Overpowering

WHY THE CARBON PRICE WILL HAVE A LIMITED IMPACT IN REDUCING ELECTRICITY EMISSIONS

The Australian Government's recently announced carbon pricing scheme – based on a cap and trade system - has divided the main political parties and the community. The looming federal election (scheduled for 7 September 2013) will again be largely fought over which party has the best policy for meeting Australia's 2020 greenhouse gas reduction target (which has bipartisan political support for 5% reductions below 2000 levels).

Much of the policy debate in Australia has supported a cap and trade scheme – seen as necessary (and some believe sufficient) to achieve Australia's emission reductions target.

The debate needs to consider the likely effectiveness of the Australian Government's carbon pricing scheme in terms of its contribution towards reducing greenhouse gas emissions given current policy and market settings. This paper examines this issue, particularly in light of changed market and policy conditions.

In an earlier Client Briefing[1], *Post hoc ergo propter hoc*, we investigated the Australian Government's claims that in its first year of operation the carbon tax resulted in a 7.7% decline in greenhouse gas emissions in the Australian National Electricity Market (NEM).

We found that emissions had indeed fallen sharply since the introduction of the carbon tax, but we showed that this fall was largely explained by factors unrelated to the carbon tax. These factors included: shutting down of a significant amount of brown coal generation in Victoria immediately before the commencement of the tax due to a mine flood; hydro generators shifting production from the year before the carbon price to the year after the carbon price to earn higher returns (shifting emissions from one year to another without reducing them in total); and a continuation of a trend of declining electricity demand that began three years earlier.

This paper takes the historical analysis presented in that Client Briefing a step further by exploring how much the Australian Government's carbon pricing scheme is likely to contribute to reducing emissions in the electricity sector in the period from 2014 to 2025. We especially focus on splitting the effect of the

1 Frontier Economics (2012), "Post hoc ergo propter hoc", Client Briefing, July.

carbon price on reducing emissions in the electricity sector from the reductions due to the operation of the Large Scale Renewable Energy Target (LRET).[2]

In forecasting the emissions reduction performance of the Australian cap and trade scheme we take account of recent changes to key factors that influence the scheme's effectiveness. These include:

- **The t/CO_2$ floor price (A$15 FY2016, A$16 FY2017, A$17.05 FY2018) was removed,** 2 months after the scheme commenced (Aug 2012);
- **EU ETS prices (EUAs) have fallen:** the most recent carbon price in Europe is €4.1/tCO2. This is even accounting for the recent approval of backloading in Europe[3].
- **Electricity demand growth has slowed/fallen**, a trend that was evident before the introduction of the carbon price.

We also take into account the most recent announced change by the Australian Government to the scheme involving a transition from the fixed price to the flexible price one year earlier (from July 2014).

Modelling approach

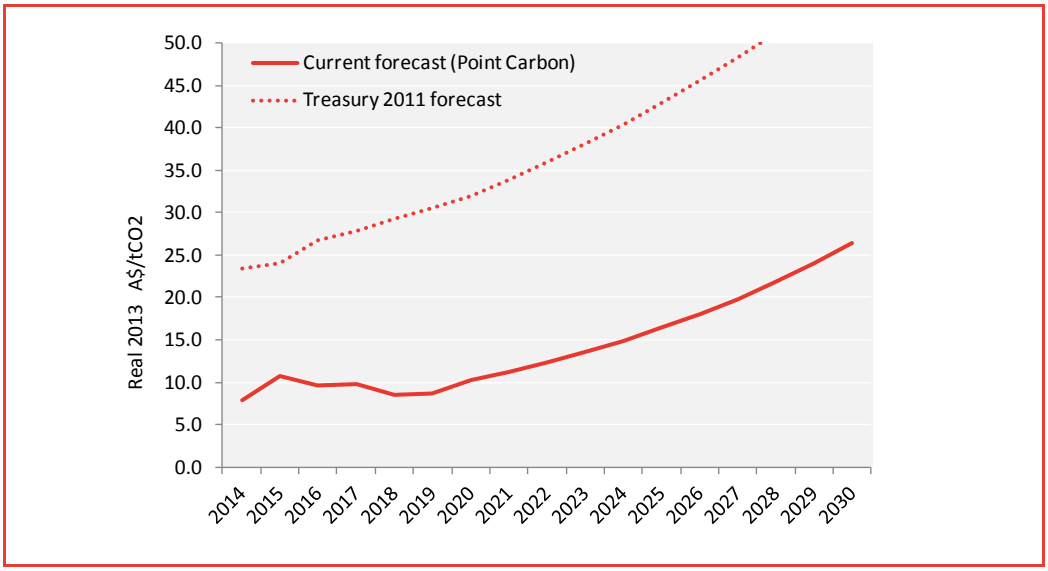
Forecasts of the contribution of various greenhouse gas abatement policies are prepared using Frontier Economics' long-term electricity sector model *WHIRLYGIG*. This model forecasts the least cost mix of electricity supply options needed to meet a forecasted peak and annual energy demand.

Figure 1 shows the assumed carbon price adopted for the modelling compared with Treasury's 2011 forecast. The new estimate is based on Point Carbon's latest estimate of EUA prices, which takes into account the recent EU decision on "backloading". This is converted to AUD, and we assume a simple 10% escalation of prices beyond 2020. This is lower than the price Treasury adopted in 2011, which assumed that prices would reach nomA$38/tCO2 (2013 real A$32/tCO2) by 2020, though we rely on the more current market estimates.

2 Clean Energy Regulator weblink: http://ret.cleanenergyregulator.gov.au/About-the-Schemes/Large-scale-Renewable-Energy-Target--LRET-/about-lret

3 In brief, the proposal is to withhold the sale of 900m permits from 2013-2015 until they are released 2019-20. This is effectively forced 'banking' of permits in an attempt to raise current carbon prices. The problem is that this is likely to shift the surplus until 2020.

Figure 1: Assumed carbon price



Source: Assumed carbon price is based on Point Carbon projections of July 3 2013 (which take account of the EU "backloading" proposal) converted to AUD, and assuming 10%p.a. escalation from 2020. http://www.pointcarbon.com/aboutus/pressroom/pressreleases/1.2445845

In this modelling we assume that the LRET scheme, which predates the carbon price, continues. This scheme involves subsidising the entry of 41,000GWh of renewable generation by 2020.

Modelling scenarios

To test the relative impact of the carbon price versus the LRET on electricity sector emissions, we considered 4 scenarios based on a combination of *retain* or *abolish* each of the carbon price or the LRET (summarised in **Table 1**). We then compare the total electricity sector emissions of the NEM both with/without each policy.

Table 1: Scenario overview

		LRET	
		Retain	Abolish
Carbon price	Retain	Retain both	Retain carbon price, abolish LRET
	Abolish	Abolish carbon price, retain LRET	Abolish both

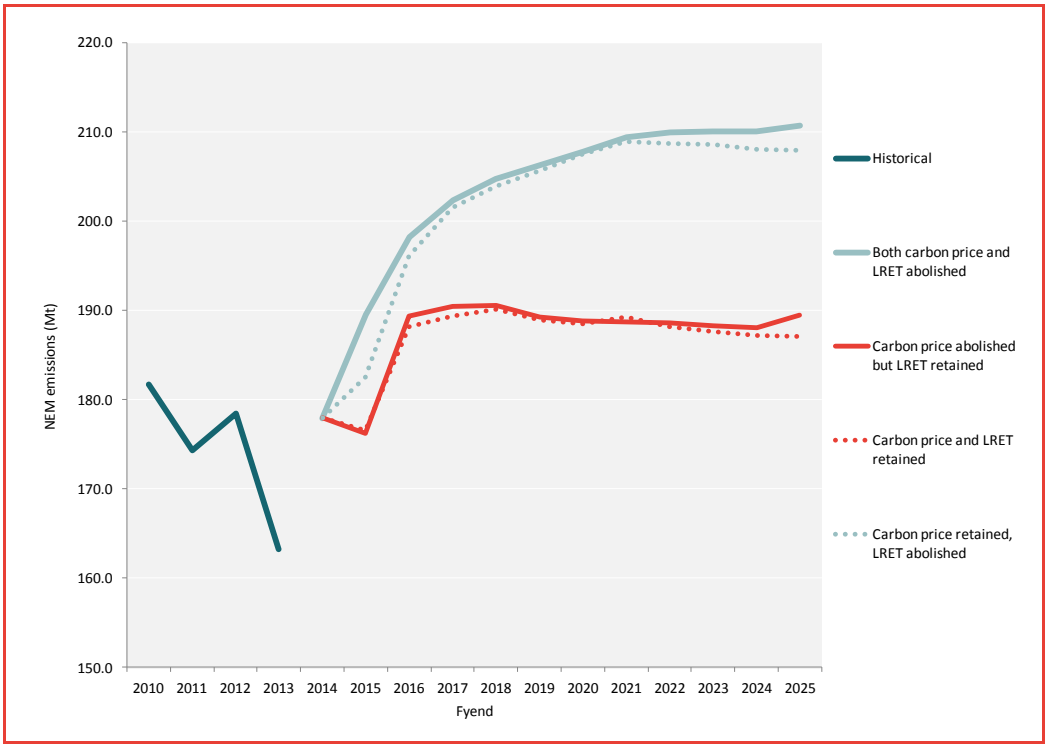
Emissions outcomes

Figure 2 shows the projected annual NEM emissions for each scenario, compared with recent historical emissions.[4] The initial rise in emissions in the modelling is largely based on recovery of demand in the AEMO demand projections (particularly to meet new LNG demand in Qld from 2015) which means that some current mothballed coal capacity returns to operation. If electricity demand does not recover as quickly as AEMO project, then this rise in emissions would not occur and the relative abatement delivered by each policy would be either the same or less than the estimates provided (as the potential growth in emissions provides more abatement opportunities).

The impact of the carbon price is reflected in the difference between the blue solid/dashed lines (if the LRET is abolished) or the difference between the red solid/dashed lines (if the LRET is retained).

The impact of the LRET is reflected in the difference between the solid blue and red lines (if the carbon price is abolished) or the difference between the dashed blue and red lines (if the carbon price is retained).

Figure 2: Projected NEM CO_2 emissions, by scenario



4 The recent fall in emissions in 2013 is discussed in a separate note. Factors explaining this include a general trend of falling demand, plant outages (such as Yallourn) and shifting of hydro output from 2012 to 2013, which exaggerates the general trend. The modelling assumes that this shifting of hydro output is not sustainable long-term (as it is constrained by rainfall), that plant outages won't persist, and that demand recovers somewhat in line with AEMO forecasts.

Source: Assumed carbon price is based on Point Carbon projections of July 3 2013 (which take account of the EU "backloading" proposal) converted to AUD, and assuming 10%p.a. escalation from 2020.

Table 2 summarises the differences between the scenarios based on the *average* annual NEM emissions from FY2014-2025. For example, average annual NEM emissions are projected to be:

- 186.6Mt if both policies are retained and operate concurrently;
- 201.5Mt if the carbon price is retained but the LRET is abolished;
- 187.2Mt is the LRET is retained and the carbon price is abolished; and
- 203.1Mt if both are abolished.

This means that for the NEM:

- **the LRET policy contributes average annual abatement of 14.9Mt if the carbon price is retained, or 15.9Mt if the carbon price is abolished. This is 90-96% of the electricity sector abatement to 2025, and**
- **the carbon price contributes average annual abatement of 0.6Mt if the LRET is retained, or 1.6Mt if the LRET is abolished. This is 4-10% of the electricity sector abatement to 2025.**

Table 2: Average annual NEM emissions (Mt), by scenario (2014-2025)

		LRET		
		Retain	Abolish	Difference (impact of LRET)
Carbon	Retain	186.6	201.5	14.9
	Abolish	187.2	203.1	15.9
	Difference (impact of carbon)	0.6	1.6	16.5 (combined impact: abolish both less retain both)

Note: LRET contributes 90-96% of the abatement, compared with the carbon price contributing 4-10% at this level of carbon price.

Table 3 provides the same summary but for aggregate NEM emissions over the period 2014-2025.

Table 3: Total NEM emissions (Mt), by scenario (2014-2025)

		LRET		
		Retain	Abolish	Difference (impact of LRET)
Carbon	Retain	2239.0	2417.7	178.7
	Abolish	2246.0	2437.3	191.3
	Difference (impact of carbon)	7.0	19.6	198.2 (combined impact: abolish, both less retain both)

Implication: LRET to drive 90-96% of electricity sector abatement

The results suggest that the LRET will have a far greater impact on electricity sector emissions in the next decade than the carbon price, given the current expected low carbon price together with the fixed 41,000 GWh target. This is because the LRET (at Large Scale Generation Certificates – LGC - prices of more than $30) provides more support to renewables and stronger incentive for switching to this form of generation than the lower carbon price; it effectively works as a minimum floor on domestic abatement. However, the relative effectiveness does not imply that the LRET provides lowest cost abatement per tonne; cheaper abatement could be obtained if the scheme were broadened.

At the same time, the LRET *mechanism* creates stronger generation switching incentives relative to the low expected carbon price, the target itself is such that renewable investments will crowd out any other (potentially cheaper) investment.

More specifically, the effect of slower demand growth combined with a rising LRET target means that almost all new investment in the electricity sector between now and 2025 is likely to be renewable (primarily wind), with perhaps some investment in peaking capacity to supplement intermittent wind. This is because the growth in the LRET target actually exceeds current projections for growth in energy demand.

The end result

Based on our modelling of the electricity sector from 2014 to 2025, our current projections suggest that the Australian Government's carbon price is likely to

result in only a small reduction in electricity sector greenhouse gas emissions, and considerably less than expected in 2011.

The key reason is that the projected carbon price is now much lower than was expected in 2011 due to both policy and market changes. Another significant factor is that electricity demand growth is also much slower than expected in 2011. This means that 'Business as Usual' (BaU) emissions growth is lower, which will reduce the opportunity to undertake abatement action.

In fact, almost all of the expected abatement from the electricity sector is likely to be driven by the LRET, which currently has the benefit of bipartisan support and the greater policy certainty that goes with this. The LRET is expected to do most of the abatement task because it is mandatory for electricity retailers to secure renewable certificates from this higher cost form of abatement and because the new capacity required under the fixed renewable target outstrips demand growth. This means that renewable investments (which yield generous returns to investors) are likely to crowd out almost all other (non-renewable) options, irrespective of whether they are cheaper.

Despite the media column inches and airtime dedicated to the carbon price and the impact of its abolition (as the Coalition has promised to do), as far as the electricity sector is concerned, the carbon price scheme in its current guise is clearly the support act to the LRET and is likely to make only a minor contribution towards meeting its primary aim – to reduce greenhouse gas emissions.

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