseline-and-credit scheme sets a quantifiable target on emissions by limiting the aggregate emissions to a predetermined cap, which is equal to the sum of the individual baselines.
with, among other things, the production and use of electricity. One of the primary objectives of this scheme is to reduce per capita CO₂-e of anthropogenic greenhouse gas emissions to 7.27 tonnes in New South Wales by using supply-and-demand side market-based techniques.³⁰ To do so, this scheme provides for, among other things, the creation of tradable certificates (a National Greenhouse Abatement Certificates) by persons who generate electricity “in a manner that results in reduced emissions of greenhouse gases”.³¹

The Australian Capital Territory Government also introduced a Greenhouse Gas Reduction Scheme, which commenced on 1 January 2005. The ACT scheme mirrors the New South Wales GGAS scheme.³² More recently, in September 2010, the ACT announced plans to expand its existing small-scale feed-in tariff mechanism to include large-scale renewable electricity generators. This scheme is scheduled to commence in 2011.³³

The Victorian and Queensland governments have also developed legal frameworks to increase the use of low-emissions technology for large-scale electricity generation. In 2004, the Queensland Government introduced the 13 per cent Gas Scheme, now known as the Queensland Gas Scheme.³⁴ When it was first designed, this scheme required that at least 13 per cent of electricity sold by retailers in Queensland be generated from gas. The threshold under this scheme has now increased to 18 per cent.

In 2007, the Victorian Government implemented a renewable energy scheme similar to the Commonwealth RET (which is discussed in more detail below).³⁵ Victoria is now in the process of transitioning this scheme into the national scheme. This process is scheduled for completion by the end of 2010.³⁶ Further, in July 2010 the Victorian Government announced plans for a large-scale feed-in tariff; however, limited details have been released about the specifics of this scheme.³⁷

(see: Neil J Buckley, Stuart Mestelman and R Andrew Muller, 'Baseline-and-Credit Style Emission Trading Mechanisms: An Experimental Investigation of Economic Inefficiency' (Department of Economics Working Paper Series 2005-04, McMaster University, 2005)).

³⁰ 'Compliance and Operation of the NSW Greenhouse Gas Reduction Scheme during 2008 - Report to Minister' (Independent Pricing and Regulatory Tribunal, 2009), 1 and 8. See also, Electricity Supply Act 1995 (NSW), part 8A.
³¹ Electricity Supply Act 1995 (NSW), s 97DA(3)(a).
³² Electricity (Greenhouse Gas Emissions) Act 2004 (ACT).
³⁴ Electricity Act 1994 (Qld).
3. THE EMERGENCE AND OPERATION OF THE NATIONAL RENEWABLE ENERGY TARGET SCHEME

In 2000, the Commonwealth Government introduced the Mandatory Renewable Energy Target (or the MRET) scheme.\textsuperscript{38} When this scheme commenced in 2001, its purpose was to increase Australia’s renewable sourced electricity by 9,500 GWh (or approximately two per cent) from its current levels by 2020. In 2009, the MRET (or, as it was renamed in 2009, the RET) scheme was amended to ensure that by 2020 approximately 20 per cent of Australia’s electricity supply (approximately 60,000 GWh, which includes about 15,000 GWh of existing renewable generation capacity) is generated from renewable energy sources.\textsuperscript{39} At the same time this scheme was extended to 2030.\textsuperscript{40}

The RET scheme requires wholesale purchasers of electricity on grids with a capacity of greater than 100 megawatts to acquire renewable energy certificates (RECs) equivalent to a percentage of their annual electricity purchases, which they are then required to surrender to the scheme’s regulator – the Renewable Energy Regulator – on an annual basis.\textsuperscript{41} RECs are created by the scheme’s regulator and transferred to eligible renewable electricity generators.\textsuperscript{42} These certificates correspond to renewable-based electricity that has been generated and consumed anywhere in Australia.\textsuperscript{43} Failure to remit sufficient RECs incurs a penalty or, using the language of the governing statute, a shortfall charge.\textsuperscript{44}

By selling RECs using the available secondary market, renewable electricity generators receive a payment (equal to the value of the RECs they have sold on market) which operates to subsidise the renewable electricity which generators have produced. The operation of this market overcomes the need for liable firms to self-generate or physically purchase energy from renewable energy sources. In addition, renewable electricity generators also receive payment for the electricity they generate. This is separate from the payment they receive for the sale of the RECs. By providing a subsidy together with a payment for the generation of renewable electricity, this scheme not only encourages the deployment of renewable generation facilities, it also facilitates the "location and technical design of renewable energy projects"\textsuperscript{45} in order to maximise the value of the energy generated by these facilities.\textsuperscript{46}

\textsuperscript{38} Renewable Energy (Electricity) Act 2000 (Cth).
\textsuperscript{39} Renewable Energy (Electricity) Amendment Act 2009 (Cth), schedule 1 s 8.
\textsuperscript{40} Renewable Energy (Electricity) Amendment Act 2009 (Cth), schedule 1 s 8.
\textsuperscript{41} Renewable Energy (Electricity) Act 2000 (Cth).
\textsuperscript{42} Renewable Energy (Electricity) Act 2000 (Cth), part 2.
\textsuperscript{43} Renewable Energy (Electricity) Act 2000 (Cth), part 2 subdivision 4.
\textsuperscript{44} Renewable Energy (Electricity) Act 2000 (Cth), 36.
\textsuperscript{46} MacGill and Passey, n 45, p 4.
In May 2010, McLennan Magasanik Associates (MMA) conducted an analysis of the effect of the revised 20 per cent target under the RET scheme. According to MMA, under the 20 per cent target, total renewable electricity generation is projected to reach 66,000 GWh in 2020, up from 27,000 GWh in 2010.\(^{47}\) In terms of the contribution made by large and small-scale technologies, large-scale technologies are projected to contribute 39,000 GWh and small-scale ones approximately 11,000 GWh.\(^{48}\) The remaining 16,000 GWh is made up of the renewable electricity sources existing prior to the implementation of the RET scheme.\(^{49}\) On this basis, renewable electricity is expected to contribute approximately 22 per cent of Australia’s total electricity generation by 2020.\(^{50}\)

Translating the targets of the RET scheme into anthropogenic greenhouse gas emission reductions, the Australian Government projects that by 2020 the RET scheme will reduce 35 Mt of CO\(_2\)-e.\(^{51}\) For Australia to reduce its anthropogenic greenhouse gas emissions by five per cent by 2020 from 2000 levels (which Australia committed to at the 15\(^{th}\) session of the Conference of the Parties meeting to the Kyoto Protocol\(^{52}\) in Copenhagen in December 2009),\(^{53}\) Australia must abate a total of 144 Mt CO\(_2\)-e.\(^{54}\) When one considers that the electricity sector contributes approximately 35 per cent of Australia’s current anthropogenic greenhouse gas emissions,\(^{55}\) the removal by the RET scheme of approximately 24 per cent of these emissions by 2020 is substantially less than the electricity sector’s contribution to Australia’s overall anthropogenic greenhouse gas emissions profile.\(^{56}\)

Further, if an internationally binding agreement is reached, Australia has offered to increase its anthropogenic greenhouse gas emission reduction target to 25 per cent by 2020 from 2000 levels.\(^{57}\) This means that Australia must abate a total of 255 Mt CO\(_2\)-e, of which the renewable electricity scheme will only contribute approximately 14 per cent of the total quantum of

\(^{47}\) 'Impacts of Changes to the Design of the Expanded Renewable Energy Target' (McLennan Magasanik Associates, 2010), 4 21.

\(^{48}\) McLennan Magasanik Associates, n 47, p 21.

\(^{49}\) McLennan Magasanik Associates, n 47, p 21.

\(^{50}\) McLennan Magasanik Associates, n 47, p 21.

\(^{51}\) 'Australia’s Fifth National Communication on Climate Change: A report under the United National Framework Convention on Climate Change' (Department of Climate Change and Energy Efficiency, Australian Government, 2010), p 78.


\(^{54}\) Department of Climate Change, n 51, p 78.


\(^{57}\) Minister for Climate Change and Water, n 53.
anthropogenic greenhouse gas emission reductions required according to the projected abatement levels under the current scheme.\textsuperscript{58}

In terms of the design of the RET scheme, the \textit{Renewable Opportunities report}\textsuperscript{59} is the most in-depth analysis undertaken in this regard since this scheme’s commencement. This report, which was published in 2003, contains a number of recommendations and findings that are premised on the design of the RET as it was in 2003. Of these recommendations, two reappear in more recent studies and are explored in more detail below as they indicate significant design flaws of the RET scheme.

First, the Renewable Opportunities report submits that the “MRET is a relatively expensive abatement measure”\textsuperscript{60} because of the high cost of renewable technologies. Along the same line, energy consultants MMA note that the RET scheme is insufficient to achieve long-term, cost-effective reductions in anthropogenic greenhouse gas emissions.\textsuperscript{61} MMA also note that the current RET scheme is not capable of developing cost-effective energy infrastructure required to meet the increasing electricity demand in Australia.\textsuperscript{62}

The second relevant conclusion posited in the Renewable Opportunities report notes that to maintain a consistent level of investment for renewable electricity projects under this scheme – rather than “a boom and bust”\textsuperscript{63} approach – the scheme must periodically raise the eligibility criteria threshold for renewable energy generation facilities.\textsuperscript{64} By doing this, the scheme can ensure that these generation facilities continue to improve their generation capabilities which, in turn, drives investment in new generation facilities. This latter recommendation recently received renewed support in the submission to the 2009 exposure draft Renewable Energy Target scheme amendments prepared by the Centre for Energy and Environmental Markets.\textsuperscript{65} This submission notes that to address this issue, the eligible facilities under the RET scheme require “a sunset period to restrict the time period over which projects can earn RECs” so that new investment in renewable electricity receives continued support.\textsuperscript{66}

The criticisms set out in the above reports together with the available data indicating the suboptimal environmental consequences of the RET scheme reflect the problematic design

\textsuperscript{58} Department of Climate Change, Australian Government, n 51, p 89.
\textsuperscript{60} Australian Greenhouse Office, 59, p xviii.
\textsuperscript{62} McLennan Magasanik Associates, n 61, p 15.
\textsuperscript{63} McLennan Magasanik Associates, n 61, p xx.
\textsuperscript{64} McLennan Magasanik Associates, n 61, p xxii.
\textsuperscript{65} MacGill and Passey, n 45.
\textsuperscript{66} MacGill and Passey, n 45, p 7.
aspects of this scheme. It is on this basis that the next section considers the two dominant legal mechanisms that have been used extensively in foreign domestic jurisdictions to mitigate the electricity sector’s contribution to anthropogenic climate change. The purpose of this analysis is to consider how these model arrangements might be used to improve the current legal arrangements in Australia.

4. LEGAL MECHANISMS AVAILABLE TO INCREASE RENEWABLE-SOURCED ELECTRICITY GENERATION

This section is concerned with understanding the design principles of the two dominant legal mechanisms which have been developed to decarbonise the electricity sector in various industrialised nation-states. This assessment begins by reviewing the price-based model – which is commonly known as a feed-in tariff mechanism – which is the mechanism most frequently used in Europe to overcome the "well-established dominant electricity supply technologies".67 This article then considers the design principles of a quota based mechanism that operates in conjunction with a tradable green certificate scheme, which is the legal mechanism on which the Australian RET scheme is based.

It is important to note that during the formative years of renewable electricity technology development, government intervention in the renewable electricity sector focussed on supporting research through funding and development projects for the purposes of creating and commercialising new technologies.68 More recently, however, the emphasis has moved to a market-pull approach (compared to the former market-push approach), which relies on the creation of incentives to encourage the development, commercialisation and dissemination of renewable electricity technologies.69 It is this latter approach that underpins the legal mechanisms discussed in this section. Despite the shift towards a market-pull approach, sustained research and development remains important for the advancement of renewable technologies and, therefore, must not be forgotten in the broader regulatory approach to decarbonising the electricity sector.

Before commencing the review of the dominant market-based mechanisms it is worth pausing to consider the role of prescriptive regulation to assist with the decarbonisation of the electricity sector. Prescriptive regulation, which historically was the preferred form of regulation to manage environmental problems, imposes rules that prescribe specifically how an entity must act.70 Proponents of prescriptive regulation hold that this regulatory approach provides legislators with greater control over the economic and environmental outcome of a particular

68 Elliot, n 67, p 220.
69 Elliot, n 67, p 220.
course of action. Further, it is said that market-based mechanisms defer the obligation to firms that can negotiate and, possibly, manipulate the market to avoid compliance. On the other hand, the common criticism levelled at prescriptive regulation is that because of its direct nature it limits the flexibility and autonomy of the liable firms, which they may otherwise be afforded under a market-based approach.

Despite the shift away from prescriptive regulation, a growing number of scholars support the view that this form of regulation has an important role to play alongside emerging market-based regulations. This view holds that we must inquire as to the wisdom of relying largely upon market mechanisms – albeit artificially constructed markets – in order to solve such a complex and difficult problem with so many causes, when the problem was caused by market failure in the first place.

While the primary purpose of this article is to assess the design of the existing Australian RET scheme, it is important to keep in mind that market-based mechanisms do not offer the only solution. For this reason, based on the more moderate approach suggested by Gunningham, Bonyhady and Prest, it is sensible to consider the application of both market-based and prescriptive regulations within the broader regulatory approach to shift the electricity sector to a low-emissions base. With this in mind the article now considers the two dominant legal mechanisms that have been used to decarbonise the electricity sector.

4.1. FEED-IN TARIFF MECHANISMS

The most common design for a feed-in tariff mechanism compels electricity retailers to enable renewable electricity generation facilities to connect to the electricity grid. Electricity retailers are then required to purchase any electricity generated by the connected renewable electricity source at a fixed price.

Stavins, n 6, p 32.

Stavins, n 6, p 32.


Prest, n 7, p 180.

Janet L Sawin, 'Policy Lessons for the Advancement and Diffusion of Renewable Energy Policy Lessons for the Advancement and Diffusion of Renewable Energy' (International Conference for Renewable Energies, 2004), p 4. It is important to note that feed-in tariffs can operate in two ways. First, the renewable electricity generator can be paid for all of the electricity which it generates (gross feed-in tariff) or, alternatively, it can be paid only for the amount of electricity which is fed into the grid for distribution (net feed-in tariff). The choice
In addition to the fixed price paid for electricity, the payments offered to participants in feed-in mechanisms are guaranteed for a period of time, which is usually for a period of 10 to 20 years. The purpose of this design is two-fold. First, it is intended to provide renewable electricity generators with price certainty so that investors are able to calculate the return on investment from the renewable electricity source which allows investors to determine the economic viability of developing and operating a renewable electricity generation facility. Secondly, the premium paid to renewable electricity generators is intended to incentivise the development of new renewable electricity generation plants.

While the basic operation of a feed-in mechanism is relatively straightforward, Mendonca, Jacobs and Sovacool have provided a useful overview of the “Basic FIT (feed-in tariff) Design Options” together with the aspects of “Bad FIT Designs”. The authors note that 13 issues must be addressed when designing an effective feed-in tariff mechanism. While each of the 13 issues is relevant to the design of an effective feed-in tariff mechanism, “one of the most urgent questions” relates to the level of the tariff.

The basic premise for policy makers when setting the tariff is that it must be set at a level that is not too low – as this does not encourage investment in renewable energy – nor too high – as this may cause windfall gains for renewable electricity generators. The tariff must therefore be set at a rate that is at a slight premium to the real costs involved in generating the electricity, which is likely to be different for each type of renewable technology. The level of the tariff is also dependent on the location of the generation facility and the size of the renewable electricity plant as economies of scale dictate that larger generation facilities are often cheaper and therefore require fewer subsidies. Further, this premium must be set at a rate that is comparable or higher to the rate of return which non-renewable generators receive. This

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77 Sawin, n 76, p 4.  
79 Mendonca, n 78, p 15-56.  
80 Mendonca, n 78, p 58-64.  
81 The 13 issues required for a successful feed-in tariff scheme are: determination of eligible technologies, criteria for eligible plants, tariff calculation methodology, technology-specific tariffs, size-specific tariffs, duration of tariff payment, financing mechanisms, purchase obligations, priority grid access, cost-sharing methodology for grid connection, effective administrative procedures, target setting and progress reports (Mendonca, n 78, p 16).  
82 Mendonca, n 78, p 19.  
83 Mendonca, n 78, p 19.  
85 Mendonca, n 78, p 26.
ensures that the profitability of these projects is sufficient to attract investors to renewable sourced electricity generation.86

Closely related to the level of the tariff is the guaranteed duration of the payment of the tariff. Mendonca, Jacobs and Sovacool note that the duration of the scheme affects the level of the tariff because, if, for example, the guaranteed duration is only 10 years (which is a relatively short period) then the level of the tariff needs to be set at a higher rate to ensure that the investors receive an adequate return on their investment over that period.87 Alternatively, longer tariff periods allow the tariff level to be set at a lower rate as the return on investment can be spread over the duration of the tariff.88 On this basis, it is evident that the price certainty offered by feed-in tariff mechanisms is the critical factor driving the operation of this approach.

While it is not the focus of this section to consider in any great depth the practical application of feed-in tariff mechanisms, it is useful to note that at September 2009, 25 European countries, 12 Asian countries and a number of Australian States and Territories used feed-in tariff mechanisms.89 Of these jurisdictions, Germany is regarded as the "worldwide leader in this area".90 The push in Germany towards greater use of renewable sourced electricity began in the 1970s and culminated in 1990 with the initial version of its current feed-in tariff mechanism.91 While the German feed-in tariff mechanism was problematic during its formative years, this scheme has been effective in increasing the number of facilities capable of generating renewable electricity. For example, in 2009, renewable-sourced electricity contributed 16.4 per cent of Germany's electricity matrix, which is an increase of over 12 per cent since the implementation of the feed-in tariff scheme in 1990.92

In addition to the capacity deployment of renewable electricity generation facilities, the German scheme also performed well with reducing costs and prices of renewable electricity technologies, which is typically thought to be the domain of quota mechanisms.93

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86 Mendonca, n 78, p 19.
87 Mendonca, n 78, p 27.
88 Mendonca, n 78, p 27.
89 Mendonca, n 78, p 78.
91 Feeding Renewable Energies into the Grid 1990 (Germany); Granting Priority to Renewable Energy Sources 2000 (Germany).
92 'Development of renewable energy sources in Germany 2009: Based on statistical data from the Working Group on Renewable Energies-Statistics (AGEE-Stat)' (BMU – KI III 1, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Germany, 2010), 8. See also Figure 1 in MacGill and Passey, n 45, p 5 showing the effectiveness of quota and feed-in tariff mechanisms. This figure indicates that historically the latter have been more effective in deploying larger amounts of renewable energy technologies.
scheme builds “in annual decline rates (and no compensation for inflation)”, which means that tariff rates decrease in line with the learning curves of specific technologies. The German application of a feed-in tariff mechanism indicates that a properly-designed feed-in tariff mechanism is capable of generating significant growth in renewable electricity generation while, at the same time, reducing the costs of the technologies being deployed under this scheme.

4.2. QUOTA MECHANISM

Quota mechanisms operate to encourage the deployment of renewable sourced electricity by mandating a percentage or a total amount of electricity that must be sourced from eligible renewable electricity generation technologies during a particular period. To achieve the scheme’s “quota”, electricity generators or retailers (depending on the scheme’s design) must acquire RECs – which represent an amount of renewable sourced electricity – equivalent to the percentage or amount of their annual electricity sales (for generators) or purchases (for retailers). Like the price component of the feed-in tariff mechanism, the stringency of the quota is determined by a political (rather than market) means. Liable entities must surrender those certificates to the regulator, failure of which generally incurs a penalty that exceeds the market price for the RECs.

Quota mechanisms frequently operate in conjunction with a secondary market in which the RECs can be traded. This overcomes the need for liable firms to self-generate or physically purchase energy from low-emissions energy sources. The availability of the secondary market also provides liable firms with flexibility regarding compliance; firms can decide whether to satisfy its obligations by purchasing RECs on market or, instead, whether to generate their own renewable electricity. In addition (and as noted for the Australian RET scheme), renewable electricity generators also receive payment for the electricity they generate that is separate from the payment they receive for the sale of the RECs. By providing a subsidy together with a payment for the generation of renewable electricity, this scheme not only encourages the deployment of renewable generation facilities, it also facilitates the optimal location of renewable electricity generation facilities.

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94 Lauber, n 93, p 258.
95 Lauber, n 93, p 258.
98 MacGill and Passey, n 45, p 4.
99 MacGill and Passey, n 45, p 4.
100 MacGill and Passey, n 45, p 4.
To be effective, a quota mechanism requires the following six pillars:  

- a quota which specifies the percentage or total amount of electricity which liable entities must source from eligible renewable electricity generation technologies during a particular period;
- a definition of eligible renewable sources which can receive RECs under the scheme;
- clear identification of the point of liability (for example, at the point of generation or retail);
- a regulated secondary market in RECs;
- a government agency to regulate the operation of the program; and
- a system which penalises non-compliance.

As with the feed-in tariff mechanism, the quota system contains two core design features which determine this scheme’s ability to effectively encourage the deployment of renewable electricity generation facilities. These features are: (i) the existence and level of the quota; and (ii) the operation of the market to encourage investment in renewable electricity generation. While being the central tenets of a quota mechanism, these design elements of a quota-based mechanism also reflect the major design differences between quota and feed-in tariff mechanisms.

The purpose of the quota is to set a minimum target for renewable-sourced electricity, which must be achieved within a predetermined timeframe. The setting of the quota is often done so that there is a gradual progression towards the final mandated target. By doing this, the deployment of renewable electricity generation facilities can occur gradually, which means that the initial price impact of the scheme is lessened for liable entities. From an energy security perspective, this gradual transition ensures that there is continual and secure supply of electricity because the phasing out of excess fossil fuel capacity can be managed gradually.

The practical effect of setting renewable electricity targets has been mixed. In Australia, for example, the RET (and the MRET before it) scheme has performed well in achieving its quota. However, as MacGill and Passey note, Australia has “only had to achieve a very modest target, operated within an energy market context that is now changing rapidly and did demonstrate some significant failings”. One such failing occurred following the amendments made to the Australian RET scheme in 2009 which allow small solar renewable technologies to

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101 Lunt, n 97, p 381 – 382.
102 Lunt, n 97, p 381 – 382.
103 MacGill and Passey, n 45, p 4.
104 MacGill and Passey, n 45, p 4.
receive multiple RECs for generated electricity.\(^\text{105}\) This amendment largely caused the REC market to become flooded by RECs created by these technologies. This, in turn, caused the price of RECs to plummet and led to a temporary suspension of a number of planned large-scale renewable electricity generation facilities because of the reduced revenue stream, which would accrue to the generators as a result of the depressed REC price.\(^\text{106}\) This issue has since been addressed by further amendments to the RET scheme which took effect on 1 January 2011.\(^\text{107}\)

In Britain, its quota mechanism – the Renewables Obligation (RO)\(^\text{108}\) – has led to an acceleration of renewable electricity construction. Since 2002, the RO has tripled the level of renewable electricity in Britain from 1.8 per cent to 6.64 per cent, with the program generating approximately £1.4 billion annually to support the renewable electricity sector (as at June 2010).\(^\text{109}\) However, despite these positive results, it has been noted by the House of Lords Select Committee on Economic Affairs that existing evidence relating to the performance of the RO “casts doubt [over] ... whether it will be feasible to increase the share of renewable energy”\(^\text{110}\) to meet the European Union-mandated target of 15 per cent.

The second critical feature of a quota mechanism is the operation of a secondary market in which to trade RECs. The use of a market to trade RECs means that, unlike the feed-in tariff mechanism, the return on investment under a quota scheme is not determined by the legislature or the relevant government authority overseeing the program at the outset of the scheme.\(^\text{111}\) Rather, it is dependent on the price of the RECs that are traded on the secondary market which, like any market, is determined by the liquidity and the scarcity of the products available on that market.

One of the major drivers to use a market to support the deployment of renewable electricity technologies is that it achieves deployment at least cost.\(^\text{112}\) The rationale for this is that because the market does not set a floor price (unlike a feed-in tariff), generators, to obtain the

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\(^{105}\) Renewable Energy (Electricity) Act 2000 (Cth), part 2 subdivision BA.


\(^{107}\) Renewable Energy (Electricity) Amendment Act 2010 (Cth).

\(^{108}\) The Renewables Obligation Order 2009 (UK).


\(^{111}\) For a more detailed comparison of the benefits and disadvantages of feed-in tariff and quota mechanisms see: Elliot, n 67 and Mendonca, n 79, p 149.

\(^{112}\) Lauber, n 93, p 255, 256 and 258.
greatest profit, will put downward price pressure on technology manufacturers and will also pressure developers for the best available locations for the generation of electricity.\textsuperscript{113} However, data obtained in relation to the British RO indicates that, in combination with other measures, this mechanism “has led to prices for wind power ... [being] substantially above German rates by about 50 per cent, despite a wind resource that is far superior in the British case”.\textsuperscript{114} This point was reaffirmed by the House of Lords Select Committee on Economic Affairs which notes that “the cost per kWh of renewable electricity supported by the Renewables Obligation has been significantly higher than the amounts paid via feed-in tariffs abroad”.\textsuperscript{115}

The existence of a market also creates a potential for variability of the return on investment which can result in less certainty for investors. This is a major problem for investors whose primary concern is the cost and return on investment rather than meeting a predetermined government quota.\textsuperscript{116} As a result, lower-cost technologies receive preferential treatment because they offer the least amount of financial risk to investors.\textsuperscript{117}

The British Government developed a process to overcome the disparity created by the REC market in favour of lower-cost renewable electricity technologies. Under the current version of the RO, electricity retailers are required to move progressively towards purchasing 15 per cent of their electricity from renewable sources by 2020.\textsuperscript{118} The RO was initially designed so that all renewable electricity generated received the same number of renewable energy certificates (or, as they are known, Renewable Obligation Certificates). This meant that, like under the Australian RET scheme, this scheme only focussed on “near market options”\textsuperscript{119} and not on those technologies that require greater financial assistance to achieve large-scale commercial deployment. Recognising this shortcoming, the British Government amended the RO in 2009 to include a banding process where different technologies receive different numbers of certificates.\textsuperscript{120} The banding rates are affected by factors such as the extent of the technology’s

\begin{footnotes}
\footnotetext{113}{Lauber, n 93, p 255.}
\footnotetext{114}{Lauber, n 93, p 255, 256 and 258.}
\footnotetext{115}{House of Lords Select Committee on Economic Affairs, n 110, p 69.}
\footnotetext{116}{Mendonca, n 78, p 152.}
\footnotetext{117}{Elliot, n 67, p 220.}
\footnotetext{119}{Elliot, n 67, p 221.}
\footnotetext{120}{\textit{The Renewables Obligation Order} 2009 (UK), s 27 – 31. Similarly, in 2009 the Australian Commonwealth Government amended the national renewable electricity scheme to provide additional support for renewable electricity generated by small-scale solar powered electricity generators. As has been noted earlier, the result of this amendment caused the Australian REC market to be flooded by RECs generated by these small-scale generators which, in turn, exacerbated the price fluctuations of the REC market and further dampened investor confidence in the Australian scheme.}
\end{footnotes}
development, the technology’s cost to develop and factors affecting optimal electricity generation capabilities.\textsuperscript{121}

Despite the recent efforts of the British Government to improve its quota-based mechanism, it is evident that these mechanisms have not shared the same success as feed-in tariff mechanisms in deploying large-scale renewable electricity technologies or in reducing the costs and prices of renewable electricity technologies.

5. INTERACTION OF RENEWABLE-CENTRIC LEGAL MECHANISMS WITH AN ECONOMY-WIDE CAP-AND-TRADE SCHEME

This article has considered the quota and feed-in tariff mechanisms within the vacuum of the electricity sector; however, in reality these mechanisms are likely to be required to interact with other overlapping legal mechanisms. The most obvious example of such interaction exists with a broad-based cap-and-trade scheme that applies to the same entities to which the electricity-focused legal mechanisms apply. Appreciating the effect that such overlapping schemes can have on one another is particularly important for Australia because of the existence of the RET scheme and the ongoing debate relating to the implementation of an economy-wide cap-and-trade scheme.\textsuperscript{122}

In its submission to the Garnaut Review, the Productivity Commission considered the application of what it called “supplementary policies” under a broad economy-wide cap-and-trade scheme.\textsuperscript{123} The central theme of the Productivity Commission’s submission was that supplementary policies, such as the existing Australian RET scheme, do not affect the quantity of anthropogenic greenhouse gas emission reductions achieved under a cap-and-trade scheme; rather, they merely influence how these reductions occur.\textsuperscript{124}

More recently, Morris reached a similar conclusion to that offered by the Productivity Commission in her analysis of a national quota mechanism and tradable green certificate scheme in the United States. Morris concludes that when operating in conjunction with cap-and-trade schemes, quota schemes fail to have any substantive bearing on the reductions in anthropogenic greenhouse gas emissions.\textsuperscript{125} Further, Morris notes that a quota scheme made

\begin{itemize}
  \item\textsuperscript{121} The Renewables Obligation Order 2009 (UK), s 27 – 31.
  \item\textsuperscript{123} ‘What Role for Policies to Supplement an Emissions Trading Scheme? Submission to the Garnaut Climate Change Review’ (Australian Government Productivity Commission, 2008).
  \item\textsuperscript{124} Australian Government Productivity Commission, n 123, p xiv – xvii.
  \item\textsuperscript{125} Jennifer F Morris, Combining a Renewable Portfolio Standard with Cap-and-Trade Policy: A General Equilibrium Analysis Massachusetts Institute of Technology, 2009), p 46.
\end{itemize}
achieving the cap slightly more expensive and less flexible because it reduced the technological neutrality that would otherwise exist under a cap-and-trade scheme.126

Based on these observations, it remains important to be cognisant of the affect electricity-specific measures can have on economy-wide measures to decarbonise the broader economy. However, the role of decarbonising the electricity sector by decreasing its reliance on the anthropocentric activities that produce anthropogenic greenhouse gas emissions is critical to the broader shift of the economy towards a low-emissions base. For this reason, even with an economy-wide measure to decarbonise the Australian economy, it remains important to retain a legal framework that is designed specifically to encourage the dissemination of renewable electricity technologies and minimise the impact of fossil fuel-sourced electricity. Further, despite the negative cost implications of a legal approach to decarbonise the electricity sector, an electricity-centric approach operates as an insurance policy to defend against the “experimental policy approach”127 of a cap-and-trade scheme to effectively decarbonise this sector.128

6. CONCLUSION

Shifting the Australian electricity sector to a lower anthropogenic greenhouse gas emissions base is the critical first step to decarbonising the Australian economy. The purpose of this analysis has been to reflect on the design of the Australian RET scheme. Based on this analysis, it is evident that the RET scheme is not nearly as effective or efficient as the feed-in tariff mechanism to achieve this objective.

Despite the evidence supporting feed-in tariff mechanisms, careful consideration needs to be given to the possibility of amending the existing RET scheme so that it can match the achievements of the successful feed-in tariff mechanisms. To do so, the two fundamental shortcomings of the RET scheme must be addressed. These are: (i) the scheme’s inability to provide investors with adequate investment certainty; and (ii) the scheme’s inability to reduce the cost of more expensive renewable electricity technologies.

Increasing the investment certainty of the REC market is a complex problem. Investment certainty can be delivered through increased government intervention in the operation of the REC market such as that which operates under a feed-in tariff scheme which compels the purchase of generated renewable electricity for a long period of time at a particular rate. This could be achieved, for example, by mandating that renewable electricity generators and liable

126 Morris, n 125, p 49 – 50.
127 MacGill and Passey, n 45, p 3.
128 MacGill and Passey, n 45, p 3.
entities enter into long-term forward contracts for the sale of RECs above a floor price.\textsuperscript{129} By doing this, however, the Australian Government would limit its ability to amend this approach without having serious ramifications for entities participating in the scheme that rely on the existence of the floor price for the profitable operation of their renewable electricity generation facility. In addition, “markets need some risk and uncertainty in order to function properly – it drives innovation and careful decision making”.\textsuperscript{130}

In relation to the second shortcoming of the RET scheme, the feed-in tariff provides a useful example of rating technologies based on their cost, size of the generation facility and optimal generation capabilities in order to encourage the deployment of different technologies. The British Government recently implemented a banding process under its RO that operates to band the different eligible renewable technologies so that each technology receives a different level of financial return based on the above noted factors. Applying a similar approach in a carefully considered manner is also a viable option for Australia.

These suggestions are not intended to provide all of the answers to improving the operation of the RET scheme in Australia. Rather, they are intended to address the dominant shortcomings of the dominant Australian legal approach to decarbonise the electricity sector by using the lessons that have been learned from the successful operation of feed-in tariff mechanisms. More important, however, is the conclusion that no particular approach possesses a perfect design. For this reason, whichever legal approach is used to decarbonise the electricity sector, it must be designed so that it balances the competing concepts of certainty, economic efficiency, flexibility and security of electricity supply that are evident to differing degrees under a quota scheme, a feed-in tariff mechanism and prescriptive regulation. Further, given the likelihood of a future economy-wide cap-and-trade scheme, the design of a legal approach to support the deployment of renewable electricity must also consider how it can operate effectively within and complement the broader economy-wide approach.

Australia sits in a unique position to redress the problems caused by the fossil fuel dominated electricity sector. It must not waste the opportunity to design an optimal legal model to shift the electricity sector towards a lower anthropogenic greenhouse gas emissions base which can, in turn, drive Australia’s shift to a low-carbon economy.

\textsuperscript{129} Hvelplund, n 96, p 257. \\
\textsuperscript{130} MacGill and Passey, n 45, p 6.