The Australia Institute

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Submission on the Renewable Energy Target

Submission
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Introduction

The Renewable Energy Target (RET) has been a very successful policy at reducing Australia's greenhouse gas emissions by increasing renewable energy generation. This submission from The Australia Institute recommends that the RET be strengthened to take advantage of the imminent retirement of gas fired electricity generation from the NEM. With wholesale gas prices increase to export parity levels it is likely that most non-peaking gas generation on the east coast of Australia will be unviable.

The closure of gas generation opens up an opportunity to expand renewable generation. The alternative is that more emissions intensive coal generation will replace gas generation and this will see the emissions intensity of electricity generation in Australia increase, reversing a long term trend.

This submission will focus on three main areas. The RET's effect on emissions, the RET's effect on electricity prices and the interaction of the RET and the rise in wholesale gas prices.

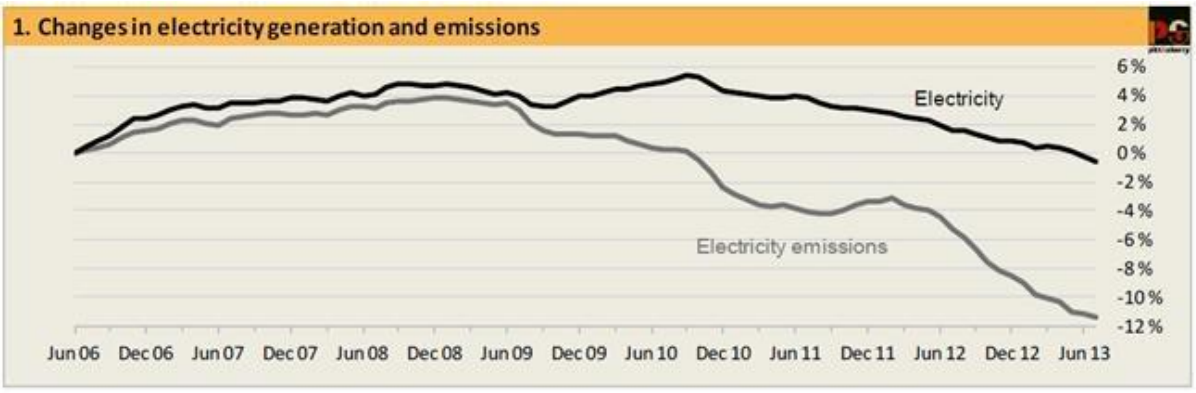
RET's effect on emissions

The primary purpose of the RET is to reduce Australia's greenhouse gas emissions. It does this by substituting fossil-fuel-generated electricity with renewable generation. The RET has been effective in achieving this and, coupled with a fall in demand for electricity, this has led to a fall in total emissions from electricity generation.

The fall in demand for electricity has been caused by a number of factors that have been covered in detail by respected energy consultant Hugh Saddler in his paper for The Australia Institute, *Power Down.*[1] The main three causes he identifies are the success of energy efficiency programs, the price effect caused by the recent rapid increase in electricity prices and the structural change in the economy away from electricity-intensive industries.

While the fall in demand for electricity and concomitant fall in the supply of electricity goes some way to explaining the decrease in emissions from electricity, it does not explain the fall in the average emissions intensity of electricity. This is the volume of emissions created when each unit of electricity is created. This is highlighted in the carbon emissions index, CEDEX, published by consultancy Pitt&Sherry.[2] As Figure 1 shows, a gap between electricity production and electricity emissions has opened up since 2009. That is to say, the amount of emissions per unit of electricity created has been falling.

Figure 1: CEDEX Changes in electricity generation and emissions



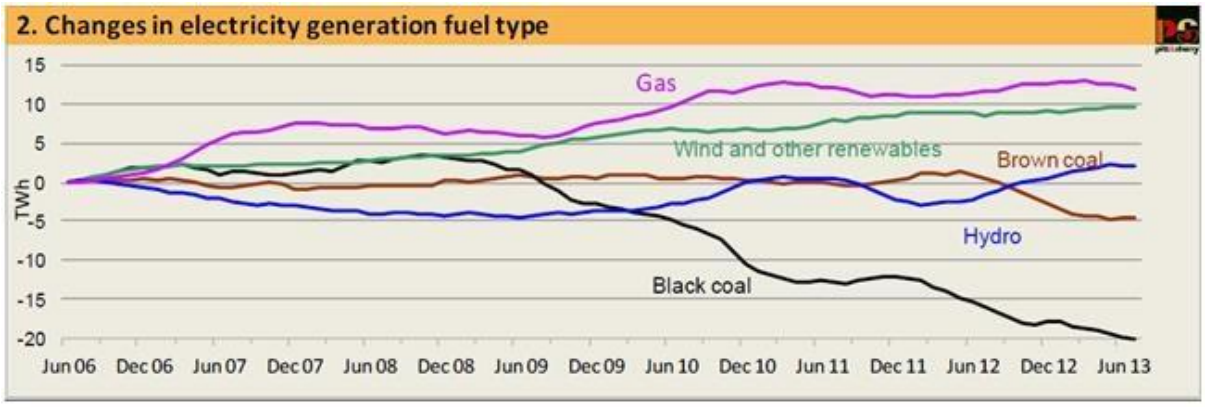
Source: Pitt&Sherry (2013) *CEDEX*

[1] Saddler (2013). *Power down*.

[2] Pitt&Sherry (2013) *CEDEX*.

The reason for the fall in average emissions intensity of electricity is that there has been a change in the mix of generation. There has been a shift from coal-fired electricity generation to renewable and gas-fired electricity generation. This is highlighted in another graph from CEDEX in Figure 2 below.

Figure 2: CEDEX Changes in electricity generation fuel type



Source: Pitt&Sherry (2013) *CEDEX*

As we can see there have been falls in both black- and brown-coal-generated electricity and at the same time a rise in renewable- and gas-generated electricity.

While gas is a fossil fuel and does generate greenhouse gas emissions when used to generate electricity, it produces fewer emissions than when coal is used. So the effect of the switch from coal to renewables and gas has had the effect of lowering the average emissions intensity of electricity generation in Australia.

The switch to renewable energy is in large part because of the incentives created by the RET. A report for the Clean Energy Council[3] found that 90 per cent of the additional renewable generation was attributable to the RET. The report also found that the RET, from its inception in 2001 until 2011, had been responsible for reducing emissions by 22.5 million tonnes of carbon dioxide equivalent (CO_2e). Without the RET, emissions in 2012 would have been four per cent higher.

As we get closer to 2020, the amount of renewable energy produced because of the RET will rise, and therefore the amount of abatement expected from the RET will also rise**.** A report for the Climate Change Authority has modelled the effect on emissions of removing the RET in 2013.[4] It found that, if the RET was abolished in 2013, then by 2031 Australia's carbon emissions would be higher by a total of 217 million tonnes of CO_2e.

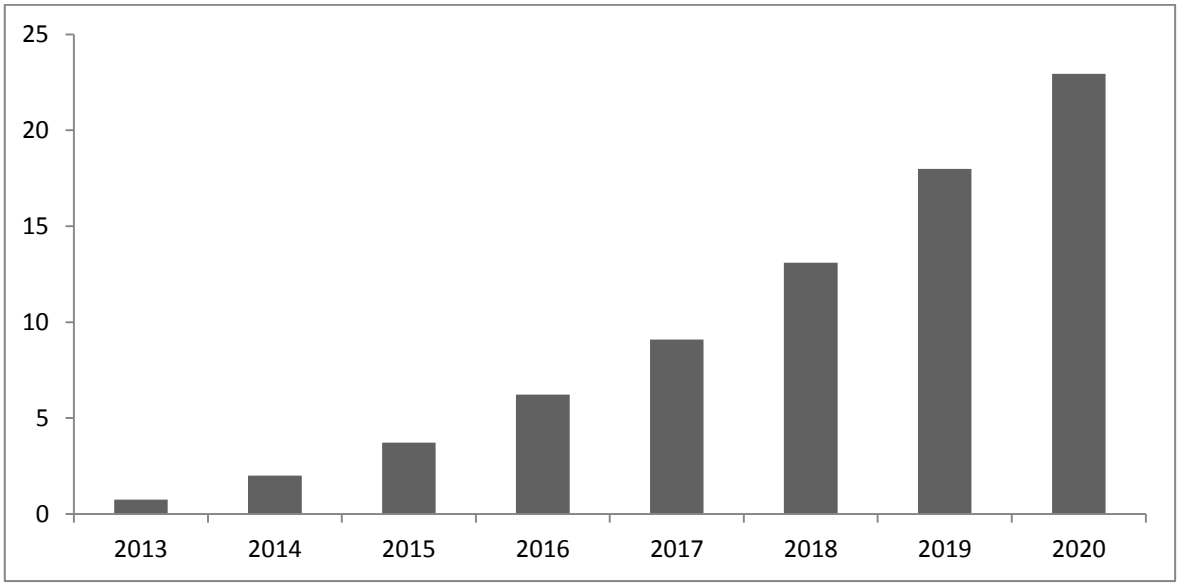
The modelling shows that from 2013 to 2020, abolishing the RET would add an additional 76 million tonnes of CO_2e. To put this into context, according to the government's figures[5] the abatement task from 2013 to 2020 is 457 million tonnes of CO_2e. This means the RET would be responsible for about 17 per cent, or one sixth, of the required abatement. The abatement each year from 2013 to 2020 is shown in Figure 3.

[3] SKM (2012a) *Benefit of the Renewable Energy Target to Australia's Energy Markets and Economy*.

[4] SKM (2012b) *Modelling the renewable energy target for the Climate Change Authority*.

[5] Australian Government Department of the Environment (2013) *Australia's Abatement Task and 2013 Emissions Projections*.

Figure 3: Estimated RET abatement (millions of tonnes of CO_2e abated)



Source: SKM (2012b). Modelling the renewable energy target for the Climate Change Authority

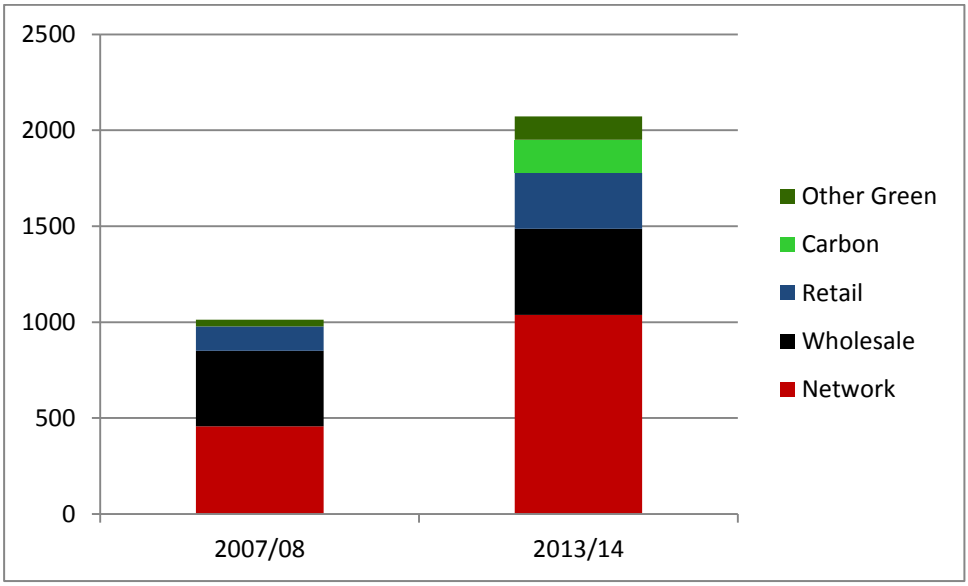
While the average emissions intensity of electricity generation in Australia has fallen, this is in part because of the switch to gas. As this submission will explain below, gas prices are going to rise to the point where it is likely that gas-fired electricity generation will become unviable. If the fall in gas-fired generation is replaced by coal-fired generation then the average emissions intensity of electricity will rise.

If gas prices continue to rise there is a likelihood that only gas peaking plants – those gas plants that supply electricity at times of peak demand when the electricity price is very high – will continue to operate.

RET's effect on electricity prices

While the RET's effect on prices paid by consumers is has been limited to around three to four and half per cent increase, under some circumstances the RET may in fact put downward pressure on electricity prices. While the cost of distributing electricity has increased dramatically, the wholesale price of electricity – that is, the price that generators receive – has been falling apart from a large increase in 2012-13 because of the carbon price. As Figure 4 shows, in NSW the share going to wholesale of the average electricity price shrank from 39 per cent to 22 per cent in the face of rising network costs. Over the six years it only increased by $55.

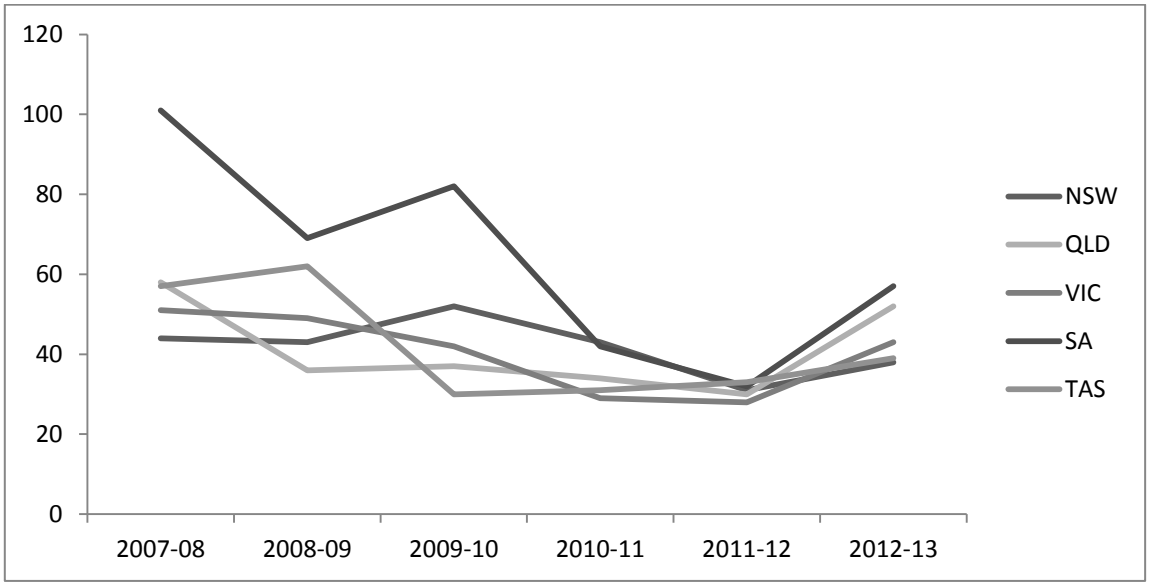
Figure 4: Causes of electricity price increases from 2007-08 to 2013-14



Source: IPART

Figure 5 shows changes in wholesale electricity prices exclusive of the carbon price for National Electricity Market (NEM) states.

Figure 5: Annual volume weighted spot prices in the NEM ($/MWh)



Source: Australian Energy Regulator (2013) State of the Energy Market 2013. Note 2012-13 has been adjusted by the AER to remove the effect of the carbon price

As Figure 5 shows, wholesale electricity prices have been trending down. This might be considered strange, since the RET affects wholesale prices – renewable electricity producers sell electricity into the wholesale market. It might be expected that wholesale prices would increase rather than decrease.

An important aspect of wholesale electricity prices is that they change day-to-day, hour-to-hour and even minute-to-minute. While the retail electricity suppliers that deal with household

consumers buy electricity at all sorts of different prices, they generally sell it to households at a fixed price. This fixed price is influenced by the average wholesale price of electricity, in addition to other factors.

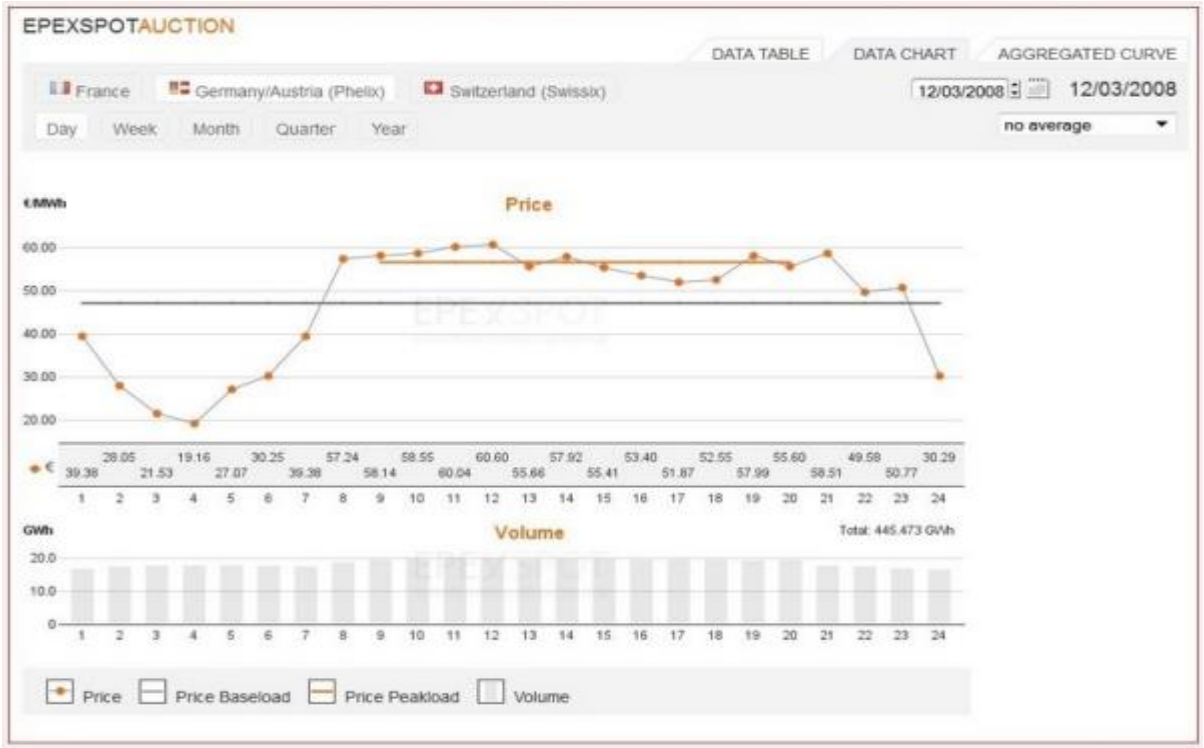
The wholesale price of electricity is determined in a market by the supply and demand of electricity. Increases in demand at certain times of the day can cause electricity prices to increase dramatically. With the increase in household use of air conditioners, these times are increasingly on very hot days. On these days prices can increase so much that some electricity suppliers have (mainly gas) generators that sit idle for most of the time that they only switch on to take advantage of these price spikes.

Some researchers estimate that 25 per cent of the cost of electricity to retailers occurs over a period of less than 40 hours of peak demand per year.[6] This puts into sharp focus how much the average cost of generation is dependent on only a short amount of time each year.

Renewable energy is variable and tends to produce significantly more electricity at these peak times. Solar in particular has higher output on hot summer days. The increase in renewable energy has the potential to put downward pressure on wholesale electricity prices at these peak times. This then has a downward effect on average wholesale electricity prices, which can then flow through as downward pressure on retail electricity prices.

This effect can be seen in Germany, which over the last four years has installed 25 GWs of solar PV. The following two graphs show the wholesale price of electricity on a typical March day. The first is in 2008 and the second is in 2012, after the 25 GWs of solar PV have been installed.

Figure 6: German electricity demand 2008



[6] Manning et al. (2012) *High power rates: it's a poles and wires story*.

Figure 7: German electricity demand 2012

The price in 2012 is significantly lower than the price in 2008 during the day, when the solar PV is generating electricity. During these times the increased supply of electricity is pushing down the wholesale price. It does so to the extent that both the peak load price and the base load price of electricity are lower. This is the effect that renewable energy can have on wholesale prices. The pushing down of wholesale prices in turn pushes down retail prices, which are made up in part by wholesale prices.

In June 2013, University of Melbourne researchers modelled the effect on wholesale electricity prices in 2009 and 2010 if there had been 5,000 megawatts of solar photovoltaic (PV) .[7] The paper found that wholesale electricity prices would have fallen. This is consistent with what is being observed in Germany.

In South Australia, where wind energy makes up a significant proportion of total generation, representing 24 per cent of capacity, the Australian Energy Regulator (AER) has found that wind has a moderating effect on wholesale electricity prices.[8]

Modelling recently released by one of Australia's leading economic modellers concludes that removing the RET would increase electricity prices by 2020. Two other leading energy market modellers, SKM-MMA and Intelligent Energy Systems have come to similar conclusions.[9] So while the RET may have increased retail electricity prices by three to four and half per cent, it is also having the opposite effect on wholesale electricity prices. The modelling suggests that, within a few years, this downward pressure on wholesale prices will be greater than its upward pressure on retail prices – meaning the RET will actually be decreasing electricity prices.

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7 McConnell et al. (2013) *Retrospective modeling of the merit-order effect on wholesale electricity prices from distributed photovoltaic generation in the Australian National Electricity Market*.

8 Australian Energy Market Regulator (2012) *State of the Electricity Market: Chapter 1 National Electricity Market*.

9 Edis T (2014) *Fighting off a gas price spike*.

Put into proper perspective, the RET is having a relatively small effect on electricity prices and even that small impact is likely to be partially offset by reducing peak wholesale electricity prices and will be fully offset in coming years. While there is considerable public concern about electricity prices, because they have doubled over the last six years, dismantling or watering down the RET will not provide the desired electricity price relief. Indeed it may ultimately lead to higher electricity prices.

The RET and the rise in gas prices

The effect of changes in the structure of the Australian eastern gas market could mean that recent falls in emissions from the electricity sector will be reversed. Changes to the RET could have a significant impact on this. The abolition or watering down of the RET could cause larger and more long-term increases in electricity emissions, while a strengthening of the RET could prevent some or all of the increase in emissions.

The Australian eastern gas market is about to be opened up to the world market and this means gas prices are on the rise. Large LNG export facilities are being constructed in Gladstone in Queensland. When complete, they will drive the wholesale gas price up from recent prices of $3 to $4 a gigajoule to $8 to $10 a gigajoule. This represents a doubling or tripling of wholesale gas prices.

There have been warnings from large industrial users about the consequences that such big gas price rises will have on gas-dependent manufacturing firms.[10] There has been less focus on the impact on electricity generation. The increase in gas prices is likely to make gas-fired power stations uncompetitive. At the moment, gas-fired electricity generation represents 20 per cent of capacity in the National Energy Market (NEM) and 12 per cent of output[11].

As this generation capacity becomes uneconomic, it will need to be replaced by other sources. This is important in the context of the RET. In the absence of strong support for renewable energy, the likely replacement for gas-fired electricity will be coal.

This has already begun to happen, with the announcement that the Swanbank gas-fired power station will shut down because it is more profitable to on-sell the gas rather than burn it to generate electricity. Owned by the Queensland government, Swanbank's gas generation will be replaced by the currently mothballed Tarong coal-fired power station.[12]

The switch from gas to coal will increase Australia's greenhouse gas emissions. Coal-fired power produces significantly more emissions than gas. This switch will make it harder for Australia to reach its emissions reduction target, particularly since the electricity sector has seen falling emissions for the last four years.

Demand for electricity has been falling in Australia since 2010. Fossil fuel generators have been feeling the squeeze due to this decline in demand combined with increased electricity generated from renewable sources. This has led to a number of coal-fired power stations being mothballed – that is, shut down, but left in case they are required at a future date. These mothballed coal-fired power stations are the most likely replacements for gas-powered generators.

It is likely that a significant proportion of current gas-fired electricity generation will become unviable. This creates the space for a large expansion in renewable energy. The decline in gas-fired electricity could create an opportunity to strengthen the RET rather than water it down.

[10] Manufacturing Australia (2013) *Impact of gas shortage on Australian manufacturing*.

[11] Australian Energy Market Regulator (2013) *State of the Electricity Market: Chapter 1 National Electricity Market*

[12] Moore (2014) *Swanbank power station to close for three years*.

Another way the government could help renewables fill the gap in generation is with its proposed emissions reduction fund (ERF). This is the centrepiece of its Direct Action Plan and involves the government buying emissions reductions from companies able to provide them. The ERF could be used to fund new renewable projects. These projects would reduce Australia's emissions, because they would prevent the switch from lower-emitting gas generation to higher-emitting coal-fired generation.

It appears, however, that the government will go in the opposite direction. The repeal of the carbon price will mean that coal-fired generators are not paying all the costs associated with their production. This will make renewables relatively more costly when compared to coal. If the government, in addition to this, waters down or scraps the RET on top of repealing the carbon price, then the likely outcome is an increase in coal-fired generation. This will make reducing Australia's emissions more difficult.

The rise in gas prices because of the linking of the eastern gas market with the world market marks an opportunity to reduce Australia's emissions. It also carries risks that Australia will revert to more emissions-intensive forms of electricity generation. The rise in gas prices creates a strong case for strengthening the RET.

Conclusion

The Renewable Energy Target (RET) has been a very successful policy at reducing Australia's greenhouse gas emissions by increasing renewable energy generation. Since its inception in 2001 to 2011 has reduced emissions by 22.5 million tonnes of CO_2e. If the RET is allowed to continue unchanged to 2020 it will further reduce Australia's emissions by 76 million tonnes of CO_2e. This will get Australia more than a sixth of the way to the five per cent reduction target.

The RET has so far had limited effect on retail electricity prices and repealing or watering down the RET is unlikely to put downward pressure on prices. Indeed in the coming years it is likely that the downward pressure that renewable energy has on wholesale electricity prices will make retail electricity prices lower than they would otherwise have been without the RET. If the review is concerned with the cost of living impacts of higher electricity prices then it should not consider weakening the RET.

The rise in wholesale gas prices creates an opportunity to further strengthen the RET. Gas fired generation that is likely to retire because of the rapid rise in gas prices could be replaced by renewable generation. If this does not occur then it is likely that the gas generation will be replaced with more emissions intensive coal generation. This will see the emissions intensity and possibly total emissions from the electricity sector reverse its current decline and instead increase.

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