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Carbon Emissions

Aussie Carbon Rules

Breaking News

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Aussie Carbon Rules: the Carbon Pollution Reduction Scheme (CPRS)

The Australian Government's proposed CPRS failed to pass in a Senate vote, but the Government has indicated that it intends to re-submit its proposal for an Australian ETS before the Copenhagen conference in December. In our view, the proposed CPRS would be technically superior to the EU-ETS in certain key aspects, and would create significant demand for CERs over 2011-20, thus limiting Australian carbon prices while boosting global emissions-reduction efforts.

Australia is committed to reducing its GHG emissions by 5-25% by 2020

The Australian Government's proposed CPRS would establish an emissions-trading scheme from 1 July 2011 as the central pillar of its strategy for reducing emissions by at least 5% by 2020 versus 2000 levels, and by as much as 25% should an 'ambitious' new global agreement on climate change be reached. Australia's GHG emissions in 2000 (including LULUCF) were 553Mt, so a 5% cut would translate into a 2020 target of 525Mt, while a 25% cut would translate into a 2020 target of 415Mt.

The CPRS was defeated in the Senate, but could be re-submitted

The Government needs the approval of both Houses of Parliament to enact the CPRS, and the Senate rejected the legislation by a margin of 42 votes to 30. However, the Government has stated that the legislative battle is not over, and that it intends to re-submit the Bill before the end of the year.

Australia has learned from the experience of the EU-ETS

The CPRS would initially cover c.75% of Australia's GHG emissions (compared with only 45% for the EU-ETS), with power generation, industry, and transport included from day one, and agriculture expected to enter from 2015. The idea would be to auction c.75% of the allowances from the outset (compared with only 4% currently in the EU-ETS), with the remaining allowances allocated for free to trade-exposed and energy-intensive sectors based on dynamic benchmarking (as opposed to the static benchmarking used in the EU-ETS). We expect that the CPRS cap would phase down between 2011-20 to the target, in the same way as the EU-ETS cap over 2013-20. There would be a price cap of AUD\$10/tonne for the first year of the scheme, and of AUD\$40/tonne rising at the rate of inflation for the following three years, after which there would be no price cap.

Unlimited CER use would limit Australian CO2 prices and boost the CDM

Australia's GHG emissions have been growing at an average rate of about 1.2% over the last decade, so even assuming a more modest rate of future growth of 0.75% total GHG emissions would reach 648Mt by 2020 versus the 5% reduction target of 525Mt. With 75% of emissions covered by the CPRS, we estimate that the market would cover some 450Mt of emissions initially, and assuming a disproportionate share of the burden for reducing overall emissions by 2020 would fall on the trading scheme we derive a 2020 CPRS cap of 381Mt compared with estimated 2020 emissions from the entities covered of 480Mt. This would mean an average gap to cap in the CPRS over 2012-20 of 52Mt per year. With the CPRS allowing unlimited access to CERs and the cost of domestic abatement in Australia in our view likely above that of CER prices, we think this would create demand for CERs out of Australia of 52Mt per year on the 5% reduction scenario. And if Australia were ultimately to adopt the 25% target, then we estimate that the average CPRS abatement requirement over 2012-20 would be 102Mt per year, creating even greater demand for CERs. In short, we think the CPRS would give a significant fillip to CDM-project development.

Valuation and risks: Please see page 14 for our methodology and risks.

Deutsche Bank AG/London

All prices are those current at the end of the previous trading session unless otherwise indicated. Prices are sourced from local exchanges via Reuters, Bloomberg and other vendors. Data is sourced from Deutsche Bank and subject companies. DISCLOSURES AND ANALYST CERTIFICATIONS ARE LOCATED IN APPENDIX 1. MICA(P) 106/05/2009

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Aussie carbon rules: CPRS would boost CDM demand

On 4 May this year the Australian Government announced a one-year delay in the planned start date of the CPRS to 1 July 2011 from 1 July 2010, whilst at the same time increasing its commitment to reducing GHG emissions by 2020 in the event that an 'ambitious' global climate treaty to succeed the Kyoto Protocol were agreed either at the UNFCCC Conference of the Parties (COP) meeting in Copenhagen this December or at some subsequent point.

Having previously committed to a unilateral cut of 5% in Australia's GHG emissions by 2020 versus 2000 levels and a 15% cut in the event of an 'ambitious' global deal being reached, the announcement of 4 May retained the unilateral commitment of 5% but raised the target in the event of a successful outcome at Copenhagen to 25% from 15% (see <http://www.environment.gov.au/minister/wong/2009/mr20090504.html> for more details).

This announcement has undoubtedly raised Australia's profile in international climate-change discussions and pre-negotiations ahead of the Copenhagen COP this December, but whether or not a deal will be reached there that will ultimately enable Australia to move to a 25% emissions-reduction target for 2020 is not the most pressing question at the moment. Of more immediate concern instead is whether the Government will be able to pass the CPRS in its current form with the less ambitious unilateral 5% target.

This is because the Government needs the approval of both Houses of Parliament to enact the CPRS, and whilst it has support for the legislation in the House of Representatives, it does not command a majority in the Senate. And the Senate has defeated the legislation on a first vote. It is now for the Government to decide whether to re-submit the CPRS legislation for a second vote after a minimum statutory pause of three months, but according to a story on the Australian Broadcasting Corporation's website subsequent to the vote the Government is already resolved on this course of action (see the story at <http://www.abc.net.au/news/stories/2009/08/13/2655269.htm?section=australia>).

If the political stakes are high, however, so too are the implications for international carbon markets. This is because the CPRS would allow unlimited use of CERs, such that even under the base-case scenario of a 5% reduction in emissions by 2020 we estimate it would generate annual demand for CERs of c.50Mt from Australian corporations over 2012-20. And in the event that this target were ultimately raised to 25%, we estimate that CER demand out of the CPRS could reach c.100Mt per year.

In short, we think that by allowing unlimited use of CERs the CPRS would limit Australian carbon prices, whilst at the same time boosting global emissions-reduction efforts by creating significant demand for CDM credits. However, to the extent that CPRS prices would effectively be capped at the level of CERs, the incentive to invest in low-carbon technologies would in our view be lower in Australia than in the EU.

The CPRS has learned two key lessons from the EU-ETS

The CPRS legislation as submitted to the House of Representatives in May is available at http://parlinfo.aph.gov.au/parlInfo/download/legislation/bills/r4127_first/toc_pdf/09091b01.pdf;fileType=application%2Fpdf, and we think it has two key advantages over the EU-ETS which should make for a technically superior trading scheme as far as price discovery and price predictability are concerned:

- (i) the Australian scheme will auction a much higher proportion of allowances from day one of the scheme than the EU-ETS. As it is currently constituted we would expect the CPRS to auction up to 75% of the allowances from the beginning of the scheme, whilst in the EU-ETS there was no auctioning at all in Phase 1 of the scheme (i.e. all allowances were allocated free of charge over 2005-07), and even over Phase 2 (which runs over 2008-12) there will only be up to 5% of the allowances auctioned, with the remaining 95% again allocated for free;
- (ii) the CPRS will allocate allowances to companies and sectors at risk of carbon leakage on the basis of a dynamic-benchmarking methodology, rather than on the basis of the static benchmarking used in the EU-ETS.

We think the advantages of these two features are that a much higher level of auctioning will make for a more efficient market from day one, while dynamic benchmarking in the manner proposed under the CPRS should prevent those installations affected from accumulating significant surpluses of allowances and hence potentially depressing the price – for more details on these points see our submission made to the Australian Senate Enquiry on the CPRS earlier this year, logged as Submissions Number 121 on the Senate's website at http://www.aph.gov.au/Senate/committee/economics_ctte/cprs_09/submissions/sublist.html.

A further difference between the CPRS and the EU-ETS is that whereas the EU-ETS limits the amount of CERs that can be used over 2008-20 (with a view to creating a European carbon price that reflects the cost of abatement in the EU), the CPRS allows for unlimited use of CERs. This means that if the cost of CERs were lower than the cost of abatement in Australia, the installations covered by the CPRS would have an incentive to buy CERs rather than reduce emissions domestically.

The question is, how big could this demand be?

The 5% target would require CPRS abatement of 52Mt p.a. over 2012-20

Figure 1 shows the evolution of emissions both including and excluding emissions from land use, land-use change, and forestry (LULUCF) over 2000-07 (the latest year for which we have both numbers). The compound annual growth rate (CAGR) over this period was 1.2%.

Figure 1: Australian GHG emissions 2000-2007 (Mt CO₂e)

	2000	2001	2002	2003	2004	2005	2006	2007
GHG emissions excl. LULUCF	494.9	505.7	507.2	515.9	522.1	524.60	534.5	541.2
GHG emissions incl. LULUCF	552.6	559.5	567.0	553.1	564.7	584.2	596.1	597.2

Source: Australian Government Department of Climate Change (National GHG Inventory, May 2009, available at http://www.climatechange.gov.au/inventory/2007/pubs/nggi_2007.pdf)

We assume the 2000 baseline for the 2020 target includes LULUCF ...

Given the importance of LULUCF emissions in the total, and the fact that Australia's Kyoto baseline is measured after including LULUCF emissions, we assume Australia's 2020 target will be based on the 2000 number including LULUCF emissions (i.e. 553Mt), and a 5% reduction therefore translates into a 2020 target of 525Mt, and a 25% reduction a target of 415Mt (Figure 2).

Figure 2: Australian GHG emissions including LULUCF (Mt CO₂e)

2000 GHG emissions	2007 GHG emissions	Implied 2020 target under a 5% reduction scenario	Implied 2020 target under a 20% reduction scenario
552.7	597.2	525	415

Source: Australian Government Department of Climate Change (National GHG Inventory, May 2009, available at http://www.climatechange.gov.au/inventory/2007/pubs/nggi_2007.pdf)

As can be seen, this compares with emissions of 597Mt by 2007, such that the absolute emissions reduction required by 2020 against most recent levels would be 73Mt under the 5% scenario and 182Mt against the 25% scenario (as discussed below, however, what matters as far as the level of abatement required over 2012-20 is concerned is, of course, actual emissions over the same period).

... but that the scope of the scheme will initially exclude both agriculture and LULUCF

Figure 3 shows the breakdown of Australia's emissions in 2000 and 2007 by sector.

Figure 3: Breakdown of Australia's GHG emissions by sector, 2000 & 2007 (Mt CO₂e)

Sector	2000	2007
Energy	358.6	408.2
Industrial Processes	25.7	30.3
Solvent and Other Product Use	N/A	N/A
Agriculture	94.7	88.1
LULUCF	57.8	56.0
Waste	15.8	14.6
Other	N/A	N/A
TOTAL	552.7	597.2

Source: Australian Government Department of Climate Change (National GHG Inventory, May 2009, available on the Ministry's website at http://www.climatechange.gov.au/inventory/2007/pubs/nggi_2007.pdf).

By far the largest contributor in both years is energy, which increased its share of the total to 68% in 2007 from 65% in 2000. Indeed, the 50Mt increase in emissions from energy over the period is slightly higher than the 44Mt increase overall, with the slight decline in agricultural emissions accounting for the difference, and emissions from all the other sectors essentially unchanged (energy is a broad category but power generation and transport are the largest contributors to emissions in this category with 2007 emissions of c.200Mt and 78Mt respectively).

As far as the coverage of the CPRS is concerned, the Government's factsheet entitled *Liable Entities and Covered Emissions* (which is available at http://www.climatechange.gov.au/emissionstrading/legislation/pubs/liable_entities_and_covered_emissions.doc) defines the scope thus:

"The Scheme will include all greenhouse gases included under the Kyoto Protocol – carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulphur hexafluoride (SF₆), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs). Emissions from industrial processes, stationary energy, transport, waste, and fugitive emissions will be covered under the scheme."

Accordingly, we assume that over 2012-20 it will cover all emissions excluding those from LULUCF and agriculture (although the Government intends to include agriculture from 2015).

Projecting Australia's total GHG emissions out to 2020

With the CPRS due to start from 1 July 2011, before modeling the dynamics of the scheme itself over 2012-20 we need first to take a view on the development of emissions between 2007-2011.

Although the severe global recession might not have had quite the same impact on Australia as on other industrialized nations or regions (not least the EU), we think it reasonable nonetheless to assume a decline in 2009 emissions relative to 2008 before they pick up again in 2010.

Accordingly, after an estimated 1% increase in emissions in 2008 versus 2007 levels, we project a 2% decline in 2009, followed by a return to growth of 1.5% in 2010 and 1% in 2011 as the economy rebounds from the dip in 2009 (Figure 4).

Figure 4: DB estimated trend in Australia's GHG emissions incl. LULUCF, 2007-2011 (Mt CO₂e)

	2006	2007	2008E	2009E	2010E	2011E
GHG emissions	596.1	597.2	603.2	591.1	600.0	606.0

Source: For 2006-07, Australian Government Department of Climate Change (National GHG Inventory, May 2009, available at http://www.climatechange.gov.au/inventory/2007/pubs/nggi_2007.pdf); for 2008-12E, Deutsche Bank

Going forward, however, the policies being enacted by the Government designed to reduce emissions over time (in addition to the CPRS these include measures to promote renewable energy and enhanced energy efficiency) should lead to a lower level of trend growth in emissions.

As a result, we do not think it is appropriate to assume emissions will revert to the historical CAGR observed over 2000-07 of 1.2%. Instead, we assume that they will grow at a more modest CAGR over 2012-20 of 0.75% (Figure 5).

Figure 5: DB estimated trend in Australia's total GHG emissions incl. LULUCF, 2012-20 (Mt CO₂e)

	2012E	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E
GHG emissions at a CAGR of 0.75%	610.5	615.1	619.7	624.4	629.0	633.8	638.5	643.3	648.1

Source: Deutsche Bank estimates

Estimating the abatement requirement within the CPRS out to 2020

To derive the likely abatement requirement within the CPRS we first need to combine our assumption regarding the scope of the CPRS' coverage with our estimated trend for emissions in the economy as a whole as shown in Figure 5 above. We then need to make an assumption regarding the share of the burden for achieving the 5% target that the CPRS will bear relative to the sectors not included in the CPRS.

With emissions from agriculture averaging c.90Mt over 2005-07, and emissions from LULUCF averaging 59Mt over the same period, we estimate that emissions from these two sources combined would be just over 150Mt by 2012, and in keeping with the reasoning we described above we exclude these sectors from our assumed scope for the CPRS in 2012 (agriculture is problematic in that, as mentioned above, it is expected to enter the scheme from 2015, but for our modeling purposes here we assume a constant coverage perimeter over 2012-20, and thus exclude both LULUCF and agriculture over the entire period).

This gives us estimated 2012 emissions for the entities covered by the CPRS of 458Mt (i.e. the total emissions number of 611Mt shown in Figure 5 above minus the 153Mt combined we assume for the excluded sectors of agriculture and LULUCF). We then assume that the CPRS will have to achieve 90% of the targeted reduction by 2020, even though it only accounts for 75% of total emissions.

This is because the whole point of establishing a trading scheme is to find the most cost-efficient way of reducing emissions. As a result, we think it is natural to assume that the sectors included in the CPRS will have greater scope for reducing emissions going forward than those sectors excluded, and hence that they will be expected to bear a disproportionately large share of the burden for meeting the target.

Figure 6 shows our approach on this point. The total economy-wide reduction required by 2020 to achieve the 5% target against estimated 2012 emissions would be 86Mt, but we assume that the CPRS would have to achieve 90% of this reduction, or 77Mt in absolute terms.

Figure 6: DB assumed CPRS reduction burden under a 5% scenario (Mt CO₂e and %)

Total estimated emissions in 2012	611
Total assumed target emissions by 2020	525
Total reduction required by 2020 against 2012	86
Estimated emissions from CPRS scope in 2012	458
Assumed share of total required reduction borne by CPRS	90%
Reduction required in CPRS by 2020 against 2012	77

Source: Deutsche Bank

Putting all of our above assumptions together, Figure 7 then shows our estimated gap between CPRS emissions and the CPRS cap over 2012-20. We model the CPRS dynamics here in such a way that the cap phases down at a linear rate from the level of 2012 emissions to achieve the 77Mt reduction we have calculated it will have to achieve.

This means our 2020 cap for the CPRS is 381Mt.

Figure 7: DB estimated abatement requirement in the CPRS under a 5% reduction scenario, 2012-20 (Mt CO₂e)

	2012E	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E
Assumed CPRS cap	458	448	439	429	419	410	400	391	381
Assumed CPRS emissions at a CAGR of 0.75%	458	461	465	468	472	475	479	482	486
Gap to cap in CPRS	0	13	26	39	52	66	79	92	105

Source: Deutsche Bank estimates

The final line in Figure 7 is the important one, as this shows the gap between the level of allowed emissions (i.e. the cap), and our estimated level of actual emissions (or what we refer to as the abatement requirement). As can be seen, the gap rises over time, from 13Mt in 2013E to 105Mt in 2020E reflecting (i) the linear reduction in the CPRS cap over time, and (ii) our assumed CAGR in CPRS emissions of 0.75%.

Figure 8 then shows the accumulated and average annual abatement requirement over this period, which come to 452Mt and 52Mt respectively.

Figure 8: DB excess CPRS emissions over 2012-20 under 25% target (Mt CO₂e)

Total accumulated abatement requirement	452
Average annual abatement requirement	52

Source: Deutsche Bank

In short, on the basis of the assumptions we have made above, we think that the CPRS as currently proposed by the Government would create an average annual abatement requirement for the entities covered over 2012-20 of 52Mt.

The question is, how would they comply with this requirement?

To abate or to buy in the market?

Under a cap-and-trade scheme such as the CPRS or the EU-ETS, entities with a shortfall of allowances relative to their emissions essentially have two ways of making good this deficit:

- (i) they can reduce their own emissions in-house;
- (ii) they can purchase eligible allowances from entities with spare allowances to sell.

Clearly, if it is cheaper to abate in-house than to purchase an allowance in the market, then installations with a shortfall to make up will choose to reduce their own emissions before purchasing allowances.

By contrast, if it is cheaper to purchase allowances than to abate in-house, then deficit installations will buy in the market.

As far as the cost of in-house abatement is concerned, experience of the EU-ETS to date has shown that the cheapest large-scale form of emissions reduction is fuel-switching in the power-generation sector. However, in the EU there is currently significant scope for switching between coal and gas-fired plants, while in Australia there is minimal spare gas capacity available.

As a result, the economics of short-term fuel switching would be different in Australia, with the short-term switching price between lignite and hard coal the main driver rather than the switching price between coal and gas as is the case in the EU.

(We would note, however, that the economics of long-term fuel switching in both the EU and Australia would likely reflect the carbon price required to make CCGT plant – or further out carbon-capture and storage generation plant – the new entrant of choice over conventional hard coal or lignite. Again, however, even here the economics would vary materially given the difference, for the foreseeable future at least, between gas prices in the EU and gas prices in Australia.)

As far as the allowances eligible for purchase on the market are concerned, the CPRS would allow both the domestic Australian currency – the Australian Emissions Units, or AEU, that make up the CPRS cap – and CERs generated from CDM projects (moreover, and as mentioned above, the CPRS, unlike the EU-ETS, would not place any limit on the use of CERs).

However, to the extent that Figure 7 shows our estimated CPRS emissions significantly above the CPRS cap over 2012-20, then on our estimates the system as a whole would by definition have a deficit of AEU. As a result, if purchasing allowances were cheaper than in-house abatement, then on a net basis the average shortfall our model projects over 2012-20 of 52Mt per year would have to be made up via the purchase of CERs rather than AEU.

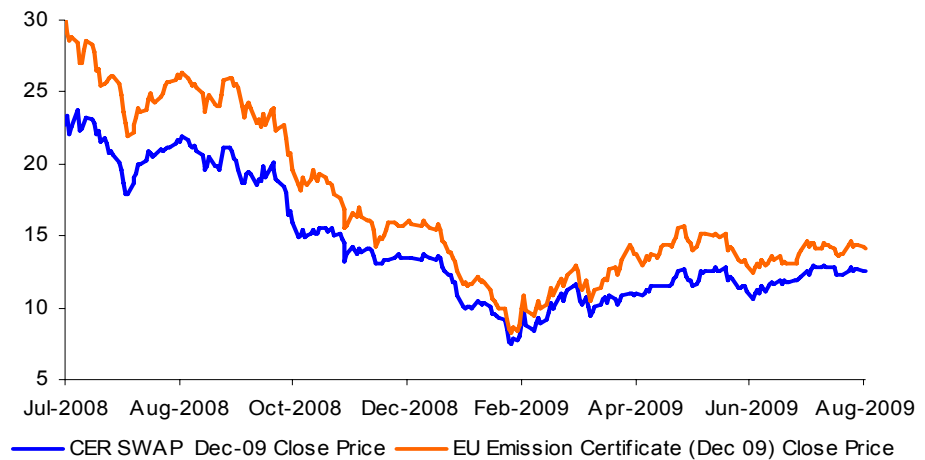
Based on current prices, we think buying CERs would be cheaper than fuel switching

Figure 9 shows the development of CER prices relative to EUA prices (EUAs being European Unit Allowances, the domestic credits traded in the EU-ETS) since the beginning of this year. With the EU-ETS the main buyer of CERs at the moment (we estimate it currently accounts for c.75% of all CER purchases, with European Governments and Japanese sovereign and corporate entities accounting for most of the remainder). CERs have been very strongly correlated with EUAs since the EU-ETS began in 2005.

As can be seen, EUA and CER prices have been very volatile over the last 12 months, reflecting both extreme oscillations in the commodity prices that influence EUA prices (oil, gas, and coal) over this period, and the sharp decline in GDP across the EU over the last three quarters amidst the ongoing very severe global recession (which has led to lower industrial production and hence sharply lower emissions).

In the last two months or so, however, prices have been much more stable, owing to the traditionally quieter trading volumes seen in the European summer and, perhaps more importantly, to signs of stabilization in parts of the EU economy and even perhaps to selected early signs of modest recovery (for example in German industrial exports).

The December-09 CER contract is currently trading at €12.5/t (which at the current €/AUD\$ exchange rate of 1.7 equates to a price of AUD\$21/tonne). These prices are well below the level required for short-term fuel switching in Germany between coal and lignite.

Figure 9: EUA and CER prices (Dec-09 contracts), July 2008--August 2009 (€/tonne)

Source: Deutsche Bank

We estimate that to engender a shift to coal-fired generation from lignite-fired plants in Germany at the moment based on a short-run marginal cost (SRMC) for lignite generators of €10/MWh at 32% thermal efficiency and a SRMC for coal generators of €27/MWh at 38% thermal efficiency (with a coal price of \$85/tonne and delivery costs of \$15/tonne) would require a carbon price of €35-40/tonne (AUD\$60-70/tonne) compared with the current Dec-09 EUA price of €14/tonne (AUD\$24/tonne).

The economics of short-run lignite-to-coal switching in Australia would be different, as while the lignite generation price before accounting for carbon would be similar to that in Germany the hard-coal generation price would be much lower in Australia. This is because we understand that the coal burned in Australian power stations is generally of lower quality than the coal exported by Australia to international markets, which in turn means it probably has a slightly higher carbon content.

As a result, whilst the carbon price required to effect fuel switching in Australia might be lower than in Germany – we estimate AUD\$35-40/tonne for a 36% thermal efficient coal plant to displace a 32% lignite plant – the carbon saving would probably be lower per MWh switched than in Germany. We estimate a saving of 0.25 tonnes of CO₂ emissions per MWh generated by hard coal instead of lignite in Australia, compared with 0.35 tonnes of CO₂ saved per MWh switched in the German example given two paragraphs above.

Moreover, there is in reality a significant physical constraint on the amount of short-run fuel switching that could take place in Australia in any case, as most of the lignite plant is in Victoria, and there is a limit both to (i) the amount of spare hard-coal capacity in neighbouring states that could displace this Victorian lignite plant and (ii) the amount of power that can be transported through the relevant inter-connectors.

In short, based on current CER prices of AUD\$20/tonne, CPRS entities with a deficit to cover would clearly have an incentive to buy CERs over opting for in-house abatement, and this would remain the case up to CER prices of at least AUD\$35-40/tonne.

It is worth noting that modelling the long-run marginal cost, or LRMC, of fuel switching in Australia is a more demanding exercise than modeling the SRMC as it is highly dependent on the development of gas prices in Australia going forward. There is undoubtedly very significant potential for new CCGT plant to displace older lignite and coal-fired generators over time and thereby reduce Australia's emissions substantially, but what complicates the equation is the outlook for coal and gas prices in Australia over the medium to longer term.

We have much more work to do in this area, but at this stage would simply say that we do not think it would be safe to assume that the LRMC of fuel switching in Australia – i.e. the carbon price required to make CCGT or eventually CCS-lignite and CCS-coal-fired power plants the new entrant technologies of choice over conventional coal and lignite plants – would be materially different from the SRMC numbers we have outlined schematically above.

The outlook for CER prices over 2012-2020

Looking at the forward curve to 2012, the Dec-12 contract currently trades at €13.5/tonne, or AUD\$23/tonne. Over the rest of Phase 2 of the EU-ETS we expect the EUA price to trend upwards, reaching €16-18/tonne by the end of this year, and trending up towards €25-30/tonne by 2012 (see our reports of 5 May and 26 May respectively, *The Long and the Short of It*, and *How Long Is A Piece of String?* for more details on this point).

However, whilst we would expect the CER price to follow the EUA price directionally over the next couple of years, we also expect the spread between EUAs and CERs to widen over the next 12-18 months (again, for more details on this point see our recent reports *The Long and the Short of It*, and *How Long Is A Piece of String?*).

Indeed, beyond the time horizon of the current phase of the EU-ETS (which ends in 2012), we would expect CERs to diverge from EUA prices more markedly. This is for two main reasons:

- (i) We expect EUA prices to rise significantly over Phase 3 (covering the period 2013-20), and to reach €48/tonne by 2020, or AUD\$82/tonne (for detailed explanations of our methodology for forecasting EU carbon prices and our rationale for expecting them to rise over time see our in-depth reports *It Takes CO₂ to Contango* published 30 May 2008, and *Emissions in Remission*, published 15 October 2008);
- (ii) We think that if a new global climate agreement is reached at Copenhagen or some point later date, the global supply of CERs will have to increase markedly over time to accommodate the likely demand for international offsets out of the US, Japan, Australia, Canada and other industrialized countries above and beyond the demand already present in the EU for the period 2013-20.

In our view, there is potential for very significant new sources of supply of CERs from projects relating to forestry, avoided deforestation, and reduced emissions from deforestation and degradation (REDD).

At this point in time it would clearly be highly speculative to venture price forecasts for international offset credits over 2013-20, but in our view we can at least say that over the longer term we would expect to see CER prices trending more towards the economic cost of the marginal projects rather than simply tracking EUA prices.

In our view, this would all suggest that whilst EUA prices could rise strongly over the next 5-10 years, CERs are likely to trade at a growing discount to the EUA price over time. As a result, whilst we do not rule out CER prices re-visiting the levels seen in the middle of 2008 (€22/tonne) should EUA prices rise to €30/t or higher in the next 12-18 months, we would not expect to see CERs trade any higher than this given the way we expect the international market to unfold over time.

As a result, we would expect the CER price to remain below the cost of fuel switching in Australia over the medium to longer term.

Conclusion: potential CPRS demand for 50Mt of CERs per year over 2012-20

We think that even on the 5% reduction scenario, the planned CPRS would generate significant demand for CERs, thus limiting the price of carbon to the entities covered by the CPRS whilst at the same time providing a material boost to the market for international offsets.

Our modelling indicates that the CPRS would create an average annual abatement requirement for the entities covered over 2012-20 of 52Mt, and that most if not all of this demand would be met via the purchase of CERs.

The next question is, what would the potential CPRS demand for CERs be under a 25% emissions-reduction scenario by 2020?

The 25% target would require CPRS abatement of 102Mt p.a. over 2012-20

As shown in Figure 2 above, under a 25% reduction scenario, Australia's 2020 target would be 415Mt. Assuming again that the CPRS would have to achieve 90% of the targeted reduction, Figure 10 shows the total economy-wide reduction required by 2020 to achieve the 25% target against estimated 2012 emissions would be 196Mt, with the CPRS responsible for achieving 176Mt of this.

Figure 10: DB assumed CPRS reduction burden under a 25% scenario (Mt CO₂e and %)

Total estimated emissions in 2012	611
Total assumed target emissions by 2020	415
Total reduction required by 2020 against 2012	196
Estimated emissions from CPRS scope in 2012	458
Assumed share of total required reduction borne by CPRS	90%
Reduction required in CPRS by 2020 against 2012	176

Source: Deutsche Bank

Figure 11 then shows our estimated gap between CPRS emissions and the CPRS cap over 2012-20. Again, we model the CPRS dynamics in such a way that the cap phases down at a linear rate from the level of 2012 emissions to achieve the 176Mt reduction we have calculated it will have to achieve.

This means our estimate of the 2020 cap for the CPRS is 282Mt.

Figure 11: DB estimated abatement requirement in the CPRS under a 25% reduction scenario, 2012-20 (Mt CO₂e)

	2012E	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E
Assumed CPRS cap	458	436	414	392	370	348	326	304	282
Assumed CPRS emissions at a CAGR of 0.75%	458	461	465	468	472	475	479	482	486
Gap to cap in CPRS	0	25	51	76	102	127	153	179	204

Source: Deutsche Bank estimates

Again, it is the final line in Figure 11 that is the important one, as this shows the abatement requirement. As can be seen, the gap rises over time, from 25Mt in 2013E to 204Mt in 2020E reflecting (i) the linear reduction in the CPRS cap over time, and (ii) our assumed CAGR in CPRS emissions of 0.75%.

Figure 12 then shows the accumulated and average annual abatement requirement over this period, which come to 928Mt and 102Mt, respectively.

Figure 12: DBE excess CPRS emissions over 2012-20 under 25% target (Mt CO₂e)

Total accumulated abatement requirement	918
Average annual abatement requirement	102

Source: Deutsche Bank

In short, we think that under a 25% economy-wide reduction scenario, the CPRS would create an average annual abatement requirement for the entities covered over 2012-20 of 102Mt, and that for the reasons mentioned above most if not all of this demand would be met via the purchase of CERs.

An alternative to the CPRS?

Earlier this week, the Australian Opposition associated itself with a report published by the economics consultancy Frontier Economics (available at <https://promo-manager.server-secure.com/download/files/01562/136541/Frontier+Economics+CPRS+report+-+STC+v2.pdf>) although it has not to our knowledge adopted the suggestions in the report as formal policy at this stage.

At the launch of the report, the Opposition stated that the alternative proposals in the Frontier report would lead to a “cheaper and greener” emissions-reduction policy than the CPRS (see ABC’s coverage of the launch of the report on Monday 10 August at <http://www.abc.net.au/news/stories/2009/08/10/2651065.htm>).

The Frontier report analyzed the economics of a baseline-and-credits scheme for the electricity sector, arguing that the increase in electricity prices for consumers would be lower under such a scheme than under the CPRS.

This is because under such a baseline-and-credits scheme generators would not have to provide an allowance for every tonne of CO₂ they generated. Rather, they would be benchmarked against a reference carbon-intensity level to be set initially at 0.86 tonnes per MWh.

So, generators with an emissions-intensity level above this benchmark would have to provide allowances to cover the difference between their own carbon intensity and the benchmark for every MWh they generated. By contrast, generators with an emissions-intensity level below the benchmark would receive allowances to the value of the difference between their own carbon intensity and the benchmark for every MWh they generated.

To the extent that under such a scheme generators would not be pricing in 100% of their carbon intensity per MWh generated but instead only their intensity relative to the benchmark, we think it is reasonable to assume that the direct increase in electricity bills to consumers under such a baseline-and-credits approach would be lower than that which would occur under a cap-and-trade approach.

In effect, such an approach would create a cost differential between higher and lower carbon-intensity power plants but at a lower absolute price level. It would do this by only partially pricing in carbon to the cost base of the more carbon-intensive generators (i.e. those with an intensity level higher than the benchmark), whilst simultaneously reducing the cost base of the less carbon-intensive generators (i.e. those with an intensity level lower than the benchmark).

That said, we think it is important to highlight some of the more obvious drawbacks of such a baseline-and-credits approach, and in this respect we would see the main drawbacks as follows:

- The setting of an intensity benchmark would not formally cap emissions, and there is thus an obvious question raised as to the compatibility of such a scheme with the kind of cap-and-trade schemes already up and running elsewhere (notably the EU-ETS) and those being mooted in other industrialized countries (most notably the US);
- such a scheme would be very complex to administer, and arguably more so than the CPRS;
- the *quid pro quo* to the lower impact of carbon prices on consumers' electricity bills under such a scheme would be the greater financial burden on the public purse to achieve the emissions-reduction target. In other words, citizens might pay less initially as electricity consumers under a baseline-and-emissions scheme than under a cap-and-trade approach, but as taxpayers we think they would pay more under this approach than under the base-case CPRS scenario (and all the more so given that the report argues for a more ambitious target of 10% than the base-case of 5%, under the CPRS, this being the basis on which the Opposition claimed it would be greener than the Government's plan).

It remains to be seen whether the idea of adopting a baseline-and-credits approach to the power sector will become the formal policy of the Opposition and hence whether amendments to the CPRS accommodating some of the ideas in the Frontier report will ultimately be made to facilitate its passage the second time around.

If this were to happen we would look to do more analysis of these proposals to see what their precise impact would be, but at this point in time we think the Government remains determined to adopt a pure cap-and-trade approach, which would be much more in line with the approach being adopted in the EU and the US.

Conclusion: CPRS would make Australia a serious global player

We think that the CPRS would create significant demand for CERs out of Australia, ranging from 50Mt per year over 2012-20 on a 5% emissions-reduction scenario to 100Mt per year on a 25% reduction scenario.

In allowing unlimited use of CERs the CPRS would limit Australian carbon prices, whilst at the same time boosting global emissions-reduction efforts by creating significant demand for CDM credits.

However, to the extent that CPRS carbon prices would effectively be capped at the level of CER prices, the incentive to invest in low-carbon technologies would in our view be lower in Australia under the CPRS than in the EU under the EU-ETS.

Carbon valuation

The theory behind our valuation of EUAs

In theory, we think that the Phase-3 ETS cap agreed at the EU Heads of Government Summit last December is tight enough to imply a EUA price of €25-30/t already in 2009. This is because expectations about a much tighter cap in Phase 3 will make Phase 2 allowances more valuable given that they can be carried over into Phase 3. In effect, the bankability of Phase 2 EUAs means that the shortage of EUAs foreseen by the market in Phase 3 should already be anticipated in Phase 2 (assuming the market is efficient).

In other words, bankability means that we have to consider the expected residual abatement requirement in Phases 2 and 3 together rather than separately. On our assumptions, the proposed Phase 3 cap results in an average residual abatement requirement within the ETS of 44Mt per year over the entire 2008-20 period.

If there is insufficient fuel-switching capacity in the EU to meet the required level of abatement in the ETS then today's EUA price should reflect the long-run marginal cost (LRMC) of carbon, this being the carbon price required to ensure that CCGT gas-fired plant gets built ahead of coal-fired plant. On our estimates, however, the full ETS shortfall of 44Mt per year could in theory be met via existing plant across the EU, and if this were to happen the price of EUAs would be set by the short-run marginal cost (SRMC) of fuel switching rather than the LRMC, unless the SRMC of abating 44Mt per year were greater than the LRMC of building new capacity.

Given the volatility of commodity prices over the last 12 months, estimating both the LRMC and the SRMC of fuel switching is very difficult at the moment. At this point in time, however, we see no reason to change our long-run commodity-price forecasts as set out in our report of 15 October, *Emissions in Remission*. Our LRMC analysis would therefore still indicate a fundamental value for EUAs of €30/t already in 2009, rising thereafter at the cost of carry (we use 4% to derive a 2020 EUA fair value of €48/t), should the building of new capacity be necessary to meet the cap.

The SRMC changes constantly in response to the prompt prices of oil, gas, and coal, but we estimate that to abate 44Mt of CO₂ fuel switching would be required in both Spain and the UK. Given that the UK's CCGT fleet is on average older and less efficient than Spain's, then even with oil and gas prices having fallen so dramatically in recent months we calculate that a price in the range of €25/t-€30/t would be necessary to achieve this in the short run (assuming coal prices of \$80/t-\$90/t, and an oil price of \$50/bbl or higher).

Risks to our valuation of EUAs

In practice, we think that market inefficiencies engendered principally by the *ex-ante* free allocation of allowances in the ETS could keep EUA prices significantly below our theoretical fair-value estimate throughout 2009 and the first half of 2010.

In particular, with our forecasts now showing Phase 2 viewed in isolation to be long of EUAs by an average of 23Mt per year, we think the EUA price will remain volatile and potentially vulnerable to any further deterioration in the EU economy beyond that already indicated in our forecasts.

Appendix A: Glossary

Figure 13 defines the technical terms used throughout this report.

Figure 13: Glossary of terms

Abatement	In the carbon context, GHG-emissions reductions
AEU	Australian Emissions Unit, the tradable domestic allowances that would be created under the CPRS
AUD\$	Australian dollar
Bankability/banking/to bank	In the EU-ETS or CPRS context, the carrying over of carbon credits from one trading period to the next
BAU	Business as usual
boe	Barrel-of-oil equivalent
CAGR	Compound Annual Growth Rate
CCGT	Combined Cycle Gas Turbine
CCS	Carbon-capture and storage
CDM	Clean Development Mechanism, one of the two so-called "flexible mechanisms" of the Kyoto Protocol
CER	Certified Emissions Reduction, an emissions credit generated from a CDM project. CERs are eligible for compliance purposes in the CPRS with no limit on their use.
COP	Conference of the Parties, the annual meeting of all parties to the UNFCCC
Copenhagen conference	The 15 th Conference of the Parties (COP) meeting that will take place in Copenhagen in December of this year
CPRS	Carbon Pollution Reduction Scheme, the emissions-trading scheme proposed by the Australian Government
DB	Deutsche Bank
Dec-09, Dec-10 etc.	In the context of an EUA or CER allowance, a contract for delivery in December 2009, December 2010 etc.
E	Estimated
€	Euro, the common currency used by 16 Member States in the EU
EU	European Union
EUA	European Union Allowance, the tradable domestic allowances issued within the EU-ETS
EU-ETS	European Union Emissions Trading Scheme
FF plant	Fossil-fuel plant (i.e. a power plant fired either by lignite, coal, gas, or oil)
GHG(s)	Greenhouse gas(es)
LRMC	Long-Run Marginal Cost
LULUCF	Land use, land-use change, and forestry, a category for classifying emissions
M or m	Million
Mt	Million tonnes or Mega-tonnes
MW	Megawatt, a measure of the capacity of a power station (one million watts)
MWh	Megawatt-hour, a measure of the output of a power station (one million watts of power generated for an hour)
p.a.	Per annum
p/y	Per year
Phase 1, Phase 2, Phase 3	Trading periods of the EU-ETS running from 2005 to 2007, 2008 to 2012, and 2013 to 2020 respectively
REDD	Reduced Emissions from Deforestation and Degradation
SRMC	Short-Run Marginal Cost
t	Tonne
UNFCCC	United NATIONS Framework Convention on Climate Change

Source: Deutsche Bank, UNEP

Appendix 1

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