ClimateWorks AUSTRALIA
Level 16, 41 Exhibition St, Melbourne VIC 3000
P: +61 3 9902 0741 | info@climateworkasaustralia.org | climateworksaustralia.org

8 March 2018

ClimateWorks Australia Submission on Energy Security Board National Energy Guarantee - Consultation Paper

Summary

Australia's obligations under the Paris Agreement will require transformation of the electricity sector to near zero emissions before 2050. This transformation will build on the change already underway and can support greater ambition in the electricity sector by 2030.

The electricity sector can contribute more than a numerical share of the national emissions reductions target: our research, along with research by others, has shown that the electricity sector is well placed to deliver emissions reductions well beyond this.

ClimateWorks has prioritised available emissions reduction opportunities showing which are the most important to enable Australia to meet our commitments under the Paris Agreement. Even unlocking only those opportunities that are already cost-effective would reduce emissions in the electricity sectors by 36 per cent by 2030 – well beyond the current suggested target for the National Energy Guarantee.

Without substantial emissions reductions in the electricity sector, well beyond a numerical share of the economy-wide target, Australia will not be able to achieve its Nationally Determined Contribution of 26 per cent below 2005 levels by 2030 in an economically responsible manner.

Transformation of the electricity sector can provide additional benefits for the economy – in particular it can drive improved energy productivity, an area where Australia is lagging behind other OECD countries.

The National Energy Guarantee could serve as effective policy - if it has sufficient ambition to drive new investment that will substantially reduce emissions and is fully compatible with the Paris Agreement.

An emissions intensity of less than 0.37 tCO_2e/MWh by 2030 is necessary to avoid locking-out emissions reductions. Flexibility to meet the emissions reductions obligation under the National Energy Guarantee should not undermine the transition to this benchmark for emissions intensity.

MONASH University | MONASH SUSTAINABLE DEVELOPMENT INSTITUTE
THE MYER FOUNDATION

Since ClimateWorks' launch in 2009 through a partnership between The Myer Foundation and Monash University, philanthropic support has been key to achieving our mission of catalysing Australia's transition to a prosperous, net zero emissions future. This support continues to allow us to remain truly independent, evidence-based and non-partisan.

Australia's obligations under the Paris Agreement will require transformation of the electricity sector to near zero emissions before 2050.

Australia is one of 175 countries that have ratified the Paris Agreement to limit climate change (as at February 2018). Australia, along with all other signatories, has made commitments to limit global warming to 2 degrees Celsius above pre-industrial levels and strive to achieve 1.5 degrees, and to reach zero net emissions in the second half of this century. For a developed country such as Australia our part in this global action is that our economy should reach net zero emissions by around 2050. The transition of the electricity sector to near zero emissions before 2045 has been identified as being at the heart of achieving this transformation (ClimateWorks et al 2014). Transforming our economy will allow us to make the most of the opportunities available to us in the future - including our ample renewable energy resources. The Paris Agreement expects that all countries will communicate targets every five years that reflect "the highest possible ambition" (UNFCCC 2015). All countries are asked to communicate long-term low-emissions development strategies by 2020. For Australia, in common with all countries with a 2030 target, we will be asked to communicate or update that target in 2020. All countries will be expected to increase the ambition of their targets, given the gap between the combined impact of current targets and what is required. Australia will be expected to submit a more ambitious 2035 target in 2025 and then new targets every five years.

ClimateWorks research shows that substantial emissions reductions in the electricity sector underpin Australia's ability to meet its commitments under the Paris Agreement (ClimateWorks 2017). There are two main reasons that the electricity sector is so important:

- Electricity greenhouse gas emissions account for over a third of Australia's total and there are ample opportunities that can reduce emissions to near zero before 2050, while the economy grows. Australia has both an energy intensive economy and our electricity sector has high emissions intensity compared to other similar countries. There is clear bipartisan agreement, supported by the International Energy Agency, to improve our energy productivity.
- Cleaner electricity enables further reductions from the rest of the economy through electrification. This switch to electricity (whether onsite or grid supplied) reduces direct combustion (particularly of gas, diesel and petrol). The cleaner the electricity, the more emissions reductions can be unlocked in buildings, industry and transport.

Our analysis also shows that Australia can meet emissions reductions compatible with the Climate Change Authorities recommended economy-wide target range of 45 - 65 per cent below 2005 levels by

2030, on its way to achieve net zero by 2050. As we discuss further below, ClimateWorks research suggests appropriate effort for the electricity sector would encompass:

- at least 60 per cent emissions reductions in the electricity sector below 2005 levels by 2030
- a share of 50 to 70 per cent renewable energy generation by 2030.

Change is already underway that would support greater ambition in the electricity sector by 2030.

It is widely recognised that transition of the electricity sector to low carbon, and more decentralised, generation is inevitable - and that government policy can assist this transition to be orderly and efficient. The Australian Government's Renewable Energy Target and state based actions are now driving substantial investment in renewable electricity generation, and the Clean Energy Regulator is confident that the Renewable Energy Target for 2020 will be met or exceeded (CER 2018).

There was more than $10 billion in private investment for projects either under construction or committed during 2017. This extra supply is expected to apply downward pressure on wholesale electricity prices over the next two years (AEMC 2017).

In parallel to investments in large scale renewable electricity assets, there have been strong increases in small scale systems, driven by solar PV installation. The number of small scale solar PV installations are now equivalent to nearly 20 per cent of households in Australia, making it one of the highest penetration in the world.

The National Energy Guarantee could guide an orderly transition of the electricity system, however the discussion paper and modelling released to date seems to underestimate the speed of the existing transition, the opportunities available and the risk that the suggested policy settings will hinder investment and slow the required pace of transformation. Based on state policy on renewables up to the end of 2017, ClimateWorks estimates that Australia will reach about 35 per cent renewables by 2030.

However, given the development pipeline and recent investment rates the ability for Australia to reach 50 - 70 per cent renewable electricity by 2030 is highly feasible. Modelling by Bloomberg New Energy Finance has shown 52 per cent renewable energy could be achieved by 2030 if the current pace of renewable energy uptake by the states and territories continues through the 2020's (BNEF 2017).

ClimateWorks AUSTRALIA

The electricity sector can contribute more than a numerical share of the national emissions reductions target: our research, along with research by others, has shown that the electricity sector is well placed to deliver emissions reductions well beyond this.

The currently proposed emissions reduction target for the electricity sector is 26 per cent below 2005 levels by 2030. The sector can reduce emissions further than this target whilst still delivering on the affordability and reliability requirements of the energy trilemma. If the electricity sector were to achieve just under half of its technical abatement potential by 2030 and achieve 40 per cent reduction below 2005 levels by 2030, this would reduce the abatement required by other sectors in the economy by 22 $MtCO_2e$ given our current 2030 target. This means less abatement from the more costly sectors throughout the economy. The technical potential exists to reduce emissions in the electricity sector by over 60 per cent below 2005 levels by 2030.

Opportunities in the electricity sector to reduce emissions exist both on the demand and the supply side:

- ClimateWorks has identified opportunities that reduce emissions by nearly 21 $MtCO_2e$ through energy efficiency improvements related to electricity consumption[1]. These not only reduce emissions, but could contribute to reducing energy costs for end users and reduce the investments required in new generation assets as existing aging power plants approach the end of their economic life. The emissions reductions are equivalent to 14 per cent of the emissions reduction task in 2030 to reach the current target under the Paris Agreement.[2]
- After accounting for energy efficiency, ClimateWorks has identified opportunities that reduce emissions by 100 $MtCO_2e$ through reducing emissions intensity of the electricity sector. This is over two-thirds of the emissions reduction task in 2030 to reach the current target under the Paris Agreement. Over a third of these opportunities are from actions resulting from cost-effective investments required to replace ageing infrastructure and meet new demand.

[1] These opportunities were identified from modelling an emissions reductions pathway that reaches net zero emissions in 2050 while the economy grows (ClimateWorks et al 2014)

[2] The emissions reduction task of 26 per cent below 2005 levels in 2030 is currently equivalent to 155 Mt CO2e based on DoEE 2017.

Around 60 per cent emissions reductions in the electricity sector and renewable energy shares of 50 - 70 per cent would also likely be required for Australia to meet the current economy-wide emissions reduction target of 26 per cent below 2005 levels by 2030, in order to prevent undue burden on sectors of the economy that have fewer or more expensive emissions reductions. It is in keeping with other analyses: CSIRO (2017) identified that about 50 - 70 per cent emissions reductions would be required in the electricity sector to achieve a 27 per cent reduction in all energy emissions by 2030, and The Australia Institute (2017) identified that 66 - 75 per cent renewables would be required to achieve the 26 - 28 per cent emissions reduction target nationally.

ClimateWorks therefore considers an appropriate target for the emissions reduction obligation in the National Energy Guarantee is 60 per cent below 2005 levels by 2030.

Transforming the electricity sector can also enable significant emissions reductions in other sectors by shifting from direct fuel combustion to clean electricity. By 2030, there are 17.4 $MtCO_2e$ potential emissions reductions available from electrification of buildings, transport and industry, or over 11 per cent of the abatement task in 2030. This potential can only be realised if the shift to electricity use is accompanied by a reduction in the emissions intensity of that electricity. Our analysis shows that the emission intensity of electricity can drop to 0.25 tCO_2e/MWh and this will unlock the full potential of the opportunities for electrification. It must drop to at least 0.37 tCO_2e/MWh to be sure that all types of electrification creates emissions reductions. The implications of this for prioritising which actions to take in the electricity sector are discussed below. Current emissions intensity in the NEM is around 0.83 t CO_2e/MWh (TAI 2018).

ClimateWorks has prioritised available emissions reduction opportunities showing which are the most important to enable Australia to meet our commitments under the Paris Agreement. Even unlocking only those opportunities that are already cost-effective would reduce emissions in the electricity sectors by 36 per cent by 2030 – well beyond the current suggested target for the National Energy Guarantee.

ClimateWorks has identified emissions reduction opportunities to 2030 through the Deep Decarbonisation Pathways Project. The project showed how Australia can reach net zero emissions in 2050 while the economy grows (ClimateWorks et al 2014). Our latest analysis has grouped these opportunities to indicate the priority that should be given to realising their full potential.

- No-brainers - emissions reductions opportunities that reduce greenhouse gases and are cost-effective. These are the highest priority because action to unlock these opportunities will save money and emissions. For the electricity sector these include energy efficiency measures and other demand side measures. It also includes changes on the supply side including investment in renewable energy to replace fossil fuel generators that are retired at the end of their economic life or to meet additional demand (e.g. due to electric vehicles). ClimateWorks estimates that if all no-brainer opportunities are unlocked then electricity emissions would be 36 per cent below 2005 levels by 2030. This shows the importance of having a target for the National Energy Guarantee well above 26 per cent.
- Avoid lock-in of high emissions and lock-out of emissions reductions opportunities. Action to avoid lock-in will ensure all new facilities are compatible with a low carbon future, and so prevent stranded assets or unnecessary costs during the transition. Action to avoid lock-out will ensure that we invest today in the technologies that we will need at a large scale in the future, allowing Australia to reap the full benefit of lowest cost emissions reductions opportunities available. These actions are critical to ensure Australia will be able to achieve its longer term Paris commitments at a low cost to the economy. In the electricity sector this means getting ready to implement high shares of renewable technologies in our grid, and ensuring that emissions intensity is low enough to take full advantage of the potential of electrification in buildings industry and transport. Policies such as the National Energy Guarantee, and the emissions reduction targets it will include, have the potential to guide investment decisions to factor in the need to transition to a clean economy.
- Responsible transition - actions that allow our economy to avoid future shocks and high costs associated with rapid decarbonisation of the economy by making sure that decarbonisation happens in a progressive transition. Taking action to unlock these opportunities will prevent the rapid stranding of assets with high emissions intensity and requirements for large investments over short periods.

Without substantial emissions reductions in the electricity sector, well beyond a numerical share of the economy-wide target, Australia will not be able to achieve its Nationally Determined Contribution of 26 per cent below 2005 levels by 2030 in an economically responsible manner.

As discussed above, the electricity sector is well placed to deliver emissions reductions beyond current proposals for the NEG. If the electricity sector were to only deliver its numerical share of Australia's existing 2030 target, this would leave a gap of 77 $MtCO_2e$ abatement to be delivered by other sectors. In addition to the full potential of energy efficiency, this would require an additional 62 $MtCO_2e$ of abatement from fuel switching, electrification and non-energy emissions in the buildings, transport, industry, waste and land sectors. This corresponds to achieving about 40 per cent of the full technical potential in those areas - as opposed to less than a quarter from cleaner electricity. To illustrate the change that would be required, the increased level of afforestation modelled beyond current policy corresponds to 36 $MtCO_2e$ by 2030, or over 3 times the amount estimated to be delivered by afforestation through the ERF in 2018 (ClimateWorks 2017). Further detail about our analysis is attached for your information. Other research also finds that emissions reductions in the electricity sector will need to be well beyond the 26 per cent level to ensure the transition is low cost (TAI 2017) and makes the most of current investment trends (BNEF 2017).

Transformation of the electricity sector can provide additional benefits for the economy.

Australia has a high reliance on fossil fuel based energy and an energy intensive economy - we have the highest per capita greenhouse gas emissions in the OECD. Transforming the electricity sector through shifting to renewable energy can improve our energy productivity. Our research suggests even the No Brainer opportunities for emissions reductions would slightly exceed Australia's energy productivity target of a 40 per cent improvement in energy productivity between 2015 and 2030. If all three types of opportunities were unlocked our productivity would improve well beyond the target.

The impact of transforming the electricity sector would be an improvement on current trends. Over the past 15 years there has been a modest improvement in energy productivity of 1.7 per cent annually on average (measured as GDP/Energy used), although the rate of improvement in energy productivity reduced in 2015-16 to 0.4 % (NEPP 2017). This rate does not put us on track to meet the 2030 energy productivity target. A significant driver of the recent slowdown was the increase in coal based electricity generation.

The National Energy Guarantee could serve as effective policy if it has sufficient ambition to drive new investment that will substantially reduce emissions and is fully compatible with the Paris Agreement.

Effective climate policy should assist governments and businesses to choose actions that:

- prevent the loss of emissions reductions opportunities in the short to medium term;
- need to occur to unlock the full opportunities for emissions reductions. For instance the electricity sector needs to be decarbonised in order to unlock the full potential of switching from petrol to electric cars
- need progress today so that they can be accelerated at scale in the future;
- do not hamper technologies or activities that will be required for transition in later years.

In the electricity sector effective policy also requires that actions to meet objectives on reliability and affordability should not compromise the ability to reach net zero emissions.

ClimateWorks analysis shows that if Governments want to unlock the full potential of identified opportunities by 2030, Australia would reduce emissions in the electricity sector by around 60 per cent below 2005 levels and a share of renewable energy of 50 -70 per cent. ClimateWorks therefore recommends that the emissions reductions target set for the NEG for 2030 should be 60 per cent.

Beyond 2030, to meet the requirements of the Paris Agreement, the NEG will need emissions reductions targets that are ratcheted up over time sufficient to meet the requirements of the Paris Agreement. The first review point for the Agreement when countries are requested to communicate or update their 2030 targets is in 2020. This should be the first review point for the level of the NEG emissions reduction obligation, reviews should then be every five years as proposed in the consultation paper.

Given that net zero emissions is the ultimate goal, policy and investment decisions to meet the 2030 target should allow Australia to meet this aim and stay within our carbon budget.

This principle is important to two main aspects of policy. Firstly the Government will need to make sure interim emissions reduction targets provide a sensible path to net zero. And secondly government policy will need to prevent investments or decisions that lock in high emissions, even if they do not prevent an interim target being met.

The Energy Security Board has also asked for comment about the nature of the emissions reductions target. ClimateWorks considers that emissions reductions targets for the NEG should reflect the end goal - a contribution to Australia's national emissions reductions target so that the electricity sector plays its appropriate part. As such the target should be for total emissions reductions - the form of Australia's NDC - rather than an emissions intensity target.

The demand side matters, with energy efficiency measures the cheapest form of emissions reductions with multiple benefits.

The demand side is important: our research shows that in order to meet any of the targets at lowest cost, Australia's 2030 energy efficiency technical potential needs to be met. This requires an additional effort to unlock a further 14 $MtCO_2e$ of abatement, or another third beyond current expectations from the National Energy Productivity Plan.

As Dr Fatih Birol put it at the launch of the IEA's Australia review: "the cheapest power plant is the one you don't need to build". Energy efficiency measures have the added benefit that they save money both for the business or household and for wider society. Reducing demand through energy efficiency measures acts across the trilemma. Lower pressure on the electricity system reduces emissions and prices and increases reliability. The design of the NEG should encourage and recognise demand side action by retailers as part of their obligations for emissions reductions.

As mentioned, our research shows that there are nearly 21 $MtCO_2e$ through energy efficiency improvements that can reduce electricity demand. This is equivalent to 13 per cent of the emissions reduction task in 2030 to reach the current target under the Paris Agreement.

And in other analysis we found that a significant untapped potential exists for demand side management in Australia's industry sector. Based on interviews with industrial companies, it was found that this could amount to about 42 per cent of the peak electricity load of industrial sectors (3.8 GW), which is equivalent to 10.5 per cent of all grid-connected electricity demand during system peak.

This potential from energy efficiency and demand side management highlights the importance of encouraging retailers to unlock action on the demand side for the NEM as well as the emissions intensity of supply.

Given these opportunities on the demand side, it is important that the design of the NEG supports investment across all aspects of the actions required to transform the electricity sector: renewable energy, storage, energy efficiency and demand side management measures. Retailers should be

allowed all to use these measures to meet their emissions reductions obligation, and likewise the reliability obligations.

The NEG should support existing policy and emissions reductions targets set by the states and territories. Under current UNFCCC rules, Australia considers voluntary action is additional to our national target. In a similar way, both voluntary action (such as customers purchasing GreenPower) and state level action should be additional to the minimum level of emissions reductions set through the NEG. If one state in the NEM has greater emissions reductions, e.g. because of policy encouraging higher renewable energy deployment, this should not allow other states not to achieve the emissions reduction obligation level set under the NEG. Emissions reductions will be required to increase over time because of Australia's commitment to the Paris Agreement and the need to reduce to net zero emissions. The 2030 and subsequent emissions reduction targets should therefore be viewed as a minimum to achieve and then exceed, rather than a point to reach at the given time.

An emissions intensity of less than 0.37 tCO_2e/MWh by 2030 is necessary to avoid locking-out emissions reductions – flexibility to meet the emissions reductions obligation should not undermine the transition to this benchmark for emissions intensity.

Measures that allow retailers flexibility in how they meet the emissions reductions obligations should be balanced with the importance of providing a clear investment signal to assist the transition of the electricity sector. This investment signal is especially important given the age of Australia's existing generation fleet and the investment that will be required to replace this generation in the next decades. ClimateWorks suggests that the use of emissions offsets could weaken the investment signal – especially if international offsets were allowed, given the uncertainty surrounding the price and mechanism for international offsets after 2020.

As previously mentioned, our research shows that an emissions intensity for the electricity sector of less than 0.37 tCO_2e/MWh is required to avoid locking-out emissions reduction from electrification. If flexibility mechanisms, including use of offsets or deferring obligations, delay the reduction of emissions intensity by 2030, then Australia's ability to meet its medium and long-term commitments under the Paris Agreement would become more costly and difficult.

References

The Australia Institute (2017 *Meeting our Paris Commitment: Modelling shows 66-75% renewable energy generation required to meet Australia's emissions target and avoid transferring major burden onto other sectors*, The Australia Institute, Canberra

The Australia Institute (2018) National Energy Emissions Audit Electricity Update February 2018, Author: Hugh Saddler, The Australia Institute, Canberra

Australian Energy Market Commission 2017 *2017 Residential Electricity Price Trends*, AEMC, Sydney

Australian Government 2017 National Energy Productivity Plan 2015–2030: Annual Report 2017, Commonwealth of Australia, Canberra

BNEF Bloomberg New Energy Finance 2017 Modelling of Australia's National Energy Guarantee. Accessed at https://data.bloomberglp.com/bnef/sites/14/2017/11/BNEF-2017-11-22-Modelling-of-Australias-National-Energy-Guarantee.pdf Viewed 1 March 2018

Clean Energy Regulator 2018 *Record year of investment means Australia's 2020 Renewable Energy Target will be met* Media release 23 January 2018 http://www.cleanenergyregulator.gov.au/RET/Pages/News%20and%20updates/NewsItem.aspx?ListId=19b4efbb-6f5d-4637-94c4-121c1f96fcfe&ItemId=468 Viewed 1 March 2018

ClimateWorks Australia, ANU, CSIRO and CoPS 2014 *Pathways to Deep Decarbonisation in 2050: How Australia can prosper in a low carbon world: Technical report,* ClimateWorks Australia, Melbourne

ClimateWorks Australia 2017 *Power Up: Australia's electricity sector can and should do more to deliver on our climate commitments* ClimateWorks Australia, Melbourne

Department of the Environment and Energy 2017 *Australia's emissions projections 2017*, Commonwealth of Australia, Canberra

About ClimateWorks Australia

ClimateWorks Australia is an expert, independent adviser, acting as a bridge between research and action to enable new approaches and solutions that accelerate Australia's transition to net zero emissions by 2050. It was co-founded in 2009 by The Myer Foundation and Monash University and works within the Monash Sustainable Development Institute.

Since launch, ClimateWorks has made significant progress, engaging key decision makers from all tiers and sides of politics and business. Their collaborative, end-to-end approach to solutions that will deliver greatest impact is informed by a thorough understanding of the constraints of governments and the practical needs of business. This, combined with philanthropic funding and university ties, has earned the organisation an outstanding reputation as a genuine and impartial adviser.

In the pursuit of its mission, ClimateWorks looks for innovative opportunities to reduce emissions, analysing their potential then building an evidence-based case through a combination of robust analysis and research, and clear and targeted engagement. They support decision makers with tailored information and the tools they need, as well as work with key stakeholders to remove obstacles and help facilitate conditions that encourage and support Australia's transition to a prosperous, net zero emissions future.