



25 March 2009

Carbon Emissions

Previewing 2008 ETS Emissions: It's all about Q4

Verified ETS emissions data for 2008 to be released from 1 April

After looking at the full-year fuel mix in the power sector in certain key countries, we now expect a year-on-year (YoY) decline of 5.2% in 2008 ETS emissions to 2,120Mt (previously 2,148Mt) from pro-forma 2007 emissions of 2,237Mt. Although our forecast implies a deficit of 42Mt against the average total Phase-2 cap of 2,078Mt, the very weak outlook for EU output in 2009 and the ripple effect of this on our 2010-12 forecasts means that we continue to expect a slight surplus of EUAs over Phase 2 as a whole.

We expect a deficit of EUAs in 2008...

The scope of the ETS was broadened slightly from 1 January 2008 to include installations with emissions of c.75Mt, and following an updated analysis of the finalized Phase-2 NAPs, we now see the average total cap over 2008-12 at 2,078Mt (2,083Mt previously) compared with pro-forma 2007 emissions of 2,237Mt. However, to arrive at the allocation to existing installations for 2008, we need to adjust the Phase-2 cap for the new-entrant reserve (NER), which we estimate at c.100Mt per year, and for the fact that the annual allocation varies slightly in some countries over 2008-12. On this basis, we estimate the total cap (i.e. including the NER) for 2008 at 2,095Mt, and an EUA allocation to existing installations (i.e. excluding the NER) of 1,995Mt. With our estimate for 2008 ETS emissions of 2,120Mt including c.30Mt from new entrants, we are projecting an EUA deficit of 25Mt against the total 2008 cap of 2,095Mt, and of 95Mt against the 2008 cap adjusted for new entrants. This means we are estimating that 70Mt of EUAs from the 2008 NER will be carried forward by Member States for use in future years either for allocation to new entrants or, in the event that the NER is not fully used up, for auctioning to incumbents.

... but a small surplus over Phase 2 as a whole

The EU economy has been deteriorating very rapidly since the late summer of 2008, and this has again been underlined by the latest macro-economic data published last week. Industrial output for the Eurozone in January showed a YoY contraction of 17.3%, while EU steel output in February was down 42% against February 2008, and for January and February combined is 43% lower than a year ago. At 2,020Mt our unchanged estimate for 2009 ETS emissions is 5% lower than our revised 2008 estimate of 2,120Mt, and we think this is consistent with a 3% contraction in the GDP of the EU's largest economies in 2009. For Phase 2 as a whole, we continue to see a small EUA surplus averaging 7Mt per year, assuming (i) that any EUAs recouped by Member States from plant closures will go to their respective NERs, and (ii) that any residual EUAs in Member States' NERs will be auctioned back to incumbents.

Phase 3 still looks tight but seems a long way off at the moment

In an efficient market and with unlimited banking between Phases 2 and 3 of the ETS, today's EUA price should reflect the supply-and-demand dynamics all the way out to 2020. In line with our "Contango" methodology, we think this implies a fundamental value for 2009 EUAs of €25-€30/t as our numbers indicate the ETS will be 80Mt per year short over 2013-20 even after allowing for the full use of CDM/JI credits. However, we think that market inefficiencies and negative sentiment will continue to weigh on prices over the next 12 months, and in the short term prices could come under pressure from the fact that the market will also have to absorb the allocation of EUAs from a number of Member States that have not yet issued to their installations. In total, we estimate the outstanding EUA allocation at c.800Mt, about half of which is accounted for by Poland, which has not yet allocated for either 2008 or 2009.

Valuation and risks: Please see page 12 for our methodology and risks.

Market Update

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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.

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Previewing 2008 ETS emissions

The European Commission has said that it will release the 2008 ETS emissions data as soon as the level of verified 2008 emissions is equivalent to 80% of the 2007 verified emissions number. ETS installations are obliged to have their 2008 emissions independently verified by 31 March, so the 80% threshold could be reached any time from 1 April. The Commission has said that on the day it has the required level of emissions data available, it will first publish a notice to this effect before 10am CET that morning, and will then allow access to the CITL from 3pm CET that afternoon (for the full text on this point see http://ec.europa.eu/environment/climat/emission/citl_en.htmhttp://ec.europa.eu/environment/climat/emission/citl_en.htm).

In previewing the 2008 ETS emissions data below it is first important to remember that the scope of the scheme was slightly enlarged from 1 January 2008 to include installations with c.75Mt of emissions. As a result, we must adjust the 2007 data to derive a like-for-like number against which to compare our 2008 forecast. This c.75Mt increase in the scope of coverage comprises c.20Mt of emission from installations opted out by the UK for the whole of Phase 1, together with c.55Mt of emissions from installations newly included in the scheme from 1 January 2008.

We would highlight that we had previously been under the impression that the emissions from installations opted out by the UK for Phase 1 was c.30Mt rather than c.20Mt, but on seeking clarification from the UK authorities, we have learned that c.10Mt was already opted back into the ETS by the UK from 1 January 2007. As a result, we have adjusted down by 10Mt our pro-forma estimate for total 2007 EU verified emissions to 2,237Mt from 2,247 Mt previously. As we explain below, this also implies a 10Mt reduction in our previous 2008 ETS emissions estimate of 2,148Mt.

After making this adjustment, we are now projecting a 5.2% YoY decline in 2008 emissions, to 2,120Mt (2,148Mt previously, but 2,138Mt after adjusting for the c.10Mt of UK emissions opted back into the ETS in 2007) from pro-forma 2007 emissions of 2,237Mt.

As explained below, the 18Mt reduction in our 2008 forecast reflects the greater impact of fuel switching in certain key power markets (notably Germany, Spain, the UK and Poland) than we had been expecting, as we had already taken into account the impact of the deterioration in economic activity in Q4 last year in our previous research reports *Emissions in Remission* and *Now for the Carbon Crunch*.

A broader scope for Phase-2 emissions

The ETS' scope was broadened slightly from 1 January 2008 to include installations with emissions of c.75Mt, and Figure 1 shows the emissions actually reported by ETS installations over Phase 1 (in black font), together with our estimate of how Phase-1 emissions would have looked if the scope of the ETS had been the same as it is now (in blue font).

Note that following the clarification we have received from the UK authorities, we now adjust the reported verified data for 2005 and 2006 upwards by 85Mt, but for 2007 we increase the reported verified data by only 75Mt, to reflect the fact that c.10Mt of emissions from installations opted out by the UK in 2005 and 2006 were brought back into the scheme already in 2007.

Figure 1: (Mt)Pro-forma Phase 1 ETS emissions (Mt)

	2005 verified emissions	Adjustment to 2005-06 reported numbers to derive pro-forma number	Pro-forma 2005 emissions	2006 verified emissions	Pro-forma 2006 emissions	2007 verified emissions	Additional emissions included in 2007 to derive pro-forma number	Pro-forma 2007 emissions
EU-25	2014.9	85.0	2,099.9	2035.6	2,120.6	2052.1	75.0	2,127.1
Bulgaria*	40.6	-	40.6	41.0	41.0	40.2	-	40.2
Romania*	70.8	-	70.8	71.5	71.5	69.6	-	69.6
Total EU-27	2,126.3	85.0	2,211.3	2148.1	2,233.1	2,161.9	75.0	2,236.9

Source: European Commission, Deutsche Bank; * Romania and Bulgaria formally entered the ETS as of 2007, so 2005 and 2006 numbers for these two countries are estimates.

The recession hit very hard in Q4 2008

As indicated in our research reports *Emissions in Remission* (15 October 2008) and *Now for the Carbon Crunch* (4 December 2008), the EU economy was hit very hard in Q4 by the global economic slowdown, and, as a consequence, we downgraded our estimates for emissions over 2008-12 in both of these reports.

Figure 2 shows the evolution of our ETS emissions forecasts over September-December 2008 as the economic news worsened very rapidly, particularly between October and December. The second downgrade we made, in our report *Now for the Carbon Crunch*, was particularly severe, reflecting the very sharp deterioration in output experienced over Q4, particularly in the steel and cement sectors.

Figure 2: The evolution of DB forecasts for Phase-2 ETS emissions over October-December 2008 (Mt)

DB ETS emissions forecasts	2008E	2009E	2010E	2011E	2012E
Before 15 October 2008	2,210	2,205	2,199	2,193	2,185
From 15 October 2008	2,183	2,146	2,141	2,145	2,148
From 4 December 2008	2,148	2,020	2,031	2,071	2,110

Source: Deutsche Bank

Figure 3 shows the YoY change in production for the final month of each quarter over 2008 for the EU's broad industry sectors, as measured by Eurostat. All sectors registered positive YoY growth in March 2008 apart from the construction sector, but by June only the capital-goods sector had higher output last year compared with the same month in 2007.

Figure 3: Selected EU industrial sectors' year-on-year output variations at the end of each quarter in 2008

	Total industry (excluding construction)	Construction	Manufacturing	Energy	Capital goods
31 March 2008 YoY change (%)	1.23	-0.17	0.98	2.80	2.68
30 June 2008 YoY change (%)	-0.47	-0.19	-0.17	-1.36	0.96
30 September 2008 YoY change (%)	-2.2	-4.43	-2.21	-0.52	-1.7
31 December 2008 YoY change (%)	-12.03	-10.35	-12.94	-5.36	-12.38

Source: Eurostat

By the end of September the rate of decline was picking up in all sectors, but the truly sharp deterioration occurred in Q4: for December 2008, industry excluding construction was down 12% versus December 2007 (compared with a reduction of only 2% at the end of September), construction -10% versus -4% at the end of September, manufacturing -13% versus -2%, energy -5% versus -0.5%, and capital goods -12% versus -2%.

And 2009 has taken up where 2008 left off.

And Q1 2009 appears to have continued in the same vein

Figure 4 shows the month-on-month development of activity for the EU's broad industry sectors, as measured by Eurostat for December 2008 and January 2009. The data for construction as at 31 January is not yet available, but in all other sectors the rate of month-on-month decline is more or less the same as it was in December, apart from capital goods where it increased to -5.6% in January versus -3% in December.

Figure 4: Selected EU industrial sectors' year-on-year output variations at the end of each quarter in 2008

	Total industry (excluding construction)	Construction	Manufacturing	Energy	Capital goods
31 December 2008 MoM change (%)	-2.77	-10.35	-3.2	-0.01	-2.95
31 January 2009 MoM change (%)	-2.68	n/a	-3.14	-0.43	-5.65

Source: Eurostat

If we look in more detail at one of the key sectors in the ETS, the steel sector, the data for January and February is very discouraging, with output down 46% YoY for January this year versus January 2008, and down 42% for February this year versus February 2008 (Figure 5).

Figure 5: EU steel output, January-February 2009 versus January-February 2008 (Kt)

	February 2009	January 2009	February 2008	January 2008	Year-to-date change versus 2008
EU Steel output (Kt)	10,060	9,821	17,029	17,647	-14,977
YoY change (%)	-41.5	-45.9	n/a	n/a	-43.0

Source: World Steel Association

In short, the very sharp deterioration in EU industrial output that occurred in Q4 2008 appears to have continued into Q1 2009, and although on balance we think that our Phase-2 forecasts over 2009-12 already reflect the severity of the recession we also think that the risk to our estimates remains to the downside.

However, we now have more information available concerning the 2008 fuel mix in the power-generation sector for some of the key countries. For example, we calculate that power-generation emissions in Germany is down by at least 20Mt versus 2007, in Spain by 17Mt, and in the UK, Poland, and Finland by 5-6Mt in each case.

As a result, to take account of the slightly less carbon-intensive fuel mix than we were expecting we have reduced our 2008 ETS emissions forecasts by 18Mt (just under 1%) to 2,130Mt. At the same time, to take account of the fact that pro-forma emissions in 2007 were actually c.10Mt lower than we had previously been assuming, we have reduced our 2008 forecast by a further 10Mt to maintain the same reduction in emissions we were previously assuming as a result of the impact of the recession.

Meanwhile, we keep our forecasts over 2009-12 unchanged (Figure 6). On an underlying basis, the reduction in our 2008 estimate is 0.8%, as given the extra 10Mt from UK emissions that we previously including in our forecast, our previous estimate of 2,148Mt 10Mt too high.

Figure 6: DB updated forecasts for Phase-2 ETS emissions (Mt)

	2008E	2009E	2010E	2011E	2012E
ETS emissions forecasts	2,120	2,020	2,031	2,071	2,110
Change versus previous forecasts (%)	-0.8	0.0	0.0	0.0	0.0

Source: Deutsche Bank

So how do our forecast 2008 ETS emissions of 2,120Mt compare with the cap?

The Phase-2 cap and the NER

Figure 7 shows our previous estimates for the Phase-2 cap, which was a uniform 2,083Mt per year over 2008-12, of which 100Mt each year was set aside in the NERs of the Member States.

As a result, we assumed an annual allocation to incumbent installations – including those newly covered from 1 January 2008 – over Phase 2 of 1,983Mt per year.

Figure 7: Previous DB Phase-2 ETS annual caps (Mt)						
	2008	2009	2010	2011	2012	Average
Annual ETS cap	2,083	2,083	2,083	2,083	2,083	2,083
NER	100	100	100	100	100	100
Annual cap ex-NER	1,983	1,983	1,983	1,983	1,983	1,983

Source: European Commission, Deutsche Bank,

Having now re-examined the finalized NAPs of all Member States, we have slightly revised our estimate of the average cap over 2008-12, and the profile of the cap over the trading period, as shown in Figure 8.

Figure 8: Revised DB Phase-2 ETS annual caps (Mt)						
	2008	2009	2010	2011	2012	Average
Annual ETS cap	2,095	2,082	2,077	2,071	2,067	2,078
NER	100	100	100	100	100	100
Annual cap ex-NER	1,995	1,982	1,977	1,971	1,967	1,978

Source: CITL, Deutsche Bank

Instead of a uniform cap of 2,083Mt per year, we now have a total cap starting at 2,095Mt in 2008, and then phasing down to 2,067Mt by 2012, as some countries have chosen to stagger the allocations to their installations on a front-end-loaded basis.

As a result, we now assume a slightly lower average cap of 2,078Mt per year. With our estimate of the EU-wide NER unchanged at 100Mt, we derive a revised average annual allocation to incumbent installations as of 1 January 2008 of 1,978Mt per year.

Figure 9 then shows 2007 verified ETS emissions as reported, together with our estimate of pro-forma 2007 ETS emissions after adjusting for the installations newly included from 1 January 2008.

The third column then shows the total annual EUA allocation for 2008 (i.e. including the NER) by country.

As can be seen, pro-forma 2007 emissions of 2,237Mt would have been 142Mt above the total cap for 2008 of 2,095Mt, and this is why the Phase-2 cap looked very tight a year ago after the 2007 data was released.

However, given the impact of the recession and the consequent 5.2% reduction in emissions that we are forecasting over 2008 relative to 2007, the EUA deficit that we project for 2008 versus the total ETS cap (i.e. including the NER) is only 25Mt (Figure 10).

Figure 9: 2007 verified and pro-forma ETS emission versus total 2008 ETS cap (Mt)

	2007 verified emissions	2007 pro-forma emissions	2008 total Allocation
Austria	31.8	32.2	30.5
Belgium	52.8	57.8	60.1
Bulgaria	40.2	40.2	42.3
Cyprus	5.4	5.4	6.5
Czech Rep	87.8	87.8	86.8
Denmark	29.4	29.4	24.5
Estonia	15.3	15.6	11.7E
Finland	42.5	42.9	37.6
France	126.6	131.7	132.3
Germany	487.0	498.0	451.9
Greece	72.7	72.7	68.7
Hungary	27.0	28.2	26.9
Ireland	21.2	21.2	22.3
Italy	226.4	226.4	207.3
Latvia	2.8	2.8	3.4
Lithuania	6.0	6.1	7.1E
Luxembourg	2.6	2.6	2.5
Malta	2.0	2.0	2.1
Netherlands	79.9	83.9	86.3
Poland	209.6	215.9	208.5
Portugal	31.2	32.0	34.8
Romania	69.6	69.6	75.4
Slovakia	24.5	26.3	30.8
Slovenia	9.0	9.0	8.3
Spain	186.5	193.2	158.2
Sweden	15.3	17.3	22.5
UK	256.6	286.1	245.6
Yearly Total	2,161.9	2,236.9	2,094.8

Source: CITL, European Commission, Deutsche Bank

Indeed, for Phase 2 as a whole, we continue to forecast a small average annual surplus of EUAs relative to emissions of 7Mt per year.

Figure 10: DB estimates for Phase-2 ETS emissions versus total Phase-2 cap (Mt)

	2008	2009	2010	2011	2012	Average
Annual ETS cap	2,095	2,082	2,077	2,071	2,067	2,078
ETS emissions forecast	2,120	2,020	2,031	2,071	2,110	2,072
Difference (emissions versus cap)	-25	+62	+46	0	-43	+7

Source: European Commission, Deutsche Bank

Figure 11 then shows the breakdown of the 2008 cap by country both with and without the NER. Our understanding is that at this stage Estonia and Lithuania have yet to decide their NER, while the aggregate annual NER of the 25 other Member States comes to 100Mt.

This leaves a 2008 allocation to incumbents as of 1 January 2008 – i.e. installations already covered in Phase 1 and the installations newly included from the beginning of Phase 2 – of 1,995Mt.

Figure 11: 2008 ETS cap by country with and without the NER (Mt)

	2008 total Allocation	NER	2008 cap over the period before use of NER
Austria	30.5	0.3	30.2
Belgium	60.1	5.6	54.6
Bulgaria	42.3	0.0	42.3
Cyprus	6.5	1.0	5.5
Czech Rep	86.8	1.3	85.5
Denmark	24.5	0.5	24.0
Estonia	11.7E	pending	11.7E
Finland	37.6	1.4	36.2
France	132.3	12.0	120.35
Germany	451.9	23.0	428.9
Greece	68.7	3.3	65.3
Hungary	26.9	0.0	26.9
Ireland	22.3	1.9	20.4
Italy	207.3	16.9	190.4
Latvia	3.4	0.8	2.6
Lithuania	7.1E	pending	7.1E
Luxembourg	2.5	0.0	2.5
Malta	2.1	0.0	2.1
Netherlands	86.3	6.4	80.0
Poland	208.5	pending	208.5
Portugal	34.8	4.3	30.5
Romania	75.4	4.3	71.1
Slovakia	30.8	0.5	30.4
Slovenia	8.3	0.2	8.1
Spain	158.2	6.3	151.9
Sweden	22.5	2.7	19.8
UK	245.6	16.3	229.3
Yearly Total	2,094.8	99.6	1,995.2

Source: CITL, European Commission, Deutsche Bank

Although it is very difficult to estimate how much of the NER will have been used up in 2008, we assume that out of our total forecast emissions of 2,120Mt, 2,090Mt is from incumbents as of 1 January 2008, and 30Mt from installations classified as new entrants (Figure 12).

Figure 12: DB 2008 ETS emissions forecast, incumbents v. new entrants (Mt)

	2008
2008 ETS emissions forecast	2,120
<i>o/w assumed emissions from incumbents</i>	2,090
<i>o/w assumed emissions from new entrants</i>	30
2008 ETS cap for incumbents	1,995
Incumbents' difference (emissions versus cap)	-95
2008 ETS NER	100
New entrants' difference (emissions versus cap)	+70

Source: Deutsche Bank, European Commission

(We would note that the difficulty in working out the proportion of 2008 emissions accounted for by new entrants ahead of the data release lies not just in the fact that the information provided by Member States is partial, but also in the fact that allowances allocated to new entrants in the course of 2008 may not be for use only in 2008 but over the whole of Phase 2.)

At any rate, what all of this means is that we estimate that incumbent installations will have a deficit of EUAs in 2008 of 95Mt, while out of a total available 100Mt set aside for new entrants only 30Mt will be used in 2008, leaving 70Mt available for use in future years.

What happens to EUAs after plant closures and any surplus EUAs from the NER?

During a recession, the question concerning what happens to any allowances recovered from plants that close during Phase 2 and any surplus left over in the NER takes on added importance.

Figure 13 shows the treatment of allowances left after a plant closure in Phase 1 and in Phase 2 in all Member States to the extent that we have been able to ascertain this information from the NAPs (where there is a question mark in Figures 13 and 14 it means that we have not yet been able to obtain the information).

Figure 13: Comparison of the treatment of allowances recovered after a plant closure in Phases 1 and 2 of the ETS

	Phase 1	Phase 2
Austria	?	Feed the NER
Belgium	allowances were not issued and the operator holding account closed in cases of closures	Feed the NER
Bulgaria	?	No provisions in the NAP
Cyprus	?	Feed the NER
Czech Rep	Put in a Party Holding account	Auctioned
Denmark	Feed the NER	Auctioned or sold
Estonia	Feed the NER	Feed the NER
Finland	Feed the NER	?
France	Feed the NER	Feed the NER
Germany	Feed the NER	Feed the NER
Greece	?	?
Hungary	Feed the NER	?
Ireland	Auctioned	Feed the NER
Italy	Feed the NER	Feed the NER
Latvia	?	Feed the NER
Lithuania	Feed the NER	?
Luxembourg	?	?
Malta	?	Feed the NER
Netherlands	Operators receive full allocation for the entire trading period	Feed the NER
Poland	Put in a Party Holding account	?
Portugal	Feed the NER	?
Romania	?	?
Slovakia	Feed the NER	Feed the NER
Slovenia	?	?
Spain	Feed the NER	Feed the NER
Sweden	Operators receive full allocation for the entire trading period	?
UK	Feed the NER	Auctioned or sold up to a limit*

Source: CITL, European Environment Agency, European Commission, Deutsche Bank; * In the UK, any EUAs not issued to installations that have closed or any surplus EUAs in the NER will be sold or auctioned up to a limit of 3% of the total number of allowances, with the remainder cancelled.

We can observe that the overall trend has not changed and that most Member States plan to feed allowances recovered after plant closures into their NERS. Figure 14 then shows what Member States plan to do with any surplus EUAs left over in their NERS.

Figure 14: Treatment of NER surplus by EU Member States in Phase 1 and Phase 2

	Phase 1	Phase 2
Austria	Sold	Auctioned or sold
Belgium	Auctioned	can be Auctioned
<i>Flemish region</i>		<i>Auctioned or banked</i>
<i>Walloon region</i>		<i>Sold</i>
<i>Brussels region</i>		<i>?</i>
Bulgaria	Cancelled	Auctioned
Cyprus	Cancelled	Auctioned
Czech Rep	Cancelled	Auctioned
Denmark	Cancelled	Auctioned or sold
Estonia	Cancelled	Auctioned
Finland	Cancelled	<i>?</i>
France	Cancelled	Cancelled
Germany	Cancelled	Not yet decided
Greece	Cancelled	<i>?</i>
Hungary	Cancelled	<i>?</i>
Ireland	Auctioned	Cancelled
Italy	Cancelled	No provisions in the NAP
Latvia	Cancelled	No provisions in the NAP
Lithuania	Cancelled	<i>?</i>
Luxembourg	not reported	<i>?</i>
Malta	Cancelled	Cancelled (but no upfront NER in any case)
Netherlands	Cancelled	No provisions in the NAP
Poland	Cancelled	<i>?</i>
Portugal	Cancelled	<i>?</i>
Romania	Cancelled	<i>?</i>
Slovakia	Cancelled	No provisions in the NAP
Slovenia	not reported	<i>?</i>
Spain	Cancelled	Auctioned or sold
Sweden	Cancelled	No provisions in the NAP*
UK	Sold	Auctioned or sold**

Source: CITL, European Environment Agency, European Commission, Deutsche Bank; *in Sweden, A further decision will be taken if there are any allowances left; **In the UK, any EUAs not issued to installations that have closed or any surplus EUAs in the NER will be sold or auctioned up to a limit of 3% of the total number of allowances, with the remainder cancelled.

As can be seen, for Phase 2 most countries have decided to auction any surplus allowances from their NERs.

In short, at this stage we assume that any EUAs recovered by Member States from plant closures over the course of Phase 2 will be fed into Member States' NERs, and that, in turn, any surplus from Member States' NERs will be auctioned back to incumbents.

In other words, our working assumption is that one way or another the full ETS cap (i.e. including the NER) over Phase 2, representing 10,390Mt EUAs in total, will come to the market over 2008-12.

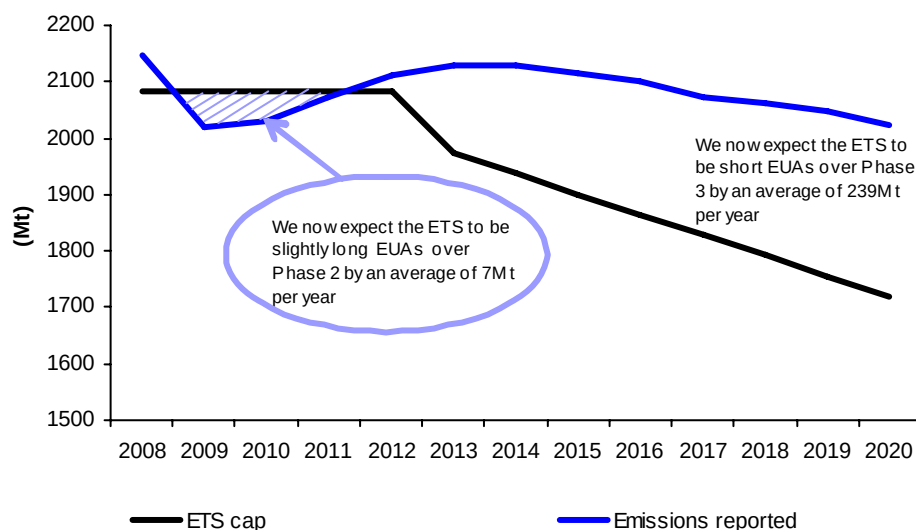
Conclusion: we see the ETS short EUAs in 2008, but slightly long over Phase 2

As explained above, on our revised estimates for 2008 ETS emissions, we expect the incumbent installations covered by the scheme to have an aggregate EUA deficit of 95Mt. If we include the NER in our calculation of the cap, then on our estimates the ETS deficit will be 70Mt lower at 25Mt.

The difference here is that we expect only 30Mt of the 100Mt annual NER to be used in 2008. As a result, we assume that the surplus 70Mt of the 2008 NER will be carried forward into 2009 and will ultimately be available for auctioning back to incumbents if there is an NER surplus over Phase 2 as a whole.

As also explained above, beyond 2008 we expect the ongoing recession to lead to a further 5% fall in 2009 ETS emissions, such that although we assume a return to growth from 2010 we are nonetheless projecting a small surplus of EUAs over Phase 2 as a whole of 7Mt per year (Figure 15).

Figure 15: DB forecast of EUA cap versus ETS emissions over 2008-20



Source: Deutsche Bank

We still think that Phase 3 will be significantly short EUAs (239Mt per year on average over 2013-20), although after taking into account the allowed use of CDM/JI credits we continue to project an average residual abatement requirement in the ETS over 2013-20 of 81Mt per year.

Given the bankability of Phase-2 EUAs into Phase 3, we continue to derive an average residual abatement requirement in the ETS over the entire 2008-20 period covered by Phases 2 and 3 combined of 50Mt per year.

Carbon valuation

The theory behind our valuation

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 an EUA price of €25-€30/t already in 2008. 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 50Mt per year over the entire 2008-20.

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 50Mt 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 50Mt per year were greater than the LRMC of building new capacity.

Given the volatility of commodity prices over the course of 2008 – and, in particular, over the last six 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 2008, 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 50Mt 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 \$90/t-\$100/t, and an oil price of \$50/bbl or higher).

Risks to our valuation

In practice, we think that market inefficiencies engendered principally by the free allocation of allowances in the ETS could keep EUA prices significantly below our theoretical fair-value estimate throughout 2009. In particular, with our forecasts showing Phase 2 viewed in isolation to be long of EUAs by an average of 7Mt per year (and by 100Mt per year if CERs/ERUs are taken into account), we think the EUA price will be vulnerable to any further deterioration in the EU economy.

More generally, if enthusiasm for the Kyoto methodology of setting emissions limits were to wane owing to a sharp deterioration in global economic growth, then this could lead to a re-negotiation and/or abrogation of the Kyoto Protocol. However, we think that EU policymakers are committed to the ETS as a long-term tool for reducing emissions in the EU, and that there is therefore less of a risk that this scheme would collapse even in a prolonged recession.

Appendix A: Glossary

The table below defines the technical terms used throughout this report.

Figure 16: Glossary of terms

Abatement	<i>In the carbon context, GHG emissions reduction</i>
Bankability/banking bank	<i>In the EU ETS context, the carrying over of carbon credits from one phase to the next</i>
BAU	Business as usual
boe	Barrel of oil equivalent
Carbon Credit	One of the various units used to offset one tCO ₂ e, including CERs, EUAs, AAUs and ERUs
CCGT	Combined Cycle Gas Turbine
CDM	The Clean Development Mechanism, one of the flexible mechanisms included in the Kyoto Protocol
CDM Project	A CDM project to produce Carbon Credits in a developing country which can be funded by a foreign investor to generate Carbon Credits for use by same or third parties
CER	A type of Carbon Credit, known as a Certified Emission Reduction, derived from CDM Projects in accordance with relevant international UNFCCC/Kyoto Protocol Rules and which represents a GHG Reduction of one metric tonne of carbon dioxide equivalent, calculated in accordance with the international UNFCCC/Kyoto Protocol Rules
CITL	Community Independent Transaction Log
CO₂	Carbon dioxide
CO₂e or CO₂eq	Carbon dioxide equivalent, the universal base reference for the determination of Global warming potential of Greenhouse Gases in units of carbon dioxide equivalent
DB	Deutsche Bank
E	Estimated
EEA	European Environment Agency
ERU	A type of Carbon Credit, known as an Emission Reduction Unit, derived from JI Projects in accordance with relevant International UNFCCC/Kyoto Protocol Rules and which represents a GHG reduction of one metric tonne of CO ₂ equivalent, calculated in accordance with the International UNFCCC/Kyoto Protocol Rules
EU	European Union
EUA	European Union Allowance being a type of Carbon Credit solely for use within the EU-ETS
ETS	European Union Emissions Trading Scheme
JI	Joint implementation, one of the three flexible mechanisms included in the Kyoto Protocol
JI Project	A JI project in a developed country which can be funded by a foreign country to generate Carbon Credits for use by the foreign country
LRMC	Long Run Marginal Cost
Member State	A member state of the European Union
M or m	Million
Member State	A member state of the European Union
M or m	Million
Mt	Million tonnes or Mega tonnes
NAP	National Allocation Plan for the EU-ETS which determines a MS' maximum permitted emissions or allowances
National Registry	A registry established by a country which will contain accounts for holding Carbon Credits. Transfers and acquisitions of Carbon Credits are expected to take place between account holders through National Registries
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
Q1, Q2, Q3, Q4	First quarter, second quarter, third quarter, fourth quarter
SRMC	Short Run Marginal Cost
t	Tonne
tCO₂e	Tonnes of carbon-dioxide equivalent, the universal base reference for the determination of global warming potential of Greenhouse Gases in units of carbon dioxide equivalent
YoY change	Year-on-year change

Source: Deutsche Bank, UNEP

Appendix 1

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Publication Address:

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