



# POWER SHIFT: A BLUEPRINT FOR A 21<sup>ST</sup> CENTURY ENERGY SYSTEM

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# POWER SHIFT: A BLUEPRINT FOR A 21<sup>ST</sup> CENTURY ENERGY SYSTEM

**As part of the international agreement reached at the 2015 UN climate negotiations in Paris, Australia has committed to emissions reduction targets that will help keep a global temperature rise to well below 2 degrees Celsius over the course of this century.**

In line with achieving these targets, the decarbonisation and modernisation of Australia's electricity system needs to occur by no later than 2050. This means a national Power Shift is required, away from an outdated power system towards a modern, 21st century energy system.

Australia has a massive competitive advantage in clean energy<sup>1</sup> in an increasingly carbon-constrained world. It is blessed with the renewable energy resources and the increasingly sophisticated technologies to make this transition – and all while delivering significant benefits for the economy.

At a time when technological evolution and rapid cost reductions in renewable energy and battery storage are creating massive disruption to the energy sector, a Power Shift can unlock huge economic opportunities across Australia.

## ZERO

### **ZERO EMISSION ELECTRICITY**

**GENERATION** will require the widespread deployment of proven renewable energy technologies, the development of new and exciting technologies, the retirement of fossil fuel-based power generation and a sophisticated energy network that can integrate and manage changes in the way that we generate and consume electricity.

## 100%

### **100% UPTAKE OF SMART AND CLEAN ENERGY SYSTEMS**

will enable Australian homes and businesses to generate and manage their own electricity. This will involve the widespread adoption of rooftop solar solutions, combined with battery storage technology, energy management solutions and smart in-home integration.

Achieving this vision is technologically possible, economically responsible and supported by the Australian people.

Power Shift details the range of strategic policy and regulatory reforms that are essential to achieving this vision and transitioning Australia's electricity system.

<sup>1</sup> ABC, Fact check: Is Australia the sunniest continent on Earth?, August 2015. Available online: <http://www.abc.net.au/news/2015-08-10/solar-coverage-fact-check-is-australia-sunniest-continent/6659316>

Geoscience Australia, Wind Energy. Available online: <http://www.ga.gov.au/scientific-topics/energy/resources/other-renewable-energy-resources/wind-energy>



A photograph of a woman with long brown hair pushing a stroller with a baby in a city street. The woman is holding a white coffee cup. The baby is looking at the camera. A hand is reaching out from the foreground, partially obscuring the baby's face. The background shows a city street with trees and buildings.

**AUSTRALIA MUST TRANSITION  
TO A ZERO EMISSION ELECTRICITY  
SYSTEM WITH 100% UPTAKE OF SMART  
AND CLEAN ENERGY SYSTEMS IN  
HOMES AND BUSINESSES.**

# THE REWARDS OF A POWER SHIFT

**AUSTRALIA'S CURRENT ELECTRICITY SYSTEM IS OLD AND VERY CARBON-INTENSIVE. THE MAJORITY OF OUR EXISTING ELECTRICITY GENERATORS ARE AT OR BEYOND THEIR EXPECTED OPERATING LIFE, AND THE HIGH DEPENDENCE ON BROWN AND BLACK COAL MEANS THAT AUSTRALIA'S ELECTRICITY GENERATION SECTOR IS ONE OF THE MOST CARBON-INTENSIVE IN THE WORLD.<sup>2</sup>**

Australia is blessed with some of the best renewable energy resources in the world, with world-class wind, solar, marine, hydro and bioenergy sources. Its proven capability for continued innovation places it well to integrate these and other emerging solutions into its electricity systems.

## **Achieving a Power Shift will deliver huge benefits to the Australian energy sector and economy:**

- Modernising Australia's aging fleet of power plants, moving toward zero emission generation while ensuring high reliability of supply.
- Moving Australia to the forefront of innovation in energy technology solutions and cementing our competitive advantage in niche aspects of clean energy development and integration.
- On current trends, the cost of deploying renewable energy will soon be cheaper than any alternative for energy generation.
- Creating new economic opportunities and jobs, particularly throughout regional and rural Australia. The current Renewable Energy Target is expected to unlock \$40 billion of investment and 15,200 jobs,<sup>3</sup> much of which will flow into regional areas. Expanding Australia's renewable energy ambition beyond 2020 would see these figures grow further.
- Driving and attracting new investment. According to Bloomberg New Energy Finance, global investment in new clean energy reached a record US\$329 billion in 2015<sup>4</sup> By 2030 this opportunity is projected to deliver more than US\$5 trillion in investment globally.<sup>5</sup>
- Reducing Australia's reliance on volatile and expensive fossil fuels, while allowing it to maximise its energy export opportunities.
- Empowering consumers to play an active role in managing and producing their electricity.
- Creating competition and driving down the cost of electricity by enabling consumers to deploy a diverse range of distributed energy technologies.

<sup>2</sup> Climate Council, Australia's electricity sector: Ageing, inefficient and unprepared, 2014, page 8

<sup>3</sup> Based on modelling studies by ACIL Allen for the Federal Government's Expert Review of the Renewable Energy Target and ROAM Consulting, with additional analysis by the Clean Energy Council

<sup>4</sup> Bloomberg New Energy Finance, Media release: Clean energy defies fossil fuel price crash to attract record \$329bn global investment in 2015, January 2016

<sup>5</sup> Bloomberg New Energy Finance, Media release: European renewable energy investment set to surge by 2030 on back of nearly \$1 trillion of investment, July 2016

# 5

## POINT PLAN FOR A 21<sup>ST</sup> CENTURY POWER SHIFT

**Achieving a Power Shift to a 21<sup>st</sup> century energy system requires a long-term strategic plan which will ultimately deliver a policy and regulatory landscape that will provide certainty to investors and electricity consumers. The necessary priorities to achieve a Power Shift can be summarised as follows:**

- 1 Ensure long-term and transparent carbon reduction targets** that apply to the energy sector, recognising the important interaction between energy policy and climate change policy. This should facilitate the closure of Australia's most carbon-intensive coal-fired generation over time.
- 2 Set strong and long-term renewable energy targets** that ensure the continued and steady deployment of renewable energy. This can be achieved by an increase and extension of the Renewable Energy Target beyond 2020.
- 3 Innovation that delivers the next generation of clean energy solutions** with appropriate institutions and support for R&D, demonstration, and innovative financing for the clean energy sector.
- 4 Smart regulation for a 21<sup>st</sup> century energy system** that creates a competitive market and empowers consumers. Reform the energy market and current regulatory framework to facilitate greater competition, empower consumers and overcome the barriers to unlock the commercial opportunities to transition to smarter, cleaner energy technologies.
- 5 Cement public support** through ongoing focus on improving the way in which the sector interacts with consumers and communities.

Achieving this requires a strategic collaboration between policy makers, regulators, energy market institutions, the renewable energy industry and the community.

This paper outlines the importance of renewable energy and the need for long-term policy certainty to facilitate investment and the progressive transition to a cleaner energy system. It also outlines the actions needed to ensure this transition occurs at the lowest cost, with increasing levels of renewable energy deployed well beyond 2020.

# HOW MUCH WILL A POWER SHIFT COST?

## THE COST OF RENEWABLE ENERGY HAS FALLEN DRAMATICALLY OVER THE PAST DECADE AND IS EXPECTED TO CONTINUE TO DECLINE.

This cost reduction, combined with greater competition in the electricity market, is good for Australian electricity prices.

Substantial investment in new forms of electricity supply is required over the coming decades. Given global trends, cost projections and the various limitations of competing forms of new electricity generation, there is a high likelihood that the vast majority of this new investment in generation capacity will come from renewable energy sources.

While the investment required to install smart energy solutions such as solar power combined with battery storage and smart meter technology is significant, the financial returns to individual consumers are improving rapidly<sup>6</sup> – even before factoring in the system-wide cost savings such as reducing peak demand in our electricity markets.

The cost of renewable energy is largely in the upfront capital infrastructure, with no ongoing fuel costs. This provides certainty for the cost of production and avoids the cost volatility associated with fossil fuels, particularly where those fuel prices are linked to international markets. The potential for rapid

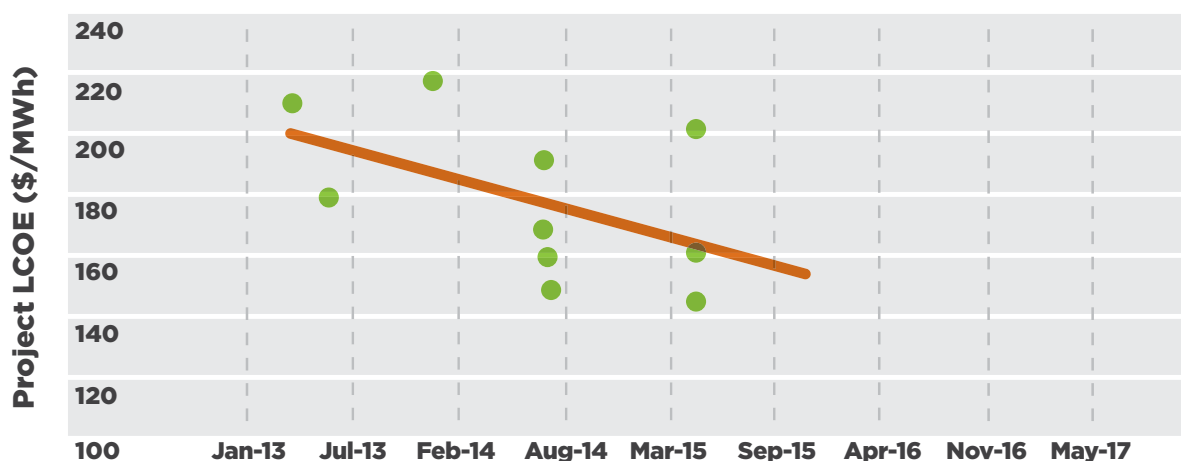
and significant change creates uncertainty and significant risk for Australian power prices. This exposure can be minimised through steadily increasing the share of renewable energy in the electricity market, while allowing Australia to maximise the export opportunities associated with some of those fuels.

Renewable energy has steadily decreased in cost over the last decade. In the case of rooftop solar power, the rapid improvement in economies of scale and efficiency both on a global and domestic level has led to spectacular cost reductions. According to Bloomberg New Energy Finance, solar costs have decreased by a factor of 150 since 1975. In Australia the cost of solar power systems is less than a quarter of what they were a decade ago. Some estimates suggest that manufacturing costs for solar panels will reduce by 30-50 per cent by 2019.<sup>7</sup>

Analysis reveals substantial cost reductions for all renewable energy technologies over the past decade<sup>8</sup>. According to the Joint Institute for Strategic Energy Analysis, “Renewable energy costs have declined dramatically over the past decades—some up to nearly 80 % since 2009—with the most significant improvements in wind and solar PV”.

The Australian Renewable Energy Agency (ARENA) has released analysis showing the average cost of large-scale solar power in Australia has declined from \$200/MWh in 2013 to less than \$130/MWh today.

**Figure 1**  
Cost of large-scale solar PV in Australia



<sup>6</sup> Australian Energy Market Operator, Emerging Technologies Information Paper, June 2015, page 3 and AECOM, Energy Storage Study, July 2015, page 12

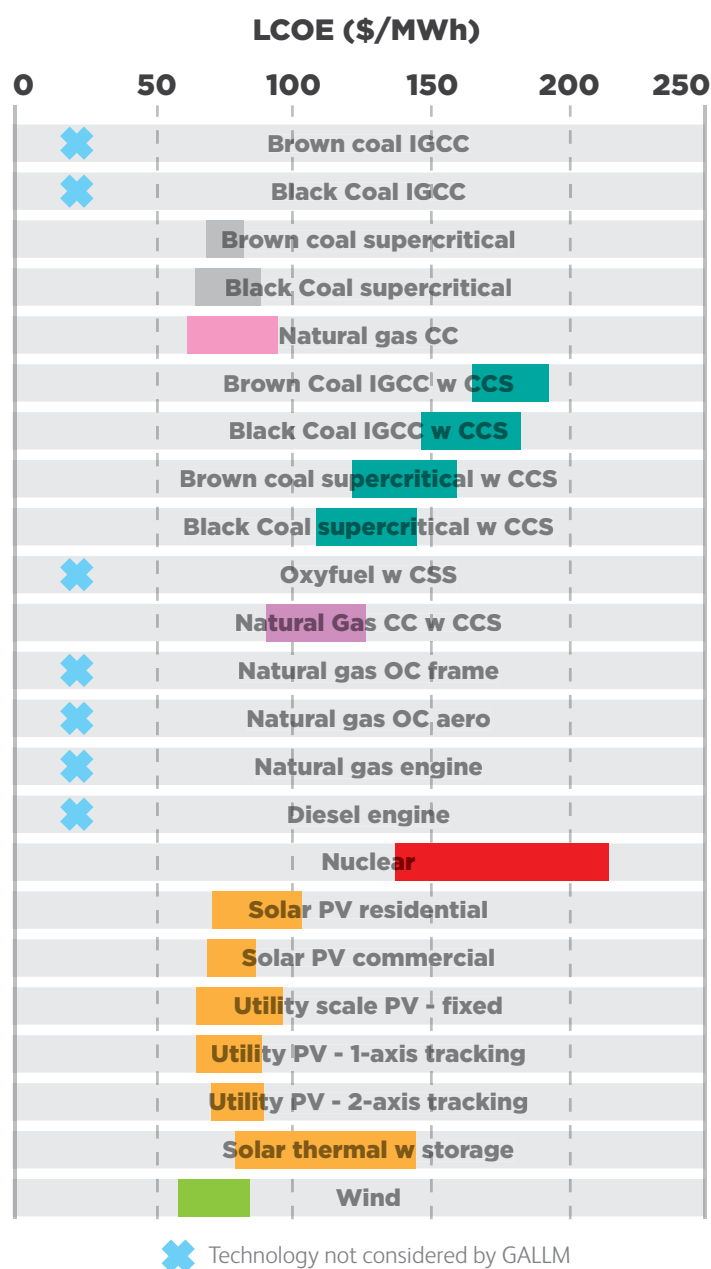
<sup>7</sup> B Mitchell, UNSW Australia, There's a sunny future ahead for solar power: here's why, January 2015

<sup>8</sup> Joint Institute for Strategic Energy Analysis, Renewable Electricity: Insights for the Coming Decade, February 2015, page v



**Figure 2**

Expected levelised cost of energy (LCOE)  
of energy technologies by 2030<sup>9</sup>



Further cost reductions are expected into the future, with many analysts expecting onshore wind and solar PV technologies will become the lowest-cost energy solutions over the next decade. The 2015 Australian Power Generation Technology Report was the most recent study to reach this conclusion (see Figure 2).

Energy market modelling studies have shown that increasing the level of renewable energy in the electricity market results in lower electricity prices for Australian consumers.<sup>10</sup> The cost of power generation, or the wholesale power price, makes up about a quarter of the average residential power bill, while the cost of poles and wires made up 43 per cent of power bills in 2015. The direct compliance costs associated with the Renewable Energy Target (RET) – the policy at the heart of renewable energy deployment for the past decade – make up about 4 per cent of a residential power bill.

However, as shown by the analysis commissioned for the Abbott Government's review of the RET, the direct cost of the policy is offset by its effect in keeping the wholesale price low through increased competition in the energy market. Analysis by ROAM Consulting for the Clean Energy Council in April 2014 found the future cost of Large-scale Generation Certificates to consumers under the RET was approximately balanced by savings that the policy created on the wholesale component of a bill.<sup>11</sup>

Increasing renewable energy will also drive significant investment in the Australian economy. A global clean energy race is underway to develop and deploy the next generation of clean energy technologies. Ultimately the way we produce and consume electricity will be completely transformed. As this transformation gathers pace, the competitive advantage of nations will increasingly be measured by the carbon intensity of national economies and the depth of knowledge, skills and capabilities required to compete in a clean energy world.

<sup>9</sup> CO2CRC, Australian Power Generation Technology Report, November 2015, page iii

<sup>10</sup> ACIL Allen Consulting, RET Review Modelling: Market modelling of various RET policy options, 7 August 2014, page ix; J Gilmore and C Giacomantonio, ROAM Consulting, RET Policy Analysis, 23 May 2014, page 1; Bloomberg New Energy Finance, Modelling options for Australia's RET review, 16 May 2014, page 1

<sup>11</sup> ROAM Consulting, RET policy analysis, April 2014, page 40

## **1 Ensure long-term and transparent carbon reduction targets**

### **Action 1:**

Ensure Australian energy policy recognises the significance and interaction with climate change policy and targets, with a strong integration between energy and climate policy.

### **Action 2:**

Long-term carbon abatement targets for the Australian energy sector that provide certainty for investors and a price signal to phase out the most carbon-intensive power plants.

### **Action 3:**

Introduce transition plans for key communities that will be affected by the transition away from fossil fuel-based generation. This should be a collaboration between Commonwealth and state governments, local communities, unions and industry.

## **2 Set strong and long-term renewable energy targets**

### **Action 4:**

Strong commitments to the current 2020 Renewable Energy Target (RET) and acknowledgment that any future review of the policy will only consider higher levels of ambition.

### **Action 5:**

Work with the renewable energy industry to set extended, strong and achievable long-term targets that build on the current RET scheme, provide long-term certainty and attract private investment.

## **3 Innovation that develops the next generation of clean energy solutions**

### **Action 6:**

Recognise the opportunity and importance of innovation in clean energy in order to accelerate the transition to a zero emission electricity sector and drive down the cost of renewable energy.

### **Action 7:**

Cement the future of the Australian Renewable Energy Agency and Clean Energy Finance Corporation and continue to leverage their roles in driving innovation across all aspects of renewable energy through the targeted provision of concessional finance, equity and capital grants.

### **Action 8:**

Collaboration between government and industry to monitor the workforce development, skills requirements and training necessary to deliver a skilled workforce for clean energy.

# WHAT ACTIONS WILL DELIVER A POWER SHIFT?



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## 4 Smart regulation for a 21<sup>st</sup> century energy system

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### Action 9:

Increase collaboration and knowledge sharing between research institutions, industry, government and the community to drive greater innovation in renewable energy technology, solutions and financing.

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### Action 10:

Prioritise opportunities and address barriers – such as upfront capital, development of local supply chain, demonstrating new financing models and corporate clean energy contracting – in order to accelerate innovation and deployment of clean energy in the future.

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### Action 11:

Amend the National Electricity Objective to recognise the clear priority to reduce the carbon intensity of Australia's electricity sector and achieve a zero emission electricity system.

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### Action 12:

Harmonise distribution network connection standards and maximise competition for connection of all forms of renewable energy.

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### Action 13:

State governments to develop smart regulation that addresses planning policies and building standards and removes barriers to the uptake of renewable energy and storage technology.

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### Action 14:

Ensure network tariffs do not discriminate against clean energy technologies and encourage the installation and use of solar and storage systems that maximise system-wide benefits.

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### Action 15:

Develop a detailed strategic review of options for increased transmission interconnection through innovative investment models that will unlock the unrealised potential of large-scale renewable energy generation.

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## 5 Cement public support

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### Action 16:

Continue to refine and improve the way utility-scale renewable energy developers interact with local communities.

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### Action 17:

The evolution and improvement of the regulatory framework for consumer-based renewable energy solutions and technologies. This includes improving standards for technology, installation practices and after sales service and warranty that protect and build consumer confidence in clean energy solutions.

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### Action 18:

Promote the benefits of small- and large-scale renewable energy and provide consumers with up-to-date information that allows them to better understand renewable energy solutions.

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### Action 19:

Support businesses, community groups, governments and consumers to develop or purchase renewable energy either through third party models or direct contracting for supply of renewable energy.

**PRIORITY**

**1**

**ENSURE LONG-TERM  
AND TRANSPARENT  
CARBON REDUCTION  
TARGETS THAT APPLY  
TO THE ENERGY SECTOR**





# ACHIEVING A ZERO EMISSION ELECTRICITY SYSTEM

## The effective transition of the Australian electricity sector to a 21<sup>st</sup> century energy system will be delivered through:

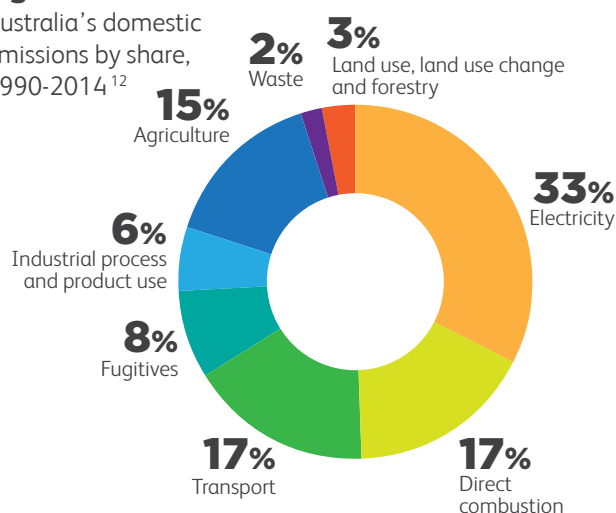
- Greater energy productivity, delivered through improved energy efficiency, energy conservation and smarter use of electricity. The many regulatory, technical and information challenges and the appropriate policy responses to deliver this are beyond the scope of this paper.
- The accelerated deployment and development of proven and emerging renewable energy technologies.
- The phase-out of Australia's most carbon intensive and marginal fossil fuel-based electricity generation.

Investments in electricity generation assets typically have investment horizons of several decades. Transforming Australia's energy sector therefore requires both long-term planning and policy stability. This can ensure investment decisions do not lock in an unnecessarily high emissions profile, and that this transition takes place in a timely manner.

Decarbonising the electricity sector is imperative to meeting Australia's medium- and long-term emissions reduction targets. In order to restrict global warming to less than 2 degrees Celsius, the global electricity sector will need to be at or close to zero emissions by 2050. Many countries have already made statements in support of this principle.

**Figure 3**

Australia's domestic emissions by share, 1990-2014<sup>12</sup>



<sup>12</sup> Department of Environment, Australia's emission projections 2014-15, March 2015, page 9

<sup>13</sup> Department of Environment, Australia's emission projections 2014-15, March 2015, page 18

# WHAT IS THE PROBLEM WITH OUR CURRENT SYSTEM?

Australia's electricity system was founded on centralised, carbon-intensive coal-fired electricity generation. The sector is the single largest contributor to greenhouse gas emissions, and contributes approximately a third of our country's total emissions. This trend is expected to continue out to 2020 and beyond.

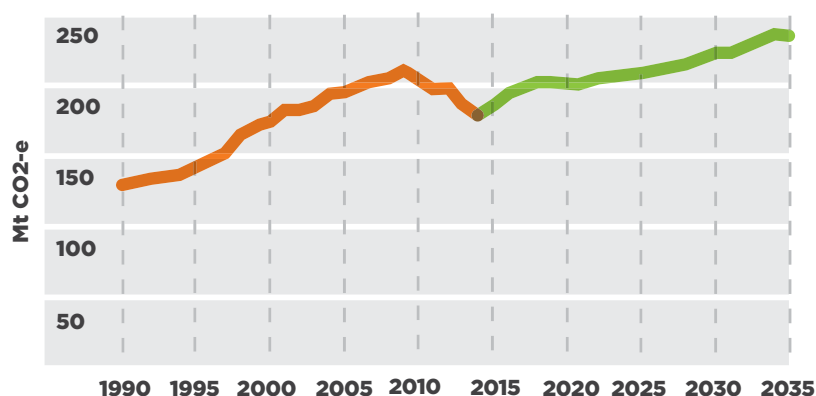
Any meaningful and lasting response to climate change needs to recognise the importance of long-term change in our electricity sector. Current projections reveal that carbon emissions from Australia's electricity systems are expected to continue to increase over the next two decades.

Australia's most emissions-intensive power stations will need to close if the transition of the energy system is to occur in a controlled and timely manner. The current oversupply of power generation capacity, in part a consequence of the absence of any long-term carbon price signal, makes investment in new renewable energy infrastructure more challenging.

Long-term and clear energy and carbon policies will enable the achievement of this goal, while making the structural adjustments that will ensure Australia remains internationally competitive and is prepared for an increasingly carbon-constrained world.

**Figure 4**

Historical and projected electricity emissions, 1990-2035<sup>13</sup>



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Declining demand for power, the extended operation of outdated power plants and the steady legislated increase in renewable energy generation has led to a surplus of generating capacity in the National Electricity Market (NEM) and Western Australia's Wholesale Electricity Market. The Australian Energy Market Operator's (AEMO) most recent forecasts concluded that no new generation is needed in the next 10 years to meet projected electricity demand.<sup>14</sup> The Independent Market Operator in Western Australia has issued similar statements, declaring that "no new capacity will be required in the SWIS (South West Interconnected System) until 2023-2024".<sup>15</sup>

Recent energy and climate policy uncertainty, combined with barriers to exit for Australia's legacy coal-fired power fleet, has resulted in these assets continuing to operate beyond their original design life, resulting in surplus capacity that is stifling signals for new investment in the energy supply sector.

Ensuring a smooth transition to a low-carbon future for Australia's electricity sector requires that clean energy generation must be in place before the most inefficient and polluting generation can be phased out. This is not a new concept: one of the primary objectives of the NEM is to ensure supply in excess of demand to avoid blackouts caused by a major plant failure. Moreover, the express purpose of the Renewable Energy Target (RET), legislated in 2000 and again in 2009, was to encourage the introduction of new clean technologies to transform Australia's energy generation into one less reliant on fossil fuels.

Although many analysts had previously anticipated the permanent closure of Australia's oldest and most greenhouse-intensive power stations, the uncertainty created by major changes to national energy and climate policies, along with barriers to exit (both real and perceived) mean this has not yet occurred. Addressing these barriers to exit for the oldest and most polluting power stations needs to be part of the policy solution for the increased deployment of renewable energy.

Most of these power plants were built and funded decades ago by state governments and are now fully depreciated. Therefore the cost of the electricity they produce is mainly based on short-run costs (primarily fuel costs).

This contrasts with all new investments – renewable energy or otherwise – that must recover all of their costs over the life of the investment. This is a significant barrier to the deployment of new low or zero emission generation, which must compete with these legacy assets.

While surplus generation capacity remains in the energy market, complementary mechanisms like the RET are important to drive the construction of new renewable energy. A complementary mechanism is needed to allow for an orderly closure and withdrawal of the most polluting power stations. This is discussed in more detail in the section below.

An orderly and planned transition will require a clear framework providing strong investment signals for new zero and low emissions technologies, and strong exit investment signals for the highest-polluting technologies. A planned transition will also achieve the best economic and environmental outcomes for the country.

The closure of coal-fired power generation must also recognise the substantial reliance on these projects by some regions and communities for employment and local economic activity. The phase-out of these generation assets needs to be accompanied by a careful and comprehensive strategy to support these communities, including workforce training and re-deployment to minimise the social and economic disruption.

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<sup>14</sup> AEMO, No New Power Generation Needed for Next 10 Years, Media Release, August 14.

<sup>15</sup> Independent Market Operator, SWIS Electricity Demand Outlook, June 2014, page 3.



# POLICY OPTIONS TO FACILITATE A ZERO EMISSION ENERGY SYSTEM

Setting a clear goal of decarbonising the electricity generation sector is important to achieve an orderly transition. Strong, stable policies that provide a clear investment signal can support this objective by encouraging the re-allocation of capital resources from fossil fuel-based generation toward renewable energy generation (discussed further in the next section). Accompanying policy support that encourages the closure of the oldest and most carbon-intensive generation is also necessary.

**There are a range of policy options to achieve this. In assessing policies it is important to consider the following objectives:**

- Constrain high emission generation resulting in reduced output and eventual closure..
- Deliver a long-term investment signal that supports the financing of new energy generation capacity.
- Positive interaction with or transition of the RET.
- Public and political acceptance.
- A smooth transition and leverage of the current policy settings.
- Managed transition considering supply security and local community and workforce transition.

**A number of policy options exist to place a carbon constraint across the energy sector, or more directly facilitate the closure of legacy and high emission generation. These include:**

- Commonwealth or state governments using a variety of regulatory tools to progressively wind back the level of capacity.
- A market-based approach such as an emissions trading scheme. This would eventually push the most polluting coal-fired plants out of the market.
- Direct regulation that sets greenhouse gas emissions limits (total for the facility or emissions intensity). This is similar to the approach recently announced in the United States. This mechanism would give the government significant control over the timetable for withdrawal of capacity, which would give the market confidence about the future supply/demand balance.

- State governments committing to discontinuing the operating licence of existing thermal generators. This would be a slower process as many plants already have licences to operate beyond 2020. As this period spans a number of state and federal elections, investors would experience lower levels of certainty until closer to the expiry date.
- Providing direct financial incentive or a ‘contracts-for-closure’ scheme. This could be managed in a variety of ways, either running an auction for the lowest cost-per-megawatt retired, or targeting the most emissions-intensive generation. Equally, contracts could focus on whole plants or partial decommissioning of multiple plants to prevent windfall gains by remaining generators. This could become part of the Commonwealth’s Direct Action Plan through the Emissions Reduction Fund (ERF).
- On a variation of the above model, a closure levy or other revenue-raising instrument could be introduced via the electricity market. This could be delivered in a number of ways with minimal impact on electricity prices.

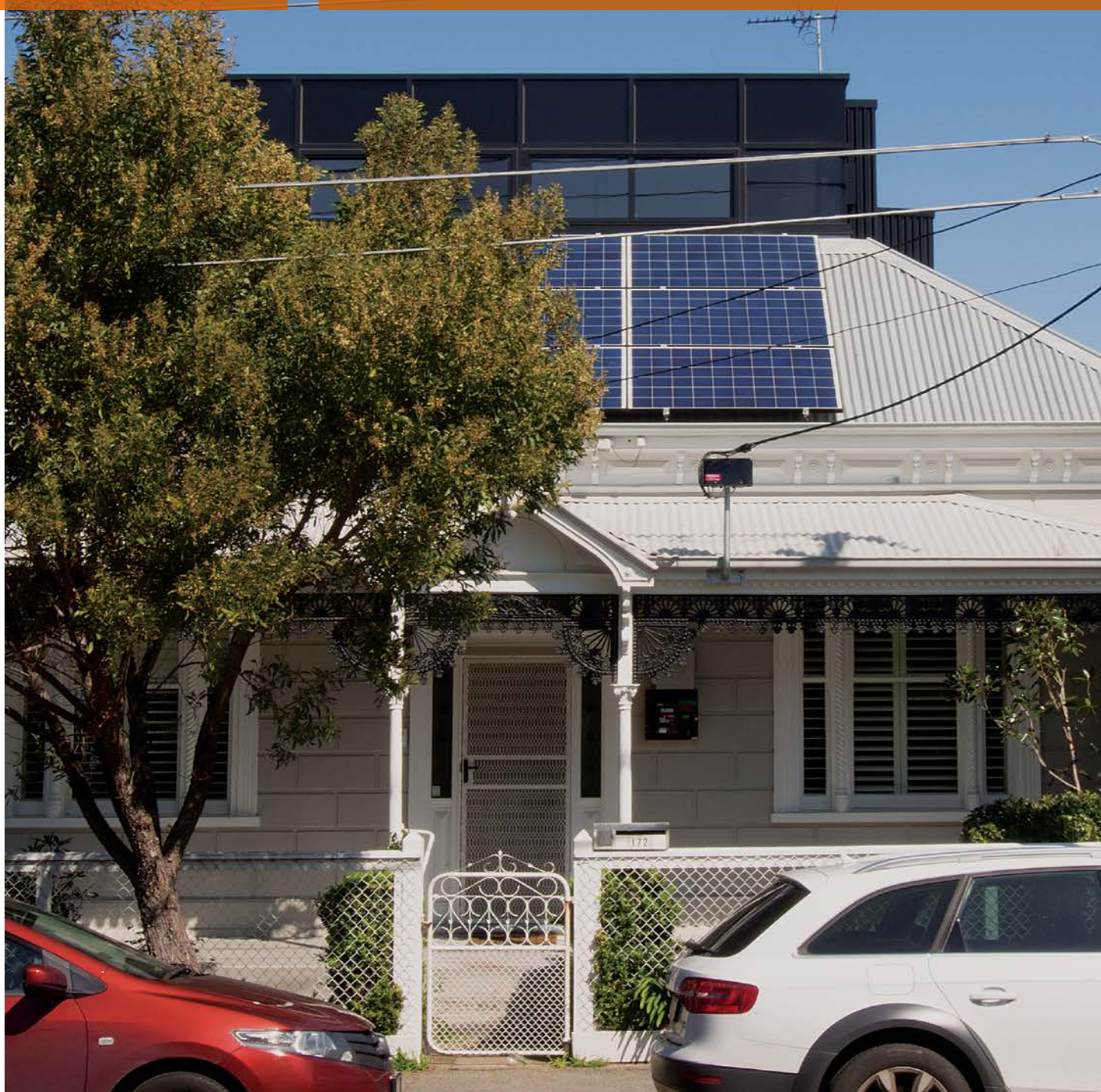
The inclusion of international permits in any carbon policy must be carefully considered, to ensure that it does not diminish the price signal for the transition of the Australian energy sector. While there can be benefits of using international permits (such as lower short-term cost) it will mean that investment will flow offshore from Australia and into countries more actively reducing their domestic emissions.

A heavy reliance on international permits to meet Australia’s emissions targets will mean that Australia does not invest in domestic technologies, innovations and projects to transition Australia to a low carbon economy. It also contributes to a perception that emissions reduction policies do not deliver meaningful change to business as usual.

**PRIORITY**

**2**

## **SET STRONG AND LONG-TERM RENEWABLE ENERGY TARGETS**





# THE ROLE OF RENEWABLE ENERGY

Renewable energy investments have already made a contribution to slowing emissions growth in the electricity sector. Modelling in 2012<sup>15</sup> indicated that between 2001 and 2012 the RET delivered cumulative emissions reductions of around 20 million tonnes of carbon dioxide equivalent. This was around 90 per cent of the abatement achieved across the electricity sector during this period. The modelling concluded that without the RET Australia would not have met its Kyoto Protocol commitments.

More recent modelling by ACIL Allen for the government's 2014-15 review of the RET<sup>16</sup> showed that without the policy, cumulative greenhouse gas emissions between 2015 and 2020 would be 58 million tonnes higher than currently anticipated. This equates to 25 per cent of Australia's overall abatement task by 2020.

This analysis demonstrates the importance of transitioning to increased renewable energy generation in the electricity sector. It also demonstrates the important role of the RET in driving down emissions in this sector. Following the removal of the carbon price in 2014, the RET is the only measure that specifically drives emissions abatement in the supply of electricity.

# THE FUTURE OF THE RET POLICY

The RET is crucial to the deployment of renewable energy in Australia, and the transition of the energy sector.

The ERF will seek out least-cost abatement across the Australian economy through providing incentives for abatement activities. With its current design, it is unlikely to either place a constraint on the emissions from power stations or provide direct support for renewable energy projects currently eligible under the RET.

Given the significant contribution of the power sector to overall emissions and the absence of a direct incentive to drive abatement, support mechanisms like the RET will continue to be needed to support the deployment of renewable energy in Australia.

When the RET was re-designed in 2009 it was expected that some form of carbon pricing would be in place by 2020 at a level that would provide the primary driver for investment in renewable energy and other low carbon technologies beyond the end of the decade. The repeal of Australia's carbon pricing scheme, and the introduction of the Federal Government's ERF have presented long-term uncertainty about the existence or nature of a future carbon price signal in the electricity sector.

The RET is not the only policy that can be used to drive the deployment of renewable energy. Other policies, including feed-in-tariffs, contracts for difference and reverse auction schemes, can also be used. For example, the ACT Government's reverse auction scheme has successfully delivered new renewable energy investment. These schemes can be developed in a manner that very effectively complements the national RET, providing targeted support for particular solutions in specific jurisdictions.

The RET has proven itself highly effective and efficient in supporting investment in renewable energy. Implementing a different national policy mechanism would take considerable time, during which investment is likely to freeze and cause any subsequent policy to be less effective than the current RET. Recent political debates about carbon pricing and emissions trading have also highlighted the challenges of brokering bipartisan support for the sustained operation of climate policy. The RET therefore remains the mechanism of choice to support the nation-wide deployment of renewable energy, particularly in the absence of a strong carbon price signal in the energy sector.

<sup>15</sup> SKM MMA, Benefit of the Renewable Energy Target to Australia's Energy Market and Economy, August 2012

<sup>16</sup> Commonwealth of Australia, Renewable Energy Target Scheme, Report of the Expert Panel, August 2014



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Before considering longer-term certainty from the RET, it should be acknowledged that the costs of renewable energy are falling and therefore the level of support needed to deploy renewable energy can be expected to fall. One of the features of the current RET is that the level of incentive it provides reduces as the cost of the technology reduces. It is designed to deploy the cheapest form of renewable energy, by focusing on the price paid for generation. The level of support will reduce as the cost of the technology reduces.

There are two key elements of the RET that need to be considered to provide longer-term and stable deployment for large-scale renewable energy. These elements are crucial particularly given large-scale renewable energy investments have a commercial life of at least 15 years. Investors need confidence that the necessary revenue will be provided over that period to recover the capital cost of their investment. Providing this into the future will require the following refinements to the RET policy:

- **An ongoing increase in the target.**

The current RET peaks in 2020, and remains at that level until 2030. Forecasting the value of RECs during this period is challenging, with some level of discounting and therefore reduced project revenue expected during this period.

This obviously makes the business case for projects more difficult as time goes on. The clean energy sector has always advocated that the RET should continue to increase at some level beyond 2020 to provide a stable growth pipeline and to allow the sector to mature and develop.

- **An extension of the RET beyond 2030 to provide long-term certainty.**

The RET scheme should continue to remain in place for 15 years after the peak of the target. For example, the current target peaks in 2020, and therefore the scheme should currently continue until 2035 in order to provide revenue support over the life of a project. The longer-term revenue support will generally result in lower REC prices – because the costs are recovered over a longer period – and therefore lower overall costs to consumers.

# WHAT LONG-TERM RENEWABLE ENERGY TARGET IS ACHIEVABLE?

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There is no question that building more large-scale renewable energy beyond the current 33,000 GWh large-scale RET is achievable. The extent to which future levels of renewable energy can be delivered will be dependent on a number of factors:

- **Long-term policy certainty that will allow the industry to invest in capability and capacity.**
- **The progress of new and emerging renewable energy technologies towards commercial maturity and the rate at which the cost of each is driven down.**

Which will allow the rate of renewable energy deployment to be accelerated in the future. This long-term certainty is important to attract the necessary finance for assets which are expected to operate for decades to come.

This will affect the diversity of technologies available to contribute to Australia's energy mix. Government policy and institutions such as the Australian Renewable Energy Agency and Clean Energy Finance Corporation play a critical role in this.

- **The extent to which barriers to deploying renewable energy are able to be managed or removed.**
- **The rate at which existing coal-fired generation is retired from the electricity market.**

For example, there are currently challenges associated with connecting new renewable energy projects into the electricity grid and this increases the time and cost associated with connecting renewable energy.

The Australian electricity sector is dominated by assets that are at or beyond their expected retirement date. This has provided a surplus of generation, creating challenges for new investments in the energy sector.

Addressing these various factors will provide greater confidence that the industry will be able to accelerate the roll-out rate of renewable energy beyond 2020.

A conservative scenario continuing with the build rates required under the current RET would deliver approximately 35 per cent of Australia's electricity from renewable energy by 2030 – assuming a modest increase in total national electricity demand as estimated by ACIL Allen for the Warburton Review of the RET. An accelerated plan to reduce coal-fired generation would materially increase the overall percentage of generation from renewable sources.

Meeting higher targets than this would require construction rates to increase beyond the level expected to 2020 under the current RET. This is achievable given substantially increased capability and technological innovation expected over coming years, delivering cheaper power from a more diverse range of renewable sources.

This expanded workforce and expertise, combined with the increased efficiency of the supply chain will enable plants to be built at progressively higher rates beyond the end of the decade.

A variety of technical challenges are associated with the increase of renewable energy. However, other countries already source a large proportion of their electricity from variable renewables such as solar and wind. South Australia is a local example, where approximately 40 per cent of the state's electricity is provided by renewable energy. These places have shown that the technical challenges of using large amounts of renewable energy can be overcome using today's technology, with sensible and smart reforms as detailed elsewhere in this paper.

**PRIORITY**

**3**

**INNOVATION THAT  
DEVELOPS THE  
NEXT GENERATION  
OF CLEAN ENERGY  
SOLUTIONS**





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The role of the RET is critical in the commercialisation of least-cost renewable energy, predominantly wind and rooftop solar at this point in time. However, additional and targeted policy support is warranted to develop and demonstrate a range of new technologies and solutions such as large-scale solar, geothermal, marine energy and storage solutions. The cost of these technologies is already coming down as a result of local technology deployment, building scale and reducing project risk and associated costs.

There is also an opportunity for further innovation of more mature clean energy solutions and how these are integrated into traditional energy systems and solutions. This includes driving the integrated use of clean energy in remote operations and communities. This presents a major opportunity for Australia to take advantage of our world-leading renewable energy resources and develop an increasingly diverse energy mix at ever-lower cost.

**There is a clear public policy rationale for targeted support for many of these clean energy solutions and applications. This support should include:**

- Funding of R&D to support the development of new technologies or applications that have a potential to drive higher-efficiency renewable energy manufacturing or deployment.
- Capital grants or other innovative programs that leverage private investment for the demonstration of renewable energy projects, and help to build scale, local capability and confidence with the deployment of technology in Australia.
- Provision of concessional finance and equity that addresses the capital-intensive and long-term nature of renewable energy investments, as well as helping to build confidence among debt and equity suppliers and driving innovation in renewable energy financing.
- A strategic and coordinated approach to identifying the opportunities and barriers for these solutions and a plan for addressing them. A recent example of this is the Clean Energy Council's Australian Energy Storage Roadmap which provides a platform for collaboration between industry, regulators, policymakers and consumers to ensure the development of this technology.

Currently much of this support is provided by the Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC), both of which have proven to be highly effective. Both of these institutions should remain in place, with adequate funding and resources, to ensure there is appropriate support for the development and deployment of the next generation of renewable energy technology.

ARENA has been instrumental in driving the deployment of large-scale solar power. Australia's solar resource is genuinely world class. Large-scale solar is close to being competitive with large-scale generation technologies such as wind power, but needs continued support to realise this potential. To capitalise on the full potential of large-scale solar technology the industry needs to deploy significant capacity locally. This will reduce costs and enable access to competitively priced finance.

Alongside ARENA, the CEFC provides finance to the emerging parts of the clean energy sector. The CEFC exists to address financial impediments that reduce the availability of private sector finance for clean energy projects. As a co-funder the CEFC is able to lower the risk profile of a project and help secure the private finance a project needs. In addition to utility-scale investments in renewable energy, the CEFC has developed innovative financing that assists Australian businesses to more readily access finance for renewable energy projects. The support of the CEFC has been instrumental in helping a series of projects reach financial close, allowing them to be fully implemented and constructed over the past 12 months. As with ARENA, this support is pivotal as Australia looks to increase the deployment of renewable energy.

**PRIORITY**

**4**

**SMART ENERGY  
REGULATION FOR  
A 21<sup>ST</sup> CENTURY  
ENERGY SYSTEM**



# REFORMING OUTDATED MARKET OBJECTIVES

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Australian energy markets were designed many decades ago, based on an outdated centralised market model. Technological evolution and rapid cost reductions in clean energy solutions – such as solar PV and battery storage – are creating massive disruption to the energy sector and business models, and changing consumer expectations about how they use, generate and store electricity.

The growth of electric vehicles will further disrupt the energy sector and challenge traditional models and current regulatory structures.

The assumptions on which Australia's energy markets were designed are no longer valid and a substantial revision of energy market design, governance and regulation is required. Reform is required to enable an accelerated transition of Australia's electricity markets by placing consumer expectations and the imperative to transition to a zero emission electricity system at the centre of market design.

Australia's energy markets will never truly facilitate new clean and smart technologies without intervention to remove barriers and distortions in renewable energy and energy storage. These reforms are now needed to allow Australian consumers to truly embrace new and emerging smart and clean energy technologies, driving our energy systems into the 21<sup>st</sup> century.

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One of the clearest failures of the historical energy market is the inefficiency and conflict created by incomplete guiding principles established by the National Electricity Objective (NEO). While referring to the 'long-term interests of consumers' the NEO lacks any reference to policy objectives relating to the reduction of energy sector carbon emissions or the deployment of renewable energy. The consequence of this reverberates throughout the energy market, its rules and governance and the judgments that are regularly made that discriminate against clean energy.

Consumer expectations and policy commitments to renewable energy will be increasingly frustrated by this tension. While the COAG Energy Council has recently prioritised review and reforms that support new and clean technology, refining the NEO to incorporate clean energy priorities is crucial to driving necessary reform throughout the entire energy market.



# DESIGNING A MARKET THAT ENABLES THE TRANSITION

The legislated RET will deliver between 6-8 GW of new large-scale renewable energy projects by 2020, while the fleet of legacy high emission coal generators will need to be retired to deliver meaningful emissions reductions in Australia. Although the modernisation of Australia's electricity supply will have a profound impact on the generation technology mix that our transmission system supports, there is no evidence to suggest that grid reliability will be negatively impacted.

For example, South Australia – where wind and solar already provide 40 per cent of the state's energy and the state's two remaining coal-fired power generators are scheduled to close this year – the Australian Electricity Market Operator has stated that the system will meet its reliability standards over the medium term. This means at least 99.98 per cent of power demand will be served, as is the case with all of Australia's eastern states.

Of course, these transitions are not without anticipated challenges. They are engineering challenges to which there are engineering solutions that need to be developed coherently to ensure a low-carbon electricity sector and consumer needs for reliable and low-cost electricity supply.

## **The range of solutions that need careful consideration and planning include:**

- Creating frameworks that encourage competition in the connection process while ensuring safety and reliability of supply.
- Driving innovation in the way renewable energy generation interacts and supports the electricity network including creating markets that encourage grid-supporting services from small- and large-scale solar PV and storage.
- Assessing options to strengthen and increase the interconnection of the NEM, potentially through innovative investment models.
- Re-purposing retiring fossil fuel generators to provide market-balancing services, while avoiding their ongoing consumption of fossil fuels.

The most effective package of solutions for the energy market will take time to develop. However, with engineering and technical capability, and sophisticated energy market institutions and operators, there are many options available to support a transitioning electricity sector.

Unlocking these solutions requires a carefully planned energy system, with market design and rules that can allow ongoing innovation and commercial investment.

# SUPPORTING CONSUMER CHOICE

With the world's highest residential solar PV penetration, a rapidly growing commercial solar PV sector and declining energy storage costs, the focus of regulation should now turn towards maximising the efficiency of these consumer-led renewable energy investments. One of the most inefficient aspects of these investments is how these new technologies integrate and interact with local distribution network service providers (DNSPs).

Australia's energy market frameworks were designed with an underlying assumption that consumers are and will remain passive consumers. The deployment of large numbers of small-scale 'active' generators was not considered likely or even possible only a decade ago. As a result the current approach to grid integration of new technologies is poorly equipped to support consumer choice.

## **There are significant institutional barriers that result in inefficiency and distortions which in turn result in:**

- Slowing down the uptake of consumer investments in new renewable energy and energy storage technologies.
- Limiting the role these systems could play in providing system wide benefits.

Smart reform is required to remove red tape and create an efficient, fair and competitive system in which consumers can invest with confidence.

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## **Developing a smart regulatory framework should include the following:**

- Facilitate the development and implementation of consistent standards for the grid connection of renewable energy and energy storage. These standards should embrace the technical capabilities of new and emerging technologies and create certainty in the investment environment, maximising the efficiency of grid integration processes. Increased confidence in the delivery of small- and commercial-scale renewable energy generators and lower delivery costs would ultimately result.
- Establish standardised grid connection approval processes and a supportive training and accreditation scheme that builds the capacity and industry confidence. A Grid Connection Training and Accreditation Scheme would relieve the grid connection assessment burden on distribution grid operators and place the onus to adhere to standards onto solar installers, enabling competition to drive down costs.
- Address anti-competitive behaviour created by the ability of distribution network businesses operating businesses that deploy solar and storage. Transparent connection processes, fair and reasonable standardised terms for connection that promote competition will be required. An independent connection approval scheme may be a necessity.
- Develop a sophisticated mapping tool for grid connection opportunities that provides transparency about location-specific hosting capability of the grid. This would reduce the burden on generator proponents and networks in identifying appropriate renewable energy capacities, and storage operating characteristics which can be deployed within the capacity of the local grid.
- Ensure the tariff reform process creates tariff structures that avoid discrimination against distributed generation or new market entrants and provide appropriate price signals that enable clean and smart technologies to be deployed as a consumer response. Access to smart meter technology should be targeted towards increasing competition and efficient asset utilisation through the deployment of smarter and clean energy technologies that can respond to an appropriate value placed on demand response and distributed generation.

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State and local government planning systems usually encourage investment and development, especially in regional areas. It is imperative that planning guidelines for large-scale renewable energy projects do not place additional burdens on the development by creating delays or adding uncertainties into the planning process. A merit-based planning approach should always ensure that proposed developments are considered based on the interests of the wider community and not a select few.

## **Planning policies for renewable energy should:**

- Have a clear and time-bound approval pathway that can be understood by both project proponents and the community.
- Be evidence-based and not treat renewable energy projects substantially differently from any other infrastructure project.
- Recognise the benefits renewable energy projects bring to the landholders involved as well as the broader local community.
- Take into account wider state objectives and strike a balance between those objectives and the costs and benefits to local communities.



PRIORITY

5

CEMENT  
PUBLIC  
SUPPORT





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The Australian public strongly supports the increased uptake of renewable energy, which has been demonstrated both by regular surveys and the 4 million Australians that now live or work under solar power. The Australian people are the direct consumers of small renewable energy systems and also form the local communities in proximity to large-scale renewable energy projects. In both cases, their support for renewable energy will ensure the enduring development and deployment of renewable energy in Australia, as well as underpinning the political support for the sector.

**This strong community support cannot be taken for granted. Cementing it requires a commitment to integrity and engagement with the community across a range of areas:**

- In the case of large-scale renewable energy, this means community engagement and consultation, as well as respectful and transparent relationships with the people living in proximity to a project. It also means ensuring the whole community understands the benefits and value of these projects.
- Small-scale renewable energy deployment is based on a retail relationship with an end-consumer. The integrity of this relationship provides the basis for the sector's social licence to operate, including the way the consumer is treated, the management of expectations and the system's satisfaction of performance and quality standards. Robust schemes such as the accreditation of solar installers and Solar Retailer Code of Conduct provide the assurance that consumers expect.
- Public support for the transition of the energy sector will also be enhanced by measures that can provide consumers with greater control and choice in their own electricity generation and consumption, and the management of their electricity costs. This must include protection of the most vulnerable electricity consumers and targeted support for all electricity consumers to take advantage of low-cost clean energy solutions.

The renewable energy sector must continue to refine and innovate in these areas, working with community representatives, regulators and policy makers to build the integrity of the sector, along with the respect and support it enjoys from the community. Strong community support will in turn ensure the enduring growth and development of the sector in Australia.

Finally, deploying renewable energy technologies requires specific skills and trades. The continued growth of the industry can deliver much-needed jobs to rural and regional economies in particular. Government and industry can work together to carry out regular skills audits, ensuring that the relevant training and development exists to support new jobs and skills.



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