

**AUSTRALIA'S RENEWABLE ENERGY TARGET LEGISLATION:
THE *RENEWABLE ENERGY (ELECTRICITY) ACT 2000* (CTH)
EXAMINED BY A SOLAR FARMER**

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ABSTRACT

Australia has committed to tackle climate change in accordance with its international agreements as a member of the United Nations. This paper examines Australia's taxation legislation, enacted in response to its duty to reduce greenhouse gas emissions. Part of Australia's commitment to reduce greenhouse gas emissions, produced from the combustion of fossil fuels to generate electricity, was the enactment of the *Renewable Energy (Electricity) Act 2000* (Cth).

This paper focuses on the impact of the *Renewable Energy (Electricity) Act 2000* (Cth) on the electrical generation industry to dilute greenhouse gas emissions. In addition the research is supported from data provided by the Solex solar project, which receives economic benefits at the expense of the fossil fuelled electricity generators.

The paper views the trading market created by the economic process of creating, selling, purchasing and the surrender of 'carbon credits' to be a system of taxation and subsidisation by the Australian Government. In Australia such 'carbon credits' are referred as renewable energy credits (RECs).

The compulsory purchase and surrender of RECs by the fossil fuel based electricity generators – the liable parties or taxpayers, is considered to be 'a compulsory monetary contribution demanded by a government' – and therefore by definition, a tax.¹ Accordingly the fiscal benefit of the receipt of funds, from the creation and sale of RECs, by 'an accredited power station', is considered to be 'a grant by a government to a company, organisation, or individual, for which it receives nothing in return' – and therefore by definition, a subsidy.²

The aim of this paper is to develop a clear understanding of the operations of the *Renewable Energy (Electricity) Act 2000* (Cth); how it interacts with Australia's two other main taxes – Income Tax and Goods and Services Tax, and how the trade of RECs may be treated in the accounts of the respective trading entities – the liable parties and renewable energy based electricity generators.

1 Colin Yallop et al (eds), *Macquarie Concise Dictionary* (4th ed, 2006) 1255. In *Bartlett v Commissioner of Taxation; Falcetta v Commissioner of Taxation* [2003] FCA 1125 the Federal court considered the definition of tax as being that contained in s 995-1 of the *ITAA 1997* (Cth) which states:

tax means:

- (a) income tax imposed by the *Income Tax Act 1986*, as assessed under this Act; or
- (b) income tax imposed as such by any other Act, as assessed under this Act.

In simple terms the legislative definition of a tax means a tax, which is not overly helpful. This paper therefore prefers the *Macquarie Dictionary* definition which is very similar to that of Peter Butt, et al (eds), *Butterworth's Concise Australian Legal Dictionary* (3rd ed 2004) 423. It is noted that the Butterworth's refers to *Matthews v Chicory Marketing Board (Vic)* (1938) 60 CLR 263 to support its definition.

2 Ibid, 1220.

I INTRODUCTION

The purpose of this paper is to outline the functions of Australia's current carbon tax legislation – the *Renewable Energy (Electricity) Act 2000* (Cth) (REE Act). It provides background and context as to why the legislation was enacted, how it operates, and how it interacts with Australia's two major taxes, income tax and the consumption based goods and services tax.

The research supporting this paper is a case study based on the operations of the Solex Carnarvon Solar Farm project which has been in operation since 25 August 2005. The Solex project is a Clean Energy Regulator accredited renewable energy generator, and is registered to create and trade renewable energy credits (RECs) under the REE Act. In addition to selling RECs, created from its own generation of renewable energy, Solex also creates, purchases, and sells RECs on behalf of others as an accredited agent.

This paper reveals how the provisions of the REE Act impact on the sustainable development framework, known as the triple bottom line. Its aim is to reduce greenhouse gas emissions³ caused from the combustion of fossil fuel for energy generation.

The paper considers the provisions of the REE Act are a carbon tax and trading regime. It demonstrates how the Australian carbon trading system acts as a taxation and subsidisation system. It notes that the controlling administrator in Australia is the Australian Government through the office of the Clean Energy Regulator.

As an indirect taxation system impacting upon most generators of electricity in Australia, (and subsequently, the broader Australian population as electricity consumers connected to main supply networks), it is surprising that such a significant financial impost appears to be little understood, and generally unknown, by Australian society.

Furthermore, the author's experience acquired from having been engaged in renewable energy generation since 2005, is that it is evident that little is known of the provisions of the REE Act within the accounting and taxation professions. Involvement in, and exposure to, the renewable energy industry, and its relationship with the fossil fuelled based energy generators, has provided an insight into potential accounting conundrums for income and goods and service tax compliance processes.

This paper seeks to fill the gap in that professional and academic knowledge, and to inform the broader academic community of how tax is levied on fossil fuel energy generators in an attempt to reduce greenhouse gas emissions in Australia. It also aims to dispel a generally accepted myth that Australia's only carbon tax was that enacted by the Gillard ALP government in 2011, and repealed by the Abbott Liberal government in 2014.⁴

Despite the repeal of the *Clean Energy Act 2011* (Cth), this paper also considers how it and REE Act have worked as punitive taxes to reduce greenhouse gas emissions. To do so, the paper looks at Australia's global position as a greenhouse gas emitter, as well as the nation's electricity consumption, and its rate of greenhouse gas emissions, on a per capita basis. It

3 The most significant greenhouse gas being carbon dioxide (CO₂) as referred to in Figure 2.

4 *Clean Energy Act 2011* (Cth).

illustrates how electricity consumption has been influenced by variations in the renewable energy certificate market trading prices (the REE Act tax rate) and the more direct, carbon tax.

Finally the paper provides examples of accounting entries for fossil fuel based energy generators, and renewable energy generators, to account for the transactions associated with the carbon trading system. It suggests an accounting formula to quantify the economic cost of the carbon tax on consumers.

The paper concludes that, despite the operations of the REE Act being little known, or understood, by Australian accounting and taxation professionals, parliamentarians and society generally, the taxation and subsidisation regime works effectively, and has had a considerable influence on the reduction of greenhouse gas emissions by the Australian electrical generation industry.

The paper firstly examines how the tax rate of the REE Act is set through the application of a renewable energy target (RET); it looks at the relevant taxing, subsidisation sections of the legislation; how it functions; how it relates to Australia's major income and consumption taxing systems; how the legislation is placed within the concept of the sustainable development framework (the triple bottom line (TBL)); and how the carbon credit trading transactions are accounted for.

It now considers previously published literature to place the research supporting this paper within the framework of existing research on the Australian RET and the REE Act. It also contains a brief overview of the United States and European models.

II LITERATURE REVIEW

The overarching paradigm of this paper is that of a sustainable development framework, wherein the three pillars of the TBL function in harmony. Hardisty observes that

[t]he stated goal of almost every national government the world over is now economic development, led by increased industrialization, access to resources, energy, and the benefits of modern technology.

But, there has been a price. As industrial development has grown, so has the state of the global environment suffered – and with environmental degradation has also come human consequences; displaced peoples, ruptured cultures, loss of traditional places and values, health impacts, death. Indeed, as the population of the planet continued to grow, and the overall level of development and industrialization has accelerated, so have the environmental and social costs multiplied.⁵

The paradox of economic development at the expense of, and often in conflict with, the interests of the natural environment and the welfare of human society forms a common feature of this literature review.

This review firstly examines Australia cases which have focussed on the provisions of the REE Act. It then considers previously published literature to provide a framework for the discussion and conclusions of the paper.

5 Paul Edward Hardisty, *Environmental and Economic Sustainability* (2010) 9-10.

Litigation

A search of the records of the High Court of Australia failed to reveal any cases to date of litigation which has focused on the REE Act.⁶ Five cases involving the REE Act were found to have been litigated in the Federal Court:

Re Bamboo Direct Pty Limited (in liq) [2016] FCA 264 – as to the ownership of small technology certificates (STCs) by a trustee of an enterprise in bankruptcy proceedings. This case did not require examination of the REE Act but was a determination of the trustee’s right to create and dispose of STCs for the benefit of creditors;

Clean Energy Regulator v MT Solar Pty Ltd (No 3) [2013] FCA 1326 – as to the recovery of the regulator’s costs incurred in a matter relating to the prosecution of an unregistered person;

Re Enviro Friendly Products Pty Ltd (In Liq) [2013] FCA 852 – as to the ownership of small technology certificates by a trustee of an enterprise in liquidation. The findings in this case were referred to in *Re Bamboo Direct Pty Limited* above;

Clean Energy Regulator v MT Solar Pty Ltd [2013] FCA 205 – as to the creation of renewable energy credits in contravention of s 24B of the REE Act. It was found that the installer of solar photovoltaic installations was not properly licensed or accredited to do so. Therefore it was found the registration of renewable energy credit certificates for the relevant installations was not valid. The findings in this case were related to *Clean Energy Regulator v MT Solar Pty Ltd (No 3)* above; and

Pacific Hydro Limited & Ors v Office of the Renewable Energy Regulator [2006] FCAFC 39 – as to the Clean Energy Regulator’s establishment of a baseline to determine the additional volume of renewable (hydro) energy after the implementation of the REE Act in 2000, to a hydro-electricity power station constructed prior to 2000. The calculation method used to determine of the generational capacity before and after 2000 directly related to the volume of eligible renewable energy certificates that can be registered from that energy source at that plant.⁷

It has been found that RECs are assets capable of being disposed of by a trustee in bankruptcy proceedings for the benefit of creditors.⁸ It has also been found that for the creation of RECs to be valid the installer of a renewable energy generation system must be a ‘fit and proper person’ within the meaning reg 3L of the *Renewable Energy (Electricity) Regulations 2001* (Cth). In the case of *Clean Energy Regulator v MT Solar Pty Ltd*⁹ it was found that the installer was not properly licensed or accredited and therefore the RECs created by a third party were invalid. Further it was held that the creator of the invalid RECs had done so fraudulently.

The findings in the case of *Pacific Hydro Limited & Ors v Office of the Renewable Energy Regulator*¹⁰ were as to the regulator’s determination of the generation capacity of a renewable energy power station in 1997 to establish a ‘baseline’ for renewable energy generation.

6 Commonwealth of Australia, *Cases* (2010) High Court of Australia
<<http://www.hcourt.gov.au/search?q=Renewable+Energy+%28Electricity%29+Act>> at 17 October 2016.

7 *Renewable Energy (Electricity) Act 2000* (Cth) ss 14, 18.

8 *Re Bamboo Direct Pty Limited (in liq)* [2016] FCA 264; and *Re Enviro Friendly Products Pty Ltd (In Liq)* [2013] FCA 852.

9 [2013] FCA 205.

10 [2006] FCAFC 39.

Renewable energy generated by a power station using generation capacity installed prior to 1998 is ineligible for the creation of RECs.

This paper focuses on marketing of RECs, created by accredited renewable energy power stations, and the purchase of those RECs by liable parties to avoid penalties levied on the generation of electricity using a fossil fuel source. Therefore the Federal Court cases are ancillary to the creation and trade of RECs but are not within the scope of this examination.

Published Literature

The first Australian government commissioned report after the introduction of the REE Act, in 2000, was the Energy Market Review Committee of 2002 'Parer Report'.¹¹ That report recommended scrapping a renewable energy target in favour of developing natural gas exploitation to reduce atmospheric carbon emissions.

It is noted that only the academic member of the Parer committee was a senior consultant to the petroleum industry and an academic from the School of Oil and Gas Engineering at the University of Western Australia, therefore the recommendation is not surprising.

However that recommendation was not acted upon, and in 2003, the Australian government commissioned a further report on the operations of the REE Act. The review was conducted by a committee appointed by the Australian Greenhouse Office and became known as the 'Tambling Review'.¹²

The report was written in the context of the RET¹³ and the shortfall charge rate prevailing in 2003. The RET was 20 000 GWh of renewable energy generation by 2020 and the shortfall penalty charge was \$A40.¹⁴ Therefore the concluding estimates and predictions of that report are not in accordance with the current RET of 33 000 GWh, and the shortfall penalty charge of \$A65¹⁵ in 2016.

This paper uses similar principles to calculate the benefit of avoided income tax to estimate the market value of RECs (in 2016 referred to as large generation certificates (LGCs)) but suggests a very different estimated market value than the estimated \$A45 for 2016 stated in the Tambling Review.¹⁶ Accordingly changes in RET and the shortfall penalty charge have been encompassed in this paper.

11 Energy Market Review Committee, Commonwealth of Australia, *Towards a Truly National and Efficient Energy Market* (2002) < <http://www.efa.com.au/Library/ParerFinRpt.pdf> > at 3 December 2016. (Parer Report).

12 Mandatory Renewable Energy Target Review Committee, Parliament of Australia, *Renewable Opportunities: A Review of the Operation of the Renewable Energy (Electricity) Act 2000* (2003) (Tambling Review).

13 Prior to the enactment of the *Renewable Energy (Electricity) Bill 2009* (Cth) Australia's Renewable Energy Target (RET) was known as the Mandatory Renewable Energy Target (MRET), for simplicity only the term RET is used in this paper.

14 *Renewable Energy (Electricity) (Charge) Act 2000* (Cth) s 6.

15 *Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act 2000* (Cth) s 6; *Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act 2010* (Cth) s 6.

16 Tambling Review, above n 11, xxii.

The review has 30 recommendations primarily as to the continuance of the RET and recognised sources of renewable energy. Whilst a recommendation was made as to the sizes of solar pv installations for the creation of RECs, solar pv as an energy source was generally overlooked. In 2003, the committee was not to foresee the popular acceptance of dispersed, embedded, solar pv installations and the consequential substantial fall in installation costs.

This paper is based on data collated from a solar pv installation, the Solex Carnarvon Solar Farm, which tends to deviate from the findings of the review. However a common key finding of the review, and this paper, is that the trading price of RECs rises near to, but does not exceed, the tax-effective value of the purchase price of a REC compared to the non-tax deductible shortfall penalty charge. (In 2016 - \$92.86)

While the Tambling Review is comprehensive it does not attempt to suggest an accounting treatment for the creation, trade and surrender of RECs. Part VIII of this paper suggests how the creation, trade and surrender of RECs might be dealt with in the accounts of both enterprises which created RECs and the liable energy generators which surrender them in place of paying the shortfall penalty charge incurred from the generation of electricity using fossil fuelled generators.

The Tambling Review has since been considered by a number of researchers: Kent and Mercer (2006);¹⁷ Kelly (2007);¹⁸ Jones (2009);¹⁹ and Simpson and Clifton (2014).²⁰ Their findings have been selected in this literature review as indicative of the scope of previous research in this area. Also of significance to this paper is that the publications cover the period of the operations of the Solex Solar Farm, 2005-16, that underpins the research supporting the findings of this paper.

It was found that despite the broad scope of published literature the researchers tend to focus on the structure of RET itself and the principles of the operations of the RET. They consider how the RET is based to encourage the development of renewable energy, to reduce CO₂ emissions, rather than develop an economic examination of the fiscal impacts of the RET.

This paper considers the economic market forces of supply and demand of RECs as the primary determinant of REC market prices. It considers that the RET may well influence demand, and ceiling prices, but it is not the sole determinant of day-to-day trading prices. As with the Parer Report, Kent and Mercer conclude that the Tambling Review may not have been entirely independent. They suggest that a missing perspective is that of an independent judiciary. They state that

It would be interesting, for example, to see how the courts would interpret ‘ecologically sustainable’ vis-

17 Anthony Kent and David Mercer, ‘Australia's mandatory renewable energy target (MRET): an assessment’, (2006) 34 *Energy Policy* 1046.

18 Geoff Kelly, ‘Renewable Energy Strategies in England, Australia and New Zealand’, (2007) 38 *Geoforum* 326.

19 Stephen Jones, ‘The Future of Renewable Energy in Australia: A Test for Cooperative Federalism?’ (2009) 68 *Australian Journal of Public Administration* 1.

20 Genevieve Simpson and Julian Clifton, ‘Picking Winners and Policy Uncertainty: Stakeholder perceptions of Australia’s Renewable Energy Target’, (2014) 67 *Renewable Energy* 128.

à-vis wind energy developments. However, at this stage of the debate the overall adjudicator is the ruling conservative administration in Canberra that has sent a very strong signal that it favours a 'business-as-usual' approach to Australian energy policy.²¹

Kent and Mercer describe how the market in RECs functions, and note the shortfall penalty charge of \$40, but do not attempt to evaluate the market price or the process of accounting for the transactions. This paper aims to provide an accounting process to be used by the parties engaged in REC trading transactions.

In addition to his examination of the Tambling Report, Kelly also refers to the Parer Report of 2002, but only to note that

The MRET [Mandatory Renewable Energy Target] program had been only briefly in existence when it was subject to a government review, the 'Parer Inquiry' of 2001 [sic], which recommended termination of the MRET among other schemes and replacement with an emissions trading system. The recommendation was not adopted, but caused significant disquiet among RE [renewable energy] investors regarding future government policy.²²

Kelly identified the existence of a REC market, which was established by concept of the RET, and its enabling legislation the REE Act. He notes its significance in encouraging the development of renewable energy generation infrastructure. However, other than note that '[l]iable parties who did not fulfil their obligations faced a penalty or buyout payment of A40/MWh,' and '[t]he penalty payment is non deductible for tax purposes and hence its effective value depends on the corporate tax rate of the time', he makes no attempt to provide an economic evaluation to set the market price of RECs.

This paper considers the economic factors of supply and demand on the establishment of a REC trading price, as well as noting the limiting factor of the value of the shortfall penalty charge in establishing a ceiling on that market price.

It is noted that a lack of understanding of renewable energy generation may have influenced the outcomes of the Parer and Tambling reviews. It is possible that the composition of the boards may have influenced the philosophies and attitudes towards the adoption of renewable energy generation.

Of the panels of both committees, Oliphant,²³ of the Tambling Review, was the only member with an academic sustainability development background. It is also noted in this review that Oliphant appears to dissent with the general recommendations of the Tambling Review as to the adoption of renewable energy generation.

Since 1997, changes in political philosophies as to attitudes towards climate change, and means of addressing rises in atmospheric pollution, make economic predictions of the financial impacts of the RET difficult, if not impossible.

21 Kent and Mercer, above n 17, 1059.

22 Kelly, above n 18, 331.

23 Monica Oliphant is an experienced research scientist with expertise in renewable energy and specialises in solar energy, as well as improving energy efficiency and reducing greenhouse emissions. She has a master's degree in physics from the University of London and worked for almost 20 years as an energy research scientist for the Electricity Trust of South Australia. She is also an adjunct associate professor at the University of South Australia.

Simpson and Clifton conclude that ‘uncertainty within the policy environment remains the key threat to meeting the RET scheme Target. This uncertainty is felt through the unknown interaction between the RET and the carbon pricing mechanism.’

They also point ‘to the necessity of ensuring a set GWh [energy production] target for the RET, and providing confidence to investors that this will not be amended, regardless of future potential review processes, cannot be overstated.’²⁴

Jones concludes that

The stalling of the development of the renewable energy industry provides evidence of the impact of government policies in the Australian context. Over the 1997–2007 decade the lack of coordination between the federal and state governments resulted in a mixture of renewable energy targets and uneven development of the renewable energy industry.

He points out that

The policy measures introduced in 1997 promised a cooperative approach and provided important opportunities for the Australian renewable energy industry. The implementation of these measures was somewhat disappointing both in terms of policy outcomes and the future contribution of the industry to the reduction of GHG emissions from the stationary energy sector.

Generally it appears that despite Australia being the first country in the world to introduce a mandatory renewable energy target²⁵ it has fallen far behind other nations in realising the goal of making significant physical progress towards combating greenhouse gas emissions from fossil fuel sourced electricity generation.²⁶

Oliphant concludes that ‘[a]lthough our responsibility for 1.2 per cent of global [greenhouse gas] emissions seems small, it is not. In both gross emissions and emissions per capita, Australia is in the world’s top 10 per cent’.²⁷ In fact Figure 1 reveals Australia to be the highest emitter of greenhouse gases per capita of all of the OECD nations.

International Overview

To provide a brief international comparative of Australia’s RET, and its enabling legislation, the following published research from the United States and Europe is examined.

In the US REC trading is conducted at a state level. In 2002, Berry investigated the renewable energy certificate trading market standards of ‘[s]everal [US] states [which] have adopted renewable energy portfolio standards including Arizona, Connecticut, Hawaii, Maine, Massachusetts, Nevada, New Jersey, Pennsylvania, Texas and Wisconsin.’²⁸

24 Simpson and Clifton, above n 20, 134.

25 Kent and Mercer, above n 17, 1046.

26 Monica Oliphant, ‘Australia’s Emissions Contribution: Does It Matter?’ in John O’Brien (ed), *Opportunities Beyond Carbon: Looking forward to a sustainable world* (2009) 317.
<<http://search.informit.com.au/documentSummary;dn=231651766486097;res=IELBUS>> at 5 December 2016.

27 Ibid, 328.

28 David Berry, ‘The market for tradable renewable energy credits’ (2002) 42 *Ecological Economics* 369, 369
<<http://www.sciencedirect.com/science/article/pii/S0921800902001283>> at 6 December 2016.

He concludes there are four key considerations in designing and implementing a tradeable renewable energy credit program, termed renewable portfolio standards (RPS).

First, market forces will tie the price of tradable [sic] credits to the cost difference between generating electricity from renewable resources and generating electricity from conventional resources. The costs of renewable energy generation are expected to fall and the market price of conventional energy could fluctuate. Thus, future credit prices are uncertain.

Second, successful navigation of the market requires that exposure to risks associated with imperfect information, opportunism, and poor performance be analyzed and managed. Participants in an emerging market must create choices and evaluate alternatives to manage the risks of imperfect information and to blunt the incentives of others to be opportunistic or to perform poorly. Risks associated with imperfect information, poor performance, and opportunism are partly managed through contractual relationships addressing pricing, assurance of performance, and the term of the contract. As buyers and sellers in tradable credit markets engage in disputes or encounter damaging risks that have not been well managed, contractual features can be expected to change to deal with evolving exposure to imperfect information, opportunism, or poor performance.

Third, the regulator must manage risks associated with the ownership and validity of the credits being traded through development of clear definitions of buyers' and sellers' rights and responsibilities, and enforcement of those rights and responsibilities.

Fourth, tradable renewable energy credits are not necessary to implement a RPS, but tradable credits do offer retail electric utilities an additional option for complying with the portfolio standard and thus may help lower the costs of complying with the standard.²⁹

In Australia the first consideration has begun to impact on the renewable energy generation industry in particular as to the construction of solar pv installations. It is noted that earlier Australian Parliamentary reviews tended to overlook the significance of solar pv electrical generation as at the time wind energy resources appeared to be most prevalent and cost effective.

The focus of renewable energy generation of this paper is solar pv generation and Berry's first factor is particularly relevant in this examination.

Despite the lack of an established market place for REC trading in Australia the concept of RECs being a derivative commodity for financial speculation exists. Many registered owners of Australian RECs have no intrinsic interest in the commodity other than for financial speculation of fluctuating market prices.

Berry's third consideration is managed by Australia's Clean Energy Regulator and the litigation examined above relates to the ownership and validity of RECs registered under the provisions of the REE Act.

Finally, it appears that Berry's fourth consideration is the substitution of surrendering RECs in lieu of paying the shortfall penalty charge (carbon tax) levied by the provisions of the REE Act. That consideration is the central focus of this paper.

Mack and others examined the state renewable energy certificate programs of California, Connecticut, Massachusetts, New Jersey, North Carolina, Ohio, Pennsylvania and Texas. They conclude that, as in Australia some states became frustrated with a lack of active

²⁹ Ibid, 377-8.

Federal participation in developing or encouraging renewable energy infrastructure. Some US states therefore created their own state RPS programs.

RECs have been created by states, in part, to allow developers of renewable energy facilities to realize monetarily the environmental benefits inherent in renewable energy generation. Many states have understandably chosen to impose in-state generation requirements on RECs used to qualify with such states' RPS regimes, in an effort to promote the myriad benefits of renewable energy development within state lines.³⁰

However

By geographically limiting qualifying RECs in this way, however, states that have adopted in-state generation requirements have (perhaps unintentionally) created small, disparate markets in RECs and have also impacted the ability of renewable energy projects to obtain price transparency in regional markets, all of which ultimately increases the net cost to produce (and ultimately the cost to utility ratepayers) of renewable energy. Such price volatility and variability will ultimately reduce the amount and efficiency of renewable energy projects and transactions in any given state market.³¹

In Australia the only REC registration and trading system through the generation of renewable energy is that established nationally under the provisions of the REE Act. Therefore the complexities encountered in the US described by Berry and Mack and others are not relevant to Australia at this time.

However some Australian states, chiefly New South Wales and Victoria do have 'energy efficiency certificates' (ESCs in NSW, REES in South Australia and VEECs³² in Victoria) created from accredited energy saving operations (method 3 in Figure 2). Both ESCs and VEECs are traded nationally, but South Australian REES are traded for discounts for installation of energy efficient infrastructure such as water saving devices and the like.

Unlike the US REC trading is conducted at an international level. Delimatsis examines the European model of trading RECs across national borders. He describes the REC creation and trading system adopted by participating member nations, and indicates that 'RECs can be bought in order to comply with the imposed demand, that is, the minimum quota obligation relating to renewables that the government has stipulated.'³³ He refers to Baron and Serret's analysis of International Renewable Energy Certificate trading³⁴ to explain how the European REC trading system functions.

30 Joel Harvey Mack, et al., 'All RECs Are Local: How In-State Generation Requirements Adversely Affect Development of a Robust REC Market' (2011) *The Electricity Journal* [24] 21-2
<https://www.lw.com/upload/pubContent/_pdf/pub4270_1.pdf> at 6 December 2016.

31 Ibid, 21.

32 Victorian energy efficiency certificates (VEECs) are electronic certificates created in accordance with the *Victorian Energy Efficiency Target Act 2007* and the *Victorian Energy Efficiency Target Regulations 2008*. Each VEEC represents one tonne of carbon dioxide equivalent (CO₂-e) abated by specified energy saving activities known as Prescribed Activities.

33 Panagiotis Delimatsis, 'Financial Innovation, Climate Change and the GATS: The Case of Renewable Energy Certificates', (Discussion Paper, Tilburg University, 2008) 12.

34 For an analysis of these schemes, see Richard Baron and Ysé Serret, 'Renewable energy certificates: trading instruments for the promotion of renewable energy' in OECD (ed), *Implementing Domestic Tradeable Permits – Recent Developments and Future Challenges* (2002), 111.

Baron and Serret describe the operation of the system:

In the case of tradeable renewable energy certificates combined with quotas, the government assigns a multi-year schedule for minimum production of renewable electricity to the electricity companies – i.e. a percentage of annual sales. Tradeable certificates corresponding to electricity from RE sources are issued to RE generators who then sell them to liable entities, either bilaterally or through a market. The electricity can be sold separately on the wholesale market.³⁵

While Australia is not party to the European agreement, and Australian RECs are not valid in those jurisdictions, the Australian REC trading system operates basically in the same manner, as described in this paper.

It is noted that in 2001, Andrews detailed how RECs would be created, traded and surrendered in Australia under the provisions of the REE Act. She stated that ‘[I] Independent reports projected a wide range of certificate prices from AUD\$12/MWh to \$30/MWh in the early years of the market’.³⁶ At that time she could never have envisaged the trading prices of RECs 16 years later, which reached very near the tax-effective limit of \$92.86 as calculated in this paper.

To provide background and context, this paper will next examine a brief history of the RET and its supporting legislation – the REE ACT. Firstly it will examine Australia’s Renewable Energy Target and how it functions to reduce greenhouse gas emissions into the Earth’s Atmosphere. It will then look at how the enabling legislation the REE Act functions to create a ‘cap and trade’ carbon certificate market before proposing an accounting system to report the financial transactions in the parties involved in Australia’s electricity generation industry.

III AUSTRALIA’S RENEWABLE ENERGY TARGET

This section considers Australia’s rate of greenhouse gas emissions which are a primary cause of atmospheric pollution, global warming and climate change. Changing climate is a significant danger to the carbon based life forms which inhabit the Earth. It is considered that measures must be established to significantly reduce greenhouse gas emissions from energy generation. This section examines Australia’s global position and action taken to establish a measure by which it can reduce global greenhouse gas emissions.

To place Australia’s anti-atmospheric pollution measures in a global context, by 2012 Australia had one of the highest emissions rate in the world. Figure 1 indicates its emission rate to be nearly double that of the average of its fellow member countries of the Organisation for Economic Co-operation and Development (OECD).

35 Ibid, 108.

36 Gwen Andrews, ‘Market based instruments: Australia’s experience with trading renewable energy certificates.’ (2001) *Workshop on good practices in policies and measures*. [8]
<http://unfccc.int/files/meetings/workshops/other_meetings/application/pdf/andrews.pdf> at 5 December 2016.

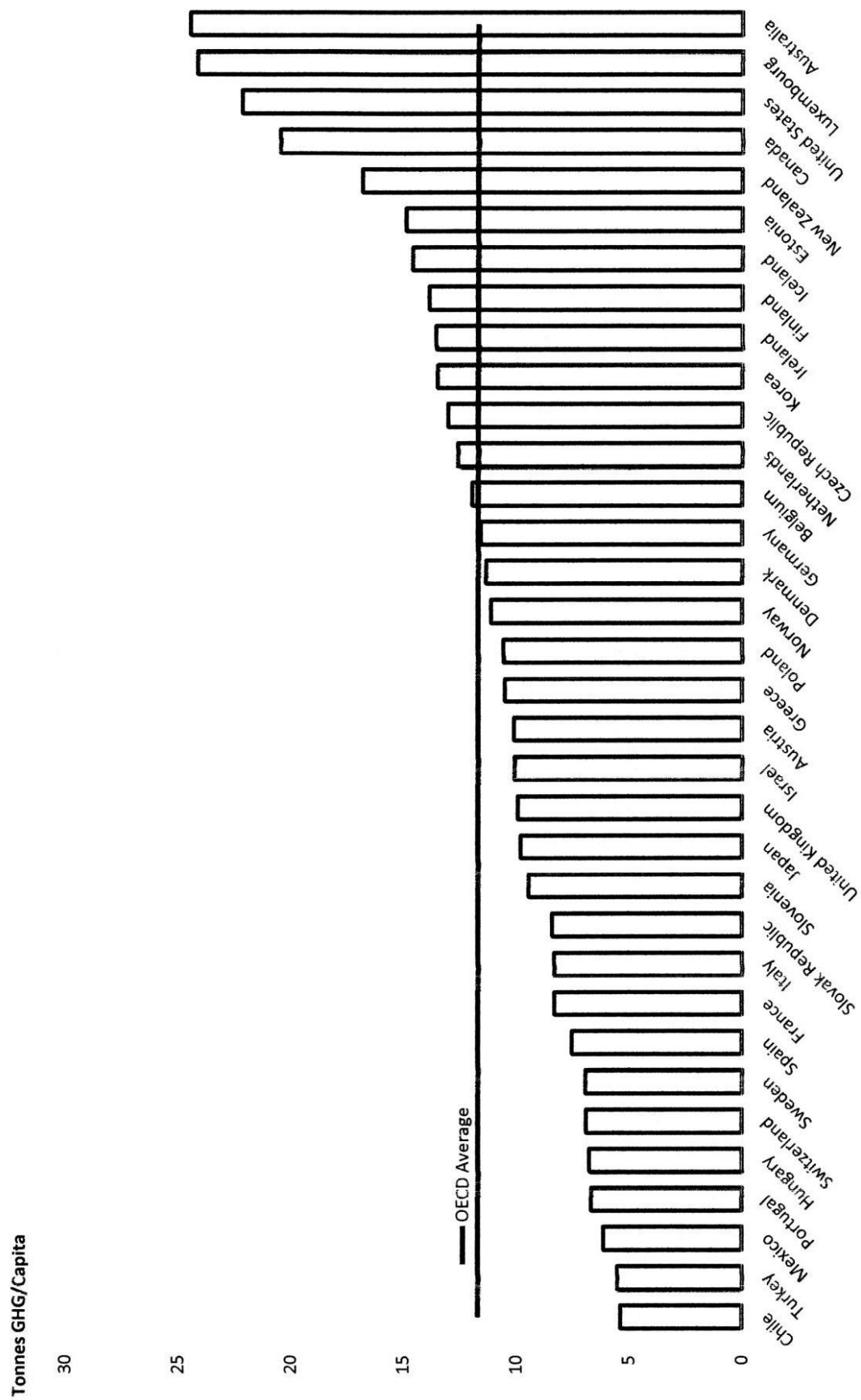


Figure 1: OECD national greenhouse gas emission intensities per capita, 2010.³⁷

37 OECD Environment Statistics (database), UNFCCC, *Greenhouse Gas Inventory Data* (2012).

On the other hand, Table 1 shows Australia's position on the list of OECD countries' renewable electricity generation volumes for the period 2008-12.

Rank	Country	2008	2009	2010	2011	2012
	OECD	1781.398	1834.263	1935.897	2073.911	2156.166
1	United States	392.736	429.652	440.231	527.490	508.360
2	Canada	384.587	379.476	366.247	398.286	397.344
3	Germany	93.980	99.251	109.635	126.78	142.685
4	Norway	139.051	125.309	116.988	120.883	142.412
5	Japan	106.065	106.833	115.238	117.692	122.368
6	Sweden	81.603	79.894	82.642	83.747	96.967
7	Italy	59.445	70.537	78.600	85.325	91.804
8	Spain	62.691	74.577	97.908	87.280	86.757
9	France	75.052	71.032	79.693	66.294	82.776
10	Turkey	34.165	37.869	55.319	57.686	64.637
11	Austria	44.775	47.352	45.162	42.473	50.881
12	Mexico	48.590	36.512	47.327	46.336	43.857
13	United Kingdom	23.292	26.902	27.124	36.254	40.248
14	Switzerland	38.119	37.813	38.246	34.702	40.155
15	New Zealand	27.939	30.919	32.599	33.539	31.564
16	Finland	27.764	21.780	24.263	23.395	28.233
17	Chile	27.072	29.396	24.079	24.537	25.219
18	Australia	19.610	19.620	22.357	26.813	23.834
19	Portugal	14.860	18.507	28.520	24.257	19.314
20	Iceland	16.342	16.709	16.931	17.083	17.423
21	Poland	6.792	8.892	11.104	12.906	16.868
22	Denmark	10.951	10.820	13.151	14.682	14.674
23	Netherlands	10.995	12.346	12.763	14.026	12.063
24	Belgium	5.478	6.749	7.788	9.665	10.473
25	Greece	5.736	8.150	10.576	8.215	10.107
26	Czech Republic	3.721	4.639	5.900	7.218	8.016
27	Korea, South	4.427	4.751	6.341	7.536	7.123
28	Slovakia	4.542	4.883	5.911	4.827	5.420
29	Ireland	3.578	4.099	3.725	5.422	5.229
30	Slovenia	4.271	4.862	4.702	3.846	4.283
31	Hungary	2.469	3.010	3.170	2.770	2.644
32	Estonia	0.197	0.541	1.044	1.181	1.477
33	Israel	0.025	0.099	0.147	0.313	0.475
34	Luxembourg	0.322	0.307	0.312	0.302	0.327
35	Puerto Rico	0.156	0.174	0.153	0.149	0.148

Table 1: OECD countries volumes of renewable electricity generation in Gigawatt hours (GWh) 2008-12.³⁸

38 US Energy Information Administration *International Energy Statistics* (2012)
<http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=6&pid=29&aid=12&cid=CG5,&syid=2008&eyid=2012&unit=BKWH> at 29 August 2015.

As to its contribution to the reduction of greenhouse gas emissions, Table 1 shows that Australia is ranked 18th in the generation of electricity from renewable sources, in 2012. Australia's production of electricity from renewable energy sources of 23 834 GWh, compares reasonably well with Chile at 25 219 GWh and Portugal at 19 314 GWh. However, Chile and Portugal are at the lowest end of the scale of polluters as shown in Figure 1.

To be making a significant reduction in greenhouse gas emissions Australia would have to have renewable energy installation rates comparable with Canada and the United States. It does not, Australia is far behind the United States (508 360 GWh) and Canada (397 344GWh). It is also well below the 'average per capita' polluting nations: Germany (142 685 GWh); Norway (142 412 GWh); and Japan (122 368 GWh).

Although it is important to note that the above data does not consider all of the renewable energy generation for the Australia. There are some hydro-electric generation, and other renewable energy electricity generation systems in operation prior to 2000, that are not subject to Australia's renewable energy legislation, and therefore not disclosed in the data. This comparison is only to indicate Australia's general global position in renewable energy generation.

It is also important to differentiate between rates of greenhouse gas emissions, as illustrated in Figure 1, and volumes of electricity generated from renewable energy sources, as shown in Table 1.

Australia's renewable energy based electrical generation volume, shown in Table 1, may appear reasonably high at nearly 24 000 GWh, however as it has the highest rate of emissions, at nearly twice that of the average of its fellow OECD members. It remains a net polluter. In order to reverse the impact of greenhouse gas emissions Australia needs not only to increase its renewable energy generation but also to decrease its per capita emission intensity.

As illustrated in Figure 2, there are three general methods of addressing the issue of increasing atmospheric greenhouse gas emissions. This can be achieved by implementing actions to reduce:

- **Emissions** caused by the combustion of fossil fuel by using substitute (renewable) fuels;
- **The volume of existing atmospheric CO₂** by increasing physical carbon storage within the Earth's surface – carbon sequestration and increased vegetation; and
- **Energy consumption**, and therefore reduce demand for electricity generation.

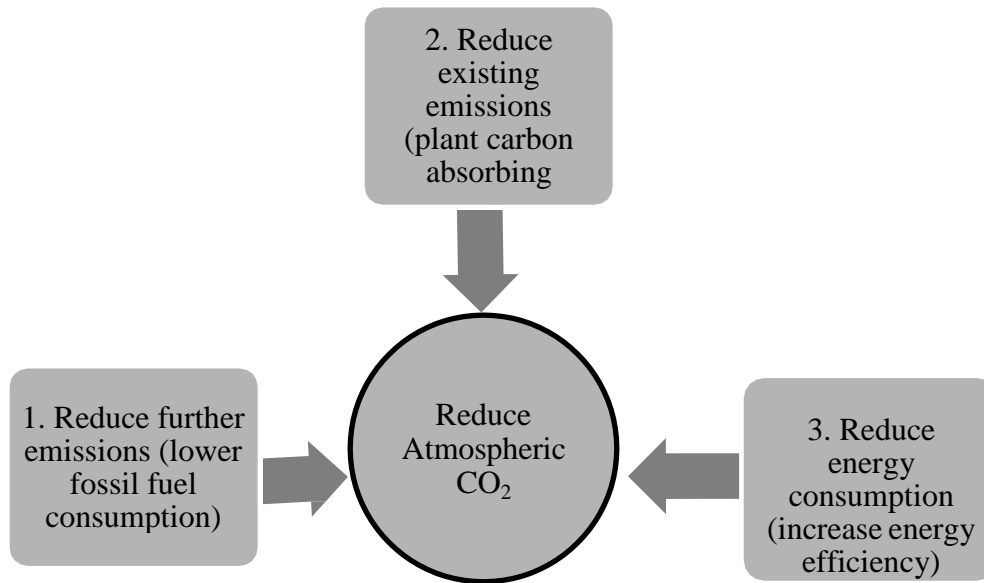


Figure 2: Methods of reducing atmospheric CO₂.

The concept of the RET, and the focus of this paper, is the first method – actions to reduce emissions caused by the combustion of fossil fuel by using substitute (renewable) fuels to generate electricity.

In order to comply with its United Nations commitments to reduce greenhouse gas emissions to reduce the impact of global climate change, referred to in the Brundtland Report of 1987,³⁹ the Australian Government introduced enabling legislation in 1999.

The objective of that legislation was to set a progressive level of reduction of greenhouse gas emission targets over 20 years. The ‘mandatory target’, initially referred to as the Mandatory Renewable Energy Target (MRET), became to be known more simply as the Renewable Energy Target (RET).

To provide background, a brief history of the Australian RET is provided on the Australian Government’s Clean Energy Regulator Internet website:

Renewable energy has an important role to play in reducing Australia’s greenhouse gas emissions and reaching the goal of 20 per cent renewable energy by 2020.

Known previously as the Mandatory Renewable Energy Target, the Renewable Energy Target has been in operation since 2001, with the initial aim to source 2 per cent of the nation’s electricity generation from renewable sources. In 2009, this was increased to ensure renewable energy made up the equivalent of 20 per cent of Australia’s electricity (41,000 GWh).

Since its beginning in 2001, the Renewable Energy Target has increased the number of installations of small-scale renewable energy systems, and successfully stimulated investment in renewable energy power stations.⁴⁰

39 Gro Harlem Brundtland, *Report of the World Commission on Environment and Development: Our Common Future*, UN Doc a/42/427 (1987).

40 Australian Government, Clean Energy Regulator, *The History of the Renewable Energy Target* (2014) Renewable Energy Target <<http://ret.cleanenergyregulator.gov.au/About-the-scheme/History-of-the-RET>> at 29 March 2015.

The RET is the basis by which the tax rate applicable to fossil fuelled energy generators, is set. Initially the 2001 targeted reduction was set at a modest 300 Gigawatt hours (GWh) or 0.24 per cent of Australia’s electricity generation to be from renewable sources. Initially the goal was to reach 41 000 GWh or an estimated 20 per cent by 2020. However that has since been modified and reduced.

Table 2 shows how the RET, expressed in GWhs, relates to the tax rate levied on fossil fuelled energy generators, to avoid charges levied under the REE Act. It shows the percentage of RECs required to be surrendered according to the volume of electricity generated. It also indicates the estimated annual electricity consumption and the actual electricity consumption for the years 2001-11.

Year	Required GWh of renewable source electricity ⁴¹	Renewable power percentage (RPP) ⁴² (REC/LGCs)	Estimated total electricity consumption GWh Required GWh/RPP	Actual electricity consumption GWh ⁴³
2001	300	0.24	125000	224641
2002	1100	0.62	177420	227563
2003	1800	0.88	204545	226452
2004	2600	1.25	208000	236581
2005	3400	1.64	207317	245642
2006	4500	2.17	207373	247568
2007	5600	2.70	207407	251227
2008	6800	3.14	216560	257998
2009	8100	3.64	222527	244414
2010	12500	5.98	209030	241586
2011	10400	5.62	185053	
2012	16763	9.15	183202	
2013	19088	10.65	179230	
2014	16950	9.87	171732	
2015	18850	11.11	169667	
2016	21431	12.75	168086	
2017	26031	14.22		
2018	28637	tba		
2019	31244	tba		
2020	33850	tba		
2021-30	33000	tba		

Table 2: The renewable energy sourced electricity and the renewable power percentage charge.

An additional impost was placed on fossil fuelled energy generators in 2011. The introduction of reg 23A of the *Renewable Energy (Electricity) Regulations 2001* added a requirement to surrender an additional class of REC – a small-scale technology certificate

41 *Renewable Energy (Electricity) Act 2000* (Cth) s 40.

42 *Renewable Energy (Electricity) Regulations 2001* (Cth) reg 23.

43 Australian Government, Department of Agriculture, Australian Energy Statistics – Energy Update 2011 (2015), <http://www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pe_abares99010610_12c.xml> at 13 June 2015.

(STC). An STC is a REC allocated to renewable energy generation systems of less than 100 kW capacity, by using a pre-determined production formula rather than metering actual electricity production as is the case with generation systems in excess of 100 kW capacity.

Since then, STCs are required to be surrendered in addition to those RECs required to be surrendered to comply with the renewable power percentage as determined by the RET.⁴⁴ In order to designate between the two classes of REC, the first class of REC was renamed a Large-scale Generation Credit (LGC).

A separate RET was not set for the STC taxation system but a renewable power percentage was regulated. Regulation 23A of the *Renewable Energy (Electricity) Regulations 2001* as amended in July 2015 set the small-scale technology percentage as following:

- (a) for 2011—14.80%;
- (b) for 2012—23.96%;
- (c) for 2013—19.70%;
- (d) for 2014—10.48%;
- (e) for 2015—11.71%.
- (f) for 2016— 9.68%
- (g) for 2017— 7.01%

The following example is given to illustrate the effect of the additional impost of 2011. For 2013 the renewable power percentage shown in Table 2 of 10.65 per cent is added to the small-scale technology percentage set out in reg 23A of 19.70 per cent. The overall tax rate for fossil fuelled energy generators was therefore 30.35 per cent of RECs (LGS and STCs) per 100 GWh of electricity generated.

Be aware the combined tax rate is expressed in RECs and not in monetary terms. The actual fiscal cost of the tax is subject to the market forces which establish the trade price of the RECs surrendered in order to ‘pay the tax’.

As part of its commitment to take action against climate change, Australia set a target to reduce greenhouse gas emissions. The reduction is intended to be achieved in part, by replacing fossil fuel energy sources with renewable energy for generating electricity. The following section examines the legislation to implement its renewable energy target.

IV THE LEGISLATION SUPPORTING AUSTRALIA’S RET

The initial enabling legislation to support Australia’s international agreement to take action on climate change was introduced in 1999 – the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

In June 2000, the Australian Government crystallised the desire to bring renewable energy into Australia’s energy mix by passing ‘an Act for the establishment and administration of a scheme to encourage additional electricity generation from renewable energy sources, and for related purposes.’⁴⁵ The Act had been passed by the Australian Parliament to ‘implement a

44 In 2011 RECs were divided into two categories: Large Generation Certificates (LGCs) and Small-scale Technology Certificates (STCs). Unless the distinction is required in this analysis both categories are termed RECs for the purposes of this paper.

45 *Renewable Energy (Electricity) Act 2000* (Cth).

government commitment to introduce a mandatory target for the uptake of renewable energy in power supplies in order to contribute towards the reduction of Australia's greenhouse gas emissions.⁴⁶

In addition to the *Environment Protection and Biodiversity Conservation Act 1999* and the REE Act itself, a number of other related acts support and provide for the administration of the creation, recording, transfer and surrender of RECs:

Renewable Energy (Electricity) (Charge) Act 2000 (Cth).

Renewable Energy (Electricity) Regulations 2001 (Cth).

Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act 2000 (Cth).

Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act 2010 (Cth).

The basic purpose of the REE Act is to 'dilute' atmospheric pollution. It encourages a system of 'tax avoidance' activity such that an electricity wholesaler will purchase RECs to demonstrate that a percentage of that electricity has been generated from a renewable energy source, in lieu of paying a penalty. That penalty is essentially a 'carbon' or pollution tax.

To encourage 'tax avoidance' activity, and motivate liable parties to purchase RECs from renewable energy based electricity generators, a subtle form of subsidy is thus created. The operations of the REE Act are supported by the provisions of the *Income Tax Assessment Act 1997* which permit such 'tax avoidance activity'.

In order that 'tax avoidance' activity is encouraged to motivate liable parties to purchase RECs from renewable energy based electricity generators and thus creating a form of subsidy, the provisions of the *Income Tax Assessment Act 1997* also support the REE Act.

As to capital gains tax considerations arising from the purchase of a right, the interpretation of s 8-1 of the REE Act considers the purchase of RECs to be recurrent and on-going. The expenditure is therefore not considered to be of a capital nature and as such is not excluded from being a deductible expense for income tax assessment purposes.

In practical terms, the onus placed on each electricity purchaser to 'dilute' the consumption of fossil fuelled energy with renewable energy would be impossible. The concept of physically 'mixing' renewable energy sourced electricity with fossil fuelled generated electricity at a central point is little more than a philosophical concept devoid of practicality. In theory, that would require a fossil fuelled power station to be physically coupled to a solar farm. However the REE Act is somewhat ingenious in overcoming that problem. The following section looks at how the REE Act functions as a 'carbon trading system'.

V HOW THE *RENEWABLE ENERGY (ELECTRICITY) ACT 2000* FUNCTIONS

The Clean Energy Regulator is the Australian government agency charged with administering the REE Act, and its regulations. Through its electronic REC Registry it:

- provides the general public with basic information and facts about the renewable energy certificate market

46 *Renewable Energy (Electricity) Bill 2000* (Cth) Explanatory Memorandum.

- lists the accreditation of eligible renewable energy power stations in Australia
- facilitates the creation, registration, transfer and surrender of large-scale generation certificates (LGCs) and small-scale technology certificates (STCs)
- tracks the ownership and status of all certificates
- provides access to the STC clearing house, and
- maintains various public registers as required by the *Renewable Energy (Electricity) Act 2000* (the Act).

The Clean Energy Regulator uses the REC Registry to manage, audit and report on:

- the participants within the renewable energy certificate market, and
- the renewable energy market as a whole.

All LGCs and STCs must be created in the REC Registry before they can be bought, sold traded or surrendered. The REC Registry records the details and history of each individual certificate from creation, through any transfer of ownership and its eventual surrender.⁴⁷

A registered renewable energy power station creates one REC (LGC) for every Megawatt hour of electricity generated, and not used internally by the power station. That REC is allocated a unique identification number according to the registered person ID (the creator) source of fuel, the state in which it is generated, the registration number of the power station and the year of creation.

In the case of the Solex Carnarvon Solar Farm the accreditation code of the power station is SRPVWA04. The code indicates it is a solar photovoltaic renewable energy system in Western Australia, and it is the fourth power station registered in that state.

For a REC created by the owner in 2016 the certificate is assigned a serial number as follows:

000000932-SRPVWA04-2016-0000034
(Creator ID) (Power station ID) (Year) (ID number)

The electronically registered REC is therefore unique and traceable, from creation to surrender, in much the same fashion as a serial number on a banknote. The REC can be traded by investors and speculators, held for an expected rise in market price and ultimately surrendered by a liable party.

In a similar way to the trading of any commodity a market exists for futures trading or simply held as an investment. The value of the REC is dependent on the market forces of supply and demand, as well as market exceptions of future value. The value of the REC can also be subject to external intrinsic forces such as political philosophies of external market forces.

An overt market place does not exist, nor is there an electronic market place for buyers and sellers. Trades are conducted by private treaty and settlements take place essentially as a matter of trust. There are a number of agents or brokers, who buy/sell or arrange for trades between holders of RECs, investors and liable parties.

The trade prices are largely competitive depending on liable party obligations to comply with their obligations under the prevailing RET and the supply volumes of RECs from renewable energy power stations. The tax effective value of the RECs, discussed in the following section, have yet to be obtained in the market place. To date there have been more RECs available to the market than demand for them.

⁴⁷ Australian Government, Clean Energy Regulator, *REC Registry*, (2016) <<https://www.rec-registry.gov.au/rec-registry/app/public/about-the-registry>> at 19 September 2016.

The administrative position in 2010 remained relatively unchanged to that in 2001 save for the changes to the target volumes.

To illustrate how the RET influences the REC market the statistical position for the year 2010 shown in Table 2 is as follows:

Required GWh	12 500 GWh
Renewable Power Percentage	5.98 per cent
RECs generated	41 008 102 ⁴⁸
Electricity Generated	241 586 000 MWh

In 2010 the required 12 500 GWh of electricity to be produced from renewable energy sources was to be 5.98 per cent of total electricity consumption. In reality, it had only risen by 5.17 per cent not the estimated 5.98 per cent as prescribed by the regulations.

If it is assumed that all electricity purchased was done so by ‘liable entities’,⁴⁹ which in fact, given the numerous exempt power generators in Australia, it is not, then the volume of renewable energy certificates required to be surrendered in 2010 would have been:

$$241\,586\,000\text{ MWh} \times (5.98/100) = 14\,446\,843.$$

Data provided by the Clean Energy Regulator shows that 35 524 421 RECs were created in 2010 of the 41 008 102 eligible for creation. As at July 2015 the ‘oversupply’ of RECs continues and at that time 784 362 RECs from 2010 remained valid.⁵⁰

It is anticipated that as the RET increases and the roll-out of renewable power stations is less than the corresponding REC demand, the prices will rise. It will remain to be seen if liable parties then choose to pay the non-deductible shortfall charge or to pay a premium for the deductible RECs.

STC trades follow a similar pattern except that the Australian government has a ‘clearing house’ as a place where liable parties can purchase STCs at a fixed price of \$40. Clearing house stocks are permitted to fall into deficit in the expectation that supply volumes will correct the shortfall at some future point. The STC clearing house is currently in deficit and the STC market trading price is at, or very near to, the \$40 fixed price of the clearing house trades.

The following section examines the impact of income tax on REC trading values.

48 Australian Government, Clean Energy Regulator, *Register of Large-Scale Generation Certificates* <<https://www.rec-registry.gov.au/rec-registry/app/public/lgc-register>> at 13 June 2015.

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

50 *Ibid.*

VI HOW THE *RENEWABLE ENERGY (ELECTRICITY) ACT 2000* RELATES TO AUSTRALIAN INCOME TAX AND GOODS AND SERVICES TAX

This section examines the relationship between the REE Act and the provisions of the *Income Tax Assessment Act 1997* (Cth) (ITAA 1997) to consider how the ‘tax avoidance’ activity of purchasing RECs to avoid penalties under the REE Act functions. It also considers how the Goods and Services Tax (GST) provisions apply to REC trading.

The marketing of RECs is significantly influenced by the provisions of the REE Act and the ITAA 1997. Discussed in detail, in section VII, the non tax-deductible shortfall charge was initially set at \$A40.⁵¹ In 2011, it rose to \$A65.⁵² This section discusses how trading prices of RECs are not only determined but also by the provisions of the respective acts as to the deductibility of charges and/or penalties levied/incurred under the REE Act but also the economic factors of supply and demand in a free market.

A Income Tax Implications

Section 7A of the *REE Act* states:

To avoid doubt, a charge or penalty under this Act is not tax deductible for the purposes of any law dealing with income tax.⁵³

That section of the REE Act clarifies the taxation status of the shortfall charge. It supports the provisions of the ITAA 1997. Section 26-5 prevents the deduction of penalties from assessable income as under.

- (1) You cannot deduct under this Act:
- (a) an amount (however described) payable, by way of penalty, under an *Australian law or a *foreign law;

Section 51(4) of the *Income Tax Assessment Act 1936* (Cth) (ITAA 1936) contains the same proscription as to the deduction of penalties from assessable income.

Therefore, in accounting terms, shortfall charges paid in lieu of surrendered RECs are after tax costs. As such, they are a distribution of profit such as the repayment of loans, capital purchases or dividends to shareholders.

On the other hand if a REC is purchased to avoid the shortfall charge. The cost of purchase is considered to be an assessable income deduction, according to ordinary concepts.

Section 8-1 of the ITAA 1997 provides that a general deduction from assessable income can be made if ‘it is necessarily incurred in carrying on a business for the purpose of gaining or producing your assessable income.’⁵⁴

51 *Renewable Energy (Electricity) (Charge) Act 2000* (Cth) s 6.

52 *Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act 2000* (Cth) s 6; *Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act 2010* (Cth) s 6.

53 *Renewable Energy (Electricity) Act 2000*, s 7A.

54 *Income Tax Assessment Act 1997* (Cth) s 8-1(1)(b).

To confirm the interpretation, that purchasing a REC in lieu of paying a charge under the REE Act, altered the status of the cost from being non tax deductible penalty to a deductible business expense a private ruling was sought from the Australian Commissioner of Taxation. The ruling was that

a liable entity [is] entitled to a deduction under section 8-1 of the *Income Tax Assessment Act 1997* (Cth) (ITAA 1997) for the cost of purchasing renewable energy certificates (RECs) to demonstrate compliance with the requirements of the *Renewable Energy (Electricity) Act 2000*.⁵⁵

The taxation bias created by the non-deductibility of the shortfall charge as compared to the deductibility of the purchase of RECS to avoid the penalty is a form of ‘acceptable tax avoidance’. It has been deliberately enacted to create a market for RECs, to provide a revenue stream (subsidy) for renewable energy based, electricity producers.

To quantify the fiscal impact of the relationship between non-tax deductible REC shortfall charges and tax deductible REC purchase costs the following formula is provided.

$$\frac{p}{r} = 1-t$$

where:

Value of non-tax deductible penalty	=	p
Value of tax deductible REC	=	r
Tax rate	=	t

Prior to 2011 when the shortfall charge was \$A40, and the Australian corporate tax rate was 30 percent, the value of a REC, influenced by the tax deductibility advantage of purchasing a REC, created a tax effective value of a REC to a liable party as:

$$\text{\$A40}/(1-0.3) = \text{\$A57.14}$$

In 2011, when the shortfall charge was raised to \$A65 and the corporate tax rate remained unchanged the tax effective value rose to:

$$\text{\$A65}/(1-0.3) = \text{\$A92.86}$$

In fact due to the free market forces of supply and demand, the traded price of RECs has yet to reach those levels. In September 2016 market forces have resulted in a ‘near parity’ price of \$86.75 for LGCs.

It will be interesting to see if liable parties will be willing to pay a premium for LGCs once the trade price exceeds \$92.86. It may be considered ‘socially’ responsible to continue to purchase LGCs to offset atmospheric pollution than to pay what is essentially a pollution tax.

B Goods and Service Tax Implications

The provisions of the Goods and Service Tax under the *A New Tax System (Goods and Services Tax) Act 1999* (Cth) (ANTS (GST) Act) apply to the sale and purchase of RECs.⁵⁶ The sale of the

⁵⁵ Australian Taxation Office, Private Ruling to Alexander Fullarton, Authorisation Number, 59756, 9 February 2006, 1.

⁵⁶ *A New Tax System (Goods and Services Tax) Act 1999* (Cth), ss 9-5, 9-10.

REC by a registered entity is considered a taxable supply⁵⁷ of goods.⁵⁸ Correspondingly, the purchase of a REC by a registered entity entitles that party to a credit for the GST component of the consideration.

The application of GST to the trading of RECs, particularly STCs, can be a little confusing. The following note is made to provide distinctions between when GST is applicable to the sale/purchase of a REC and when it does not.

Sections 9-5 and 9-10 of the (ANTS (GST) Act) provide that GST applies to all supplies by a registered enterprise unless the supply 'is GST-free or input taxed.'⁵⁹ Section 9-10 provides that a 'supply is any form of supply whatsoever.'⁶⁰ A REC falls within the meaning of 'a creation, grant, transfer, assignment or surrender of any right.'⁶¹

It is considered a right as it is a certificate registered under the provisions of the REE Act to enable a liable party to prove the generation of 1 MWh of renewable energy to enable that liable party to generate a certain amount of electricity from fossil fuel source. In common terms, a right to generate greenhouse gas emissions, for which that party would otherwise be penalised.⁶²

In the event the supply might be considered as a 'financial supply'⁶³ as it might be interpreted that a certificate is in lieu of a cash value, it would remain GST taxable as the certificate is not 'money', which is exempt under s 9-10(4).

However, not all REC trades attract GST as the tax can only be collected by registered parties. Generally STCs, created from the installation of domestic solar pv and hot water systems, are created by home owners who generally are not registered for to collect GST. It is therefore possible to assume trades of STCs are exempt. They are not exempt. As soon as the STC falls into the ownership of a registered party GST applies.

In the case of LGCs the requirement of that class of REC to be created is that the energy is generated from a power station in excess of 100 kilowatts. A system that size could not be installed on a domestic dwelling, either physically or in accordance with the building and utility codes existing in Australia. An LGC therefore is likely to be created by a GST registered enterprise.

An additional point of confusion as to the GST implications of a REC is that the surrender of a REC does not create a GST supply. It has been ruled by the ATO that the surrender of a REC is not a supply as there is no consideration involved in the surrender. The Clean Energy

57 Ibid s 9-5.

58 Ibid s 9-10 (2)(a).

59 Ibid s 9-5.

60 Ibid s 9-10 (1).

61 Ibid s 9-10 (2) (e).

62 Renewable Energy (Electricity) (Charge) Act 2000 (Cth) s 6.

63 A New Tax System (Goods and Services Tax) Act 1999 (Cth), s 9-10 (f).

Regulator does not purchase the REC it simply cancels it for no exchange of value. It is considered that as no transaction takes place no GST applies.⁶⁴ That interpretative decision has been withdrawn but it remains unchallenged.

Therefore it is possible that given no GST sale takes place on the surrender of the REC that GST does not apply to the purchase. That assumption would be incorrect as the liable party effectively consumes the REC and is therefore the end user. The liable party is however entitled to the GST input credit as it is a cost of manufacture.

It would strongly appear therefore that REC trading transactions are GST exempt, but they are not. Many trades, and GST debits and credits, may take place between creation and surrender of RECs as they can, and often are, used as speculative derivatives by investors who wish to take advantage of market price fluctuations.

It is also noted that the Clean Energy Regulator, which administers the clearing house for STC trades, does not require STC sellers to be GST registered, as they are generally created by small domestic renewable energy generators, but it does require STC buyers to be registered.⁶⁵

The sequence of GST debits and credits renders the transaction revenue neutral as to the impact of the GST collections. However the impost of the GST is eventually borne by the end consumer of the electricity generated by the liable party.

Trading of RECs by the Solex Project to liable parties and marketing agents for the past 10 years has been conducted, and reported in accordance with that interpretation. It has not been challenged by any of those parties, which include some major publicly listed mining companies.

The purchase of a REC becomes part of the operating costs of a fossil fuel based enterprise. Therefore, this additional cost to fossil fuel based electricity charges will eventually increase. Likewise, the sale and income of a REC subsidises the operating costs of a renewable energy based electricity generator, and should ultimately reduce electricity charges by those enterprises, or make them more profitable.

The following section looks at how the *Renewable Energy (Electricity) Act 2000* impacts on the overall sustainable development framework – the corporate triple bottom line (TBL) reporting requirements in Australia.

VII HOW THE *RENEWABLE ENERGY (ELECTRICITY) ACT 2000* IMPACTS ON THE TRIPLE BOTTOM LINE

The RET has become a very sensitive political issue between the Australian Labor Party (ALP), the Liberal Party (Lib) and the Greens (GRN). In 2010 the ALP government increased the RET from its originally targeted 4.27 per cent for the 2010 year to 5.98 per cent,

64 ATO Interpretative Decision ATO ID 2004/956 (Withdrawn) Goods and services tax GST and surrender of a renewable energy certificate to a government regulator; ATO Legal Database (2004) <<http://law.ato.gov.au/atolaw/view.htm?docid=AID/AID2004956/00001>> at 13 December 2016.

65 Australian Government, Clean Energy Regulator, *Renewable Energy Target: REC Registry and Small-scale Technology Certificate clearing house - terms and conditions* (2009) <<http://www.cleanenergyregulator.gov.au/DocumentAssets/Documents/REC%20Registry%20and%20Small-scale%20Technology%20Certificate%20clearing%20house%20-%20terms%20and%20conditions.pdf>> at 13 December 2016, item 3.6.

rising to 10.65 per cent (more than half way to its original target of 20 per cent by 2020) in 2013.⁶⁶

The ALP government also introduced other legislation, aimed at promoting environmentally sustainable projects, such as a mining rental resource tax and a tax on carbon emissions. Industry reacted strongly to those taxes, and a political campaign focussed on repealing those taxes was conducted in 2010 to replace the ALP government with a more economically biased Liberal government.

In 2014, the Liberal government repealed both the mining tax and the carbon tax. Interestingly however, the ultimate outcome of 20 per cent electricity generation from renewable sources by 2020 remained the RET for the Liberal government.

However there was considerable political pressure to reduce, or even abolish, the RET for Australia in 2015. A compromise was set at 33 000 GWh or around 15 per cent. Curiously, the requirement to surrender STCs by liable parties does not appear to be considered in that targeted amount.

The market price of LGCs became significantly influenced by political interests. The LGC market changed its focus from being an economically driven factor to reduce pollution, to a speculative commodity on a futures market, influenced by varying political philosophies.

The prime directive of a RET, driven by tax rates and economic market forces, became lost in political divisions which prevail in the Australian Parliament.

Figure 3 indicates how some major political decisions have influenced the market price of LGCs during the period 2003 – 11.

66 Australian Government, Clean Energy Regulator, *The Renewable Power Percentage Target* (2014) Renewable Energy Target <<http://ret.cleanenergyregulator.gov.au/About-the-Schemes/About-the-renewable-power-percentage/Annual-targets>> at 29 March 2015.

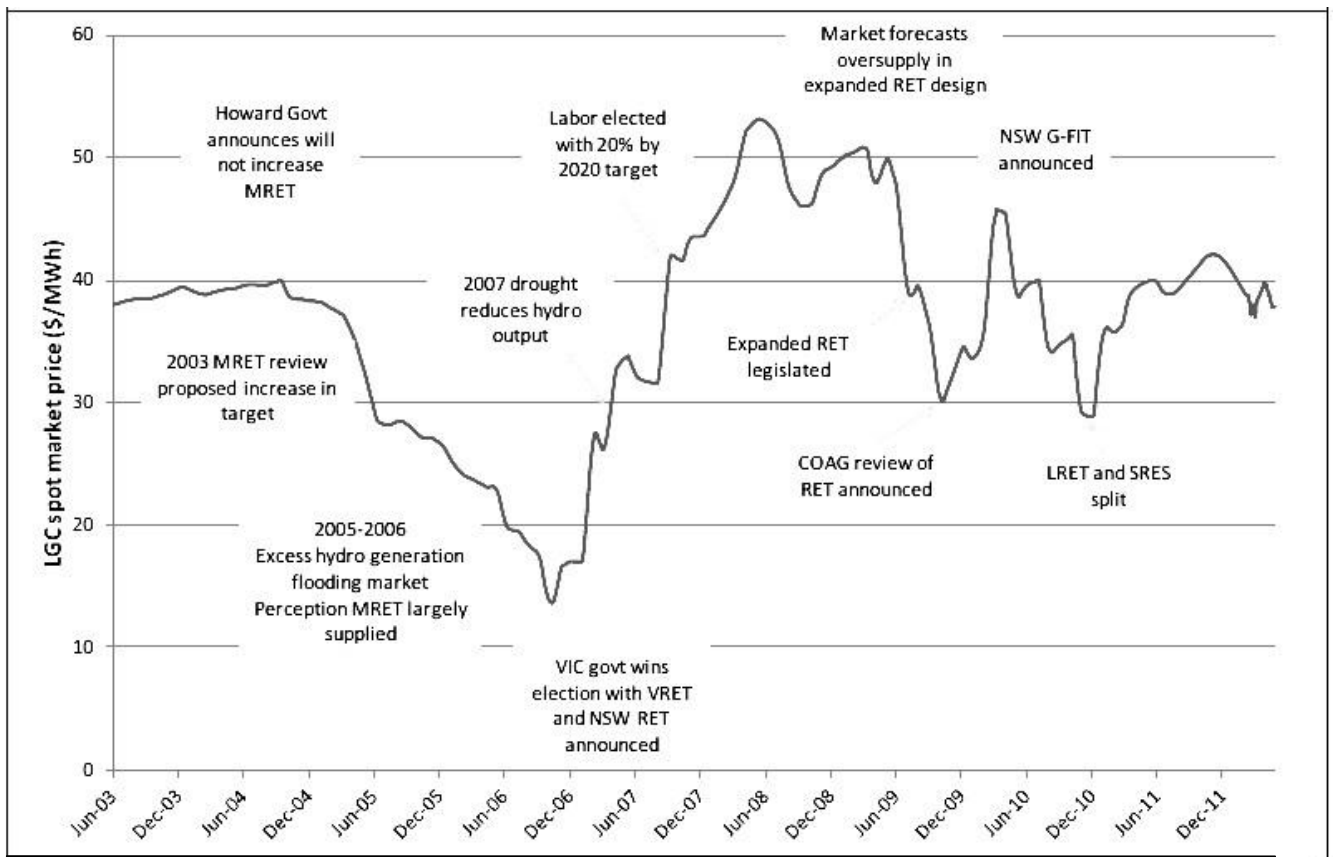


Figure 3: Political influences on the LGC/REC market prices 2003-11.⁶⁷

However, ultimately the provisions of the REE Act, and in particular the carbon tax legislation, did have an effect of Australia's use of energy and in particular the use of fossil fuels. The graph in Figure 4 shows a decline in electricity consumption in the Australian National Electricity Market (NEM) after 2008-9.

67 ROAM Consulting Pty Ltd, 'Solar Generation Australian Market Modelling' (Report to the Australian Solar Institute, 2012) 38. Underlying spot price curve sourced from Green Energy Markets and the Clean Energy Council.

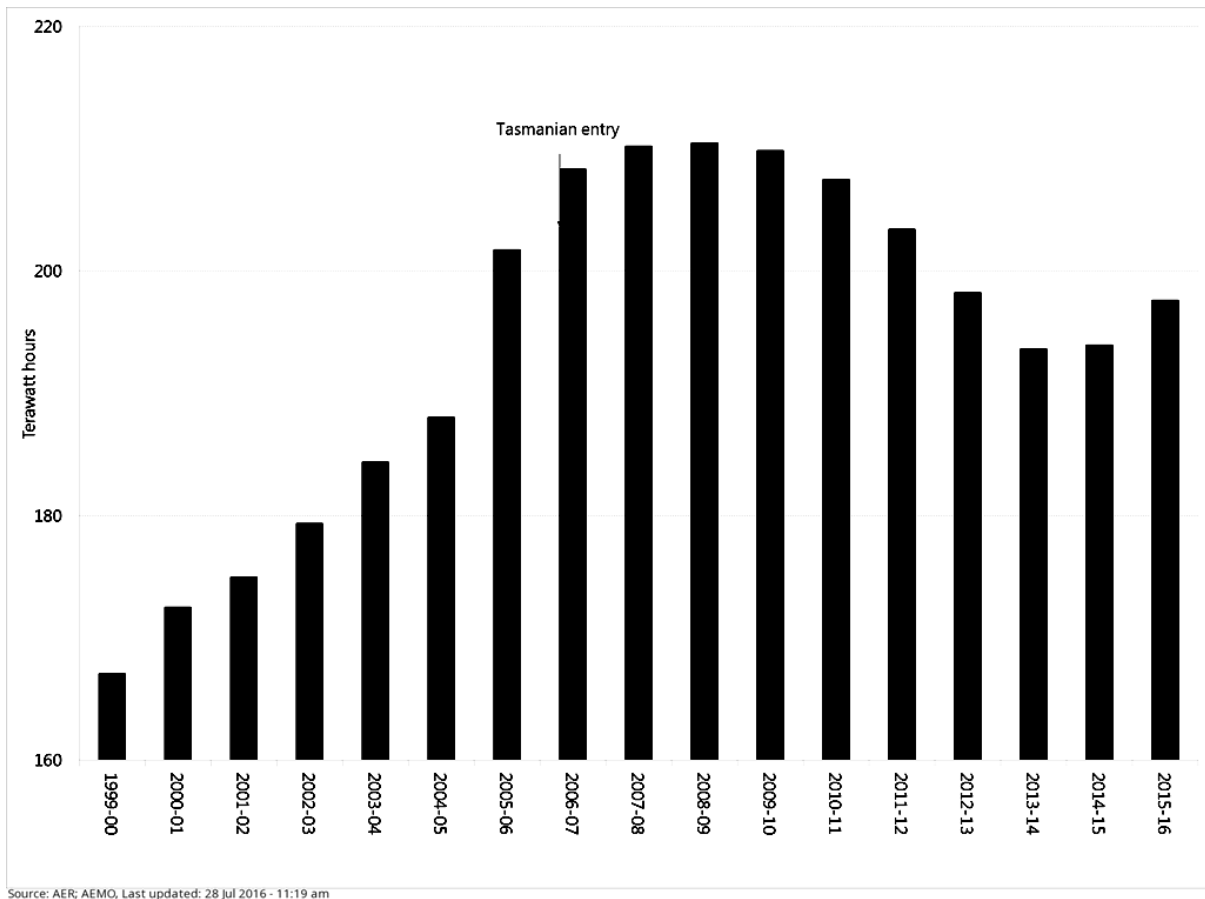


Figure 4: National Electricity Market electricity consumption 2000-16.⁶⁸

Electricity consumption is monitored and published by the Australian Energy Regulator (refer Figure 4). Following the inclusion of Tasmania in 2006-07, market consumption levels out, before declining, 2013-15.

Figure 4 clearly shows that Australians have reduced their electricity consumption since 2008-9. However it does not reveal the ‘energy mix’ between fossil fuel and renewable energy source electricity. As the RET has been rising over those years, and there is a surplus of RECs in the market place, it is reasonable to assume the contribution of renewable energy has increased, and therefore greenhouse gas emissions have decreased accordingly. Further, it is acknowledged that electricity consumption may also have fallen due to increased energy efficiencies.

It is also noted that energy consumption has risen since 2014. That may be attributable to the repeal of the Carbon Tax and corresponding decrease in the cost of electricity to the consumer. It may also be attributable to a rise in the volumes of renewable energy available to consumers.

⁶⁸ Australian Energy Regulator National Electricity Market electricity consumption (2016) <<https://www.aer.gov.au/node/9765>> at 11 September 2016. Scale is in Terawatt hours, 1 TWh = 1000 GWh.

Either way there has been a considerable reduction in fossil fuel based energy generation. That is due to, or at least in part by, the impact of the RET and the operations of the REE Act.

Society and the environmentalists (the subsidy recipients) may want high targets, but heavy industry, and in particular the fossil fuel energy based generators (the taxpayers), may want low targets.

Furthermore, there is a discrepancy between the volumes indicated in Figure 4 and the total consumption of an entire nation. The NEM data does not include electricity consumption in Western Australia or the Northern Territory. Table 2 includes those states but is also subject to some under-reporting. The data given in Table 2 suggests the national average is closer to 240 000 GWh, though that is some years out of date.

Be that as it may, if 200 000 GWh was accepted as a subjective baseline, then the RET 'estimation' is simply a matter of deciding what percentage target is desired. The annual increment volume is calculated by multiplying that percentage by 2 000. That is a 20 per cent target is achieved by setting 40 000 GWh as the required GWh of renewable source electricity.

$$20 \text{ per cent} = 20/100 = 40\,000/200\,000$$

Simplicity has long been held as one of the essential criteria of a 'good tax system'⁶⁹ and that is the basis for this recommendation. However setting RET targets is also influenced by political interests as examined above.

The final section illustrates a suggested approach to accounting for the financial transaction of carbon trading under Australia's RET scheme.

VIII HOW TO ACCOUNT FOR CARBON CREDIT TRADING

The preceding sections have examined the structure of Australia's RET system from a philosophical perspective – the reason for the legislation and the principles of its operation. In that examination similarities with taxation legislation were considered. The ITAA 1997 was compared to the RET and Carbon Tax legislation to illustrate the economic influences of taxation systems on social behaviour.

This section looks at the accounting treatment of the fiscal transactions of the REC market and the income tax and goods and services tax (GST) implications of those transactions. To illustrate the entries in the accounts of a REC producer, an extract of the Solex Project's financial accounts is presented.

The sale of RECs created from harvesting renewable solar energy is part of Solex's revenue and is presented in the form of a primary producer's live stock account. It is considered that the creation of RECs is similar in philosophy to the breeding of livestock by way of 'natural increase'.

69 CCH Australia Ltd, *The Asprey Report: An Analysis*, (1975) 8.

Extract of Solex accounts 30th June 2010
Renewable Energy Credits (Livestock A/c)

		Number	Value	
Sales				\$0.00
less	Opening Stock	34	\$1,467.72	
	Natural Increase	182		
	Purchases	<u>157</u>	<u>\$7,065.00</u>	
		373	\$8,532.72	
less	Closing Stock	373	\$15,812.72	<u>\$7,280.00</u>

Gross Profit from RECs **\$7,280.00**

A liable party's accounts do not reflect similar accounting treatment as the entity does not 'breed' or manufacture RECs. The examples below have been simplified to demonstrate the impact of the tax avoidance activity of purchasing RECs at prices below their equivalent tax effective value. In practice the electrical generation volumes and values are far higher. In these hypothetical accounts a small corporate profit has been rendered a loss if the option to pay the shortfall charge is exercised.

The accounts of the liable party firstly disclose the purchase of RECs as a revenue item in its expense account. In the second example the shortfall charge is disclosed as a taxation expense in its profit distribution account, as it does with other taxes, dividends and the like.

An extract of a revenue statement of a Liable Party

Case 1: LGCs and STCs purchased to avoid the non-deductible shortfall penalty:

Income tax

Gross sales revenue	(10 MWh @ \$100)	\$ 1 000
Administrative costs	\$ 200	
Financial costs	\$ 200	
Operating costs	\$ 400	
Purchase of RECs (10 @ \$10)	\$ 100	<u>\$ 900</u>
Net profit (assessable income)		<u>\$ 100</u>
Corporate tax 30 %		<u>\$ 30</u>
After tax distributable profit		<u><u>\$ 70</u></u>

GST Account

GST credits from purchases	\$ 90	GST levied on sales	\$ 100
GST payment due	<u>\$ 10</u>		
	<u><u>\$ 100</u></u>		<u><u>\$ 100</u></u>

The company has an income tax liability of \$30; a \$90 GST credit and a \$100 GST debit.

Case 2: Non-deductible shortfall charge is paid in lieu of surrender of LGCs and STCs

Income tax

Gross sales revenue	(10 MWh @ \$100)		\$ 1 000
Administrative costs		\$ 200	
Financial costs		\$ 200	
Operating costs		<u>\$ 400</u>	<u>\$ 800</u>
Net profit (assessable income)			<u>\$ 200</u>
Corporate tax 30 %		\$ 60	
Shortfall charge (10 MWh @ \$40)		<u>\$ 400</u>	<u>\$ 460</u>
Loss of shareholders' funds			<u>\$ 260</u>

GST Account

GST credits from purchases	\$ 80	GST levied on sales	\$ 100
GST payment due	<u>\$ 20</u>		
	<u>\$ 100</u>		<u>\$ 100</u>

The company has an income tax liability of \$60; a \$80 GST credit and a \$100 GST debit.

VIII SUMMARY AND CONCLUSION

This paper has looked at part of Australia's action to combat climate change by reducing greenhouse gas emissions caused by burning fossil fuel to generate electricity. While Australia's overall contribution to atmospheric greenhouse gas emissions appears relatively negligible on a global scale, this paper finds that Australia's population was once the highest emitters on a per capita basis.

Since 2000 Australia has introduced a renewable energy target in an attempt to considerably reduce atmospheric pollution and uphold its international responsibilities as a member of the United Nations. The legislation supporting that dilution of greenhouse gas emissions by way of encouraging an uptake of electricity generation from renewable energy sources is primarily Australia's *Renewable Energy (Electricity) Act 2000*.

On the one hand, the REE Act functions as a taxation system, as the fossil fuelled generation industry is compelled to surrender a carbon credit (a REC) or pay a penalty. The penalty rate is fixed according to the volume of electricity generated and is an after-tax impost. On the other hand, renewable energy electricity generators are subsidised in the form of the revenue received from the creation and sale of the REC.

The REE Act does that by encouraging a form of tax avoidance by substituting the non tax-deductible charges levied on fossil fuel based electricity generators for RECs surrendered in lieu of the charges. The purchase of RECs, created by a renewable energy based electricity generator, is allowed as a tax deduction.

This paper has described how the REE Act functions and how its impacts reduce Australia's greenhouse gas emissions. Also illustrated, is a method by which the financial transactions for trading RECs may be shown in the books of account of both parties.

In modern times the World's nations have recognised the dangers of climate change due to global warming, caused by greenhouse gas emissions. As a consequence, this paper acknowledges that some of the fall in Australia's electricity consumption may be due to non-economic factors. Social influences, such as the desire by society to become energy efficient to reduce greenhouse gas emissions, for the benefit of the natural environment, may have contributed.

However, this paper considers that much of the social drive to move away from fossil fuel based electricity generation, is derived from rising economic costs. It concludes that while the RET may be unpopular with industry, as it increases its economic costs of production and taxation expenses, the provisions of the REE Act have made significant progress towards reducing fossil fuel consumption and consequently, successfully tackling climate change.

BIBLIOGRAPHY

Articles/Books/Reports

Andrews, Gwen, 'Market based instruments: Australia's experience with trading renewable energy certificates.' (2001) *Workshop on good practices in policies and measures*. [8] <http://unfccc.int/files/meetings/workshops/other_meetings/application/pdf/andrews.pdf> at 5 December 2016.

Baron, Richard, and Serret, Ysé, 'Renewable energy certificates: trading instruments for the promotion of renewable energy' in OECD (ed), *Implementing Domestic Tradeable Permits – Recent Developments and Future Challenges* (2002).

Berry, David, 'The market for tradable renewable energy credits' (2002) 42 *Ecological Economics* 369, 369 <<http://www.sciencedirect.com/science/article/pii/S0921800902001283>> at 6 December 2016.

Brundtland, Gro Harlem, *Report of the World Commission on Environment and Development: Our Common Future*, UN Doc a/42/427 (1987).

Butt, Peter, et al (eds), *Butterworth's Concise Australian Legal Dictionary* (3rd ed 2004).

CCH Australia Ltd, *The Asprey Report: An Analysis*, (1975).

Delimatsis, Panagiotis, 'Financial Innovation, Climate Change and the GATS: The Case of Renewable Energy Certificates', (Discussion Paper, Tilburg University, 2008)

Hardisty, Paul Edward, *Environmental and Economic Sustainability* (2010)

Jones, Stephen, 'The Future of Renewable Energy in Australia: A Test for Cooperative Federalism?' (2009) 68 *Australian Journal of Public Administration* 1.

Kelly, Geoff, 'Renewable Energy Strategies in England, Australia and New Zealand', (2007) 38 *Geoforum* 326.

Kent, Anthony and Mercer, David, 'Australia's mandatory renewable energy target (MRET): an assessment', (2006) 34 *Energy Policy* 1046.

Mack, Joel Harvey, et al., 'All RECs Are Local: How In-State Generation Requirements Adversely Affect Development of a Robust REC Market' (2011) *The Electricity Journal* [24] 21-2 <https://www.lw.com/upload/pubContent/_pdf/pub4270_1.pdf> at 6 December 2016.

ROAM Consulting Pty Ltd, 'Solar Generation Australian Market Modelling' (Report to the Australian Solar Institute, 2012).

Simpson, Genevieve, and Clifton, Julian, 'Picking Winners and Policy Uncertainty: Stakeholder perceptions of Australia's Renewable Energy Target', (2014) 67 *Renewable Energy* 128.

Yallop, Colin, et al (eds), *Macquaire Concise Dictionary* (4th ed, 2006).

Case Law

Re Bamboo Direct Pty Limited (in liq) [2016] FCA 264.

Bartlett v Commissioner of Taxation; Falcetta v Commissioner of Taxation [2003] FCA 1125.

Clean Energy Regulator v MT Solar Pty Ltd (No 3) [2013] FCA 1326.

Clean Energy Regulator v MT Solar Pty Ltd [2013] FCA.

Re Enviro Friendly Products Pty Ltd (In Liq) [2013] FCA 852.

Matthews v Chicory Marketing Board (Vic) (1938) 60 CLR 263.

Pacific Hydro Limited & Ors v Office of the Renewable Energy Regulator [2006] FCAFC 39.

Legislation

A New Tax System (Goods and Services Tax) Act 1999 (Cth).

Clean Energy Act 2011 (Cth).

Environment Protection and Biodiversity Conservation Act 1999 (Cth).

Income Tax Assessment Act 1936 (Cth).

Income Tax Assessment Act 1997 (Cth).

Renewable Energy (Electricity) (Charge) Act 2000 (Cth).

Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act 2000 (Cth).

Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act 2010 (Cth).

Renewable Energy (Electricity) Bill 2000 (Cth) Explanatory Memorandum.

Renewable Energy (Electricity) Bill 2009 (Cth).

Victorian Energy Efficiency Target Act 2007 (Vic).

Victorian Energy Efficiency Target Regulations 2008 (Vic).

Other Sources

Australian Energy Regulator, National Electricity Market electricity consumption (2016) <<https://www.aer.gov.au/node/9765>> at 11 September 2016.

Australian Government, Clean Energy Regulator, *Renewable Energy Target: REC Registry and Small-scale Technology Certificate clearing house - terms and conditions* (2009) <<http://www.cleanenergyregulator.gov.au/DocumentAssets/Documents/REC%20Registry%20and%20Small-scale%20Technology%20Certificate%20clearing%20house%20-%20terms%20and%20conditions.pdf>> at 13 December 2016, item 3.6.

Australian Government, Clean Energy Regulator, *The History of the Renewable Energy Target* (2014) Renewable Energy Target <<http://ret.cleanenergyregulator.gov.au/About-the-scheme/History-of-the-RET>> at 29 March 2015.

Australian Government, Clean Energy Regulator, *Register of Large-Scale Generation Certificates* <<https://www.rec-registry.gov.au/rec-registry/app/public/lgc-register>> at 13 June 2015.

Australian Government, Clean Energy Regulator, *REC Registry*, (2016) <<https://www.rec-registry.gov.au/rec-registry/app/public/about-the-registry>> at 19 September 2016.

Australian Government, Clean Energy Regulator, *The Renewable Power Percentage Target* (2014) Renewable Energy Target <<http://ret.cleanenergyregulator.gov.au/About-the-Schemes/About-the-renewable-power-percentage/Annual-targets>> at 29 March 2015.

Australian Government, Department of Agriculture, Australian Energy Statistics – Energy Update 2011(2015), <http://www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/D AFFService/display.php?fid=pe_abares99010610_12c.xml> at 13 June 2015.

Australian Taxation Office, *Legal Database* (2004) <<http://law.ato.gov.au/atolaw/view.htm?docid=AID/AID2004956/00001>> at 13 December 2016.

Australian Taxation Office, Private Ruling to Alexander Fullarton, Authorisation Number, 59756, 9 February 2006.

Energy Market Review Committee, Commonwealth of Australia, *Towards a Truly National and Efficient Energy Market* (2002) <<http://www.efa.com.au/Library/ParerFinRpt.pdf>> at 3 December 2016. (Parer Report).

Commonwealth of Australia, *Cases* (2010) High Court of Australia <<http://www.hcourt.gov.au/search?q=Renewable+Energy+%28Electricity%29+Act>> at 17 October 2016.

Mandatory Renewable Energy Target Review Committee, Parliament of Australia, *Renewable Opportunities: A Review of the Operation of the Renewable Energy (Electricity) Act 2000* (2003). (Tambling Review).

Oliphant, Monica, 'Australia's Emissions Contribution: Does It Matter?' in John O'Brien (ed), *Opportunities Beyond Carbon: Looking forward to a sustainable world* (2009) 317, 328 <<http://search.informit.com.au/documentSummary;dn=231651766486097;res=IELBUS>> at 5 December 2016.

OECD Environment Statistics (database), UNFCCC, *Greenhouse Gas Inventory Data* (2012).

US Energy Information Administration *International Energy Statistics* (2012) <<http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=6&pid=29&aid=12&cid=CG5,&syid=2008&eyid=2012&unit=BKWH>> at 29 August 2015.