

Renewable Energy in Australia: Policy, Regulation, and Institutions

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Abstract

This paper assesses the policy, regulatory and institutional settings for renewable energy in Australia. This assessment is premised on the following arguments: a) the extent to which renewable energy is likely to contribute to electricity defossilisation will be largely determined by the efficacy of the policy, regulatory and institutional settings; and b) most of the existing discussion on renewable energy is neglectful of the significance of these settings. The assessment suggests that the overall policy, regulatory and institutional settings for renewable energy in Australia are characterised by a lack of political constituency for redressing climate change challenge, thereby piecemeal policy for promoting renewable generation, significant regulatory uncertainty, and limited institutional capacity. The assessment also suggests that this lack of political constituency is primarily a reflection of the broader electricity and socio-economic policy settings, which have historically favoured cheap and abundant indigenous coal for power generation, to serve wider socio-economic priorities and agendas. In such environments, issues of climate change have assumed a dormant role. Hence – inefficacious policy, regulation and institutions for promoting renewable generation.

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Keywords: Renewable energy; Policy; Regulation; Institutions; Australia

Introduction

It is now widely accepted that climate change is one of the most pressing challenges facing humanity, due to its detrimental impact on human and natural systems (IPCC, 2007). The climate change challenge is an outcome

of increase in global temperature (global warming) caused by anthropogenic greenhouse gas (GHG) emissions. The use of fossil fuels for electricity generation is the single largest source of these emissions, responsible for almost one-fourth of global emissions (IPCC, 2014). In the absence of any significant transformation in the electricity generation technology-mix, it is expected that global emission levels will increase by at least 35 per cent, by 2040 (compared with 2015 levels), which would potentially intensify the climate change challenge (IEA, 2017).

Recent years saw growing efforts to search for options to defossilise electricity generation, especially in Australia (the focus of this paper), which is considered as one of the worst emitters in the world in terms of emissions per capita (The Climate Council, 2015). Among various options under consideration, a consensus seems to have reached that renewable energy (such as, wind and solar) is an attractive option. The attractiveness of renewable energy becomes even greater if one takes notes of the growing uncertainty about the viability and acceptability of alternative options for electricity defossilisation, particularly nuclear energy and carbon capture and storage (CCS).

Considerable work has already been undertaken to discuss the role of renewable energy in electricity defossilisation. This discussion has primarily been confined to the techno-economic aspects of renewable energy, focusing on its technical potentials (Dawson and Schlyter, 2012; Shafiullah et al., 2012; Yusaf et al., 2011), cost-effectiveness (ATSE, 2009; Kann, 2009; Lu et al., 2017; Trainer, 2017), externalities (such as, multiplier effects) (SKM, 2012, 2013; The Climate Institute, 2011), and risks (for example, merit-order effects) (Diesendorf, 2007; Needham, 2008; Prasad et al., 2017). There is rather scant discussion of the policy, regulatory and institutional aspects of renewable energy. This paper argues that these non-techno-economic aspects are equally important, because they will largely determine the extent to which renewable energy is likely to contribute to electricity defossilisation. Insights into these aspects are therefore pre-requisites for developing a more concerted discussion on the role of renewable energy in the Australian electricity landscape.

Against the above backdrop, the primary objective of this paper is to assess the policy, regulatory, and institutional settings for renewable energy in Australia. Policy setting, in the context of this paper, refers to the political processes for making policies to promote renewable energy. Regulatory setting focuses on the prevailing legislations for regulating various facets of renewable energy, such as, planning, financing, implementation and operation. Institutional setting is about the responsibilities of various institutions involved in making and implementing renewable energy policies and regulations. Further, this paper assesses the policy, regulatory, and institutional settings in the broader electricity and socio-economic policy settings. This assessment is made based on the argument that generation technology-mix is shaped by the underlying electricity policy setting, which in turn draws its imprimatur from the wider policy setting for socio-economic development of the nation. Hence, the policy, regulatory and institutional settings for promoting renewable generation are inextricably intertwined with the broader electricity and socio-economic policy settings.

The assessment in the paper is empirical in nature. Such an assessment – this paper contends – is extremely useful, especially for policy-makers and energy planners. Its usefulness arises from its ability to demonstrate the significance of policy, regulatory, and institutional aspects of renewable energy, and how appreciation of these aspects is critical for providing context and meaning to the techno-economic discussion of renewable energy. The insights of the assessment are not only relevant for Australia, but also for other countries currently considering renewable energy as an option for defossilising electricity generation.

This paper is organised as follows. Section 2 provides a brief narrative on the electricity and socio-economic policy settings for Australia – essential for appreciating various arguments presented in this paper. Section 3 provides an overview of the policy, regulatory and institutional settings for renewable energy in Australia. The efficacy of these settings is also discussed in the section. Section 4 presents some broad conclusions of the paper.

Electricity and socio-economic policy settings

This section of the paper provides a brief overview of the electricity and socio-economic policy settings for Australia, with the aim of developing a contextual backdrop for assessing the policy, regulatory and institutional settings for renewable energy in Australia. This overview is carried out for three-time periods, to coincide with major changes in these policy settings. These time periods are: early years of the electricity industry (1880s and 1890s), era of state interventionism (1900s to 1970s), and market reform period (1980s to the present). Assessment of broader policy settings in these three-time periods – this paper argues – will provide insights into the underlying influences that have shaped these settings, and how these settings have shaped the policy, regulation and institutions for promoting renewable generation.

1880s and 1890s : In the years following the emergence of electricity industry in Australia, the policy setting of the industry mainly emphasised furtherance of business interests, through recourse to *laissez faire* precepts, namely, private ownership as the best way to promote economic and social progress (Wilkenfeld and Spearritt, 2004). This emphasis was consistent with the socio-economic policy settings of the time that prioritised the creation of a socio-economic order in which investors (especially, British) were given freedom to pursue their self-interest with British colonial government assuming a supportive role (Butlin, 1959). This priority essentially reflected British interests, for example, developing the continent as sources of raw materials (Attard, 2008), and as outlets for surplus capital and labour (Steven, 2000; Trainor, 1994). It also received substantial support from domestic capitalists whose existence and prosperity were closely linked to accelerated urbanisation and trade fuelled by British capital and technology (Gilchrist, 2017). Guided by the private-oriented policy setting of the electricity industry, private investment was drawn to the industry; most of this investment was made in coal-based power projects, due to the abundance of domestic coal resources and the existence of well-established coal mining industry (Saddler, 1981).

1900s to 1970s: Prompted by concerns about Australia’s economic vulnerabilities to external threat (such as, significant fluctuations in international demand and prices for primary commodities) and growing public appeal of Keynesianism, the policy priorities for socio-economic development began to shift in the early 20th century towards state interventionism, protection of the infant industry, and creation of a welfare society (Bell, 1997). These priorities were essentially reflective of a consensus between the labour and the business, known as the Australian Settlement (Kelly, 1992). The essence of this consensus was that protectionism could promote domestic industry, and create employment opportunities for urban professionals and factory workers (Castles, 1988). In order to subserve these priorities, state electricity authorities were created, and made responsible for managing power systems within the state territories (Sharma, 2003). The electricity authorities were deliberately encouraged to procure cheap and reliable indigenous fuels (especially, coal) for power generation – essential for promoting industrial growth and social welfare improvement (Rosenthal and Russ, 1988).

1980s to the present: Australia embraced economy-wide neoliberal reforms in the 1980s, indicating a fundamental shift in the policy priorities for socio-economic development towards market competition, private investment and deregulation (Quiggin, 2002). This shift was assisted by several developments that undermined the public appeal of Keynesianism. These developments included: the end of post-war economic boom and the onset of economic recession; the need to revive economic growth in new economic circumstances typified, for example, by stagflation and increasing economic globalisation; a view that revival of economic growth in these circumstances can only be achieved by improving international competitiveness of the national economy; an argument that improving international competitiveness requires improvement in domestic competitiveness first; a strong belief that domestic competitiveness is best measured in terms of economic efficiency; and a faith that this efficiency can be best improved through recourse to free market principles (Argy, 2002; Bell, 1997). The neoliberal reforms also received substantial support from internationally competitive, export-oriented industries (especially, resource industries), whose interests were well served by market liberalisation and de-regulation (Bernard, 1994).

Electricity reforms have been implemented in Australia as integral extensions of the economy-wide reform

programs. These reforms led to significant changes in the Australian electricity industry, for example, vertical and horizontal unbundling of existing vertical-integrated electricity authorities, creation of competitive markets for electricity trading (*i.e.*, National Electricity Market, NEM), establishment of sector-specific regulators (*i.e.*, Australian Energy Regulator, AER), and privatisation (Moran, 2006). These changes have encouraged electricity companies to use cheap indigenous fuels (especially, coal and gas) for power generation, and to rehabilitate some old less-efficient coal power plants, with the view to minimise short-run marginal costs of electricity (MacGill and Healy, 2013; Sharma, 2003). Even in the recent years, the growing pressure for the Australian government to act on climate change has not led to a fundamental shift in the generation technology-mix, which continues to be dominated by coal-based capacities (IEA, 2018).

Based on the above discussion, some points are identified that will need to be considered in the assessment of the policy, regulatory and institutional settings for renewable energy in Australia. These points are as follows:

The electricity policy setting in Australia has, over three distinctive time periods (namely, classical, Keynesian, and neoliberal), focused on cheap and reliable fuels for power generation. This focus has tended to favour coal-based technologies, resulting in the formation of a coal-electricity compact. This compact trace its origin to the late 19th century, when private investment was drawn to the industry, as a response to the technological advancements in electricity and the business opportunities it offered. Most of this investment was made in coal-based power projects, due to the abundance of indigenous coal reserves and the existence of well-established coal mining industry. The coal-electricity compact was consolidated in the era of state interventionism (1900s to 1970s), as state electricity authorities were deliberately encouraged to procure indigenous fuels (especially, coal) for power generation to promote supply reliability. The coal-electricity compact was further strengthened after market reforms, as these reforms tended to encourage cost-minimisation and profit maximisation behaviours of electricity companies. These obviously favoured generation technologies using cheap indigenous fuels, especially coal.

The underlying electricity policy setting in each time period has predominantly reflected the wider socio-economic policy setting and associated interests. This implies that the coal-electricity compact is likely to remain dominant in Australia in the years to come, especially in the absence of a national consensus of developing a low-carbon economy. This is so because the coal-electricity compact is essentially reflective of the electricity policy setting, which derives its legitimacy from the underlying policy setting for socio-economic development of the country. Change in the coal-electricity compact (through, for example, promoting renewable generation) will lead to socio-economic and political consequences, which may in turn cause public concerns, and hence reservation, about further policy support for renewable energy. The recent announcement made by the Victorian government to extend the licenses of two large coal-based power stations in the Latrobe Valley for 17 years may lend some credence to this viewpoint.

Renewable energy: Policy, regulation, and institutions

This section provides a description of the key policy, regulatory, and institutional settings of renewable energy in Australia, with the view to assess the efficacy of these settings.

Policy

The review of policy setting for renewable energy in Australia is divided in this section into four time-periods, according to the changing position taken by the Australian government towards climate change policy in general, and renewable energy policy in particular. These time periods are:

1980-1996: The debate of climate change in Australia traces back to the 1980s. For example, in 1980, a conference was held by the Australian Academy of Science to discuss 20 years of measurements that show an increase in the levels of GHG emissions (Burgmann and Baer, 2012). Later, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) held two conferences (in 1987 and 1988), focusing

on the biological and social impacts of climate change. These two conferences attracted considerable public attention (Staples, 2009). Besides, Australian scientists also played active role in the international conference on climate change held in Toronto in 1988, which called for a 20 per cent reduction of global emissions from current levels by 2005, known as the Toronto target (Staples, 2009).

The early debate of climate change in Australia had raised extensive public concerns about dangerous effects of GHG emissions, yet political will to act was limited. For example, in 1989, a proposal was made by the Environment Minister to adopt an Interim Planning Target of reducing emissions to 20 per cent below 1988 levels by 2005. The proposal was however rejected due to strong opposition from ministers with economic and resource portfolios. It was later accepted with the proviso that measures for achieving the interim target would not be introduced at the expense of the economy – the so called no-regrets measures (Burgmann and Baer, 2012).

In 1992, the Council of Australian Government (COAG) endorsed the National Greenhouse Response Strategy (NGRS), which called for the pursuit of no-regrets measures that ‘meet equity objectives by causing minimal disruption to the wider community, and single industry sector, or any geographical region’ (National Greenhouse Advisory Panel, 1996, pp 12-13). Accordingly, measures recommended by the NGRS mainly focused on voluntary actions for emissions reduction. In the context of electricity industry, market reforms were recommended based on the argument that these reforms could establish the primacy of pricing mechanism in the industry, which could foster competition, and hence provide appropriate signals for attracting new investment, especially in renewable energy and co-generation (Commonwealth of Australia, 1997).

The emerging evidence however suggests that the NGRS had failed to meet the interim target (Wilkenfeld et al., 1995). For example, in the electricity industry, market reforms had failed to encourage generators to take voluntary actions (*e.g.*, investment in renewable generation) for reducing their emissions. Rather, the market reforms had tended to encourage them to use low-quality high-GHG-emitting coal for power generation, and to rehabilitate some old less-efficient coal power plants, with the view to minimise short-run marginal costs of electricity (Sharma, 2003). According to Findlay (2000), ‘...introduction of electricity markets has increased Greenhouse gas emissions by 6 million tonnes of CO₂ equivalents per year above the predictions, yet the restructuring of the electricity industry was the centrepiece of the 1992 National Greenhouse Response Strategy!’.

1997-2006: In response to the failure of the NGRS and growing public pressure for Australian government to act on climate change, the federal Coalition government announced in 1997 a \$180 million, 5-year package of measures – *Safeguarding the Future: Australia’s Response to Climate Change* – that constituted the National Greenhouse Strategy (NGS). The NGS was targeted to deliver a ‘reduction of a third in our expected net emissions growth from 1990-2010...from 28 to 18 per cent in that period’ (Commonwealth of Australia, 2000). There was one measure in the NGS specifically identified as going beyond no-regrets measures – the Mandatory Renewable Energy Target (MRET). The MRET provided financial incentives to renewable generators in the form of tradeable certificates (Renewable Energy Certificates, RECs). The RECs were created for every megawatt hour of electricity renewable generators produce. Electricity retailers were obligated to purchase the RECs to meet their annual renewable energy obligations. The obligations were to have 2% of electricity sales from renewable sources by 2010, equivalent to 9,500 GWh of electricity generation in that year (Moran and Sood, 2013).

Despite some progress in promoting renewable generation, overall the NGS was seen by many commentators as insufficient because it mainly reinstated the previously cancelled measures (Taplin and Yu, 2000). This view was also supported by some speculation that the NGS was largely introduced as an attempt to convince the international community that Australia should be given special consideration in the Kyoto negotiations, as the country has already made significant efforts to reduce its emissions (Hamilton, 2000; Taplin and Yu, 2000). This speculation may get substantiated by the strong position taken by the Australian government during the Kyoto negotiations, particularly the threat to withdraw from the negotiations, and refusal to ratify the Protocol, even with the inclusion of the controversial land-clearing clause (*i.e.*, the Australia Clause).

In contrast to the federal government, Australian state governments appeared to have taken more active actions for emissions reduction. For example, the New South Wales government introduced the Greenhouse Gas Reduction Scheme (GGAS) in 2003. It was one of the world's first mandatory emissions trading scheme for the power sector. This scheme had provided significant support for renewable generation, leading to emissions reduction of 90 million tonnes (Burgmann and Baer, 2012). Besides, feed-in tariffs (FiTs) were also provided in various states, mainly focusing on the promotion of residential rooftop solar PVs (Nielson, 2010). In addition, in 2004, a working groups was established by the First Ministers of all Australian State and Territory governments to discuss the development of a national emissions trading scheme (ETS) (Warren et al., 2016).

2007-2012: Australia's environmental stance had drastically changed after the 2007 federal election. Immediately after the election, the Labour government ratified the Kyoto Protocol with unconditional emissions reduction target of 5 per cent below 2000 levels by 2020, and conditional target of 15-25% subject to international commitment (Cheung and Davies, 2017). In 2010, the Labour government also expanded the MRET to 45,000 GWh by 2020 (equivalent to 20% of electricity sales in that year) (MacGill and Healy, 2013). In the following year, the MRET was further separated into two components. They are: 1) the Small-scale Renewable Energy Scheme (SRES) that covers small-scale renewable installations (for example, rooftop solar PVs, and solar water heaters); and 2) the Large-scale Renewable Energy Scheme (LRET) that covers utility-scale renewable power stations (such as, wind farms, and solar PVs). This separation was made due to concerns about excessive supply of RECs created by a large number of small-scale installations (for example, rooftop PVs) fuelled by state-based FiTs and its crippling impacts on REC prices (Nielson, 2010).

In addition, the Labour government had also made some attempts to introduce a national carbon pricing scheme – the Carbon Pollution Reduction Scheme (CPRS), which is likely to benefit renewable energy, because it will improve the cost-competitiveness of renewable generation by increasing the cost of fossil fuel generation. These attempts had however failed, due mainly to the lack of bipartisan support for the CPRS and growing public concerns in regard to the cost of climate change policies following the 2007-08 financial crisis (McDonald, 2015). Later, a modified carbon pricing scheme was introduced (in 2011), which commenced with a fixed price of \$23/t CO₂ in 2012-13, and \$24.15/t CO₂ in 2013-14 (Clean Energy Regulator, 2015).

2013-2018: The carbon pricing scheme was however repealed in 2014 by the Coalition government as a fulfilment of their campaign commitment (Crowley, 2017). The Coalition government also called for a review of the prevailing renewable energy policies. This has resulted in a significant roll-back of policy support for renewable energy, most notably, a reduction in the 2020 targets for renewable generation from 41,000 MWh to 33,000 MWh (Cox, 2015), reduced investments by the Clean Energy Finance Corporation (CEFC) in renewable projects (McKenzie-Murray, 2015), and abolishment of Climate Commission (Arup, 2013). These led to a sharp reduction in renewable investment since 2014, which only began to recover recently (Ludlow, 2018).

In 2017, a new policy scheme – National Energy Guarantee (NEG) – was proposed by the Coalition government to attract investment in low-emission generation technologies while ensuring the reliability and affordability of electricity. The proposed NEG is made up of two components, namely, the reliability guarantee, and the emissions guarantee. The reliability guarantee requires electricity retailers to have certain amounts of their peak demand covered by dispatchable capacity (*e.g.*, coal, gas, hydro and battery storage). The emissions guarantee requires electricity retailers to purchase electricity from the wholesale market to meet a defined emission intensity level for that electricity. The reliability component of the NEG is planned to start in 2019 and the emissions component to succeed the RET in 2020 (Energy Security Board, 2017). Details of the NEG are yet to be determined. It is expected that a high target for emissions guarantee will be required to provide additional incentives for renewable investment, because about 4,300 MW of renewable projects are already committed or under construction – more than sufficient to meet a low target for emissions guarantee (equivalent to 28% of electricity generated from renewable sources) currently under discussion (CEC, 2018).

Regulation

The responsibility of renewable energy regulation is shared between federal and state governments. Table 1 provides a summarised overview of key federal and state legislations for regulating renewable energy. Details are discussed below.

The key federal legislations that regulate the renewable energy sector include the following.

The *Renewable Energy (Electricity) Act* was enacted in 2000 with specific objectives to promote renewable generation. In particular, the Act establishes a scheme – the Mandatory Renewable Energy Target (MRET) – that mandates electricity retailers to purchase certain amounts of their electricity from renewable sources. To provide certainty, the target for renewable generation is expressed in the Act as a fixed amount of electricity that must be sourced from renewable generators each year; the initial target is 9,500 GWh of electricity by 2010, which represents about 2 per cent of electricity supply in that year (Parliament of Australia, 2014b).

The Act was amended in 2009, as the Renewable Energy (Electricity) Amendment Act 2009. Major changes brought about by this amendment are: 1) expansion of the target for electricity generation to 45,000 GWh by 2020 (equivalent to about 20 per cent of electricity supply in that year); 2) introduction of a Solar Credits multiplier, to provide an additional incentive for the installation of solar PV systems; and 3) provision of exemptions for emissions-intensive trade-exposed industries (Parliament of Australia, 2014b). In the following year, the Act was amended to split the scheme into two separate schemes: the LRET for utility-scale renewable generators, and the SRES for small renewable installations (such as, rooftop PVs and solar water heaters) (Parliament of Australia, 2014b). Another major amendment was made in 2015, as the Renewable Energy (Electricity) Amendment Bill 2015. As part of the amendment, the LRET was reduced from 41,000 GWh to 33,000 GWh by 2020 (Cox, 2015).

Table 1: Overview of key renewable energy legislations

| | Year | Legislations | Key features, outcomes |
|---------|------|---|--|
| Federal | 2000 | Renewable Energy (Electricity) Act | establishment of MRET introduction of a renewable generation target: 9,500 GWh by 2010 |
| | 2009 | Renewable Energy (Electricity) Amendment Act | expanded renewable target: 45,000 GWh by 2020 exemptions for emissions-intensive trade-exposed industries |
| | 2010 | Renewable Energy (Electricity) Amendment Act | separation of MRET into LRET and SRES |
| | 2011 | Australian Renewable Energy Agency Act | establishment of ARENA funding allocation (2013-2020): A\$3.2 billion |
| | 2012 | Clean Energy Finance Corporation Act | establishment of CEFC funding allocation: A\$2 billion each year |
| | 2013 | Clean Energy Legislation (Carbon Tax Repeal) Bill Budget Saving (Omnibus) Bill | reduction of funding allocation for ARENA to A\$2 billion |

| | Year | Legislations | Key features, outcomes |
|-----|------|--|---|
| NSW | 2015 | Renewable Energy (Electricity) Amendment Bill | reduction of LRET to 33,000 GWh by 2020 |
| | 2011 | Section 15A of the Electricity Supply Act 1995 | introduction of Solar Bonus Scheme until 2016 |
| | 2013 | Renewable Energy Action Plan | creation of Renewable Energy Advocate |
| | 2016 | Section 43ECA of the Electricity Supply Act 1995 | requirement for IPART to determine a voluntary FiT benchmark for retailers |
| VIC | 2008 | Electricity Industry Act (VIC) | introduction of various FiTs for different technologies |
| | 2017 | Energy Legislation Amendment (Feed-in Tariffs and Improving Safety and Markets) Bill | consolidation of existing FiTs |
| | 2017 | Renewable Energy (Jobs and Investment) Act | introduction of renewable generation targets: 25% by 2020, and 40% by 2025 creation of the Victoria Renewable Energy Auction Scheme |
| SA | 2007 | Climate Change and Greenhouse Emissions Reduction Act | introduction of a renewable generation target: at least 20% by 2014 |
| | 2009 | Climate Change and Greenhouse Emissions Reduction Amendment Act | expanded renewable target: 33% by 2020 |
| | 2014 | Climate Change and Greenhouse Emissions Reduction Amendment Act | expanded renewable target: 50% by 2025 |
| | 2008 | Electricity (Feed-in Scheme – Solar Systems) Amendment Act | introduction of FiTs for household solar |
| ACT | 2011 | Electricity (Miscellaneous) Amendment Act | introduction of FiTs for household solar PV |
| | 2011 | Electricity Feed-in (Large-scale Renewable Energy Generation) Act | establishment of an auction scheme for renewable projects |

| | Year | Legislations | Key features, outcomes |
|-----|------|--------------------------|---|
| QLD | 2015 | Powering Queensland Plan | establishment of an auction scheme for renewable projects |

The Act is implemented through the Renewable Energy (Electricity) Regulation 2001, which specifies the regulatory regime for governing the MRET, especially the administration of registration and accreditation of the Renewable Energy Certificates (RECs), and the issuance of exemption certificates to emissions-intensive trade-exposed industries. The Regulation has been revised several times since its inception, to reflect amendments made to the underlying Renewable Energy (Electricity) Act (as noted above).

The *Australian Renewable Energy Agency Act* was enacted in 2011, with a purpose to improve the competitiveness of renewable energy technologies, and to increase the supply of renewable energy in Australia – through the provision of financial assistance for research and the commercialisation of renewable technologies. The Act establishes the Australian Renewable Energy Agency (ARENA) for this purpose (ARENA, 2018a). The funding allocation for ARENA was initially at A\$3.2 billion over the period 2013-2020, and was later reduced to A\$2 billion, as a result of the introduction of the Clean Energy Legislation (Carbon Tax Repeal) Bill 2013, and the Budget Savings (Omnibus) Bill 2016 (ARENA, 2018b). In 2014, the Australian Renewable Energy Agency (Repeal) Bill was tabled in the Parliament, with the intention of repealing the Australian Renewable Energy Agency Act 2011, which would have the effect of abolishing the ARENA (Parliament of Australia, 2014a). This Bill was however rejected in the Parliament, due to strong public opposition – 129 out of 132 public submissions opposed the Bill (ARENA, 2014).

The *Clean Energy Finance Corporation Act 2012* was enacted in 2012, with the objective of financing clean energy projects (such as, renewable energy, and energy efficiency) that could help lower Australia's GHG emissions. The funding allocation is at A\$2 billion each year, for five years from 1 July 2013. The Clean Energy Finance Corporation is established by the Act to manage this funding. In 2013, a Bill was proposed in the Parliament, to abolish the Clean Energy Finance Corporation Act (Parliament of Australia, 2013). This Bill was however blocked in the Senate, and after a long period of discussion, abandoned in 2016.

Australian state governments have also introduced a range of legislations for regulating renewable energy within their jurisdictions. For example:

In New South Wales (NSW), the state government introduced the *Renewable Energy Action Plan* in 2013, with the aim to guide the development of renewable energy industry, and to support the national target of 20% renewable generation by 2020. Specific objectives outlined in the Plan are: attracting renewable investment and projects, building community support for renewable energy, and growing expertise in renewable technology (NSW Department of Planning & Environment, 2016). Besides, a scheme was legislated in 2009, as the *Section 15A* of the *Electricity Supply Act 1995 (NSW)*, to provide fixed feed-in-tariffs (FiTs) for household solar PV installations. The scheme is known as the Solar Bonus Scheme. This scheme initially set the FiTs at 60 c/kWh. However, the government announced major changes to the scheme in 2010, including a reduced FiTs of 20c/kWh for new participants. The scheme was ended in 2016 (NSW Department of Industry, 2016). Since then, solar FiTs began to be provided in NSW under the arrangements known as Voluntary Retailer Contribution, which allows each retailer to set their own FiTs. The Independent Pricing and Regulatory Tribunal (IPART) is required by the *Section 43ECA* of the *Electricity Supply Act 1995 (NSW)* to determine a voluntary FiT benchmark for electricity retailers (IPART, 2016).

The Victorian government enacted the *Renewable Energy (Jobs and Investment) Act* in 2017, as part of a package of policy reforms designed to deliver investment and jobs in the state. The Act is targeted to ensure 25 per cent of the state's electricity generation from renewable sources by 2020, and 40 per cent by 2025. The Victoria Renewable Energy Auction Scheme (VREAS) is created to achieve these targets (DELWP,

2018a). Besides, under the *Electricity Industry Act 2000*, various forms of FiTs had been provided to renewable technologies until 2016. In 2017, the Act was amended to consolidate these FiTs with the passage of the Energy Legislation Amendment (Feed-in Tariffs and Improving Safety and Markets) Bill. The Bill also requires the Essential Services Commission to determine the rates of FiTs each year (DELWP, 2018b).

In South Australia, the state government enacted the *Climate Change and Greenhouse Emissions Reduction Act* in 2007. The Act includes a renewable energy target of at least 20 per cent of electricity generation and consumption by 2014, which was increased to 33 per cent by 2020 in 2009, and 50 per cent by 2025 in 2014. Besides, FiTs have also been provided in the state to encourage the uptake of residential rooftop solar PV systems. These FiTs are regulated by the *Electricity (Feed-in Scheme – Solar Systems) Amendment Act 2008*, and the *Electricity (Miscellaneous) Amendment Act 2011* (South Australian Government, 2018).

In 2016, the government of Australian Capital Territory (ACT) legislated a target of sourcing 100% of the state's electricity from renewable sources. The ACT government also enacted the *Electricity Feed-in (Large-scale Renewable Energy Generation) Act* in 2011, which establishes an auction scheme for procuring renewable projects. Under the scheme, private investors are invited to bid for renewable projects. Winners are awarded long-term power purchase agreements (PPAs) with 'contract for difference' FiTs (ACT Government, 2017). Similar action schemes have also been introduced in Queensland (QLD) for acquiring new renewable capacity, under the *Powering Queensland Plan* (DMEW, 2018).

Institutions

The previous sections presented key policies and legislations for promoting renewable generation in Australia. These policies and legislations have been made and implemented by a range of institutions at both federal and state levels. Figure 1 provides a broad contour of the current institutional structure for governing renewable energy industry. Further details are discussed as follows.

Figure 1: Current institutional structure of renewable energy: A broad contour

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The key federal institutions that govern the renewable energy industry include the following.

The *Council of Australian Government (COAG)* was established in 1992 as the principal institution in governing issues of national significance or matters that need co-ordination by all Australian governments. The *Ministerial Council on Energy (MCE)*, as part of the COAG, was established in 2001, to provide overarching guidance in energy sector policy and planning. The MCE comprises ministers with responsibility for energy from the federal government and all states and territories. The MCE was merged with the Ministerial Council on Mineral and Petroleum Resources in 2011, as the *Standing Council on Energy and Resources (SCER)*. Later, the SCER was replaced by the *COAG Energy Council* in 2013, as the outcome of efforts to streamline the COAG council system (COAG Energy Council, 2018).

The *Department of Industry, Tourism and Resources* was established in 2001, and is responsible for policy-making and implementation in the energy sector, including renewable energy. Following the 2007 election, the responsibility for energy matters was transferred to the newly created *Department of Resources, Energy and Tourism*. This responsibility was again transferred to the *Department of the Environment and Energy (DoEE)*, after the 2016 election. The DoEE is responsible for administering various renewable energy legislations, such as, the Renewable Energy (Electricity) Act, the Australian Renewable Energy Agency Act, the Clean Energy Finance Corporation Act (DoEE, 2018). It also oversees the institutions, responsible for implementing these legislations. These institutions are:

The *Clean Energy Regulator (CER)* was created in 2012 as the independent statutory authority, responsible for administering schemes legislated by the federal government for measuring, managing, reducing or offset-

ting Australia's GHG emissions. One of these schemes is the Renewable Energy Target scheme, under the Renewable Energy (Electricity) Act (CER, 2016).

Created by the Australian Renewable Energy Agency Act, the *Australian Renewable Energy Agency (ARENA)* is responsible for promoting the development, commercialisation and deployment of renewable energy, through the provision of financial assistance for R&D programs in renewable technologies and early-stage commercialisation renewable projects. The ARENA was initially provided with A\$3.2 billion funding over the period 2013-2020. The funding was later reduced to A\$2 billion, as part of a A\$6 billion budget-saving package (Hopkin, 2016).

The *Clean Energy Finance Corporation (CEFC)* was established by the Clean Energy Finance Corporation Act in 2012, with the aims to facilitate and increase flows of finance into the clean energy technologies – renewables, energy efficiency and low-emission technologies (excluding CCS and nuclear). The CEFC makes commercial investments in these technologies based on guidance provided by responsible ministers (*i.e.*, environment and finance) in the forms of the Investment Mandate. It has been observed in the past few years that the Investment Mandate has tended to direct the CEFC to invest in certain renewable technologies (Keany, 2015).

Besides, in various Australian states, the Minister with energy portfolios also has the responsibility for making and implementing state-based support for renewable energy. This responsibility is normally assumed by the Department associated with the Energy Minister, such as, Department of Environment and Planning in New South Wales, Department of Environment, Land, Water and Planning in Victoria, Department for Energy and Mining in South Australia, and Department of Natural Resources, Mines and Energy in Queensland. The Energy Minister could also delegate the responsibility to an authorised entity. For example, in New South Wales, the Energy Minister has transferred the FiT regulatory functions from the NSW Department of Environment and Planning to Independent Pricing and Regulatory Tribunal (IPART). This transfer took effect in 2015 when IPART received a referral from the Energy Minister to determine the annual solar FiT benchmark under Section 43ECA of the Electricity Supply Act 1995 (IPART, 2016).

Assessment of efficacy

This section assesses the efficacy of existing policy, regulatory and institutional settings for renewable energy in Australia. This assessment is made based on the insights gained from a review of key policy, regulatory and institutional settings (as presented in sections 3.1 to 3.3), complemented by some thoughts on the all-to-familiar shenanigans of the policy and legislative processes. Some key points are discussed as follows:

- **Lack of political constituency for redressing climate change challenge** : Although the enormity of climate change challenge is well recognised in Australia, the political constituency to act is limited. The review as presented in section 3.1 should substantiate this observation; this review clearly demonstrates that policy efforts for reducing total emissions in Australia have been largely insufficient. For example, despite growing public concerns about climate change, the National Greenhouse Response Strategy (NGRS) adopted in the early 1990s mainly focused on no-regret measures for emissions reduction. In the mid-1990s, as the ineffectiveness of such measures became clearer, the National Greenhouse Strategy (NGS) was adopted, which went beyond no-regrets measures by introducing the Mandatory Renewable Energy Target (MRET) of having 2% electricity generation from renewable sources by 2010. Despite some progress in promoting renewable generation, the NGS turned out to be insufficient for reducing total emissions, as it mainly reinstated the previously cancelled measures for emissions reduction. After the 2007 federal election, Australia drastically changed its environmental stance. The ratification of the Kyoto Protocol, expansion of the MRET to 20% by 2020, and introduction of a national carbon pricing scheme thereafter firmly established a stance that prioritised emissions reduction. But this stance was short-lived, and a significant roll-back of policy measures for emissions reduction was witnessed after 2014 election, as the Coalition government repealed the

carbon pricing scheme, reduced the renewable energy target to 33,000 MWh (equivalent to about 15% of total generation in 2020), cut the funding for Clean Energy Finance Corporation, and abolished the Climate Commission.

- **Piecemeal policy for promoting renewable energy** : In the absence of adequate political constituency, the renewable energy policy setting in Australia is characterised by piecemeal policy efforts for promoting renewable generation. As presented in section 3.1, these policy efforts have primarily been made as a response to immediate pressure for the country to act on climate change. This pressure has arisen from increasing domestic concerns about climate change challenge and international commitment (*e.g.*, Kyoto Protocol) to emissions reduction. The 2007-08 financial crisis appeared to have created a general anxiety about economic slowdown and its crippling effects on living standards. In such environments, issues of climate change have assumed a dormant role. The outcomes have been a significant roll-back of policy support for renewable energy, for example, reduced the renewable energy target to 33,000 MWh.
- **Regulatory uncertainty** : Under the guidance of above-noted piecemeal policy, the task of developing effective regulation has become extremely difficult. This is so because any major policy change typically needs change in the underlying regulation, which requires recourse to time-intensive, and sometimes confrontational, legislative processes. The outcomes are therefore significant regulatory uncertainty. This viewpoint gets further substantiated by a review of the legislative landscape, as presented in section 3.2. This review shows that renewable energy legislations have been subject to frequent change in Australia, mainly as the results of underlying policy changes.
- **Limited institutional capacity** : The institutional arrangements for making and implementing renewable energy policy and regulation are well-developed in Australia with clear delineations of institutional responsibilities (Figure 1). Notwithstanding the satisfactory assignation of institutional responsibilities, the capacity of these institutions to fulfil their responsibilities is limited by factors, such as, frequent institutional change (*e.g.*, department reorganisation), reduction in budget allocation, and political interference. A review of the institutional landscape – as provided in section 3.3 – should provide some credence to this viewpoint.

The above discussion identifies major lacunae in the existing policy, regulatory and institutional settings. This discussion is further extended below, with the view to draw out some points that will need to be considered in order to improve the efficacy of the policy, regulatory and institutional settings. This extended discussion is developed based on the insights gained from a review of broader policy settings in section 2. Some of the main points are as follows.

As presented in section 2, the electricity policy setting in Australia has historically favoured cheap and abundant indigenous fuels (especially, coal) for power generation, to subserve wider priorities and agendas of socio-economic development of the country. In such environments, issues of climate change have become subordinate to wider socio-economic priorities, hence a lack of political constituency for redressing climate change challenge. Piecemeal policy efforts for promoting renewable generation, significant regulatory uncertainty, and limited institutional capacity are therefore natural outcomes, as a rapid increase of renewable generation would undermine the wider socio-economic priorities that have favoured coal-based generation.

To rectify the situation will require the formation of a national consensus to shift wider developmental priorities towards the development of a low-carbon economy, because this consensus will facilitate the development of more effective policy, regulation and institutions for promoting a major transformation of the existing coal-dominated generation mix, aimed at reducing emissions from power generation. The formation of such a consensus will be the outcome of a complex and challenging political bargaining process, through which various affected interests will be accommodated.

Conclusions

This paper has assessed the policy, regulatory and institutional settings for renewable energy in Australia. The assessment suggests that the existing policy, regulatory and institutional settings are characterised by a general lack of political constituency for redressing climate change challenge, thereby piecemeal policy efforts for promoting renewable generation, significant regulatory uncertainty, and limited institutional capacity.

The assessment also suggests that this lack of political constituency is essentially a reflection of the broader electricity and socio-economic policy settings, which have historically favored cheap and abundant indigenous coal for power generation, to serve wider socio-economic priorities and agendas. In such environments, issues of climate change have become subservient to wider socio-economic priorities. The inefficacious renewable energy policy, regulations and institutions are therefore ‘natural’ outcomes.

It is therefore reasonable to argue that effort to defossilise electricity generation through, for example, promoting renewable generation is more likely to bear fruit, if there is a national consensus to develop a low-carbon economy. The formation of this consensus will clearly require a considered accommodation of various affected interests through political bargaining processes.

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