GOVERNMENT INITIATIVES PROMOTING RENEWABLE ENERGY FOR ELECTRICITY GENERATION IN AUSTRALIA

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I INTRODUCTION

Since the oil energy crises of the 1970s, government policies in countries belonging to the Organisation of Economic Cooperation and Development have favoured the promotion of renewable energy through mechanisms such as tax and other financial incentives, and the mandatory purchasing by electric utilities of electricity generated from renewable energy sources. Environmental concerns about climate change together with the volatile world price of oil, the continuing need for energy security,[1] and the global trend towards the deregulation and privatisation of energy markets, have recently led a number of developed countries to re-examine their renewable energy policies. New legislative and fiscal measures have been adopted in many countries to support the increased use of renewable energy resources for electricity production.

The leading countries in promoting renewable energy have been the United States ('US') and the countries of the European Union.[2] In contrast, Australia has

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1 On the importance of national energy security see, eg, Chandler L Van Orman, 'The National Energy Strategy – An Illusive Quest for Energy Security' (1992) 13 *Energy Law Journal* 251; United Nations Development Programme, United Nations Department of Economic and Social Affairs and World Energy Council, *World Energy Assessment: Energy and the Challenge of Sustainability* (2000) ch 4.

2 The initiatives introduced in the US and the United Kingdom are discussed in detail below, Parts II and III. For initiatives in the European Union see: *Directive (EC) No 96/92* [1997] OJ L 27/20; Commission of the European Communities, *Energy for the Future: Renewable Sources of Energy – White Paper for a Community Strategy and Action Plan* (1997) The European Commission, Directorate General, AGORES <http://www.agores.org/POLICY/COM_STRATEGY/WHITE_PAPER/default.htm> at 19 November 2001; *Resolution of 17 June 1998 of the European Parliament on the Communication from the Commission: Energy for the Future: Renewable Sources of Energy – White Paper for a Community Strategy and Action Plan (A4-0199/98)* [1998] OJ C 210/02, 104; *European Parliament Resolution on Electricity from Renewable Energy Sources and the Internal Electricity Market* [2000] OJ C 378/02, 89; Commission of the European Communities, *Proposal for a Directive of the European Parliament and of the Council on the Promotion of Electricity from Renewable Energy Sources in the Internal Electricity Market* (2000) The European Commission, Directorate General, AGORES <http://www.agores.org/POLICY/COM_STRATEGY/elecdirective.htm> at 19 November 2001. For German initiatives see *Gesetz für den Vorrang Erneuerbarer Energien (Erneuerbare-Energien-Gesetz – EEG)* [*Law for the Priority of Renewable Energies (Renewable Energy Law – EEG)*] v 29 March 2000 (BGB1 I S305).

been slow in adopting similar initiatives. Our significant indigenous reserves of oil, and our self-sufficiency in natural gas and coal, have given us a greater measure of energy security than most developed countries, and have sheltered us from any threats of world shortage or disruption of supplies. Unlike North America and Europe, Australia was able to ride out the Arab oil embargo of the 1970s with no effect on prices or availability for domestic consumers.

Yet the lack of government intervention has significantly retarded the use of renewable energy and the development of a significant renewable energy industry in this country. Apart from hydro-electricity, which is exploited commercially in the Snowy Mountains, Tasmania and northern Queensland, the amount of electricity produced from renewable energy in Australia is very small.[3] This is disappointing as Australia has abundant supplies of renewable energy at its disposal, particularly solar[4] and wind energy.[5]

However, under the *United Nations Framework Convention on Climate Change*[6] and the *Kyoto Protocol to the United Nations Framework Convention on Climate Change*,[7] Australia committed itself to limiting its atmospheric anthropogenic carbon emissions,[8] obliging the federal government to take a more proactive stance towards supporting renewable energy. This is primarily due to the fact that energy use and production currently account for approximately 57 per cent of Australia's carbon emissions.[9] It is thus effectively impossible for Australia to fulfil its commitments under the international agreements on climate change unless our heavy reliance on coal and natural gas for electricity generation is replaced by renewable energy.

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3 Renewable energy currently constitutes approximately 10.5 per cent of Australia's electricity supplies: see 'Renewable Target in Sight' (2001) 19 *Australian Energy News* 24, 24.

4 The mean solar energy input to the surface of Australia is discussed in Australian Academy of Science, *Report of the Committee on Solar Energy Research in Australia*, Report No 17 (1973) 24.

5 The greatest onshore wind resources in Australia are found in the southwest of Western Australia (from Bunbury to Albany), in the Coorong region of South Australia, and on the west coast of Tasmania. In these regions the average wind speed exceeds eight metres per second: see Adrian J Bradbrook, 'The Access of Wind to Wind Generators' [1984] *Australian Mining and Planning Law Association Yearbook* 433, 435. Australia also has very significant offshore wind energy potential: see Adrian J Bradbrook and Alexandra S Wawryk, 'The Legal Regime Governing the Establishment of Offshore Wind Energy Farms in Australia' (2001) 18 *Environmental and Planning Law Journal* 30.

6 Opened for signature 4 June 1992, 31 ILM 849 (entered into force 21 March 1994). See generally Daniel Bodansky, 'The United Nations Framework Convention on Climate Change: A Commentary' (1993) 18 *Yale Journal of International Law* 451; Daniel Bodansky, 'Managing Climate Change' (1992) 3 *Yearbook of International Environmental Law* 60; Christopher D Stone, 'Beyond Rio: "Insuring" Against Global Warming' (1992) 86 *American Journal of International Law* 445.

7 Opened for signature 16 March 1998, 37 ILM 22. See generally Peter Cameron, 'From Principles to Practice: The Kyoto Protocol' (2000) 18 *Journal of Energy and Natural Resources Law* 1; Michael Grubb, Christiann Vrolijk and Duncan Brack, *The Kyoto Protocol: A Guide and Assessment* (1999); Peter G G Davies, 'Global Warming and the Kyoto Protocol' (1998) 47 *International and Comparative Law Quarterly* 446.

8 Under the *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, opened for signature 16 March 1998, 37 ILM 22, art 3, annex B, Australia is obliged to limit its carbon emissions to 108 per cent of its 1990 emissions in the commitment period 2008–12.

9 Federal Department of Primary Industry and Energy, *Sustainable Energy Policy for Australia: Green Paper* (1996) 20; Robert Fowler, 'International Policy Responses to the Greenhouse Effect and their Implications for Energy Policy in Australia' in Dal Swaine (ed), *Greenhouse and Energy* (1990) 462.

As a result, Australian governments (at both the federal and State levels) have implemented a variety of initiatives over the past two years, including the enactment of numerous pieces of legislation, to increase the use of renewable energy resources for electricity generation. This article seeks to explore and evaluate these recent Australian developments, comparing them with the initiatives adopted in the United Kingdom ('UK') and the US. These mechanisms include quota systems, net metering and financial incentives for the development and use of renewable energy technologies.[10]

A quota system is a 'market-based strategy to ensure that renewable energy constitutes a certain percentage of total energy generation or consumption'.[11] The government sets an amount of electricity, or a percentage of the total electricity generated or consumed, that must be sourced from renewable energy. The market determines the price for the electricity generated from renewable energy sources. The quota system that has recently attracted the most attention across the globe is the Renewable Portfolio Standard ('RPS'). This system sets a fixed percentage of energy that is to be produced from renewable resources. The target must be achieved by all electricity wholesalers or retailers. For example, an RPS can require wholesale electricity purchasers to acquire five per cent of their electricity from renewable energy sources.

Net metering is a mechanism that allows a user of electricity who also generates electrical power from renewable energy sources to sell any excess power generated over their load requirement back to the electrical grid to offset consumption.[12] A third significant mechanism involves financial incentives, which may be paid either to producers or consumers of electricity generated from renewable energy sources. A popular type of financial incentive for the development and use of renewable energy technologies is a Public Benefits Fund ('PBF'). This type of scheme is based on charging a fee for connection to transmission facilities (called an electricity service distribution surcharge, public benefit charge, access charge, wires charge, systems benefit charge or universal service charge) in order to fund a variety of programs to benefit the public. These include programs for the research and development of renewable technologies, subsidies for renewable energy generation, and programs promoting energy conservation and energy efficiency.

The types of government initiatives outlined in this article all constitute forms of government intervention in the electricity marketplace. As such, they are subject to the criticism that they distort the operation of the free market, in which renewable forms of energy would arguably be adopted only when they become commercially competitive. The initiatives are anathemas to those who believe in

10 Another type of supply-side mechanism is the fixed price system. This involves the mandatory purchase by electric utilities of power generated by renewable technologies at a price set by the government. The price paid to the generator or producer of renewable energy is often referred to as an electricity 'feed-in tariff'. Fixed price systems tend to be popular in countries where the electricity market is heavily regulated and/or dominated by one large public utility, and will not be analysed in this article.

11 Energy Information Administration, *Challenges of Electric Power Restructuring for Fuel Suppliers* (1998) 78 <http://www.eia.doe.gov/pub/electricity/chg_str_fuel.pdf > at 13 July 2002.

12 Ibid.

minimal government involvement in the economic sector and in 'light-handed' regulation.

The authors do not share this view. Such free market arguments do not recognise the public interest associated with the furtherance and maximisation of sustainable energy solutions. The public interest arises from the benefit to society in saving the remaining reserves of fossil fuels for future generations, and in the reduction of global atmospheric pollution caused by the burning of fossil fuels leading to climate change and acid rain, and localised air pollution in cities caused by motor vehicle exhaust.[13] The existence of a public interest in sustainable energy solutions was first recognised at the international level by the Brundtland Report in the 1980s, which stated that energy was the key to sustainable development, and that immediate policy measures were required to shift the energy mix towards renewables.[14] These themes were reiterated and expanded on in 2000 by the *World Energy Assessment* report,[15] which focused on the importance of renewable energy development to human health, education, employment, wealth and lifestyle.[16]

Our position is that the major issue is not whether government intervention should occur in Australia, but the determination of the most appropriate form of intervention. This article adopts a comparative approach to this question, examining the experiences of the US and the UK in legislating to promote the generation of renewable energy, in contrast to the approach taken in Australia. It is argued that, in determining the best approach to encourage renewable energy generation, the experience of the US and the UK is instructive.[17] While it is too early to develop a thorough appraisal of any of these systems, it is argued further that certain initiatives of the US and UK systems could be beneficial if introduced in Australia.

II GOVERNMENT INITIATIVES IN THE UNITED STATES

Under US State laws, electricity utilities held monopolies with a right and responsibility to serve all customers in a particular area for most of the 20th century. States permitted utilities to charge customers a regulated rate for electric power based on the cost of producing power plus a 'rate of return' on investment. The current restructuring of the electricity industry in the US is based on the introduction of competition into the generation segment of the electricity

13 United Nations Development Programme, above n 1, ch 3.

14 World Commission on Environment and Development, *Our Common Future* (1990) ch 7.

15 United Nations Development Programme, above n 1.

16 Ibid chh 2, 3.

17 The issue of carbon taxes is not considered in this article as they are not specifically aimed at promoting renewable energy. The published material on carbon taxes is voluminous: see, eg, Michael Grubb, *Energy Policies and the Greenhouse Effect* (1991) ch 3; José Goldemberg, *Energy, Environment and Development* (1996) ch 8; United Nations Development Programme, above n 1, ch 12.

industry,[18] and on enabling retail consumers to choose their electricity supplier. Transmission and distribution are to remain non-competitive, but will be regulated to ensure that utilities are required to open transmission and distribution wires to all qualified sellers of electricity.[19]

The Federal Energy Regulatory Commission ('FERC') has responsibility for regulating interstate trade in electric power in the US. In 1996, FERC issued an order requiring all public utilities that own, control or operate transmission facilities to provide non-discriminatory, open access transmission services by filing tariffs that offer to others the same transmission services that they provide to themselves.[20] This was designed to remove barriers to competition in wholesale electricity trade by ensuring that small generators of electricity, including renewable electricity generators, have access to electricity grids at fair prices.[21] This has been one of the key initiatives behind the increase in the nonutility share of electricity production from 7 per cent in 1988 to 11 per cent in 1998.[22]

As the electricity industry is restructured, questions have emerged over the role of the federal government in the restructuring process, including its activities in promoting renewables in the competitive electricity industry. In the last three years, concern over the unsuitability of existing legislative measures, combined with a desire to protect and advance the role of renewable energy sources in electricity generation, has led to the introduction of a large number of Bills in Congress and the State legislatures seeking to promote electricity produced from renewable sources in a deregulated environment. Mechanisms adopted over the past 25 years in the US include mandatory purchasing provisions, the regulation of interstate trade in electricity, and the Production Tax Credit ('PTC'). The most recent legislative initiative, the *Energy Policy Act of 2002* ('*EPA*'),[23] proposes to introduce an RPS system and net metering.

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18 In 1998, utilities in the US accounted for 89 per cent of total electricity generated in that country (a decrease from 93 per cent in 1988), while nonutilities accounted for 11 per cent of generation (an increase from 7 per cent in 1988): Energy Information Administration, *The Restructuring of the Electric Power Industry: A Capsule of Issues and Events* (2000) 1–3 <http://www.eia.doe.gov/cneaf/electricity/chg_str/booklet/electbooklet.html> at 19 November 2001.

19 Ibid 1.

20 *Promoting Wholesale Competition Through Open Access Non-Discriminatory Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, 61 Fed Reg 21 539 (1996).

21 Energy Information Administration, *Challenges of Electric Power Restructuring for Fuel Suppliers*, above n 11, 1.

22 Energy Information Administration, *The Restructuring of the Electric Power Industry*, above n 18.

23 HR 4, 107th Cong, 1st Sess (2001). This Bill was introduced in the House of Representatives on 27 July 2001 as the *Securing America's Future Act of 2001*, following a recommendation for 'comprehensive electricity legislation that promotes competition, protects consumers, enhances reliability, improves efficiency, promotes renewable energy, repeals the *Public Utility Holding Company Act*, and reforms the *Public Utility Regulatory Policies Act*': The National Energy Policy Development Group, *Report of the National Energy Policy Development Group* (2001) 5–12. It passed through the Senate on 25 April 2002, but has returned to the House of Representatives, which has not yet accepted major amendments made by the Senate: The Library of Congress, *Bill Summary and Status for the 107th Congress* (2002) Thomas: Legislative Information on the Internet <http://thomas.loc.gov/cgi-bin/bdquery/z?d107:HR00004:@@@X> at 2 August 2002.

Although the States have had an active role in restructuring the electricity industry, it is beyond the scope of this article to examine all the measures introduced by the State governments in the US. However, the legislative provisions of California provide an excellent example of a comprehensive PBF, which is a popular State government incentive mechanism.

A Early American Initiatives to Promote Renewable Energy

In the 1970s, the US federal government sought to reduce America's dependence on imported oil and its vulnerability to interruptions in energy supply in the wake of the Arab oil embargo of 1973. It also aimed to prepare the US for an expected rise in fuel prices. A key strategy for achieving these aims was to encourage the development of renewable energy sources and increased energy efficiency. An early part of this strategy was the enactment of the *Public Utilities Regulatory Policies Act of 1978* ('*PURPA*').[24]

Section 210 of *PURPA* requires FERC to prescribe 'such rules as it determines necessary to encourage cogeneration and small power production, and to encourage geothermal small power production facilities of not more than 80 mW capacity'.[25] One such set of rules, commonly referred to as the mandatory purchasing provisions, require electric utilities to trade in electric energy with 'qualifying cogeneration facilities' and 'qualifying small power production facilities'.[26]

The definition of 'qualifying small power production facilities' is contained in § 3(17) of the *Federal Power Act* ('*FPA*').[27] There are no size limitations for eligible solar, wind or waste facilities, but for a non-eligible facility, the power production capacity for which qualification is sought may not exceed 80 mW. To be classified as a qualifying small power producer, nonutilities must meet the ownership and operating criteria established by FERC. Additionally, at least 75 per cent of the total energy input must come from renewable resources. Small power producers must have less than 50 per cent of their equity held by an electric utility.[28]

The rate at which electricity must be purchased by utilities has to be 'just and reasonable to the electric consumers of the electric utility', in the public interest, and must not discriminate against qualifying facilities.[29] Such a rate is known as the incremental cost or avoided cost of production, that is, 'the cost to the electric utility of the electric energy which, but for the purchase from such co-generator or small power producer, such utility would generate or purchase from another

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24 Section 210 of the *Public Utilities Regulatory Policies Act of 1978* is codified in 16 USC § 824a-3 (1994).

25 16 USC § 824a-3(a) (1994).

26 *Regulations Under Sections 201 and 210 of the Public Utility Regulatory Policies Act of 1978 with Regard to Small Power Production and Generation*, 18 CFR § 292 (2001).

27 16 USC § 796(17) (1994).

28 *Regulations under Sections 201 and 210 of the Public Utility Regulatory Policies Act of 1978 with Regard to Small Power Production and Generation*, 18 CFR § 292.206(b) (2001).

29 16 USC § 824a-3(b) (1994).

source'.[30] *PURPA* eased the burden on nonutility companies that wished to enter the electricity generating market by exempting most qualifying facilities from various regulatory requirements. This included exemptions from rate and accounting regulation by FERC under the *FPA*, regulation by the Securities and Exchange Commission under the *Public Utilities Holding Corporation Act of 1935*,[31] and from State rate, financial and organisational utility regulations.[32]

PURPA has been described as

> successful in that it promoted cogeneration, the use of renewable resources, and other energy-efficient technologies, and ... fortuitous in that it also introduced competition by demonstrating that the generation of electricity is not a natural monopoly.[33]

While *PURPA* is still in effect, including the mandatory purchasing provisions of § 210, it has recently been targeted for repeal as the electricity industry moves towards competition.[34] It is beyond the scope of this article to examine the many arguments that have been advanced both for and against the repeal of *PURPA*.[35] However, the principal argument that has been made in favour of repeal is that the mandatory purchasing provisions are anti-competitive and inappropriate in what is now a competitive and deregulated market.[36]

A further early initiative implemented by the US is the PTC. The *Internal Revenue Code 1986*[37] established a PTC for wind energy, closed-loop biomass, and poultry waste.[38] The PTC is essentially a price supplement, paid by the government and added on to the market price received by renewable energy generators. The credit is set by legislation at 1.5 cents per kW of electricity produced from these renewable energy resources, adjusted for inflation. It is adjusted downwards if the average price of the renewable resource exceeds 8 cents per kW (this figure is also adjusted for inflation). In the case of wind energy, the credit is currently worth about 1.7 cents per kW in a project's first 10 years.[39] The credit is reduced where the renewable energy generator is the recipient of other financial incentives, including grants, tax-exempt bonds, and subsidised energy financing.[40]

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30 16 USC § 824a-3(d) (1994).

31 15 USC § 79 (1994).

32 16 USC § 824a-3(e)(1) (1994).

33 Energy Information Administration, *The Changing Structure of the Electric Power Industry 2000: An Update* (2000) 51 <http://www.eia.doe.gov/cneaf/electricity/chg_stru_update/update2000.html> at 19 November 2001.

34 National Energy Policy Development Group, above n 23, 5–12.

35 For a summary of these arguments, see Energy Information Administration, *The Changing Structure of the Electric Power Industry 2000*, above n 33, 51–2; Energy Information Administration, *The Restructuring of the Electric Power Industry*, above n 18, 13–14.

36 US Department of Energy, *Comprehensive Electricity Competition Plan* (1999) 19 <http://www.energy.gov/HQDocs/policy/ceca.htm> at 19 November 2001.

37 26 USC 45 (1994).

38 The proposed *Energy Policy Act of 2002*, discussed in Part II(B) of this article, will extend the PTC to electricity generated from swine and bovine waste nutrients, small irrigation power, municipal biosolids and recycled sludge, and geothermal energy: HR 4, 107th Cong, 1st Sess (2001) §§ 1901–6.

39 Diane Bailey, 'Industry Buzzing After Tax Credit Extension' (2002) 18(4) *Windpower Monthly* 24, 24.

40 26 USC § 45(b)(3) (1994).

The PTC has stimulated investment in renewable energy in the US, and the system is relatively transparent and easy to administer. However, the PTC does not provide a truly stable climate for investment as it only operates for a period of two years and then requires extension by Congress.[41] When the PTC expired in 1999, it was not renewed until November 2000. The PTC was then scheduled to expire on 31 December 2001, and the legislation extending the PTC was delayed until March 2002, for reasons unconnected with the credit.[42] On 9 March 2002, the credit was extended to 31 December 2003, applying retroactively from 31 December 2001. The uncertainty surrounding a tax credit that is renewed biennially, and the delays in extending the credit, have caused instability in the market. It has acted as a disincentive for the establishment of a domestic wind turbine manufacturing industry in the US, and led to delays in planning and commissioning wind power projects.[43]

B Recent Initiatives: The Proposed *Energy Policy Act of 2002*

The major aims of the proposed *EPA*,[44] as contained in its full title, are to 'enhance energy conservation, research and development and to provide for security and diversity in the energy supply for the American people'. To this end, the proposed legislation covers a range of topics dealing with the promotion of renewable energy and energy conservation and efficiency, and also includes provisions dealing with climate change. Two important mechanisms contained in the proposed *EPA* are the establishment of a federal RPS, and the introduction of legislative provisions relating to net metering.

1 *A Federal Renewable Portfolio Standard*

Section 264 of the proposed *EPA* would insert a new § 606 in *PURPA* to establish a federal RPS. This would be implemented through a system of tradable Renewable Energy Credits ('RECs').[45] This RPS would largely replace the mandatory purchasing provisions of *PURPA*.

The *EPA* would establish a 'Minimum Renewable Generation Requirement'. Retail electric suppliers of electricity would be required to submit RECs for each calendar year to the Secretary of Energy, in an amount equal to a required annual percentage of total electric energy sold by the retail electrical supplier.[46] The proportion of each company's total electricity supplies that must be generated

41 The tax incentive was extended by the *Job Creation and Worker Assistance Act of 2002*, Pub L No 107-147, § 603(a), 116 Stat 59, amending 26 USC §§ 45(c)(3)(A)–(C) such that the production tax credit applies until 1 January 2004.

42 The *Job Creation and Worker Assistance Act of 2002*, Pub L No 107-147, § 603(a), 116 Stat 59, contained an economic stimulus package that dealt with 16 other expiring tax provisions. The political parties were deadlocked over other provisions of the Act completely unconnected with the production tax credit.

43 Bailey, above n 39.

44 HR 4, 107th Cong, 1st Sess (2001).

45 Please note that the references to the *Public Utilities Regulatory Policies Act of 1978* in the following text and footnotes are to the amended sections proposed by the *Energy Policy Act of 2002*, HR 4, 107th Cong, 1st Sess (2001).

46 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 606(a).

from renewable energy sources has been set at 1 per cent for 2005 and 2006, with the proportion increasing every two years to a target of 10 per cent for 2019 and 2020.[47] The Secretary of the Department of Energy will determine the annual percentages (which cannot be less than 10 per cent) for the calendar years 2020–30.[48]

Under the new proposed § 606(c) of *PURPA*, retail electric suppliers would satisfy their obligation under the minimum renewable generation requirement by submitting RECs that have been either: issued to the retail electric supplier by the Secretary for generating electricity from renewable energy sources or obtained by trade in RECs; or 'borrowed' under the terms of the legislation. The Secretary of Energy would be responsible for establishing a program to issue, monitor the sale or exchange of, and track RECs.[49] Under this proposed program, any entity that generates electricity through the use of a renewable energy resource may apply to the Secretary for RECs to be issued. One REC may be issued for each kW of electricity generated through the use of a renewable energy resource, although there are certain exceptions to this rule. Two RECs may be issued for each kW of electricity generated through the use of a renewable energy facility located on Native American land, and for renewable energy resources produced from a 'generation offset'. In the case of 'incremental hydro-power', RECs are based on expected increase in average annual generation. If both renewable and non-renewable energy sources are used to generate electricity, credits will be issued based on the proportion of the renewable energy resource used.[50]

'Renewable energy source' and 'eligible renewable energy source' are defined identically as 'solar, wind, ocean or geothermal energy, biomass (including municipal solid waste), landfill gas, a generation offset, or incremental hydro-power'.[51] The inclusion of 'incremental hydro-power' would bring within the operation of the proposed *EPA* additional generation achieved through the increased efficiency or additions to the capacity of existing hydro-electric dams after the date of enactment of the legislation. 'Generation offsets' would allow RECs to be issued for reduced electricity usage metered at a site where a customer consumes energy from a renewable energy technology, thereby encouraging energy efficiency. The proposed *EPA* seeks to ensure that the obligations under the RPS are met by the generation of electricity from additional renewables facilities. This would be achieved by limiting eligible renewable generating facilities to those placed in service after the proposed *EPA* is enacted.

An REC may be sold or exchanged by the entity that issued it, or by any other entity that acquires it. Unused RECs can be carried forward for use within four years.[52] A new § 606(f) would make special provision for credit borrowing in the three years to 2005. If, before the end of 2005, a retail electric supplier believes it will not have sufficient credits to discharge its future obligations, the supplier

47 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 606(b)(1).
48 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 606(b)(2).
49 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 606(d)(1).
50 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 606(d)(3).
51 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 606(1)(3)–(9).
52 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 606(e).

may submit a plan to the Secretary of Energy which demonstrates that it will earn enough credits in the next three years to meet its requirements for 2005 and subsequent calendar years. Upon approval, the supplier may use the credits earned in the three years to 2005 to meet its future obligations. A retail supplier that does not submit the required number of RECs is subject to a civil penalty of not more than either 1.5 cents, or 200 per cent of the average market value of credits for the compliance period for each REC not submitted.[53]

The Secretary of Energy would be required to offer RECs for sale under the proposed amendments. A cost cap would be set on RECs of the lesser of 1.5 cents for each kW/REC or 200 per cent of the average market value of credits, during the years 2000–04. This charge would be adjusted for inflation on 1 April of each year.[54] This means that if the market price rises above the cap, electric retailers would be able to purchase RECs at the price of 1.5 cents per REC.

In the US, the RPS system has been the subject of much debate. Some of the arguments for and against the system reflect the ideological divide as to whether government intervention is required in the first place. Proponents have argued that such standards promote environmentally friendly forms of electricity and help to diversify the national or State energy supply.[55] It is also argued that they boost renewable energy industries that are in their infancy by increasing market demand for renewables, and correct the market failure by which the price of electricity generated by conventional fossil fuels does not internalise the cost of damage to the environment over the long-term.[56] Critics of government intervention have argued that RPS systems increase electricity costs to consumers by forcing energy suppliers to purchase electricity generated from higher-cost energy sources. They contend that the system provides an unfair market advantage to renewable energy technologies, and that the RPS impinges on freedom of choice – customers and the market should be able to select the types of electricity sources that are used rather than be compelled to select one source over another.[57]

The greatest advantage of an RPS is that it offers a decentralised, market-based and cost-effective mechanism. It allows retail suppliers and developers of renewable sources of energy to contract and trade credits and renewable power through private transactions. This avoids the market distortions caused by the fixed-price systems in Europe, where the government sets the price for renewable

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53 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 606(h).

54 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 606(g).

55 Fred Sissine, *Renewable Energy and Electricity Restructuring* (1999) National Library for the Environment <http://cnie.org/NLE/CRSreports/energy/eng-56.cfml> at 11 July 2002; Ryan Wiser, Steven Pickle and Charles Goldman, 'Renewable Energy Policy and Electricity Restructuring' (1998) 26 *Energy Policy* 465, 471.

56 See Pace University Center for Environmental Legal Studies, *Environmental Costs of Electricity* (1990).

57 Energy Information Administration, *The Changing Structure of the Electric Power Industry*, above n 33, 50; Sissine, above n 55; Wiser, Pickle and Goldman, above n 55, 471.

energy.[58] Also, unlike tendering systems such as the UK's Non-Fossil Fuel Obligation ('NFFO'),[59] the RPS requires no government involvement in the contracting process.

However, a limitation of the RPS system is that it primarily benefit generators of existing, low-cost renewables and is poorly suited to promoting less mature, higher-cost technologies. In particular, a 'single-band' RPS, which specifies a percentage of electricity that must be purchased from any combination of eligible renewable energy sources but does not require retailers to purchase electricity from different, specified technologies, will not encourage high-cost technologies. Retailers will seek to comply with the standard at the lowest cost consistent with the purchase requirement.

One solution to this problem is to construct 'additional technology bands' so that the purchase of electricity from a range of technologies is required. Another potential response is to make the purchase of higher-cost technologies worth more credits per kW. However, these solutions are administratively complex and politically difficult. The treatment of different technologies is extremely contentious, and a requirement to purchase high-cost technologies will lead to higher costs for consumers.[60] In fact, the *EPA* adopts a 'single-band' RPS precisely because such a band enables the fulfilment of the obligations at the lowest cost. Another potential problem is that once a technology is established in an additional band, it could be extremely difficult politically to remove the technology from that band.

It has also been argued that the RPS system is not competitively neutral. In a system under which all existing renewables contribute to the discharge of the RPS requirements and electricity retailers are required to meet the same purchase requirement, electricity retailers using a higher pre-existing level of renewables will be less affected by the requirement than other retail electric suppliers. They may in fact receive a 'windfall' gain by selling excess credits to other suppliers.[61] However, this gain is only a short-term phenomenon. Further, while the selling of excess credits may lead to a windfall for some retailers, it will have the positive effect of ensuring there is no shortage of renewable energy to meet the target as well as keeping the prices for renewables down. This appears to be a problem in the UK as the country transfers to the new Renewables Obligation.[62]

Another criticism of RPS systems is that they lack cost control. In California, industrial customers, utilities and power marketers were particularly concerned about limiting the cost of public purpose programs. The lack of explicit cost containment was a major reason that an RPS was rejected by the Californian

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58 For a description of fixed price schemes, see Michael Cerveny and Gustav Resch, *Feed-In Tariffs and Regulations Concerning Renewable Energy Electricity Generated in European Countries* (1998) EVA [The Austrian Energy Agency] <http://www.eva.wsr.ac.at/(en)/publ/pdf/feed-in98.pdf> at 18 July 2002; Lyn Harrison and David Milborrow, 'In the Absence of a Carbon Tax' (2002) 18(4) *Windpower Monthly* 44, 47.

59 See below Part III(A).

60 Wiser, Pickle and Goldman, above n 55, 474.

61 Ibid 472.

62 See below nn 124–5 and accompanying text.

legislature in favour of a PBF.[63] The cost cap of the RPS contained in the *EPA* is intended to limit the costs faced by consumers. In terms of administrative costs, other initiatives such as the Californian PBF can be administratively complex and thus more costly than an RPS.

Finally, it is arguable that an RPS will be overly burdensome on retail electricity suppliers, who are required to actively participate in the renewables (or the renewables energy credit) market. The strength of this argument remains to be tested, but after the first year of the mandatory renewable energy target in Australia, this does not appear to be a major issue.[64]

2 *Net Metering*

The second major initiative contained in the proposed *EPA* is net metering. Section 245 would amend *PURPA* by inserting a new § 111(d)(13) to allow net metering for renewable energy. Each retail electric supplier would be required to make available, upon request, a net metering service to any retail electric consumer whom the electricity supplier serves.[65] A 'net metering service' is a service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric customer during the applicable billing period.[66]

The rules for net metering would be contained in § 115(k) of *PURPA*. Electric utilities must not discriminate in price against consumers to whom they provide net metering service, and must measure the quantity of electricity produced by the on-site generating facility and consumed by the consumer according to normal metering practices. The electric utility would bill the owner or operator of the on-site generating facility for the electricity they have consumed during a billing period, according to the usual practice. However, if the electricity generated by the consumer exceeded the quantity sold to them by the utility in that billing period, the utility must credit the consumer for the excess kW generated on the following period's bill.[67]

The net metering service would be available to residential and commercial consumers. In the case of residential consumers, an 'eligible on-site generating facility' must have a maximum generating capacity of 10 kW or less and be fuelled solely by solar energy, wind energy or fuel cells. For commercial consumers, an 'eligible on-site generating facility' must have a maximum generating capacity of 500 kW or less and be fuelled solely by solar, wind, geothermal or biomass energy, landfill gas, or fuel cells of combined heat and power.[68]

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63 See below Part II(C) for analysis of Californian initiatives.

64 See below Part IV for analysis of Australian initiatives.

65 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 111(d)(13)(A).

66 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 115(k)(7)(D).

67 Proposed *Public Utilities Regulatory Policies Act of 1978*, §§ 115(k)(1)–(4).

68 Proposed *Public Utilities Regulatory Policies Act of 1978*, § 115(k)(7).

American commentators seem to be unanimously in favour of the system of net metering, with net metering laws existing in 36 States as of 10 May 2002.[69] Net metering is a low-cost and easily administered mechanism. It encourages consumer investment in renewable energy technologies by giving customers the flexibility to use the amount of electricity produced at a different time than when it is actually generated, thereby allowing them to maximise the value of their production. Electricity supply companies also benefit from net metering for a number of reasons. First, when customers produce electricity during peak periods, the system load factor is improved. Secondly, distribution losses are reduced, compared to the supply of electricity from a central power station.[70] Thirdly, in a competitive market, net metering provides a method for utilities and power marketers to differentiate their products.

C The Public Benefits Fund

A good illustration of a PBF is provided in the *Californian Public Utilities Code*. California has been the leading US State in both electricity industry restructuring and in the implementation of policies promoting renewable energy development. In 1996, it accounted for 14 per cent of all utility renewable electricity generation and 23 per cent of all nonutility renewable electricity generated in the US.[71]

The Assembly Bill 1890 of 1996[72] amended the *Californian Public Utilities Code* to establish a PBF in California. The large, privately owned utilities in the State (California Edison, Pacific Gas and Electric Company, and San Diego Gas and Electric) are required to collect revenue to fund public benefits programs. The funds are collected on the basis of electricity usage, via a charge levied on their local distribution service.[73] Customers pay a charge on their electricity bills at a rate of 0.37–0.45 cents per kW.[74]

The Californian Public Utilities Commission ('CPUC') allocates the funds to cost-effective energy efficiency and conservation activities, public interest research and development, and the in-state operation and development of existing, new, and emerging renewable resource technologies.[75] US$540 million has been collected over four years, and is to be spent on renewable energy

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69 United States Department of Energy, *Net Metering* (2002) US Department of Energy, Office of Efficiency and Renewable Energy <http://www.eren.doe.gov/greenpower/netmetering/index.shtml> at 10 May 2002.

70 Thomas Ackermann, Göran Andersson and Lennart Söder, 'Overview of Government and Market-Driven Programs for the Promotion of Renewable Power Generation' (2001) 22 *Renewable Energy* 197, 199.

71 Energy Information Administration, *Challenges of Electric Power Restructuring for Fuel Suppliers*, above n 11, 70–2.

72 Cal Stat ch 854 (1996).

73 CAL PUB UTIL CODE (Deering) § 381(a)–(c).

74 Energy Information Administration, *Status of State Electricity Industry Restructuring Activity: Public Benefits Programs as of November 2001* (2001) <http://www.eia.doe.gov/cneaf/electricity/chg_str/pbp.html> at 22 November 2001.

75 CAL PUB UTIL CODE (Deering) § 381(b).

technologies.[76] Although initially the PBF was to run only between 1998–2001, it has been extended to 1 January 2012.[77]

While § 381 of the *Californian Public Utilities Code* is directed at the three large privately owned utilities, § 385 requires all publicly owned Californian utilities to establish a usage-based charge on local distribution service. The money collected funds investments by the utility 'and other parties' in activities such as cost-effective demand-side management services to promote energy efficiency and energy conservation, new investment in renewable energy resources and technologies 'consistent with existing statutes and regulation which promote these resources', along with research, development and demonstration programs.[78]

In September 1997, Senate Bill 90[79] was enacted to provide administrative guidelines for the renewables program introduced by the Assembly Bill 1890 of 1996.[80] The California Energy Commission administers the funds collected for renewable energy technologies.[81] The portion of revenue collected from electrical corporations that is to be spent on renewable technologies is transferred to the California Energy Commission for deposit in the Renewable Resource Trust Fund.[82] This fund contains four accounts: the Existing Renewable Resources Account; the New Renewable Resources Account; the Emerging Renewable Resources Account; and the Customer-Side Renewable Resources Purchases Account.[83]

The Existing Renewable Resources Account is used to pay generators a monthly subsidy for eligible renewable energy electricity generation. The New Renewable Resources Account supports new renewable electricity generation projects built in California after 26 September 1996 by awarding a production incentive to potential projects according to bids submitted at periodic auctions. The Emerging Renewable Resources Account (Buy-Down) Program offers a cash rebate to electricity consumers of up to US$3000 per kW or 50 per cent off the purchase price of an eligible renewable energy electricity-generating system. Funds in the Customer-Side Resources Purchases Account are used for customer rebates for the purchase of electricity produced by renewable energy, and for consumer education.[84]

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76 CAL PUB UTIL CODE (Deering) § 381(c)(3).

77 Senate Bill 1194, Cal Stat ch 1050 (2000); Assembly Bill 995, Cal Stat ch 1051 (2000). Enacted on 30 September 2000, these have been codified in CAL PUB UTIL CODE (Deering) § 399.8(c). See California Energy Commission, *SB1194/AB995: Renewable Energy Public Benefits Program* (2000) <http://www.energy.ca.gov/renewables/00-REN-1194/index.html> at 19 November 2001.

78 CAL PUB UTIL CODE (Deering) §§ 385(a)(1)–(3).

79 *Senate Bill 90*, Cal Stat ch 905 (1997).

80 Cal Stat ch 854 (1996).

81 CAL PUB UTIL CODE (Deering) § 383 (a).

82 CAL PUB UTIL CODE (Deering) § 445(d).

83 CAL PUB UTIL CODE (Deering) § 445(b). See also California Energy Commission, *Renewable Energy Programs Overview* (2001) <http://www.energy.ca.gov/renewables/renewables_fact_sheet.html> at 19 November 2001.

84 CAL PUB UTIL CODE (Deering) § 383.5.

PBFs have a number of advantages.[85] A major advantage is that they can include an explicit cost ceiling, so that the development of renewables can be maximised within reasonable cost limits. This, it is argued, makes the system pragmatic and politically viable.[86] In California, industrial customers, utilities and power marketers were particularly concerned about limiting the cost of public purpose programs, and the cost cap contained in the PBF policy was 'critical in attracting broad-based support' for the inclusion of this policy in the new legislation.[87] A further advantage is that funds which are distributed through an auction or bidding system, such as the Californian New Renewable Resources Account, promote competition among and within renewable energy groups.

However, PBFs also suffer from a number of limitations.[88] First, they may be administratively complex. The CPUC explicitly stated its opposition to centrally administered funds because of such complexity.[89] Secondly, opponents of government intervention have argued that renewable energy funds are unnecessary subsidies that needlessly increase electric rates. It is argued that only solutions which can survive in the market without special forms of protection that raise costs should be pursued.[90] However, the subsidies can also be seen as correcting the market failure associated with the low prices for fossil fuels, which do not reflect the marginal social cost to society of environmental damage. Thirdly, a wires charge may be viewed as a tax, and may therefore be politically unacceptable.

III GOVERNMENT INITIATIVES IN THE UNITED KINGDOM

The major reform of the UK electricity industry began in 1989 with the passage of the *Electricity Act 1989* (UK). First, the government-owned, vertically integrated Central Electricity Generating Board was restructured into two generating companies (PowerGen and National Power – the latter has since demerged into Innogy and International Power). Further, a transmission company (the National Grid Company) and 12 regional area boards were transformed into a distribution network of 12 regional electricity companies. All these companies were progressively privatised. Secondly, competition was introduced into the generation and retail sectors of the industry, so that no single generation

85 See, eg, Sissine, above n 55; Wiser, Pickle and Goldman, above n 55, 466–7.

86 Wiser, Pickle and Goldman, above n 55, 471.

87 Ibid 472.

88 See generally Sissine, above n 55.

89 California Public Utilities Commission, *Order Instituting Rulemaking on the Commission's Proposed Policies Governing Restructuring California's Electric Services Industry and Reforming Regulation*, D 95-12-063, as modified by D 95-01-009 (20 December 1995).

90 See Sissine, above n 55.

company is now dominant in England and Wales.[91] Thirdly, the *Electricity Act 1989* (UK) established the England and Wales Electricity Pool for wholesale trading in electricity.

Further reforms were introduced by the *Utilities Act 2000* (UK). A single regulator for the gas and electricity markets, the Gas and Electricity Markets Authority ('GEMA') was introduced. Electricity licensing conditions were changed, which resulted in the separation of electricity supply and distribution functions.[92] The Electricity Pool was replaced with the New Electricity Trading Arrangements.

While the electricity industries of Scotland and Northern Ireland were restructured at around the same time, this occurred separately to the reforms in England and Wales. Legislative mechanisms to implement policies to promote the generation of renewable energy also operate separately to those in England and Wales. Thus, it is important to note that references to the UK industry in this article generally refer only to England and Wales.

A Non-Fossil Fuel Obligation

From 1989 to 2000, the mechanism adopted in the UK for the promotion of electricity from renewable energy sources was the Non-Fossil Fuel Obligation ('NFFO'), as provided in ss 32 and 33 of the *Electricity Act 1989* (UK). The NFFO applied in England and Wales, with similar obligations existing in Scotland (the Scottish Renewables Obligation) and Northern Ireland. The following discussion of the NFFO relates to the legislative situation in England and Wales prior to amendments made to the *Electricity Act 1989* (UK) by the *Utilities Act 2000* (UK).[93]

Sections 32(1) and 31(2) of the *Electricity Act 1989* (UK) empowered the Secretary of State to make an order, known as an NFFO Order, requiring each public electricity company to acquire specified amounts of generating capacity from non-fossil fuel generating stations, including renewable energy sources. The renewables capacity was secured though contracts at premium rates with generators of renewable electricity.[94]

Through the Non-Fossil Purchasing Agency ('NFPA'), the government would invite renewable energy generators to submit tenders to supply electricity from

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91 In 2000–01, PowerGen and National Power together accounted for 38 per cent of electricity generation, compared with 74 per cent in 1990–91. The share of nuclear power in electricity generation rose from 17 per cent to 24 per cent, with power generated by independents and 'others' rising from 9 per cent to 38 per cent in the same period: US Energy Information Administration, *Electricity Reform Abroad and US Investment* (1997) 17 <http://www.eia.doe.gov/emeu/pgem/electric/contents.html> at 18 August 2002.

92 Initially, the RECs were permitted to acquire generation assets provided these did not account for more than 15 per cent of individual electricity sales, spurring the generation of electricity by independent power producers.

93 For information on the NFFO, see Ackermann, Anderson and Söder, above n 70, 200–1; David Porter and Nicola Steen, 'Renewable Energy in a Competitive Electricity Market' (1996) 9 *Renewable Energy* 1120; David Elliot, 'Renewable Energy Policy in the UK: Problems and Opportunities' (1996) 9 *Renewable Energy* 1308.

94 United Kingdom Department of Trade and Industry, *The Renewable Obligation/NFFO* <http://www.dti.gov.uk/renewable/nffo.html> at 19 November 2001.

renewable energy sources. The government had five rounds of tendering under the NFFO process conducted on a biennial basis. The renewable energy generators were required to submit details of the proposed project (including the provisional bid price per kW and their generating capacity), and demonstrate the availability of the resource to the NFPA. Once submitted, the Office of Electricity Regulation ('OFFER') examined the technical, commercial and legal aspects of the project. Having obtained OFFER's approval, final bids were submitted by the renewable energy generators. The government awarded contracts to the best bidders within each type of eligible renewable energy technology. The renewable energy generator then supplied the electricity to the public utility at the price specified in the contract for a period of up to 15 years.[95]

Under the NFFO, the regional electricity companies paid the renewable electricity generators an amount or 'rate' that corresponded to the cost of electricity generated by fossil fuels. Because the cost of supplying electricity generated by fossil fuels was lower than the cost of supplying electricity generated by renewable energy sources, the rate paid to renewable generators by the regional electricity companies was lower than the NFFO contract price. The difference between this rate and the contract price was paid by the NFPA to the generators out of funds raised by a Fossil Fuel Levy[96] of 0.9 per cent on the electricity bills of electricity consumers.[97] Most of the funds collected by the levy (which typically exceeded £1 billion per year) have been used to support the nuclear power industry, with renewable energy schemes receiving £30 million in 1992–93, £60 million in 1993–94, and £96 million in 1994–95.[98]

The NFFO was the subject of a number of criticisms with respect to its ability to promote the use of renewable energy sources in electricity generation. While it has been acknowledged that the NFFO achieved reductions in the price of renewable energy,[99] the scheme was criticised as an unsuitable mechanism 'for renewables deployment and development of a local industry'.[100] The key failures of the NFFO stem from limitations associated with the need for the government to award contracts under a system of tendering.

First, the underlying basis for awarding contracts under the NFFO was criticised. As contracts in each technology band were awarded solely on the basis of cost, the system favoured large companies able to utilise economies of scale at the expense of emerging and experimental technologies. This was exacerbated by the fact that the scheme favoured existing traditional electricity providers, who

95 Ibid; see also Cerveny and Resch, above n 58.

96 Established under the *Electricity Act 1989* (UK) s 33.

97 United Kingdom Department of Trade and Industry, above n 94; Cerveny and Resch, above n 58; Altener Programme, *Final Report of the Ener-lure Project* (1998) RES Legislation in the United Kingdom <http://www3.jrc.es/projects/eneriure/pages/1reports.htm> at 19 November 2001.

98 Porter and Steen, above n 93, 1121; Elliot, 'Renewable Energy Policy in the UK', above n 93, 1309.

99 Ackermann, Anderson and Söder, above n 70, 201.

100 Australian Greenhouse Office and the Renewables Target Working Group, *Final Report to the Greenhouse Energy Group: Implementation Planning for Mandatory Targets for the Uptake of Renewable Energy in Power Supplies* (1999) 102.

had a 'vested interest in not promoting the renewables industry or lobbying governments for pro-renewable policies'.[101]

Secondly, the length of time between the award of contracts and the deployment of technology (five years) provided an incentive for parties to make low-cost bids to win contracts. Such bids were made in the hope that between the contract period and the commissioning date, costs would decline sufficiently to make the project viable. The use of cost predictions for future projects, based on large cost reductions over the following five years, led to a situation where projects were not being deployed at the required commissioning date because sufficient cost reductions had not occurred.[102]

Thirdly, under a system of competitive bidding such as the NFFO, the government is constrained by legal procedures and terminology when awarding contracts to renewable energy generators. The NFFO was criticised over the failure of the scheme to award contracts to some well-developed projects because of the legal and administrative restrictions placed upon governments under the terms of the legislation.[103] In contrast, under an RPS, once the renewables obligation has been set, the electricity suppliers are free to enter into contracts with the generating company that will best meet their requirements. Thus one benefit of an RPS over a tendering system like the NFFO, is that the former is self-regulating, as it requires no government interference in the contracting process.

Fourthly, the NFFO failed to include an appeals mechanism regarding the awarding of projects. Where governments are involved in the granting of projects, an appeals mechanism is essential to achieving fairness and government accountability.

A final reason why the NFFO failed to achieve its objectives was the difficulties in obtaining development approval (particularly for landfill gas and waste and wind power projects) after NFFO contracts had been awarded. This presented a major barrier to the successful construction of renewable energy facilities. The denial of planning permission meant that relatively few mW of energy from these sources were actually installed despite dozens of contracts being signed under the NFFO. While it can be argued that issues of development approval are separate from the actual operation of the NFFO, the lack of a streamlined system for granting permits demonstrates that power purchase contracts alone are insufficient to ensure new renewable facilities are actually built.[104] For these reasons, the UK devised a new approach to encourage the generation of renewable energy: the Renewables Obligation.

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101 Ibid; Muriel Watt and Hugh Outhred, 'Australian and International Renewable Energy Policy Initiatives' (2001) 22 *Renewable Energy* 241, 242; Elliot, 'Renewable Energy Policy in the UK', above n 93, 1310.

102 Australian Greenhouse Office, above n 100, 103; Ackermann, Anderson and Söder, above n 70, 201.

103 Porter and Steen, above n 93, 1122.

104 Ibid; Elliot, 'Renewable Energy Policy in the UK', above n 93, 1310; David Elliot, 'Prospects for Renewable Energy and Green Energy Markets in the UK' (1999) 16 *Renewable Energy* 1268, 1269.

B Renewables Obligation

The *Utilities Act 2000* (UK) abolished the NFFO and replaced it with a new Renewables Obligation and Renewables (Scotland) Obligation.[105] This system is similar in nature to the new Australian system.[106] The abolition of the NFFO was proposed partly in response to the failings discussed above, and partly because it was seen as an inappropriate mechanism following the changes to the structure of the UK electricity industry after privatisation. These changes included the introduction of separate licences for distribution and supply, and new electricity trading arrangements.

While the NFFO was a quota system based on a tendering procedure, the new Renewables Obligation is a renewable portfolio system incorporating a system of tradable 'green' certificates. The Secretary of State is empowered to impose, by order, a Renewables Obligation on electricity suppliers (known as 'designated electricity suppliers').[107] Designated electricity suppliers are required to produce evidence to GEMA that a specific percentage of electricity supplied to their customers has come from electricity generated by using renewable sources.[108] This 'evidence' is the required amount of renewable obligations certificates.

The term 'renewable sources' is defined as 'sources of energy other than fossil fuel or nuclear fuel, but includes waste of which not more than a specified proportion is waste, or is derived from, fossil fuel'.[109] In the case of electricity generated by a power station that is fuelled or driven partly by renewables and partly by fossil fuel, only the proportion attributable to the renewable sources can count towards discharging the renewables obligation.[110] 'Eligible renewable sources' are also defined broadly to mean electricity-generated renewable sources, except power generated from 'excluded' generating stations which are listed in the *Renewables Obligation Order 2002* (UK).[111] Notably, large hydro-electric stations (with a net capacity of more than 40 mW) are excluded as eligible renewable sources unless commissioned after 1 April 2002. This is because they are well established in the market and in a position to compete with electricity from fossil fuel.[112] The *Renewables Obligation Order 2002* (UK) also ensures renewable energy will come from additional (not yet existing) renewable energy sources by excluding generating stations commissioned before 1 January 1990.[113]

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105 Sections 62–7 of the *Utilities Act 2000* (UK) amend ss 32–3 of the *Electricity Act 1989* (UK) to abolish the old NFFO and establish the new renewables obligation. All references to the *Electricity Act 1989* (UK) s 32, as amended by the *Utilities Act 2000* (UK), will be referred to in the following text as the 'new' or 'amended' s 32. Details of the renewables obligation are set out in the *Renewables Obligation Order 2002* (UK), which came into force on 1 April 2002.

106 See below Part IV.

107 *Electricity Act 1989* (UK) ss 32(1)–(3).

108 *Renewables Obligation Order 2002* (UK) art 3(1).

109 *Electricity Act 1989* (UK) s 32(8).

110 *Electricity Act 1989* (UK) s 32(6).

111 *Renewables Obligation Order 2002* (UK) art 8.

112 UK Energy Technology Support Unit, *EC Altener Programme: UK Renewable Policy Report for the AGORES Web Site* (2000) 4, The European Commission, Directorate General, AGORES <http://www.agores.org/Publications/EnR/UKREPolicy2000.pdf> at 19 November 2001.

113 *Renewables Obligation Order 2002* (UK) art 8.

As an RPS, the Renewables Obligation places a burden on every designated electricity supplier to show that a percentage of their total electricity supply has been acquired from renewable energy sources. This proportion has been set at three per cent from 1 April 2002 to 31 March 2003. The proportion will increase annually to reach a target of 10.4 per cent in 2010, and to remain at 10.4 per cent until 31 March 2027.[114]

The system of tradable green certificates is established through the new s 33B inserted in the *Electricity Act 1989* (UK). GEMA is empowered to issue a certificate to the operator of a generating station or to an electricity supplier[115] in accordance with the criteria specified in art 4 of the *Renewables Obligation Order 2000* (UK). A certificate must confirm that the generating station has produced the amount of electricity stated in the certificate from renewable sources, and that it has been supplied to customers in Great Britain.[116] Any green certificate produced by an electricity supplier to the GEMA is to count as sufficient evidence for the purposes of discharging the Renewables Obligation.[117]

To be issued with renewable obligation certificates, a generating station must first be accredited by GEMA. Certificates will be issued monthly, with one certificate being issued per mW of electricity generated from eligible renewable energy sources. The formula for calculating the amount of electricity generated from eligible renewable energy sources is as follows:[118]

$$\text{Renewable output per month} \times \frac{\text{Net output per month}}{\text{Gross output per month}}$$

'Renewable output' is the gross output less electricity sourced from fossil fuels. Net output is gross output less all electricity consumed by the company, and gross output is the total amount of electricity generated by the station.[119]

As an alternative to surrendering green certificates to the GEMA, an electricity supplier may 'buy out' its renewables obligation, that is, discharge its obligation by making a payment to GEMA.[120] This option has been included in the scheme in order to provide a safety net so that the costs to consumers of the Renewables Obligations do not rise out of control if there are serious delays in the development of the industry.[121] The buyout price is a cost per kW of the amount of renewable electricity by which the supplier falls short of discharging the Renewables Obligation. The payment of this price to GEMA, on top of the 'normal' cost of electricity supplied from non-renewable fuels, will set a cap on the price suppliers are willing to pay for electricity from renewables. The price is

114 *Renewables Obligation Order 2002* (UK) art 6, sch 1.
115 *Electricity Act 1989* (UK) s 32B(1).
116 *Electricity Act 1989* (UK) s 33B(2).
117 *Electricity Act 1989* (UK) s 33B(3).
118 *Renewables Obligation Order 2002* (UK) art 9(1).
119 *Renewables Obligation Order 2002* (UK) arts 4(12)(a), 9.
120 *Electricity Act 1989* (UK) s 32C.
121 UK Energy Technology Support Unit, above n 112, 6.

set at £30 per mW (or 3 pence per kW), with allowances made for the price to be indexed with inflation.[122]

The *Electricity Act 1989* (UK) also makes arrangements for recycling the receipts from the buy out of renewable obligations. GEMA is directed to pay amounts received in the buy out of electricity suppliers 'in accordance with a system of allocation specified in the Order'.[123] The funds collected by GEMA are placed in the 'buyout fund' and returned only to suppliers who have discharged their renewable obligation by surrendering certificates.[124] The purpose of this is to provide a financial incentive for meeting the Renewables Obligation by surrendering green certificates rather than returning them through the buyout mechanism.

As an RPS, the Renewables Obligation can be subjected to the same debate over its merits and demerits as discussed above in relation to the US scheme. However, various factors specific to the UK market may hinder the operation of the Renewables Obligation. In particular, a current shortage in the generating capacity of renewables is placing a premium on the prices of available renewable energy. While renewables account for over 2.8 per cent of UK electricity, a significant percentage is sourced from waste incineration and large hydro-electric schemes, both of which are excluded under the *Renewables Obligation Order 2000* (UK). This has left about 1.6 per cent of total generation available to cover the requirements of the renewable obligation certificates. This is about half of the total capacity required by all electricity suppliers to meet their obligations.[125] This, combined with the opportunity to buy out of the Renewables Obligation at a fixed price, has caused short-term prices of renewables to rise. For example, at the auction of the 'old' NFFO contracts, wind prices were double their level at the last NFFO auction. Market uncertainty, the lack of information concurrent with the introduction of the new system, and the shortfall of renewable supplies, led retailers to anticipate having to pay the buyout price and to factor this into the prices for short-term contracts.[126]

As the market gains more information, and a larger capacity to generate renewable energy is installed, the price of renewables should fall. Whether this actually occurs depends on the pace at which eligible renewable energy installations are deployed, and whether the buyout price has been set at an appropriate level. If renewable energy developers continue to face hurdles in gaining development approval then the shortage of renewables will persist, and possibly worsen as the obligation placed on electricity suppliers increases each year. If the buyout price has been set too low, then there is an incentive for electricity suppliers to discharge their obligation through the buyout mechanism. In this respect, the lack of tough sanctions for non-compliance with the Renewables Obligation may prove to be a significant flaw in the UK system,

122 *Renewables Obligation Order 2002* (UK) art 7.
123 *Electricity Act 1989* (UK) s 32C(1).
124 *Renewables Obligation Order 2002* (UK) art 12.
125 Janice Massy, 'Shortfall of Supply to Meet Obligation' (2002) 18(4) *Windpower Monthly* 28.
126 Harrison and Milborrow, above n 58, 48.

tempting suppliers to opt for the buyout option, and defeating the purpose of the legislation.

IV GOVERNMENT INITIATIVES IN AUSTRALIA

Historically, a single vertically-integrated, State-owned authority (or a combination of State-owned authorities), responsible for the generation, transmission and distribution of electricity, dominated the electricity supply industry in each Australian State and Territory. Prior to 1990, State governments and their electricity authorities drove investment in the generation of electricity from new sources. Electricity prices were regulated by State governments, and were set at a level that covered the industry's costs plus any returns required by State governments as shareholders.[127]

Since 1991, the Australian electricity industry has been radically transformed. State-owned utilities have been restructured: the different functions of the electricity supply industry have been separated into generation, transmission, distribution, and retail supply, and the entities responsible for each have been corporatised and/or privatised. More specifically, generation has been disaggregated into separate companies to ensure adequate competition between generators. Transmission and distribution systems have been established as separate companies managed as monopolies by a regulator who is independent of government.[128]

A second key development was the creation of the National Electricity Market ('NEM') on 13 December 1998. The NEM is a market for the wholesale supply and purchase of electricity, combined with an open access regime for use of the transmission and distribution networks in five Australian States and Territories: the Australian Capital Territory, New South Wales, Queensland, South Australia and Victoria. Tasmania will enter the NEM when Basslink, the transmission system connecting Tasmania and Victoria, is completed.[129] Western Australia is not part of the NEM as the Western Australian grid is too far from the nearest point on the South Australian grid to make interconnection a feasible option, while the Northern Territory has no comprehensive grid.

A key component of this radical transformation of the electricity industry is the movement towards generating electricity from renewable sources. To encourage the generation of electricity from such sources, the federal government has recently introduced a quota system called the 'mandatory renewable energy target'. Additionally, both federal and State governments have developed financial incentives to this end.

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127 National Electricity Market Management Company Limited, *An Introduction to Australia's National Electricity Market* (2001) <http://www.nemmco.com.au/publications/whitebook/introbook.htm> at 18 July 2002.

128 Ibid.

129 National Electricity Code Administrator, *The National Electricity Market* (2002) <http://www.neca.com.au/NEM/> at 7 August 2002.

A Commonwealth Government Initiatives

1 *Mandatory Renewable Energy Target*

The federal government's mandatory renewable energy target aims to increase the contribution of renewable energy sources in Australia's energy mix by 9500 gigawatt hours ('gWh') per year by the year 2010, representing an increase from approximately 10.5 per cent to 12.5 per cent of total electricity generation.[130] This will be achieved through a system of tradable renewable energy certificates, implemented and regulated under the *Renewable Energy (Electricity) Act 2000* (Cth), the *Renewable Energy (Electricity) (Charge) Act 2000* (Cth) and the *Renewable Energy (Electricity) Regulations 2001* (Cth).[131]

These pieces of legislation establish a national scheme that applies to all electricity retailers and wholesale electricity purchasers. The scheme involves the issuing of renewable energy certificates for the generation of electricity from eligible renewable energy sources to certain purchasers of electricity, called 'liable entities'. These entities are required to surrender a specified number of certificates for the electricity that they acquire during a year to the Renewable Energy Regulator. If a liable entity does not have enough certificates to surrender, it must pay a renewable energy shortfall charge. Renewable energy certificates may be traded in a market separate from the physical market for energy. The Regulator is responsible for the general administration of the scheme, assisted by the Office of the Renewable Energy Regulator ('ORER').

The *Renewable Energy (Electricity) Act 2000* (Cth) is the major enactment creating and implementing the mandatory renewable energy target. Only a 'liable entity' – defined as 'a person who, during a year, makes a relevant acquisition of electricity'[132] – can be required to meet the mandatory targets. The only electricity transactions that fall within the scope of the legislation are 'relevant acquisitions', defined as wholesale acquisitions and notional wholesale acquisitions.[133] A wholesale acquisition is an acquisition of electricity from the National Electricity Market Management Company ('NEMMCO'),[134] (ie, a purchase from the electricity pool), or an acquisition from a person who did not acquire it from another person.[135]

The concept of a 'notional wholesale acquisition' encompasses first, a sale of electricity from a generator to an end user where the end user is not required to

130 Australian Greenhouse Office, above n 100, 9.

131 The relevant provisions of the legislation dealing with tradable energy certificates are discussed in Michael MacGinley, 'The New Renewable Energy Legislation' (2001) 20 *Australian Mining and Petroleum Law Journal* 87. See also 'Renewable Target in Sight', above n 3; Office of the Renewable Energy Regulator, *Overview of the Mandatory Renewable Energy Target* <http://www.orer.gov.au/overview.htm> at 27 August 2002.

132 *Renewable Energy (Electricity) Act 2000* (Cth) s 35.

133 *Renewable Energy (Electricity) Act 2000* (Cth) ss 31–4.

134 NEMMCO manages the wholesale electricity market, acting as the system operator for the wholesale electricity pool. It was established by the National Electricity Law, which was enacted under the *Electricity (National Scheme) Act 1997* (ACT); *National Electricity (New South Wales) Act 1997* (NSW); *Electricity – National Scheme (Queensland) Act 1997* (Qld); *National Electricity (South Australia) Act* 1996 (SA); *National Electricity (Victoria) Act 1997* (Vic).

135 *Renewable Energy (Electricity) Act 2000* (Cth) s 32.

be registered under the National Electricity Code for this to occur.[136] Secondly, the concept includes self-generation of electricity, except where the point at which the electricity is generated is less that one kilometre from the point at which the electricity is used, and when the electricity is distributed between the point of generation and end use on a line that is used solely for transmitting electricity between those two points (in other words, is not connected to the grid).[137] In the case of 'notional wholesale acquisitions', the generator is deemed to be a notional wholesaler and responsible for creating renewable energy certificates for the sale.[138]

For reasons of administrative efficiency, 'relevant acquisitions' exclude purchases of electricity where the electricity is delivered on a grid that has a capacity of less than 100 mW and is not, directly or indirectly, connected to a grid that has a capacity of 100 mW of more.[139] An acquisition of electricity will fall outside the scope of the *Renewable Energy (Electricity) Act 2000* (Cth) if the end user generated the electricity and either the point at which the electricity is generated is less than one kilometre from the point at which the electricity is used, or the electricity is distributed between the point of generation and end use on a line that is used solely for transmitting electricity between those two points.[140] An acquisition is also not a relevant acquisition if the electricity is later acquired by NEMMCO.[141]

Section 40 of the *Renewable Energy (Electricity) Act 2000* (Cth) establishes the interim targets for the nation's generation of additional specified gWh of electricity from renewable sources for each year until 2021. The target for 2001 is set at 300 gWh, and this figure rises each year until the amount of 9500 gWh is reached in 2010. The target remains fixed at this level for each succeeding year up to 2021. Wholesale electricity purchasers are liable for meeting the nation's extra renewable electricity target in proportion to their share of the nation's total electricity purchased in one calendar year.

In this respect, the Australian Mandatory Renewable Energy Target ('MRET') differs in a fundamental way from the US and UK RPS systems, which specify that each electricity supplier/retailer must acquire a *set percentage* of total electricity sales from renewable energy sources. For example, in the first year of operation of the UK Renewable Obligation, designated suppliers must source 3 per cent of their electricity from eligible renewable energy facilities.[142] In contrast, the Australian MRET sets a target *amount* in gWh of electricity that must be sourced from additional renewable energy sources for the whole of Australia, and is to be met by wholesale purchasers of electricity according to their market shares. For example, under the MRET of 300 gWh in 2001, a wholesale purchaser who bought 10 per cent of the nation's wholesale purchases

136 *Renewable Energy (Electricity) Act 2000* (Cth) s 33(2).
137 *Renewable Energy (Electricity) Act 2000* (Cth) s 33(3).
138 *Renewable Energy (Electricity) Act 2000* (Cth) ss 33(2), (3).
139 *Renewable Energy (Electricity) Act 2000* (Cth) s 31(2)(a).
140 *Renewable Energy (Electricity) Act 2000* (Cth) s 31(2)(b).
141 *Renewable Energy (Electricity) Act 2000* (Cth) s 31(2)(c).
142 See above n 114 and accompanying text.

of electricity would be liable to source 30 gWh of their supplies from renewable energy sources.

To discharge their obligations under the MRET in Australia, liable entities must surrender the prescribed number of renewable energy certificates to the Regulator. After their surrender, certificates are 'retired' (that is, expire). The actual number of renewable energy certificates that must be surrendered by a liable entity each year is determined by the following formula:[143]

Total electricity acquired under relevant acquisitions during the year x Renewable power percentage for the year

The renewable power percentage is worked out using the formula:[144]

Renewable power percentage for the previous year x $\frac{\text{Required gWh for the year}}{\text{Required gWh for the previous year}}$

If a liable entity does not surrender a sufficient number of certificates to the Regulator, the entity has a renewable energy certificate shortfall. This shortfall is determined by calculating the liable entity's amount of required renewable source energy for the year, and adding or subtracting any shortfalls or surpluses from the previous year, as well as any certificates surrendered to the Regulator. Any resulting number greater than zero is the renewable energy certificate shortfall; any result less than zero is a carried forward surplus.[145] The entity is liable to pay a renewable energy shortfall charge,[146] calculated as the amount of the shortfall multiplied by the rate of charge specified in s 6 of the *Renewable Energy (Electricity) (Charge) Act 2000* (Cth) (currently A$40 per mW).[147] This penalty is not linked to inflation, and will thus require regulatory amendment as the real value of the penalty decreases over time.

Renewable energy certificates may only be created by persons registered under s 10 of the *Renewable Energy (Electricity) Act 2000* (Cth). A registered person may apply to the Regulator for a particular electricity generation system that the person owns to become an 'accredited power station'.[148] A power station is eligible for accreditation if some or all of the power generated by the power station is generated from an eligible renewable power source, and if the power station satisfies the prescribed requirements.[149]

A registered person may create one certificate for each whole mW of electricity generated by an accredited power station, provided that the electricity

143 *Renewable Energy (Electricity) Act 2000* (Cth) s 39.
144 *Renewable Energy (Electricity) Act 2000* (Cth) s 39(2); *Renewable Energy (Electricity) Regulations 2001* (Cth) reg 23.
145 *Renewable Energy (Electricity) Act 2000* (Cth) s 38.
146 *Renewable Energy (Electricity) Act 2000* (Cth) s 36.
147 *Renewable Energy (Electricity) Act 2000* (Cth) s 37.
148 *Renewable Energy (Electricity) Act 2000* (Cth) s 13.
149 *Renewable Energy (Electricity) Act 2000* (Cth) s 14(2).

generated is above a historical baseline called the '1997 eligible renewable power baseline'.[150] This baseline has been introduced in order to ensure that certificates are only created for electricity generated from renewable sources that are new or additional to the amount of such electricity generated before the *Renewable Energy (Electricity) Act 2000* (Cth) came into effect. Pre-existing renewable generation assets (that is, those in commercial operation prior to 1 January 1997) will only be eligible to earn certificates from existing generation assets if they can demonstrate an increase in output from these existing assets above the 1997 eligible renewable power baseline.[151] The 1997 baseline for each power station is determined by the Regulator in accordance with the *Renewable Energy (Electricity) Regulations 2001* (Cth).

Renewable energy certificates must exclude from the calculations electricity that was generated using any energy sources that are not eligible renewable energy sources.[152] 'Eligible renewable energy sources' include hydro, wind, solar, bagasse co-generation, black liquor, wood waste, energy crops, crop waste, food and agricultural wet waste, and landfill gas.[153] Fossil fuels and waste products derived from fossil fuels are specifically excluded from the definition of eligible renewable energy sources.[154] A certificate is not valid unless the Regulator has registered it,[155] whereupon it can be traded.[156] The Regulator must be notified of each transfer of a certificate, and must alter the register of certificates accordingly.[157]

While it is too early to make a definitive assessment of the operation of the MRET, the ORER has reported the results of the first year of the scheme. Up to 18 February 2002, 659 805 renewable energy certificates had been created from generation in 2001. This was sufficient to meet the 2001 target of 300 000 certificates.[158] The difference of 359 805 certificates can be brought forward to meet the 2002 target of 1.1 million certificates. Different prices have emerged for certificates, depending on the source of the renewable energy. RECs for 'clean' renewable sources such as wind, sold for A$33–36 at the start of 2002. In contrast, there is less demand for 'dead koala' energy sourced from native forest biomass due to the negative public perception of this source, with early trades reportedly around A$25–28.[159] Prices for 'dead koala' energy sources, and

150 *Renewable Energy (Electricity) Act 2000* (Cth) s 18(1).

151 *Renewable Energy (Electricity) Act 2000* (Cth) s 18.

152 *Renewable Energy (Electricity) Act 2000* (Cth) s 18(4).

153 *Renewable Energy (Electricity) Act 2000* (Cth) s 17(1).

154 *Renewable Energy (Electricity) Act 2000* (Cth) s 17(2). See also *Renewable Energy (Electricity) Regulations 2001* (Cth) reg 12 for further exclusions.

155 *Renewable Energy (Electricity) Act 2000* (Cth) s 26.

156 *Renewable Energy (Electricity) Act 2000* (Cth) s 27.

157 *Renewable Energy (Electricity) Act 2000* (Cth) s 28.

158 David Rossiter, Regulator, Office of the Renewable Energy Regulator, '*Renewable Energy (Electricity) Act 2000*: An Update on Performance to Date' (Paper presented at the EcoGeneration 2002 conference, Sydney, 13–15 March 2002) 20, Office of the Renewable Energy Regulator <http://www.orer.gov.au/pubs/bioenergy.pdf> at 2 August 2002.

159 Koulja Coulston, 'Australia's 2% Obligation: First Year of Green Credit Trade Complete' (2002) 18(3) *Windpower Monthly* 36, 36.

renewable sources in general, rose in the month prior to the deadline for compliance, but did not reach the shortfall charge of A$40 per mW.

Thus, in contrast to the UK, there has been more than enough renewable energy available to meet the obligation set by legislation in Australia.[160] This may be due to the inclusion of hydro-electric facilities as eligible sources of renewable energy in the Australian scheme. The majority of certificates in Australia came from hydro-electricity (231 000), followed by solar hot water systems (158 000), and wind energy (102 000). Furthermore, the greatest number of applications for accreditation and successful accreditations have come from hydro-electric sources, as can be seen from Table 1 below.

TABLE 1: ACCREDITATIONS UNDER THE *RENEWABLE ENERGY (ELECTRICITY) ACT 2000* (CTH) AS AT 14 FEBRUARY 2002[161]

Eligible Renewable Energy Source	Number of Applications	Number of Accreditations
Hydro-electricity	67	64
Landfill gas	22	21
Photovoltaics	22	22
Bagasse	16	7
Wind	11	11
Wood waste	4	4
Other	8	7
TOTAL	**150**	**136**

While the MRET has encouraged the installation of new renewables facilities, some aspects of the MRET have already been criticised. Some have claimed that the aim of the *Renewable Energy (Electricity) Act 2000* (Cth) has been 'bastardised' by the definition of 'renewable energy' and the 1997 baseline, which have combined to allow renewable energy certificates to be surrendered by hydro-electric facilities existing prior to 1997, which are already competitive with fossil fuelled power stations.[162] However, the inclusion of hydro-electricity as an eligible source has avoided the situation in the UK where there is a significant shortfall of capacity to meet the obligation, putting upward pressure on prices towards the level of the buyout price. It may be that in Australia, as cheaper renewables options are exhausted, the price will rise over the years. However, it is too early to predict the price effects with certainty.

The level of the MRET has also come under early criticism. The target set for extra renewables of 9500 gWh by 2010 equates to a two per cent target increase

160 Ibid.

161 Rossiter, above n 158, 10.

162 Coulston, above n 159, 37.

since 1997, based on a forecast of estimated Australian electricity generation by 2010. However, more recent estimates of future electricity consumption estimate the 9500 gWh target will represent an increase in renewables of only 0.5 per cent to 2010.[163] This has raised the question whether the costs of complying with the MRET will be justified in order to deliver only a 0.5 per cent increase in market share for renewables.

The *Renewable Energy (Electricity) Act 2000* (Cth) is set to be reviewed in April 2003, two years after it came into operation. Issues likely to be addressed in the review include: increasing the MRET (to at least 5 per cent); raising the penalty for non-compliance; linking the penalty to the consumer price index; and rewriting the 1997 baseline to exclude power from existing hydro-electric dams.[164]

However, the MRET is not the only initiative currently operating in Australia to encourage the generation of electricity from renewable sources.

2 *Financial Incentives*

The federal government has recently introduced several financial schemes to promote the use and development of renewable energy technologies.[165] In particular, the government has introduced two major programs offering financial incentives to consumers in the form of cash rebates for the installation of renewable energy generating technologies in order to encourage the production of electricity by renewable energy. These are the Photovoltaic Rebate Program ('PVRP'), and the Renewable Remote Power Generation Program ('RRPGP').

The PVRP was introduced in January 2000. Federal funding of A$31 million has been made available over four years to fund cash rebates to householders and community groups who install approved, grid-connected or stand-alone photovoltaic systems. The States administer the program on behalf of the Commonwealth.[166]

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163 Ibid 36.

164 Ibid 38.

165 These include the Renewable Energy Equity Fund ('REEF'), the Renewable Energy Commercialisation Program ('RECP'), the Renewable Energy Industry Program ('REIP') and the Renewable Energy Showcase ('RES'). For information on these programs, see Australian Greenhouse Office, *Renewable Energy Equity Fund (REEF)* (2002) <http://www.greenhouse.gov.au/renewable/renew4.html> at 19 November 2001; Australian Greenhouse Office, *RECP – Supporting Renewable Energy Industry Development Activities* <http://www.greenhouse.gov.au/renewable/recp/support.html> at 19 November 2001.

166 For information on the program in various States and Territories, see: New South Wales Sustainable Energy Development Authority, *Cashback Offer: Up to 50% Cashback on Solar Power Systems in NSW* <http://www.SEDA.nsw.gov.au/ren_cashbackoffer_body.asp> at 7 August 2002; Queensland Environmental Protection Agency, *The Photovoltaic Rebate Program (PVRP)* <http://www.epa.qld.gov.au/sustainable_energy/rers/pvrp.htm> at 7 August 2002; Sustainable Energy Authority Victoria, *Photovoltaic Rebate Program (PVRP)* (2001) <http://www.seav.vic.gov.au/renewable/PV/rebate/pvrebate.html> at 19 November 2001; Energy South Australia, *Regional and Remote Areas PVRP* <http://www.sustainable.energy.sa.gov.au/dhtml/ss/section.php?sectID=75&tempID=5> at 7 August 2002; Environment ACT, *Photovoltaic Rebate Program* (2000) <http://www.environment.act.gov.au/ie4/airandwater/photovoltaicrebateprogram.html> at 7 August 2002; Northern Territory Department of Mines and Energy, *Photovoltaic Rebate Program* <http://www.dme.nt.gov.au/dmemain/energy/renewables/renewable4.html> at 7 August 2002.

Rebates for new residential systems of a minimum system size of 450 Watt peak ('Wp') output are available at a rate of A$5 per Wp of photovoltaic capacity up to a maximum of A$7500, while rebates for extensions of existing systems are available at a rate of A$2.50 per Wp up to A$2500. From July 2000, rebates became available to owners of community buildings such as schools. To be eligible for a rebate, community organisations must be government-owned or nonprofit organisations that undertake ongoing solar electricity education, extension, promotion, interpretation and/or demonstration activities that support the aims of the program. Community rebates for new systems are available at a rate of $5 per Wp of photovoltaic capacity up to a maximum of A$10 000, while rebates for extensions of existing systems are available at a rate of $A2.50 per Wp up to A$2500. The minimum system size is, again, 450 Wp.[167]

In addition to the PVRP, the RRPGP provides support for the conversion of diesel-based electricity supplies to renewable energy technologies, with up to A$264 million available over the four year life of the program. The funds, made available to States and Territories from July 2000, are used to provide a rebate for the installation of remote area power supplies. To be eligible for the rebate, installations must replace diesel with renewable energy for all or part of the energy source for off-grid installations. The rebate is also available for new installations where it can be shown that the fuel would otherwise have been diesel. The RRPGP may provide support for up to half of the capital cost of a renewable energy installation. This can include generating equipment, enabling equipment, and essential non-equipment such as installation costs. As with the PVRP, the RRPGP is administered by the States on behalf of the Commonwealth.[168]

The effectiveness of these recently introduced financial schemes has not yet been studied. On the one hand, they can be criticised on the grounds that there has been no attempt to coordinate their implementation with that of the regulatory system established under the *Renewable Energy (Electricity) Act 2000* (Cth), so as to produce a coherent government policy on the promotion of renewable energy for electricity generation in Australia. They are simply an ad hoc response to political pressure to support the photovoltaic manufacturing industry and the use of renewable energy in remote areas. On the other hand, the

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167 Australian Greenhouse Office, *Photovoltaic Rebate Program* (2002) <http://www.greenhouse.gov.au/renewable/rrpgp/index.html> at 19 November 2001.

168 Australian Greenhouse Office, *Supporting the Use of Renewable Energy for Remote Power Generation: Renewable Remote Power Generation Program* <http://www.greenhouse.gov.au/renewable/rrpgp/index.html> at 18 July 2002. The implementation details of the scheme differ between the various States. For more information on the program in various States and Territories, see: Queensland Environmental Protection Agency, *Renewable Remote Power Generation Program (RRPGP)* <http://www.epa.qld.gov.au/sustainable_energy/rers/rrpgp.htm> at 7 August 2002; Queensland Environmental Protection Agency, Working Property Rebate Scheme <http://www.epa.qld.gov.au/sustainable_energy/rers/wprs.htm> at 7 August; Energy South Australia, *Regional and Remote Areas RRPG* <http://www.sustainable.energy.sa.gov.au/dhtml/ss/section.php?sectID=77&tempID=10> at 7 August 2002; Sustainable Energy Development Office, Government of Western Australia, *Renewable Remote Power Generation Program* <http://www1.sedo.energy.wa.gov.au/rrpgp.asp> at 7 August 2002; Northern Territory Department of Mines and Energy, *Renewable Energy Rebate Program* <http://www.dme.nt.gov.au/dmemain/energy/renewables/renewable3.html> at 7 August 2002.

schemes respond to social and environmental needs and, within their limited scope, support the transition to renewable energy.

The notion of combining regulatory measures with financial incentives has long been advocated as an appropriate way to promote renewable energy technologies. Regulations ensure that a minimum level of response to government initiatives is obtained, while incentives encourage targeted groups to go beyond the prescribed minimum. This is sometimes referred to as the 'carrot and stick' approach to reform. It has been proposed in other contexts in the promotion of renewable energy and energy efficiency,[169] and its use in the present context is quite appropriate.

B State Government Initiatives

In some States, federal initiatives supporting electricity produced from renewable sources have been supplemented by additional legislative and fiscal measures. Consistent with differing political attitudes towards energy policy and renewable energy resources, these mechanisms differ between the jurisdictions. It is beyond the scope of this article to examine all these initiatives, which include both financial and non-financial measures. Examples of non-financial initiatives introduced through legislation include: guaranteeing access to the grid for renewable generators on a non-discriminatory basis;[170] prohibiting retail sellers from engaging in price discrimination against purchasers of electricity produced from renewable energy sources;[171] and other miscellaneous provisions, such as imposing a condition on each retail supplier's licence requiring the licensee to develop 'strategies for purchasing energy from sustainable sources'.[172]

One example of a financial mechanism is the New South Wales Rebates for Solar Power Scheme, which provides funding to assist the installation of building-integrated photovoltaic systems.[173] This scheme boosts the federal PVRP by offering householders who install new systems A$2.40 per W for installed capacity above 1.5 kW, up to a maximum of 5 kW. The scheme also offers a rebate of A$2.40 per W for eligible systems not covered by the PVRP.[174] Additionally, the NSW government has also provided funding for three large-scale, grid-connected photovoltaic installations.[175]

Another example of a State initiative is the Western Australian scheme to fund grants to independent renewable power producers by matching customer

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169 See, eg, Adrian Bradbrook and Alexandra Wawryk, 'Legislative Implementation of Financial Mechanisms to Improve Motor Vehicle Fuel Efficiency' (1998) 22 *Melbourne University Law Review* 537, 541–2.

170 *Electricity Distribution Access Order 2001* (WA) s 6, made under the *Electricity Corporation Act 1994* (WA) s 93(1); *Electricity Act 1994* (Qld) ss 32(1), 35, 43(1), 44.

171 *Electricity Supply Act 1995* (NSW) s 35(1); *Utilities Act 2000* (ACT) s 102.

172 *Electricity Supply Act 1995* (NSW) sch 2, para 6(4)(c)(ii).

173 The Queensland government also offers a solar hot water rebate scheme: Queensland Department of Mines and Energy, *Solar Hot Water Rebate Scheme* <www.env.qld.gov.au/cgi-bin/w3-msql/sustainable_energy/msqlwelcome.html> at 19 November 2001.

174 New South Wales Sustainable Energy Development Authority, *Cashback Offer*, above n 166.

175 New South Wales Sustainable Energy Development Authority, *Renewable Energy & Cogeneration: Photovoltaics* <http://www.SEDA.nsw.gov.au/ren_photovoltaics_body.asp> at 19 November 2001.

premiums collected from the sale of 'green' power schemes.[176] The matching funds are paid on a dollar for dollar basis at the rate of 3 cents per kW, up to a maximum of one million dollars per annum over the first five years of the program. The fund is used to support the establishment of renewable energy sources by independent power producers through the allocation of grants ranging between $10 000 and $50 000 for research, demonstration and education programs supporting the use of renewable energy and/or promoting energy efficiency. These grants are allocated on a competitive bidding basis.[177]

These State initiatives have been adopted independently of the Commonwealth government reforms. Constitutionally speaking, it is quite appropriate for the States to intervene in this area, as they possess the basic powers over intrastate energy trading under the terms of the *Australian Constitution*. The initiatives can also be supported on the basis that any measures for the promotion of renewable energy for electricity generation are welcome on environmental grounds. Nevertheless, in comparison with the Commonwealth initiatives discussed above, state powers are very limited in their scope and application, and are most unlikely to have any major impact on the switch to renewable energy for power production. If the States wish to supplement the Commonwealth measures, it would seem appropriate for the current miscellaneous measures to be replaced by harmonised and coordinated schemes. This should be the subject of discussion at a future meeting of the Council of Australian Governments.

V EVALUATION: WHICH WAY FORWARD FOR AUSTRALIA?

An ideological difference exists between those who view initiatives to promote electricity generation from renewable energy sources as unwarranted government intrusion in the electricity market, and those who view such initiatives as necessary in the public interest. We believe that government intervention *is* required to ensure that all electricity supply companies take a minimum level of action in support of renewable energy resources. The question thus arises: what is the most appropriate form of intervention? This article has examined the main initiatives that governments in the US, UK and Australia have adopted to encourage the generation of electricity from renewable energy sources, including the American mandatory purchasing requirements, the British NFFO, RPS systems, net metering and PBFs.

A major question is whether the Australian federal government has chosen the correct regulatory choice in focusing so strongly on the mandatory renewable energy target. Although it is too early to answer this question definitively by reference to the practical effectiveness of the *Renewable Energy (Electricity) Act*

176 Office of Energy, Government of Western Australia, *Green Power* (2001) (copy on file with authors). For a discussion of green power schemes see Blair Swezey and Lori Bird, *Green Power Marketing in the United States: A Status Report* (5th ed, 2000) <http://www.nrel.gov/analysis/emaa/brief_5.html> at 18 July 2002; Adrian Bradbrook, 'Green Power Schemes: The Need for a Legislative Base' (2002) 26 *Melbourne University Law Review* 15.

177 Office of Energy, Government of Western Australia, above n 176.

2000 (Cth) and the *Renewable Energy (Electricity) (Charge) Act 2000* (Cth), other options which would supplement rather than replace this system should be considered. In particular, the American system of net metering has attracted no significant criticism, and does not appear to present any insuperable barriers for adoption in this country. While some electricity retailers in Australia are voluntarily introducing net metering services for their customers,[178] the current Australian system would be improved if provisions making net metering mandatory were added to the Australian legislation. This could be achieved simply by adding a new part to the *Renewable Energy (Electricity) Act 2000* (Cth).

The MRET could also be supplemented by an expansion of the financial incentives available to producers and consumers of renewable energy. While a carbon tax may be the most economically efficient tool for correcting the failure of electricity prices to account for the environmental costs of fossil fuels, these taxes have proved extraordinarily difficult to introduce due to political considerations.

In general, consumer incentives have attracted far less debate and criticism than carbon taxes or forms of non-financial regulation. The existing Australian initiatives such as the PVRP and the RRPGP should be welcomed, and their terms amended to make them more generous. The federal government should also consider costing a PBF similar to the Californian model, in order to increase the funds that could be spent on consumer incentives, and research and development into renewable energy. Again, the changes would not involve legislative upheaval. A PBF could be implemented by adding a new part into the *Renewable Energy (Electricity) Act 2000* (Cth) pursuant to s 51(ii) of the *Australian Constitution* (the taxation power).

Production tax incentives may stimulate the development of a domestic manufacturing industry in renewable energy technologies, for example, in manufacturing wind turbines. Yet the experience of the US suggests that such incentives, which tend to run for relatively short-term periods (such as two years) and which rely heavily on political will, are subject to too much uncertainty to form a stable long-term base for investment in renewable energy technologies.

A second major question that arises is whether the Australian MRET system is more effective than the existing American mandatory purchasing requirements contained in *PURPA*, the US RPS system, the British NFFO, and the new UK Renewables Obligation. The problems associated with the NFFO,[179] which led to its eventual repeal, are sufficient to rule this system out of contention in Australia. Similarly, the mandatory purchasing provisions of *PURPA*, which have been marked for repeal in the US as they are inappropriate for competitive and deregulated electricity markets, should not be adopted in Australia.

In regard to the new US RPS, the UK Renewables Obligation and the Australian MRET, it is too early to draw firm conclusions as to which is the most

178 Office of Energy Policy, South Australia, *Electricity Authorities Allowing Grid-Connections* (2001) (copy on file with authors).

179 See above Part II(A).

effective mechanism for maximising the generation of electricity from renewable energy sources. However, a comparison of the systems can assist in determining how the Australian system may be improved in the future. The new renewable portfolio systems in the UK and US are closer to each other than the Australian MRET, although all three models have some differences. The key features of the three systems are summarised in Table 2, below.

As can be seen from Table 2, there are several differences between the American federal portfolio standard and the UK Renewables Obligations on the one hand, and the Australian MRET on the other. In contrast to Australia's MRET, the obligation to meet the minimum renewable energy generation requirement in the US and UK is placed specifically on retail sellers, not purchasers of wholesale electricity. Additionally, it is based on the electricity sold by the retail supplier to consumers, not on electricity purchased from wholesalers. Finally, it is calculated as a percentage of an individual entity's sales, not proportionately according to an entity's share of the nation's total wholesale electricity purchases.

The definition of 'eligible renewable energy' contained in the US *Energy Policy Act of 2002* can be contrasted with the British and Australian definitions, which are wider and more inclusive. One key difference in definition between Australia and the US on the one hand, and Britain on the other, is the treatment of existing large hydro-power stations. In Australia and the US, large hydro-power from 'existing' generating stations is an eligible source for renewable energy certificates/credits, if the hydro-power is generated from additional capacity added after the relevant legislation takes effect.[180] In the UK, electricity generated from large hydro-power stations existing prior to 1 April 2002 is ineligible for certificates, but electricity from large hydro-power stations commissioned after 1 April 2002 will be eligible.[181]

It can be argued that large hydro-power should be excluded from these schemes because it is already competitive with fossil fuels and has a comparatively high market share in relation to other renewables. It is also arguable that hydro-power has the potential to negatively impact on the environment, so it should be placed outside the definition of a renewable energy source. However, if all existing hydro-power stations are excluded, targets may be achieved through investment in renewables that have a higher financial cost. The exclusion of hydro-power may also lead to a shortage of capacity to meet the legislative requirements, forcing up the prices of renewables in general and the cost of tradable certificates. In Australia, the question whether hydro-power should continue to be an eligible power source under the *Renewable Energy (Electricity) Act 2000* (Cth) be considered when the legislation is reviewed in 2003. The authors believe that it is preferable that large hydro-power be excluded as an eligible power source. The majority of potential sites for this resource in Australia have been fully exploited, and the exploitation of the remaining sites

180 See above Part II(B)(1).

181 See above Part III(B).

TABLE 2: KEY FEATURES OF RENEWABLES OBLIGATIONS

	US: RPS	**UK: Renewables Obligation**	**Australia: MRET**
Liable entity	• Retail electric suppliers. • Each supplier is liable for obtaining the relevant percentage of their electricity supplies from renewable energy sources.	• Designated electricity suppliers. • Each supplier is liable for obtaining the relevant percentage of their electricity supplies from renewable energy sources.	• Wholesale electricity purchasers. • Purchasers are liable to meet the MRET according to their proportion of the nation's wholesale purchases of electricity.
Obligation/ Target	• One per cent of electricity supplies for the calendar years 2005 and 2006, rising to 10 per cent for 2019–20, and remaining at 10 per cent to 2030.	• Three per cent of electricity supplies from 1 April 2002 to March 2003, rising to 10.4 per cent in 2010, and remaining at 10.4 per cent to 31 March 2027.	• Additional 300 gWh across the nation in 2001, rising to an extra 9500 gWh in 2010 (ie 12.5 per cent of the nation's wholesale electricity purchases), and remaining at 9500 gWh to 31 March 2021.
Power source	• Defined as solar, wind, ocean or geothermal energy, biomass (including municipal solid waste), landfill gas, a generation offset, or incremental hydro-power.	• Defined as 'sources of energy other than fossil fuel or nuclear fuel'. • Legislation lists the facilities that are excluded. • Excludes hydro facilities of >40 mW capacity constructed prior to 1 April 2002.	• Specifies a very wide range of renewable energy sources. • Includes hydro-power.
Cut-off date for inclusion of generating stations	• Power must be generated from facilities placed in service after the law is enacted (excluding incremental hydro).	• Excludes generating stations commissioned before 1 January 1990.	• 1997 eligible renewable power baseline.
Cost caps	• Secretary of Energy to offer renewable energy certificates for sale at the lesser of 1.5 cents per kW or 200 per cent of the average value of credits.	• Buyout price of £30 per mW (3 pence per kW).	n/a
Penalties	• The lesser of 1.5 cents per kW or 200 per cent of the average value of credits.	n/a	• A$40 per mW of renewable energy shortfall (4 cents per kW).

has been the subject of considerable social unrest and environmental concern.[182] This can be contrasted with small-scale hydro-power projects, which utilise the run of the river and do not involve the creation of dams and land flooding. Such small-scale hydro-power is little used in Australia and should be exploited in the future.

A unique feature of the proposed US system is that it will allow certificates to be issued for generation offsets, that is, for reductions in power usage at facilities that use renewable energy. As a mechanism for encouraging energy conservation, the success of this feature should be monitored if the proposed *EPA* comes into force, to determine whether it should be introduced into the Australian scheme.

The cut-off date for the inclusion of renewable power generating stations as 'eligible' power stations also varies between the schemes. If the cut-off date is late (as in the US), more power must be generated from additional renewables facilities to meet the legislative requirements. If the cut-off date is early (as in the UK), more electricity produced from existing capacity is eligible to satisfy the legislative requirements. A later cut-off date should stimulate investment in additional renewable energy facilities. However, depending on the size of the target that must be met, a later date may lead to a shortage of eligible renewables to meet the requirements, due to a time lag between the start of the RPS and the date at which the new facilities are brought into service. A later cut-off date may also fail to take into account the fact that bringing additional capacity into service from existing renewables facilities may be a cheaper way to achieve the target. This is a major reason why the Australian legislation has a comparatively early cut-off date in that it allows certificates to be created for electricity generated from additional capacity added to existing facilities after 1997. It is submitted that the 1997 date achieves the desired balance between the need to maximise energy output and the need to encourage the installation of new renewable energy facilities.

The UK and US systems both provide a cost cap mechanism, which does not exist in Australia. In the US, this takes the form of purchasing renewable energy certificates from the Secretary of Energy.[183] In the UK, electricity suppliers may elect to pay the buyout price of £30 per mW without actually purchasing any tradable certificates. In the absence of a significant penalty for failing to meet the obligation, and with a shortage of renewables capacity in the UK forcing up the price of renewables towards the buyout price, an unintended consequence of the UK scheme could be that suppliers will pay money to discharge their obligation rather than trade in renewable energy certificates. Such a scheme of cost-capping appears undesirable. The purpose of the legislation is to encourage, to the greatest extent possible, the installation of new energy facilities. Any system that

182 The best-known illustration of this was the proposal in the early 1980s to dam the Franklin River in Tasmania. This led to Commonwealth intervention and an unsuccessful constitutional challenge before the High Court of Australia by the Tasmanian government: see *Commonwealth v Tasmania* (1983) 158 CLR 1.

183 See above Part II(B)(1).

allows suppliers to buy out their obligations is essentially defeating the desired goal.

The size of the target also differs between the systems. The US target is the least stringent, requiring a 10 per cent obligation by 2019 for retail electric sellers. This can be contrasted with the 10.4 per cent requirement for UK electricity sellers by 2010, and the target of 12.5 per cent for Australia's wholesale electricity purchases by 2010. As stated above, since electricity figures have been revised in Australia, the MRET has come under some criticism as likely to achieve only a 0.5 per cent increase in renewables (from 10.5 per cent to 11 per cent, not 12.5 per cent).[184] The magnitude of the target will need to be monitored in the coming years to ensure it is set at an effective level.

VI CONCLUSION

As with all energy issues, the practical implementation and efficacy of various reforms will determine their success. Like the Australian legislation, the current American and British legislative schemes are new and have no history from which their efficacy can be definitively judged. Similarly, it is too early to draw anything other than tentative conclusions about the Australian legislation. However, it is already clear that some issues should be raised when the *Renewable Energy (Electricity) Act 2000* (Cth) is reviewed in 2003. These include: increasing the MRET (to at least 5 per cent); raising the penalty for non-compliance; linking the penalty to the consumer price index; and rewriting the 1997 baseline to exclude power from existing hydro-electric dams. Aspects of the US system, such as the PBF and net metering, should also be considered for implementation in Australia. It is essential that a watching brief be kept on the practical implementation of the overseas models for the purposes of future reconsideration of our own legislation.

Although the success of the Commonwealth's reforms in the area of renewable energy has yet to be determined with certainty, the government can at least be congratulated for having taken decisive measures to increase the use of renewable energy resources in this country. In light of the dearth of legislative measures supporting sustainable energy solutions in the past, the fact that the government has finally chosen to enact comprehensive legislation in this field is an important step towards tackling the issue of climate change. Even if the *Renewable Energy (Electricity) Act 2000* (Cth) is later found to have significant flaws and to require amending legislation, the foundation for a fundamental shift in the fuel sources of electricity production has now occurred.

184 See above n 163 and accompanying text.