Energy Policy 62 (2013) 386–400

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

# An analysis of Australia's large scale renewable energy target: Restoring market confidence ☆

Tim Nelson *, James Nelson, Jude Ariyaratnam, Simon Camroux

*Level 22, 101 Miller Street, North Sydney, NSW, 2060, Australia*

## HIGHLIGHTS

- We examine the history of Australian renewable energy policy.
- We examine whether capital market efficiency losses occur under certain policy scenarios.
- We find electricity prices increase by up to $119 million due to renewable policy uncertainty.
- We conclude that constant review of policy is not reform and should be avoided.

## ARTICLE INFO

*Article history:*
Received 23 December 2012
Accepted 27 July 2013
Available online 17 August 2013

*Keywords:*
Policy uncertainty
Renewable energy
Electricity policy

## ABSTRACT

In 2001, Australia introduced legislation requiring investment in new renewable electricity generating capacity. The legislation was significantly expanded in 2009 to give effect to a 20% Renewable Energy Target (RET). Importantly, the policy was introduced with bipartisan support and is consistent with global policy trends. In this article, we examine the history of the policy and establish that the 'stop/start' nature of renewable policy development has resulted in investors withholding new capital until greater certainty is provided. We utilise the methodology from Simshauser and Nelson (2012) to examine whether capital market efficiency losses would occur under certain policy scenarios. The results show that electricity costs would increase by between $51 million and $119 million if the large-scale RET is abandoned even after accounting for avoided renewable costs. Our conclusions are clear: we find that policymakers should be guided by a high level public policy principle in relation to large-scale renewable energy policy: constant review is not reform.



## 1. Introduction

Australia has significant reserves of low-cost black coal, brown coal and natural gas. This energy providence has sustained Australian economic growth for much of the last century. However, as Jarvinen et al. (2012, p.63) observed, Australian policy derivation is often 'policy taking' rather than 'policy making' due to the relatively small size of Australia in terms of population, technology origination and global influence. To that end, Australia has been one of 96 countries that have embraced government policies designed to facilitate greater investment in renewable energy technologies (BNEF, 2012) despite the advantage of abundant low-cost fossil fuel energy reserves. Globally, concerns about energy security have motivated policymakers to introduce mechanisms designed to deploy renewable energy. Within Australia, it would be reasonable to state that the public policy objectives being pursued in relation to renewable energy relate to reducing greenhouse gas emissions and diversifying Australia's electricity supplies. This is in addition to market failures associated with sub-optimal, inter-temporal, investment allocation given the long-lived nature of electricity infrastructure, and a bipartisan agreement to reduce greenhouse gas emissions over the long-term.

In 2011, approximately 90% of all electricity generated in Australia was fuelled by either coal or gas (ESAA, 2012). The remaining 10% was sourced from renewables with hydro-electric generation producing around 7% and wind contributing around 3% (ESAA, 2012). This result is different when compared to ten years ago. In 2000, coal and gas collectively powered 92% of all electricity generation in Australia with hydro-electricity comprising the remaining 8% (ESAA, 2000). Wind was almost non-existent as a deployed technology within the Australian electricity market. The critical difference between the years 2000 and 2011 was the operation of the Mandatory Renewable Energy Target (MRET).

The MRET was introduced in 2001 by the Commonwealth Government with a public policy objective of increasing Australia's

☆Any errors or omissions remain entirely the responsibility of the authors.

* Corresponding author. Tel.: +61 402406616.
*E-mail address:* tanelson@agl.com.au (T. Nelson).

0301-4215/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.enpol.2013.07.096

renewable electricity generation by an 'additional 2%'. It became known as the '2% MRET' policy and was successful in achieving its public policy objective: the deployment of more renewable energy. However, there have been several policy development 'junctures' where investor confidence has been damaged due to ongoing reviews and amendment of this policy. Since the passage of the legislation underpinning the original MRET policy, there have been two major amendments and five points of 'review' by policy-makers. While one of these amendments could be thought of as being unambiguously material – the expansion of the policy from 2% to 20% – the remaining reviews contributed little towards providing a stable platform for investors to make long-term decisions regarding renewable energy infrastructure. For a more comprehensive outline of the history of Australia's renewable energy policy see Nelson et al. (2011).

In addition to consistent uncertainty in relation to Australian renewable energy policy, there has been the added uncertainty created by the intense debate around climate change policy within Australia. A thorough explanation of the history of Australian climate change policy is provided by Nelson et al. (2012). Most recently, on 1 July 2012, the Commonwealth Government introduced a fixed carbon price or carbon tax of $23 per tonne of carbon dioxide equivalent ($CO_2e$) which will apply to all industrial facilities with emissions greater than 25,000 tonnes of $CO_2e$. It is intended that the fixed price (which increases each year) will apply for three years with an emissions trading scheme to commence operation from 2015. This policy mechanism is designed to deliver on the Government's policy objective – reducing Australia's 2020 greenhouse gas emissions by 5% relative to 2000 levels. However, while the objective is shared by the opposition (Liberal/National Coalition), the mechanism by which to achieve the target is not. The opposition has committed to repealing the carbon price legislation if elected to form Government and will then implement a 'direct action' framework. Accordingly, policy uncertainty exists in relation to the longevity of carbon pricing in Australia.

The impact of carbon policy uncertainty has been quantified in two aspects by Australian economists (a) suboptimal investment decisions, and (b) suboptimal investment costs relative to a counterfactual scenario. Nelson et al. (2010) examined the costs associated with the sub-optimal capital investment caused by carbon policy uncertainty. They found that the costs could be as high as $2 billion per annum due to unnecessarily high electricity prices. This research was tested by other economic modeling firms and while the thesis was found to be correct, cost estimates varied. Nelson, Simshauser, Orton and Kelley (2011) provide a summary of these studies so we do not intend to replicate such analysis here. On suboptimal investment costs, Simshauser and Nelson (2012) estimated the capital market efficiency losses associated with carbon policy uncertainty. Their project finance market survey established that providers of debt finance would impose higher risk premiums as a result of ongoing policy uncertainty in relation to carbon pricing. The higher risk premiums would result in capital market efficiency losses of up to $4.5 billion over the period between 2015 and 2020.

It is in this context that this article considers approaches to renewable energy public policy development in Australia, applying the same methodology utilised by Simshauser and Nelson (2012) to assess the capital market efficiency losses associated with uncertainty in relation to the LRET. It is important to note that this article is not intended to discuss the merits or otherwise of renewable energy policy. This has been debated at length in the Australian and international context (for example, see SKM-MMA, 2012). Rather, our analysis takes as given a renewable energy policy in place for 11 years with legislated targets for the following 18 years.

This article is structured as follows: Section 2 reviews the evolution of large scale renewable energy policy in Australia and associated global market developments; the supply and demand for Large Scale Generation Certificates (LGCs) is presented in Section 3; the results of a survey of renewable electricity market participant views in relation to policy and pricing are documented in Section 4; Section 5 analyses the capital market efficiency losses associated with higher risk premiums being applied to new developments; partial equilibrium analysis of electricity price impacts related to ongoing policy uncertainty is presented in Section 6; our policy recommendations are presented in Section 7 with concluding remarks provided subsequently.

## 2. The evolution of large-scale renewable energy policy in Australia

The Mandatory Renewable Energy Target (MRET) was introduced in Australia in 2001. The legislation underpinning the policy was passed in 2000. The *Renewable Energy (Electricity) Act 2000* and *Renewable Energy (Electricity) Regulations 2001* required electricity retailers to purchase Renewable Energy Certificates (RECs) to avoid paying a shortfall penalty of $40 per megawatt hour (MWh) of renewable energy not acquired. Under MRET, new renewable electricity generators constructed after 1997, and incumbent renewable generators who generated power above their historical baseline, were eligible to create RECs with one REC equivalent to the generation of one MWh of renewable energy. The legislation required retailers to progressively increase their purchases of RECs so that by the year 2010, an additional 9500 MWh of new renewable generation would be produced. It was forecast that the policy would add renewable generation output equivalent to around two percent of electricity demand by 2010. It could be argued that the policy was effective in achieving its objectives over its first few years of existence as significant new investments in renewable energy capacity were made in biomass, landfill gas and wind farms. Fig. 1 shows the new installed renewable capacity (wind and non-wind) since 2001. This is in addition to the roughly 1.5 GW of small scale solar PV installed between 2001 and 2011.

In 2003, a review of the MRET legislation was initiated by the Howard Government and conducted by a panel chaired by former Senator Grant Tambling. The review came to be known as the 'Tambling Review' and heard from interested stakeholders about the operation of the MRET since its inception in 2001. Recommendations from the review included: the MRET measure to continue to operate; MRET targets to continue to be expressed in GWh and not as a percentage of overall electricity demand; MRET targets to increase beyond 2010 and to stabilise at 20,000 GWh in 2020; and the end date of the measure to be extended beyond 2020 so that renewable energy projects receive RECs for a full 15 year period presumably because such a tenor would align more closely to project financings (Australian Greenhouse Office, 2004).

The Tambling Review provided its report to the Minister for the Environment and Heritage in late 2003, which was tabled in Parliament in early 2004. The Commonwealth Government made a number of minor changes to the policy as a result of the Tambling Review but the significant recommendations outlined above were largely ignored (Australian Greenhouse Office, 2004). When considered in the context of global renewable energy policy, this is not surprising. Renewable energy investment at the time was relatively small by comparison to investment in thermal coal-fired and gas-fired power generation. This is shown in Fig. 2. Global renewable energy investment (LHS) and the ratio of global thermal to renewable investment (RHS) are plotted for the years 2004 through 2011. In 2004, when the Commonwealth