

12 April 2012

EU Energy: ETS Reform Should Not Be Set Aside

- **The EU-ETS and the need for a long-term price signal:** The EU-ETS is the only commodity market in the world where demand varies in real time but supply is fixed years in advance. To the extent that the ETS is designed not only to reduce emissions in line with the EU's 2020 target, but also to generate a long-term price signal to incentivize low-carbon investment, this seriously impedes its effectiveness. This is all the more true now that we think the EU economy is in the midst of a second recession within three years and that the implementation of the Energy-Efficiency Directive (EED) is likely to reduce demand for EUAs further over 2014-20.
- **We increase our forecast for the over-supply of EUAs out to 2020:** We estimate that implementation of the EED will lead to incremental ETS emissions reductions over Phase 3 of 201Mt, and after updating our base-case scenario for the ETS supply-demand balance out to 2020 to take account of this we now project an accumulated EUA surplus by 2020 of +1,264m (+1,063m previously). Of course, the true impact of the EED could be greater or smaller than this, and this is precisely the problem as far as the current configuration of the ETS is concerned: the impact of *all* of the key demand drivers (economic growth, weather patterns, and the EU's policies on renewable energy and energy efficiency) is unknowable ahead of time, and yet the supply of EUAs is fixed years in advance. That is why the system ends up being hugely over-supplied if demand crashes, and why EUAs have recently fallen to a new all-time low.
- **Restoring confidence: a set-aside is necessary but not sufficient:** The European Commission would appear to favour withholding allowances from the pool of EUAs to be auctioned over Phase 3 as a way of addressing the current over-supply. However, whilst a set-aside would undoubtedly be the most pragmatic way of re-establishing meaningful price tension in the near term, we do not think it would be enough, on its own, to re-establish the long-term credibility of the scheme. This is because industrial investors in low-carbon technologies need long-term predictability on pricing, and as a one-off measure a set-aside by definition could not provide this.

The time for a serious debate over the future of the ETS is now: We think that EU policymakers need to implement a material set-aside as soon as possible – on our estimates withholding 1,200m EUAs over 2013-20, or 600m over 2013-16 might well lift prices back into the €15-20/t range – whilst also committing to structural reform of the ETS. Specifically, we think a mechanism is needed to make the ETS cap more responsive to variations in demand. Without the promise of such a mechanism in the future, the risk is that even if a material set-aside can be agreed in the near term, power companies will still not feel sufficiently confident in the *long-term* pricing outlook for EUAs to make the enormous capital outlays required for the transition to a low-carbon future. As such, without the promise of structural reform we think the most likely default outcome will be an EU-wide dash for gas over the second half of this decade, with implications for (i) the EU's long-term emissions trajectory, (ii) its security of supply, and (iii) the efficiency of EU power markets. In other words, there will likely be an over-reliance on gas for new generation capacity, and a need for costly complementary measures in any Member State wanting to incentivize low-carbon generation (indeed, we already have an example of this with the UK's Carbon Price Support Rate).



Special Report

Table of Contents

#1 Executive Summary	2
#2 The impact of the EED on our ETS emissions forecasts out to 2020	5
#3 ETS reform should not be set aside ..	12
#4 The potential pricing impact of a set-aside.....	20
#5 Conclusion: EU policy-makers face a double challenge.....	25

Research Team

Isabelle Curien

Research Analyst
(33) 1 4495 6616
isabelle.curien@db.com

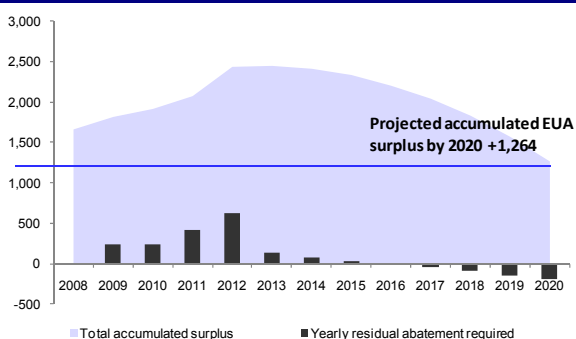
Mark-C Lewis

Research Analyst
(33) 1 4495 6761
mark-c.lewis@db.com

#1 Executive Summary

- The ETS and the need for a long-term price signal:** The EU-ETS is the only commodity market in the world where demand varies in real time but supply is fixed years in advance. To the extent that the ETS is designed not only to reduce emissions in line with the EU's 2020 target, but also to generate a long-term price signal to incentivize low-carbon investment, this seriously impedes its effectiveness. This is all the more true now that we think the EU economy is in the midst of a second recession in three years and that the implementation of the Energy-Efficiency Directive (EED) will reduce demand for EUAs further over 2014-20.
- EED will increase the over-supply of EUAs:** We now assume that the EED will formally become EU Law by mid-2013 at the latest, with the incremental efficiency measures it mandates starting to make an impact from 2014 onwards. However, we remain sceptical about the extent to which the EED will enable the EU to meet its 2020 policy goal of reducing primary-energy consumption by 20% against business-as-usual (BAU) levels, and assume that only 25% of the incremental savings targeted under the Commission's more pessimistic scenario will actually be met. Nonetheless, we estimate that implementation of the EED will lead to incremental emissions reductions in the ETS over Phase 3 of 201Mt, and as shown in Figure 1 after updating our base-case scenario for the ETS supply-demand balance out to 2020 to take account of this we now project an accumulated EUA surplus by 2020 of +1,264m (+1,063m previously). We assume that by 2020 the ETS surplus is held entirely in the form of EUAs, with all CERs/ERUs having been surrendered.

Figure 1: DB updated base case for ETS supply-demand balance out to 2020 under Phase-3 scope (mEUA/Mt)



Source: Deutsche Bank.

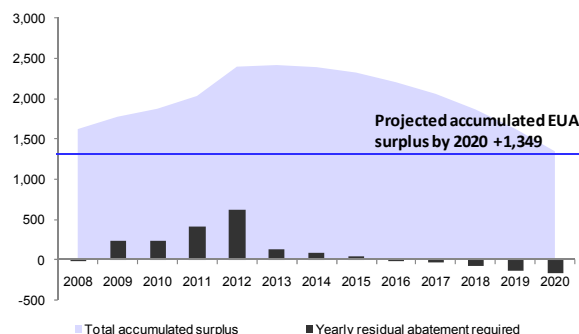
- Long-term investors are very concerned:** Without remedial action to re-establish scarcity, such a large over-supply of allowances will likely weigh on EUA prices for years, thereby making the ETS essentially meaningless as far as incentivizing low-carbon investments is concerned. Against this backdrop it is not surprising that EUAs have recently fallen to a new all-time low, and that the CEO of E.ON, Dr. Johannes Theyssen, has recently summed up the concern this is causing by saying that "the ETS is bust".
- There are numerous ways of restoring scarcity:** So, how is the current over-supply of EUAs best addressed such that meaningful price tension can be restored and a predictable long-term price signal generated? Of the many proposals that have been put forward to re-establish scarcity in the ETS since the impact of the 2009 recession first highlighted the problem of fixed supply, the most commonly discussed are: (i) raising the EU's 2020 emissions-reduction target to 30%; (ii) establishing some kind of carbon central bank or other such institutionalized mechanism (e.g. a rolling cap) that could modulate supply in the face of varying demand; (iii) setting a reserve price for the EUAs to be auctioned over Phase 3; and (iv) setting aside a certain amount of EUAs from the Phase-3 cap.
- The current focus of attention is on a set-aside:** In the last nine months the debate over how best to re-establish scarcity in the ETS has become overwhelmingly focused on the idea of a set-aside. This is in part understandable, as given the sheer scale of the current perceived over-supply of EUAs out to 2020, there is an urgent need to find a way of re-creating meaningful price tension as soon as possible. This means that a key consideration in any analysis of the best way of achieving this is not only the likely effectiveness of the measure *per se*, but also its political and legal feasibility, i.e. how much resistance would it face and how long would it take to implement? And this is where a set-aside has a clear advantage over the other options listed above.
- A set-aside could be implemented more quickly than other options:** Any measure requiring a change of the EU-ETS Directive is more difficult to implement than measures only requiring a change to a Regulation, as modifying a Directive requires the full tripartite Co-Decision process, whereas modifying an EU Regulation would be done under the quicker Comitology process. And we think that, on balance, a set-aside of allowances could be implemented via the Auction Regulation if the allowances were initially withheld on a provisional basis (with modification of the Directive permitting their cancellation then possible at a later date).

- **But even a set-aside is far from certain to happen:** We think the EU Parliament is likely to back leaving open the idea of a set-aside in June, but that some Member States will strongly object. As a result, we think the idea of a set-aside within the framework of the EED legislation might well be rejected by the Council of Ministers at its meeting on 15 June (always assuming it is proposed by the Danish Government – as current EU President – in the first place). And in any case, we do not think a set-aside on its own can solve the fundamental structural problem of the ETS.
- **The impact of the EED is unknowable in advance:** Since the true impact of additional energy-efficiency measures on the EU-ETS will only be known on an *ex-post* basis after many years, any *ex-ante* solution that is by its very nature only a one-off measure – such as a set-aside – will not be able to respond to any further changes in market expectations of future emissions at a later date. This is an absolutely fundamental point, and goes beyond the impact of the EED alone.
- **Indeed, the impact of all demand variables is unknowable in advance:** Demand in the ETS is a dynamic variable, influenced by economic growth, weather patterns, and the interaction of the CO₂-emissions-reduction target with the two other pillars of EU energy policy, i.e. the renewable and energy-efficiency targets. As a result, whilst a set-aside would undoubtedly be the most pragmatic way of re-establishing meaningful price tension in the near term, we do not think it would be enough, on its own, to re-establish the long-term credibility of the scheme. This is because industrial investors in low-carbon technologies need long-term predictability on pricing, and as a one-off measure a set-aside by definition could not provide this.
- **A set-aside is necessary but not sufficient:** In our view, the challenge facing EU policy-makers today goes beyond the urgent need to re-establish a meaningful degree of scarcity in the ETS as quickly as possible (vital though that objective certainly is); at the same time the challenge is to send a signal that they have understood that the ETS as currently configured has proved itself structurally flawed, and needs at some point in the future to be overhauled. As a result, we think the best outcome for the carbon market over the next few months would comprise two elements.
 - **Element 1: a set-aside of 1,200m over 2013-20 (or 600m over 2013-16) could boost prices:** The first element would be for the Parliament and Council both to back the idea of a set-aside in June, and for the Commission then to publish a proposal before the end of the year to withhold a significant amount of EUAs from the pool to be auctioned over Phase 3 in a way that could be done in Comitology. On our estimates withholding 1,200m EUAs over 2013-20 (or 600m over 2013-16) could well lift prices back into the €15-20/t range over 2013 (although we would note that given the size of the industrial surplus such a price outcome could not be guaranteed and would depend ultimately on how many allowances from their huge surplus industrials were willing to sell).
 - **Element 2: structural reform of the ETS:** The second element would be for the Commission to start a debate over future reform of the ETS relating to the need for supply-side flexibility. This would allow time for the parties that actually matter most in this debate – i.e. the industrial investors that the policymakers expect to make the low-carbon investments for the future – to make their voices heard about the institutional arrangements necessary for delivering future pricing predictability.
 - **Our optimism is limited at the moment:** The best that can be said on the prospects for a set-aside is that they are currently in the balance, while there is as yet no discussion at all as far as we are aware about the need for structural reform of the ETS. We think this betrays a lack of urgency given the extent to which the ETS is currently failing to incentivize the investments necessary to deliver a low-carbon future.
 - **An EU-wide dash for gas is the default option:** In our view, without the promise of structural reform of the ETS with a view to introducing a mechanism to make the cap more flexible in the future, the risk is that even if a material set-aside can be agreed in the near term, power companies will still not feel sufficiently confident in the *long-term* pricing outlook for EUAs to make the enormous capital outlays required for the transition to a low-carbon future. As such, we think the most likely default outcome in the absence of structural reform will be an EU-wide dash for gas over the second half of this decade, with implications for (i) the EU's long-term emissions trajectory, (ii) its security of supply, and (iii) the efficiency of EU power markets. In other words, without structural reform there will likely be an over-reliance on gas for new capacity, and a need for costly complementary measures in any Member State wanting to incentivize low-carbon generation (indeed, the UK's Carbon Price Support Rate is already an example of this).

- **No change to our Q2 pricing outlook.:** Now more than ever, the only value in EUAs lies in their political optionality, and we continue to expect Dec-12 EUAs to trade in a range of €5-7/tonne in Q2 2012 as the impact of recession is felt and as the market waits for the outcome of the discussions over a set-aside within the framework of the EED in June (the plenary vote in Parliament on the EED will take place on 11 June, and the Council will then vote on 15 June). That said, we still think a clear deterioration in the prospects for such a positive outcome in the build-up to June could yet see prices drop below €5/t before the current quarter is out.
- **The longer-term pricing outlook depends on the outcome in June:** Beyond Q2, if Parliament and Council agree in June to leaving open the option of a set-aside within the framework of the EED, we would expect EUA prices to recover to €10/t by year-end 2012. This is because such a scenario would give an explicit mandate to the Commission to present a report that could refer to withholding a certain number of EUAs from the market over 2013-20, likely prompting a rally in EUA prices over H2 of this year in the expectation of a tightening of the cap at some point in 2013. However, absent a positive outcome in June we think EUA prices will remain below €10/tonne into 2013 and beyond, unless and until a political solution to the problem of ETS over-supply is found, especially if the growing risk of non-compliance with ETS obligations from non-EU airlines continues to gather pace over the next few months.
- **Risks to our view:** We would caution that the risk to our forecasts for ETS emissions out to 2020 remains to the downside, with three issues of particular concern to us in this respect.
- **Risk 1:** First, there is the question of the ongoing Phase-2 NAP legal cases, which on our worst-case scenario could add 110m EUAs to the Phase-2 cap (see our report *The ECJ Comes Into Play*, 29 September 2011, for more details).
- **Risk 2:** Second, and despite the definitive ruling of the European Court of Justice in favour of the EU Commission on this point (see our report, *Courting Turbulence*, 4 October 2011, for background), there is the growing risk that the continuing political pressure of countries like the US, China, and India might ultimately lead to modification to the coverage of aviation under the EU-ETS at some point before 2020.

Figure 2 shows a sensitivity analysis of our ETS supply-demand balance out to 2020 excluding emissions from non-EU airlines. The increase in our projected EUA surplus would be +85m, and the accumulated EUA surplus out to 2020 would be +1,349m (Figure 2).

Figure 2: DB implied accumulated EUA surplus out to 2020 if non-EU carriers excluded from ETS (mEUA/Mt)



Source: Deutsche Bank.

- **Risk 3:** Third, there remains the risk of a further material deterioration in the EU economy in 2012 beyond the contraction of -0.5% that we are currently assuming.
- **Caveat to our analysis:** In this report we present numerous scenarios for different-sized set-asides and the impact we think they would have on the overall supply-demand balance in the ETS, all of them referenced against our updated base-case scenario for the ETS supply-demand balance out to 2020 (for those interested, Annex A at the end of this report summarizes 10 different permutations, including the ones covered in the main body of this report in Sections 3 and 4).

We would emphasize, however, that the experience of the ETS to date suggests that EUA pricing is driven primarily not so much by the overall systemic balance, but more especially by the size of the buying requirement faced by the power sector.

This is important when considering the size of the set-aside that would be required to re-establish price tension in the ETS, and we explain this point in detail in Section 4 of this report.

We would also emphasize from the outset that all of our set-aside scenarios assume that the EUAs withheld are initially set aside on a provisional basis via the Auction Regulation, but are then cancelled at a later date via a modification to the ETS Directive such that they do not re-enter the market.

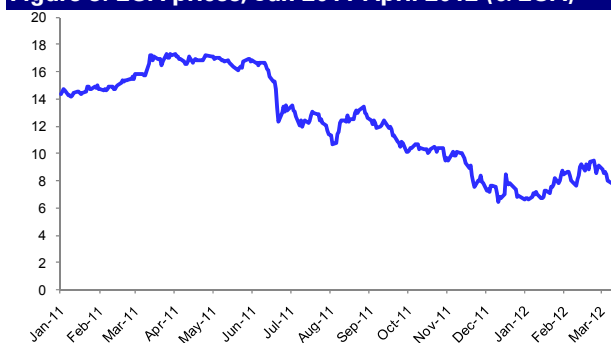
#2 The impact of the EED on our ETS emissions forecasts out to 2020

We think the current bear market in EUAs that began in June last year is attributable to two main factors: (i) the sovereign debt crisis in Greece and other southern European countries, which over the second half of 2011 prompted growing (and ultimately well-founded) fears of a negative impact on the real EU economy; and (ii) the publication of the Commission's draft EED in June of last year, which led to concerns in the market that new efficiency measures to be made mandatory under the EED would compound the already existing over-supply in the ETS over Phase 3.

Of these two factors we have long been of the view that a second EU recession so soon after the one experienced in 2009 would be a greater risk to EUA prices over 2013-20 than the impact of the EED. This is because, as explained below, we have long been sceptical of the extent to which energy-efficiency targets and measures will translate into sustained CO₂-emissions reductions. However, there can be no doubt that the publication of the EED had a significant negative impact on ETS market sentiment.

Figure 3 shows EUA prices from January 2011 to date, and it can be seen that prices fell sharply in mid-June immediately after the EED was published. Indeed, over the three days following the publication of the draft EED, prices fell by 20%. This proved to be the start of a downward trend in the pricing trajectory over the course of the second half of last year which only began to reverse in late December following the EU Parliament's Environment, Public Health and Food Safety Committee (ENVI) vote in favour of a set-aside.

Figure 3: EUA prices, Jan 2011-April 2012 (€/EUA)



Source: Datastream.

So, what is the background on the EU's energy-efficiency policy, and to what extent will the EED lead to sustained long-term CO₂-emissions reductions?

The background on EU energy-efficiency policy

The policy proposals that underlie the Commission's target to improve energy efficiency in the EU form one of the three pillars of its so-called 20/20/20 framework. Under this framework, the EU has committed itself (i) to reducing its greenhouse-gas (GHG) emissions by 20% by 2020 relative to 1990 levels, (ii) to sourcing 20% of all final energy consumed by 2020 from renewable sources, and (iii) to reducing its primary-energy consumption by 20% by 2020 against business-as-usual (BAU) levels.

However, while the GHG-emissions and renewable-energy targets are legally binding, the energy-efficiency target is not, and even assuming that the EED is ultimately passed into EU Law with few material changes, the draft Directive as it stands today does not envisage making the 2020 target for EU primary-energy consumption itself legally binding. Rather, it seeks to make certain *measures* designed to help achieve this target legally binding in Member States.

In other words, the passage of the EED will not change the status of the 2020 energy-efficiency target *per se*, which will remain aspirational in nature rather than mandatory.

Figure 4 summarizes the three iterations we have had since 2006 of the EU's aspirational or indicative 2020 energy-efficiency target, a target that has always been expressed relative to BAU projections for primary-energy consumption by 2020. Note that as a general rule, the Commission estimates that every tonne of oil equivalent consumed results in approximately two tonnes of CO₂ emissions.

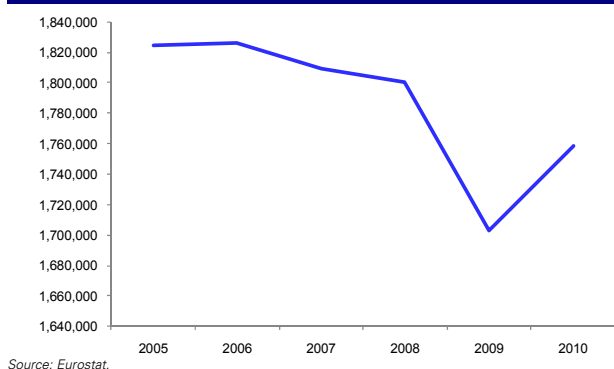
The 2011 estimates highlighted in blue are the ones contained in the draft EED now being considered by the EU Parliament and Member States.

Figure 4: Changes in European Commission assumptions on primary-energy consumption by 2020

	2006 iteration*	2008 iteration	2011 iteration
2020 primary-energy consumption BAU (mtoe)	1,890	1,968	1,842
2020 primary-energy consumption target (mtoe)	1,512	1,574	1,474
2020 annual reduction in primary energy consumption (mtoe)	378	394	368
Corresponding CO ₂ savings (Mt)	780	860	821
tCO ₂ /toe	2.1	2.2	2.2

Source: Deutsche Bank from European Commission; *EU-25 only.

Figure 5 then shows the actual primary-energy consumption in the EU-27 over 2005-10 in order to put the aspirational targets shown in Figure 4 into context.

Figure 5: EU-27 primary-energy consumption (ktoe)

The Commission first set out an aspirational target for the EU's 2020 primary-energy consumption in a paper published in October 2006 entitled *Action Plan for Energy Efficiency: Realising the Potential*. As this pre-dated the accession of Bulgaria and Romania, at this time the EU was projecting that BAU primary-energy consumption for the EU-25 would reach 1,890 million tonnes of oil equivalent (mtoe) by 2020, as per the first column of Figure 4. At this time it was projecting that reducing 2020 BAU primary-energy consumption by 20% to the aspirational target of 1,512mtoe would save 780Mt of CO₂ emissions in 2020 against the BAU scenario.

In November 2008 the Commission then published a further Communication, in which it projected BAU primary-energy consumption for the EU-27 (i.e. including Bulgaria and Romania) of 1,968mtoe, as per the second column of Figure 4. This resulted in a 2020 aspirational target for primary-energy consumption of 1,574mtoe, implying that CO₂ emissions would be 860Mt lower in 2020 than under the BAU scenario.

Finally, in June of last year, the Commission published the draft EED, and in the Impact Assessment accompanying this it projected that BAU primary-energy consumption for the EU-27 by 2020 would reach 1,842mtoe, giving a 2020 target of 1,474mtoe and implying that CO₂ emissions would be 821Mt lower than under the BAU scenario if this target were achieved in full.

There are two things worth noting about the big difference between the Commission's 2008 and 2011 projections for 2020 BAU primary-energy consumption and the corresponding aspirational targets (the difference between the 2006 and 2008 projections can be disregarded, as it simply reflects the change in scope from EU-25 to EU-27).

First, the 2011 BAU projection is significantly lower than the 2008 one (1,842mtoe and 1,968mtoe respectively), reflecting the impact of the severe EU recession in 2009. As can be seen from Figure 5, primary-energy consumption fell by nearly 100mtoe in 2009 (to 1,703mtoe from 1,800mtoe).

Second, and as can be seen from Figure 5, despite the very sharp drop caused by the recession in 2009, primary-energy consumption was still 226mtoe higher than the latest 2020 aspirational target (1,703mtoe versus 1,474mtoe), and after recovering strongly in the following year it was nearly 300mtoe higher in 2010 than the 2020 aspiration.

In our view, this pattern of energy consumption in response to the macro environment demonstrates very clearly that the factor that will ultimately determine whether the EU meets its energy-consumption target or not will be first and foremost the state of the economy.

That said, and precisely because the most recent data indicates that the EU is some 16% above the 2020 target at the moment (1,759mtoe in 2010 versus a 2020 target of 1,474mtoe), the EED is designed to redouble the EU's efforts towards achieving this goal by making certain energy-efficiency measures mandatory across the EU.

So, where do we now stand in the legislative process?

The EED legislative process: where are we now?

In keeping with the legal procedure for transposing a newly proposed Directive into EU Law, the EED is passing through the full Co-Decision process. This means that all three lawmaking bodies of the EU – the Commission, the Parliament, and the Council of Ministers (i.e. the ministerial representatives of Member-State governments) – must give their consent before it can become EU Law.

The first stage of the Co-Decision process was the publication of the draft EED last June by the Commission, and the second stage – its discussion and amendment in the EU Parliament – has been underway since last Autumn.

With the EU Parliament's Environment and Industrial Committees (henceforth ENVI and ITRE) having already proposed and voted on their amendments, the final stage of the parliamentary approval process is due on 11 June with the plenary Parliament vote.

The third stage is the discussion and amendment process in the Council of Ministers. The Danish Government, as current holder of the EU Presidency, has already circulated its own proposed text for the EED, and it will be for the Council to make any further amendments it wishes.

With the Danish Presidency having made the passage of the EED one of its main priorities, the most optimistic scenario is that the Parliament and Council will be able to reach agreement on a final text before the Danish Presidency ends on 30 June, thus enabling the Directive to enter into force by the end of the year and hence before the start of Phase 3. On the other hand, if

negotiations are protracted and significant amendments to the substance of the Directive are proposed – and at this stage we think the most likely source of any such amendments are Member States rather than the Parliament – then the Directive might not enter into force before the start of Phase 3.

In our view, the fact that the EED does not propose a legally binding target but rather only legally binding *measures* already makes the task of reaching agreement easier, but this does not mean that there will not be scope for disagreement either within the Council itself, and/or between the Council and the Parliament. For example, if the idea of leaving open the option of a set-aside in the final text of the EED is ultimately approved in the plenary Parliament vote on 11 June, this could be contentious for some Member States if this wording is included in the final text submitted to the Council vote.

Indeed, it is probably for this reason that the Danish Government has excluded any reference to a set-aside in the initial text it has circulated to Council Members. However, since the Presidency can make amendments to the draft before the Council vote, the Danish Government may be waiting for further signs from Parliament and Member States on the question of a set-aside option before making a decision on whether or not to make reference to it in its own text.

In the end, given the Danish Government's strong wish to have the EED approved by the end of its Presidency, we think that whether or not a set-aside is ultimately submitted to the Council of Ministers will depend on the degree of opposition from certain Member States before the Council vote. In other words, if the Danish Government senses that opposition to the idea of a set-aside would jeopardize the passage of the EED in June, it may well prefer to exclude any reference to a set-aside in the final text submitted to the Council, thereby leaving it for the Commission to re-visit the idea of withholding allowances outside the context of the EED.

Overall, we think there the passage of the EED will be completed in all its essentials by the end of June, and we henceforth assume that the EED will formally become EU law within the next 12 months.

Meanwhile, what of the efficiency measures themselves to be made binding via the EED, and the CO₂ savings the Commission expects from them?

Looking at the EED's binding measures

The measures proposed in the draft EED have been summarized by the Commission itself as follows:

- **Public bodies** would need to buy energy-efficient buildings, products and services, and refurbish 3% of their buildings each year.
- **Energy utilities** would be required to encourage end users to adopt efficiency improvements such as the replacement of old boilers or insulation of their homes.
- **Industry** would be expected to become more aware of energy-saving possibilities, with large companies required to undertake energy audits every three years.
- **Consumers** should be better able to manage their energy consumption thanks to better information provided on their meters and bills.
- **Energy transformation** would be monitored for efficiency, with the EU proposing measures to improve performance if necessary, and promoting the co-generation of heat and electricity.
- **National energy regulatory authorities** would have to take energy efficiency into account when deciding how and at what costs energy is distributed to end users.
- **Certification schemes** would be introduced for providers of energy services to ensure a high level of technical competence.

These are all eminently sensible policy aims that we think should meet with little objection from Member States (although the Public Bodies measures may be somewhat harder to implement in times of fiscal retrenchment), but the real question is whether such measures – which in themselves can only inform and attempt to *persuade* consumers to become more energy efficient – will actually succeed in revolutionizing demand-side behavior.

And in our view a revolution is precisely what is required if the 20% target is to be met in full by 2020. This is because on the Commission's own modelling the current energy-efficiency measures in place (i.e. before the entry into force of the binding measures contained in the EED) will only be enough to achieve a 9% reduction in CO₂ emissions by 2020 against the BAU forecast.

This would imply primary-energy consumption of 1,677mtoe in 2020 compared with the updated 2011 indicative target of 1,474mtoe (Figure 6).

Figure 6: European Commission assumptions on primary-energy consumption by 2020 (mtoe)

	2011 iteration of the -20% EE* target	Trajectory with current EE* measures
2020 primary-energy consumption BAU	1,842	1,842
2020 primary-energy consumption target	1,474	1,677**
2020 annual reduction in primary energy consumption	368	165
Corresponding CO2 savings (Mt)	821	370
tCO2/toe	2.2	2.2

Source: Deutsche Bank from European Commission; *energy-efficiency; **Number projected by the Commission in the Q&A document accompanying the proposed EED in June.

Indeed, ever since we began modeling the impact of the EU's energy-efficiency policy on ETS emissions out to 2020 back in 2007, we have been sceptical of the extent to which policy measures in this area would translate into sustained long-term CO₂-emissions reductions.

In our report *Abatement Statement* (10 March 2008), we assumed that about only one quarter of the 20% reduction against BAU emissions would be achieved by 2020, giving an annualized emissions saving from energy-efficiency measures by 2020 of 195Mt in total, of which we expected 60% (117Mt) in the ETS, and 40% (78Mt) in the non-ETS sectors.

We have retained this forecast ever since until now, which means that compared with the Commission's estimate of the annualized CO₂ savings that will be achieved in the ETS and non-ETS sectors combined by 2020 under the existing trajectory – 370Mt, as per Figure 6 – our forecast savings are about half of those foreseen by the Commission today before the entry into force of the EED (i.e. 195Mt versus 370Mt).

The question is, without a mandatory target can the new legally-binding measures proposed in the EED on their own achieve the 2020 policy goal of a 20% cut against BAU primary-energy consumption?

Binding measures alone will not deliver a 20% cut

Figure 7 shows two trajectories for the incremental CO₂ savings against BAU potentially resulting from the measures in the EED relative to the Commission's estimate of the savings that will be achieved under the existing trajectory shown in Figure 4 above.

It also shows two scenarios for each of these trajectories showing (i) the impact of achieving the 20% target in full, and (ii) the impact of achieving a 15.4% reduction against BAU by 2020 rather than the full 20%.

Trajectory 1 assumes that the incremental emissions reductions will be achieved in linear fashion from 2014 onwards, while Trajectory 2 assumes that although the incremental emissions reductions will also here begin from 2014 that will become progressively higher over the period (i.e. that they will be back-end loaded).

The source for these numbers is the Impact Assessment accompanying the draft EED, with the numbers for 2015 and 2020 (highlighted in blue) calculated from numbers given by the Commission, and the numbers for the other years representing our estimates based on the 2015 and 2020 numbers given by the Commission (note that we derive our numbers for CO₂ emissions from the Commission's numbers for carbon emissions using a ratio of 1t of carbon emissions= 3.67t of CO₂ emissions).

The first thing to note is that the Commission itself states in its Impact Assessment that the 20% reduction against BAU will not be achieved in the absence of a binding *target*, and as we have already mentioned above the draft EED itself does not envisage a binding target, but rather only binding *measures*. As a result, in its Impact Assessment the Commission also developed an optimistic and a pessimistic scenario for the reductions that could be achieved under binding measures relative to the 20% reference scenario, and in Figure 7 below we have shown only the pessimistic scenario (i.e. the 15.4% reduction against BAU) versus the 20% reference scenario, as the optimistic scenario, at 19.3% below BAU, was very close to the 20% target in any case.

Under both Trajectory 1 and Trajectory 2 it can be seen that the annual CO₂ savings against BAU in 2015 and 2020 would be the same, but as the former assumes a linear progression towards the 2020 goal while the latter assumes it is back-end loaded, the total savings over the period under the two trajectories are different.

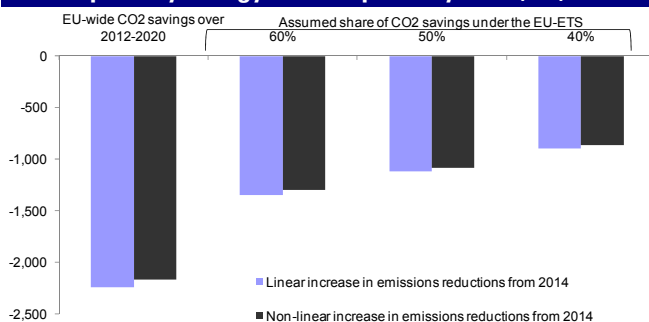
Looking at the 20% reference scenario first, under Trajectory 1, the total CO₂ savings on an EU-wide basis (i.e. ETS and non-ETS combined) versus BAU over the period are 2,241Mt, and under Trajectory 2 a slightly lower 2,161Mt.

Turning then to the 15.4% scenario, under Trajectory 1, the total CO₂ savings on an EU-wide basis versus BAU over the period are 1,400Mt, and under Trajectory 2 1,342Mt. Figure 7 then also shows the breakdown of the emissions reductions that would be achieved in the ETS under each of these four scenarios depending on whether the ETS accounted for 40%, 50%, or 60% of the total EU-wide reduction achieved. So, for example, if 60% of all the CO₂ savings were achieved in the ETS, then under the 20% reference scenario total emissions reductions versus BAU over the period would be 1,344Mt under Trajectory 1, and 1,297Mt under Trajectory 2.

Figure 7: Potential extra CO₂ savings from additional measures proposed in the EED relative to existing trajectory with current measures in place (MtCO₂)

Achieved in 2020*	EU-wide emission reductions											Emission reductions in the EU-ETS		
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2012-2020	60%**	50%**	40%**
Trajectory 1: Assuming linear increase of emission reductions from 2014														
15.4% in 2020	0	0	0	-74	-149	-178	-206	-235	-264	-293	-1,400	-840	-700	-560
20% in 2020	0	0	0	-127	-253	-293	-333	-372	-412	-451	-2,241	-1,344	-1,120	-896
Trajectory 2: Assuming progressive effort from 2014 (non-linear increase of emission reductions)														
15.4% in 2020	0	0	0	-74	-149	-166	-189	-218	-253	-293	-1,342	-805	-671	-537
20% in 2020	0	0	0	-127	-253	-277	-309	-348	-396	-451	-2,161	-1,297	-1,081	-865

Source: Deutsche Bank from European Commission's numbers; 2015 and 2020 numbers in blue are derived from the Commission's calculated numbers that are the basis for our scenarios. * Share of reduction of primary energy consumption compared to business as usual, ** Different scenarios for the share of EU-wide emission reductions hosted by the ETS: 40%, 50% and 60%.

Figure 8: DB scenarios for additional EU-ETS CO₂ savings from enhanced energy-efficiency measures to reduce primary energy consumption by 20% (Mt)

Source: Deutsche Bank.

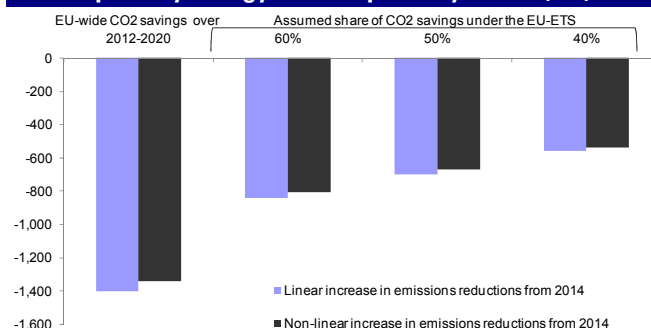
Under the 15.4% scenario, the respective total savings in the ETS over the period under Trajectory 1 and Trajectory 2 would be 840Mt and 805Mt.

In short, there is a wide range of possible outcomes for the emissions reductions that might ultimately be achieved in the ETS sectors as a result of the entry into force of the EED, and these are shown graphically in Figures 8 and 9.

All of which leads to the key question: given that the Commission itself does not expect the 20% target to be achieved in the absence of a binding target, what should we now be assuming as a realistic level of CO₂ savings from the incremental measures contained in the EED out to 2020?

Impact of the EED on the ETS: revised DB forecasts

As already mentioned above, we have long been sceptical about the EU's ability to achieve the goal of reducing primary-energy consumption by 20% against BAU by 2020, and we think that the Commission's so-called "pessimistic" scenario, under which emissions are reduced by 15.4% versus BAU by 2020, is still a very ambitious goal. This is for two main reasons.

Figure 9: DB scenarios for additional EU-ETS CO₂ savings from enhanced energy-efficiency measures to reduce primary energy consumption by 15.4% (Mt)

Source: Deutsche Bank.

First, to put it into context, we calculate that the *incremental* efficiency savings by 2020 implied under the 15.4% scenario relative to the Commission's estimate of the savings that will be achieved from the measures currently in place – an *increment* of 117Mtoe per year, as per Figure 10 – would equate to about 1,490TWh, or c.45% of current EU electricity demand.

This is a huge number.

Figure 10: Difference in CO₂ savings between existing trajectory and the 15.4% scenario

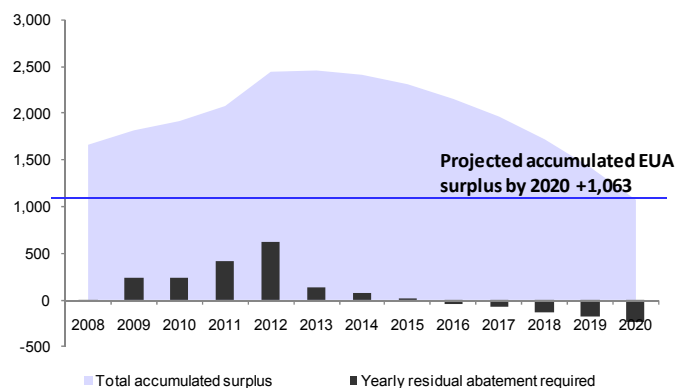
	Trajectory with current EE measures	15.4% scenario	Difference
2020 primary-energy consumption BAU (mtoe)	1,842	1,842	0
2020 primary-energy consumption (mtoe)	1,677*	1,559	117
2020 annual reduction in primary energy consumption (mtoe)	165	283	117
Corresponding CO ₂ savings (Mt)	370	631	261
tCO ₂ /toe	2.2	2.2	2.2

Source: Deutsche Bank from European Commission; * Number projected by the Commission in the Q&A document accompanying the proposed EED in June based on with current energy-efficiency measures in place.

**Figure 11: Previous DB base case ETS* cap, emissions and accumulated EUA surplus out to 2020 (m, Mt)**

	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2008-2020
Estimate of the available EUA cap**	2,291	2,253	2,215	2,176	2,138	2,100	2,062	2,024	27,889
Reported Emissions	2,278	2,300	2,315	2,333	2,327	2,343	2,361	2,371	28,570
Gap to EUA cap	13	-47	-100	-157	-189	-243	-299	-347	-681
Average gap to EUA cap over Phase 3 alone				-171					
Average gap to EUA cap over 2008-20				-52					
Assumed use of CERs/ERUs	116	116	116	116	116	116	116	116	1,744
Residual abatement required (RAR)***	129	69	16	-41	-73	-127	-184	-231	1,063
Average RAR over Phase 3 alone				-55					+82

Source: European Commission, Deutsche Bank; *EU-27, plus Norway & Liechtenstein, plus Iceland (some of whose aircraft operators are covered by the EU-ETS from 2012); **Assumes the full Phase-3 NER comes to market; *** Total net position (i.e. accounting for the demand of aircraft operators and the use of CERs/ERUs).

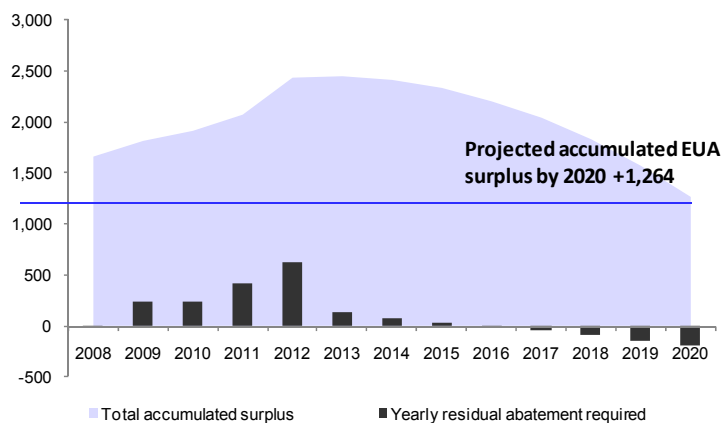
Figure 12: Accumulated surplus out to 2020 under previous DB base case (mEUAs/CERs/ERUs, Mt)

Source: Deutsche Bank; the non-linear increase in 2012 surplus is explained by our assumption that 130M undistributed EUAs from Phase-2 NERs will be sold/auction in the end of Phase 2.

Figure 13: Revised DB base case ETS* cap*, emissions and accumulated EUA surplus out to 2020 (m, Mt)

	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2008-2020
Estimate of the available EUA cap**	2,291	2,253	2,215	2,176	2,138	2,100	2,062	2,024	27,889
Reported Emissions	2,278	2,289	2,293	2,308	2,299	2,311	2,323	2,327	28,369
Impact of incremental energy-efficiency measures	0	-11	-22	-25	-28	-33	-38	-44	-201
Gap to EUA cap	13	-36	-78	-132	-161	-210	-261	-303	-480
Average gap to EUA cap over Phase 3 alone				-146					
Average gap to EUA cap over 2008-20				-37					
Assumed use of CERs/ERUs	116	116	116	116	116	116	116	116	1,744
Residual abatement required (RAR)***	129	80	38	-16	-45	-95	-146	-187	1,264
Average RAR over Phase 3 alone				-30					+97

Source: European Commission, Deutsche Bank; *EU-27, plus Norway & Liechtenstein, plus Iceland (some of whose aircraft operators are covered by the EU-ETS from 2012); **Assumes the full Phase-3 NER comes to market; *** Total net position (i.e. accounting for the demand of aircraft operators and the use of CERs/ERUs).

Figure 14: Accumulated surplus out to 2020 under revised DB base case (mEUAs/CERs/ERUs, Mt)

Source: Deutsche Bank; the non-linear increase in 2012 surplus is explained by our assumption that 130M undistributed EUAs from Phase-2 NERs will be sold/auction in the end of Phase 2.

Second, we feel that the so-called “rebound effect” will reduce the effectiveness of these measures in any case, in that a portion of any future efficiency savings will likely be recycled into further energy consumption. In other words, to the extent that efficiency improvements reduce the cost of energy consumption, consumers will actually be encouraged to increase their energy consumption.

As a result, we assume a more conservative scenario, whereby only 25% of the *incremental* savings under the 15.4% scenario are achieved by 2020, which comes to 73Mt of extra annual reductions by 2020 on an EU wide basis (i.e. 293×0.25).

We then further assume that 60% of these incremental EU-wide savings are achieved in the ETS, giving us *incremental* annualized emissions reductions by 2020 of 44Mt.

Finally, we assume that these incremental savings are achieved on a progressive basis from 2014 onwards and are therefore back-end loaded. This results in total incremental emission reductions in our model of 201Mt over 2014-20.

Overall, as shown in Figures 11-14 above, what all of this means is that our projected accumulated EUA surplus by 2020 is now 201m higher under our revised base-case scenario, at +1,264m compared with +1,063m previously.

Conclusion: EED raises our EUA surplus to +1,264m

To summarize, we now assume that the EED will formally become EU Law by mid-2013 at the latest, with the incremental efficiency measures it mandates starting to make an impact from 2014 onwards.

However, we remain sceptical about the extent to which the EED will enable the EU to meet its 2020 policy goal of reducing primary-energy consumption by 20% against BAU levels, and assume that only 25% of the incremental savings targeted under the Commission's more pessimistic scenario will actually be met.

Nonetheless, this results in an increase of our projected EUA surplus out to 2020 of 201m, bringing our accumulated over-supply in the ETS over Phases 2 and 3 combined to +1,264m.

This is a huge number, and without remedial action to re-establish price tension such a large over-supply of allowances will weigh on the market for years, thereby making the price generated by the ETS essentially meaningless as far as a signal for new low-carbon investments is concerned.

Moreover, since the true impact of additional energy-efficiency measures on the EU-ETS will only be known on an *ex-post* basis after many years, any *ex-ante* solution that is by its very nature only a one-off measure – such as

a set-aside – will not be able to respond to any further changes in market expectations of future emissions at a later date.

This is an absolutely fundamental point, and goes beyond the impact of the EED alone. The point is that demand in the ETS is a very dynamic variable, influence by economic growth, weather patterns, and the interaction of the CO₂-emissions-reduction target with the two other pillars of EU energy policy, i.e. the renewable and energy-efficiency targets.

And what this means is that while a set-aside might be the easiest short-term solution to the problem of over-supply in the ETS (and therefore the most pragmatic way of re-engineering price tension in the ETS in the near term), it will be completely inadequate on its own to resolving the fundamental structural flaw of the system, namely the problem of fixed supply.

It is to a more detailed discussion of this point that we now turn.

#3 ETS reform should not be set aside

Ever since the reduction in emissions caused by the recession of 2009 first focused the market's attention on the structural problem inherent in the ETS – i.e. the fact that it is the only market in the world where demand varies in real time but the supply is fixed for years in advance – many proposals have been put forward to re-establish price tension, and the debate has been given renewed momentum since the publication of the EED last June.

The most commonly advanced proposals are:

- (i) raising the EU's 2020 emissions-reduction target to 30%;
- (ii) establishing some kind of carbon central bank or other such institutionalized mechanism (e.g. a rolling cap) that could modulate supply in the face of varying demand, for example via changes to the annual linear-reduction factor in the EU-ETS in response to varying demand;
- (iii) setting a reserve price for the EUAs to be auctioned over Phase 3; and
- (iv) setting aside a certain amount of allowances from the Phase-3 cap.

In the last nine months, however, the debate has become overwhelmingly focused on the last of these four ideas, i.e. that of a set-aside.

This is in part understandable, as given the sheer scale of the current perceived over-supply of EUAs out to 2020, there is an urgent need to find a way of re-creating meaningful price tension within the ETS as soon as possible.

This means that a key consideration in any analysis of how best to re-establish price tension is not only the likely effectiveness of the measure *per se*, but also its political and legal feasibility, i.e. how much resistance would it face and how long would it take to implement?

Any measure requiring a change of the EU-ETS Directive is more difficult to implement than measures only requiring a change to a Regulation, as modifying a Directive requires the full tripartite Co-Decision process, whereas modifying an EU Regulation could be done under the quicker Comitology process.

And this is where a set-aside has a clear advantage over the other options listed above.

This is because while the first two options would definitely require a change to the ETS Directive, and a minimum auction price most likely as well, a set-aside of allowances could be implemented via the Auction Regulation if the allowances were initially withheld on a provisional basis (modification of the Directive to permit the cancellation of the allowances withheld could then be done at a later date).

In our view, however, while a set-aside would certainly appear to be the most pragmatic way of re-establishing meaningful price tension within the ETS in the near term, this does not mean it is either the best or the only option that should be pursued.

We do not think a set-aside is the best of the four options set out above because it would not resolve the fundamental structural problem of the ETS, namely the fact that the cap is fixed years in advance while demand varies in real time.

And it is precisely for this reason that we do not think a set-aside is the only option that should be pursued either: in our view, the EU authorities should start debating a more fundamental overhaul of the ETS already today by looking at options that *would* address the ETS' fundamental structural problem. This would mean that when the time comes to revising the ETS Directive for Phase 4 the necessary changes stand the greatest possible chance of being adopted.

In other words, whilst a set-aside is undoubtedly the most expedient short-term fix, it should not be seen as sufficient in itself.

Against this backdrop, we now turn to examining each of the four options listed above, considering their respective strengths and weaknesses, and, in particular judging them on the three criteria of greatest importance with regard to (i) re-establishing price tension as soon as possible, and (ii) resolving once and for all the problem of fixed supply in the face of variable demand, namely:

- 1) *Would the Commission support it?* This matters because as the Commission is the only EU body able to propose legislation.
- 2) *Would it require a change to the ETS Directive?* This matters because the answer will dictate the speed of implementation.
- 3) *Would it resolve the structural flaw in the ETS?* In our view, this is the most important consideration of all as far as the long-term credibility of the scheme is concerned.

1. Raising the EU's 2020 emissions-reduction target.

The EU's consistent position since 2007 has been that it would be willing to raise its 2020 emissions-reduction target to 30% from the current 20% versus 1990 levels if other developed countries were to adopt "comparable" targets.

Indeed, the Commission has already done a lot of work studying the impact of a move to a 30% target on the ETS, and on the analysis it made of such a scenario in its Communication of May 2010 it indicated that moving to a 30% EU-wide emissions-reduction target would entail a reduction in the cap of 1.4bn tonnes over 2013-20 compared with the cap under the current 20% target (see our report *Hard to Credit*, 22 June 2010).

This was followed by a Working Paper published in January 2012 which stated that a move to 30% would translate into an EU-27 ETS 2020 target of -34% compared with 2005 levels implying an EU-27 Phase-3 scope cap by 2020 of 1.6bn tonnes.

As a lower ETS cap would entail either a change of the annual linear-reduction factor or withholding and cancelling a number of allowances available under the current 20% target, Figure 15 below develops two hypothetical scenarios for moving to an EU-wide 30% emissions-reduction target based on changes to the annual linear-reduction factor.

The first scenario developed in Figure 15 assumes a change to the annual linear-reduction factor from 2013 whereas the second scenario assumed a change from 2014. Reaching the EU-27 1,600m 2020 cap would require annual linear reductions in these two cases of -3.09% and -3.77% respectively.

Figure 16 then shows in diagrammatic form the projected EUA deficit out to 2020 under a 30% target with a 3.09% linear-reduction factor from 2013, and Figure 17 the deficit we estimate would occur under a 30% target with a 3.77% linear-reduction factor from 2014.

From this it can be seen that moving to a 30% target would, other things being equal, lead to a very significant tightening of the cap: it would be enough to re-establish a deficit of at least -250Mt or more out to 2020 versus the surplus of +1,264m EUAs that we are here projecting based on the projected surplus of +1,063m already in our model plus the +201m we are now assuming would accrue from the implementation of the EED.

So how does this option measure up in terms of the three criteria we mentioned above?

On the first point, we think that if the political conditions were right the Commission would be an enthusiastic supporter of moving to a 30% target.

However, it is currently difficult to envisage the political circumstances arising that would enable the Commission to propose raising the 2020 target to 30%, as this would likely run into opposition from a number of Member States, not least owing to the lack of progress in international climate talks since 2009 (although the EU decided at the COP-17 climate talks in Durban last December to agree to a second commitment period under the Kyoto framework it did not change – nor did it give any sign of changing – its current 20% target).

That said, it would be fair to say that it would now be much easier and cheaper for the EU to meet a 30% target than would have been the case two or three years ago, simply as a result of the very significant fall in emissions caused by the economic weakness since early 2009.

As a result, we think this could be used by the Commission as a valid argument to push for a 30% target as an achievable goal in its own right (quite apart from the boost it would give to the ETS), but we do not think it is on the agenda in the foreseeable future.

With regard to the second of our three criteria, it is clear that if an EU-wide 2020 target beyond 20% were at some point in the future to be adopted, the Commission would have to submit a report assessing the situation and proposing new legislation to amend the ETS Directive. This would take a long time, perhaps two years or more.

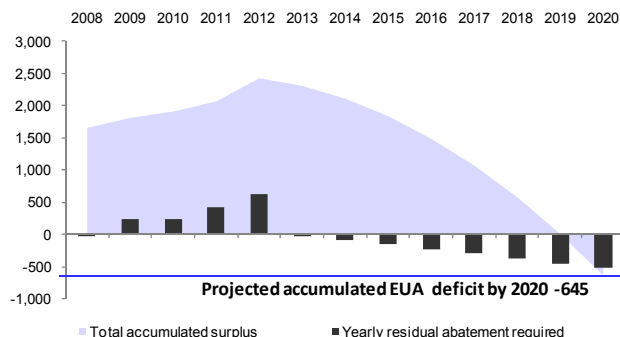
Finally, with regard to the third criterion, although such a tightening of the ETS cap as that entailed by a move to a 30% target would certainly re-establish a significant projected deficit versus our current estimates, the problem is that as a one-off event it would not resolve the fundamental structural problem of the ETS.

In other words, although there would be a significant reduction in the supply of allowances against current levels, the supply would nonetheless still be fixed. As a result, this would leave open the risk that if demand were to decline again materially in the future the projected deficit could once more revert to a projected surplus.

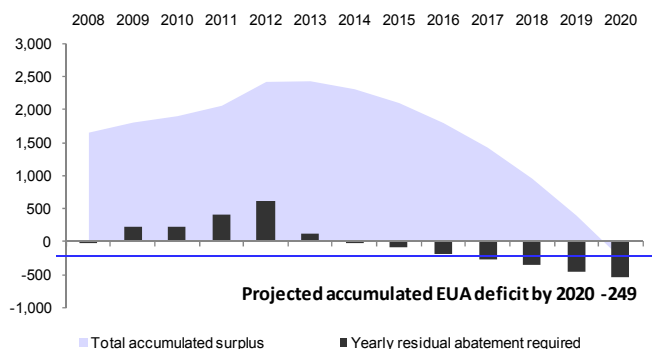
Figure 15: ETS residual abatement required by 2020 under illustrative scenarios of changes to the ETS annual linear reduction factor in line with going to a 2020 EU-wide -30% emission-reduction target (mEUAs/Mt)

	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2008-2020
Reported Emissions	2,278	2,289	2,293	2,308	2,299	2,311	2,323	2,327	28,369
Scenario 1: Change to the annual linear reduction factor from 2013 in line with going to a 2020 EU-wide 30% emission-reduction target: -3.09%									
Estimate of the available EUA cap – EU-27 Phase-3 scope ^{2,3}	2,075	2,007	1,939	1,871	1,803	1,735	1,668	1,600	25,183
Estimate of the available EUA cap – Total Phase-3 scope ^{1,2}	2,158	2,090	2,021	1,953	1,885	1,817	1,748	1,680	25,979
Residual abatement required (RAR) ^{1,4}	-4	-83	-156	-240	-299	-378	-459	-531	-645
Average RAR over Phase 3 ¹	-269								-50
Scenario 2: Change to the annual linear reduction factor from 2014 in line with going to a 2020 EU-wide 30% emission-reduction target: -3.77%									
Estimate of the available EUA cap – EU-27 Phase-3 scope ^{2,3}	2,207	2,083	2,003	1,922	1,842	1,761	1,681	1,600	25,584
Estimate of the available EUA cap – Total Phase-3 scope ^{1,2}	2,290	2,166	2,085	2,004	1,923	1,842	1,761	1,680	26,375
Residual abatement required (RAR) ^{1,4}	127	-7	-92	-189	-261	-353	-447	-532	-249
Average RAR over Phase 3 ¹	-219								-19

Source: European Commission, Deutsche Bank; ¹ EU-27, plus Norway & Liechtenstein, plus Iceland (some of whose aircraft operators are covered by the EU-ETS from 2012); ² Assumes the full Phase-3 NER comes to market; ³ According to the Commission going to an EU-wide -30% emission-reduction target by 2020 would translate into a -34% 2020 target for EU-27 ETS covered activity (we assume the EU-27 aviation cap is decreased from 2013 in both scenarios); ⁴ Total net position (i.e. accounting for the demand of aircraft operators and the use of CERs/ERUs).

Figure 16: Potential accumulated deficit out to 2020 under an EU-wide 30% scenario with a change of the annual linear-reduction factor from 2013 (mEUAs/Mt)

Source: Deutsche Bank.

Figure 17: Potential accumulated deficit out to 2020 under an EU-wide 30% scenario with a change of the annual linear-reduction factor from 2014 (mEUAs/Mt)

Source: Deutsche Bank.

Figure 18: Residual abatement required under the total Phase-3 scope with a 2.25% annual linear reduction factor from 2014 (mEUAs/Mt)*

	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E
Available EUA CAP **	2,296	2,242	2,192	2,143	2,094	2,044	1,995	1,945
Reported Emissions	2,278	2,289	2,293	2,308	2,299	2,311	2,323	2,327
Residual abatement required***	133	69	15	-50	-90	-151	-213	-266
Average Residual abatement required over Phase 3 alone	-69							
Average Residual abatement required over 2008-20	+73							

Source: European Commission, Deutsche Bank; * EU-27, plus Norway and Liechtenstein, plus Iceland (some of whose aircraft operators are covered by the EU-ETS from 2012); ** Assumes some surplus NERs' EUAs does not come to market in Phase 2 but that full Phase-3 NER comes to market; *** Total net position (i.e. accounting for the demand of aircraft operators and the use of CERs/ERUs).

Figure 19: Residual abatement required under different Phase-3 scopes with a 2.25% annual linear reduction factor from 2014 (mEUAs/Mt)

	2013	2014	2015	2016	2017	2018	2019	2020	2008-2020
Available cap**	EU-27 Phase-3 scope	2,218	2,165	2,116	2,066	2,018	1,969	1,919	26,826
	Phase-3 scope without aviation	2,081	2,032	1,982	1,933	1,883	1,834	1,785	25,677
	Total Phase-3 scope (including aviation)*	2,296	2,242	2,192	2,143	2,094	2,044	1,995	27,579
Residual abatement required***	EU-27 Phase-3 scope	152	90	39	-24	-61	-118	-178	1,210
	Phase-3 scope without aviation	150	97	51	-7	-39	-92	-146	1,208
	Total Phase-3 scope (including aviation)*	133	69	15	-50	-90	-151	-213	955

Source: European Commission, Deutsche Bank; * EU-27, plus Norway and Liechtenstein, plus Iceland (some of whose aircraft operators are covered by the EU-ETS from 2012); ** Assumes some surplus NERs' EUAs does not come to market in Phase 2 but that full Phase-3 NER comes to market; *** Total net position (i.e. accounting for the demand of aircraft operators and the use of CERs/ERUs).

2. Creating an ETS central bank to modulate supply.

An idea often mentioned in the debate over how best to resolve the over-supply in the ETS is that of establishing a central bank for carbon or some such public agency that could intervene in the market to modulate supply in keeping with the public-policy objectives that the ETS is designed to achieve.

In principle, we think the idea of a carbon central bank is very appealing, as if such an institution were to be established along the same lines as national central banks in the monetary sphere it would enable the EU public authorities to intervene in real time in the market, and maintain price tension in such a way as to achieve the public-policy objectives the scheme is there to deliver.

One could imagine various ways in which such an agency could intervene in the market, such as changing the linear-reduction factor as and when deemed necessary or intervening to buy up allowances at times of over-supply (and to sell them if market scarcity reached extreme levels).

A further variation on this would be to institute a rolling cap instead of the current fixed cap, whereby the cap were modified on a periodic and *ex-post* basis to take account of actual emissions and hence ongoing demand (as is envisaged under the Australian scheme due to start in 2015, for example).

If we consider first the possibility of intervening via modifications to the linear-reduction factor, this would entail having the power to change the fixed percentage rate at which the ETS cap falls year on year over time from 2013 onwards.

As such, we could conceive of such intervention as being similar in nature to central banks in the monetary sphere changing the key interest rate used to manage domestic inflation or the value of their currency on the foreign-exchange market.

The ETS Directive bases the trajectory for the ETS cap from 2013 onwards on a linear-reduction factor of 1.74% per year from a notional 2010 cap based on the average annualized Phase-2 cap.

In our report *The ETS Review: Unfinished Business* (23 February 2009) we explained that giving the Commission or another EU public body the power to change this linear-reduction factor, whenever necessary, in line with the evolution of demand would address the structural problem inherent to the ETS, i.e. fixed supply of, but varying demand for, EUAs.

Figures 15-19 show what we estimate the impact of changing the linear-reduction factor on the net position of the ETS out to 2020 would be, and from Figures 15 and 16 it can be seen that an annual linear-reduction factor of 3.1%-3.8% would be required to have the same impact as moving to a 30% EU-wide target, depending on whether such a change were made from 2013 or 2014.

Figures 18 and 19 show that a linear-reduction factor of 2.25% – as approved by the ENVI Committee in the EU Parliament in its voted amendments on 20 December 2011 – would not, on its own, be enough to redress our projected over-supply in the ETS out to 2020, as it would only reduce the ETS cap by 310Mt versus the current trajectory under the 1.74% factor.

What all this illustrates is that the linear-reduction factor could be a very useful tool for managing the supply side of the ETS provided that, under such an institutional arrangement, the agency responsible for setting it had the latitude to change it *as and when deemed necessary* in response to unforeseen changes in demand.

In other words, a one-off change to the linear-reduction factor would not suffice, as what would be required is the ability to respond to changing demand conditions on an ongoing basis.

Alternatively, a central carbon bank could be given the power to intervene in the market by buying and selling allowances on the market in response to prevailing pricing conditions.

This could be conceived of as directly analogous to central banks' "open-market operations" in the monetary sphere, whereby national central banks inject or remove liquidity from the money markets in order to influence the price of money (i.e. the interest rate).

Despite the obvious comparisons to be drawn with the monetary sphere, the objection to the idea of a central bank for carbon most commonly made is that it would create uncertainty in the market as participants would always be second-guessing whether the central bank might intervene at some point if prices moved too sharply either to the downside or the upside.

We think, on the contrary, that just as is the case in the foreign-exchange market, a central bank for carbon would actually create a greater degree of predictability as far as pricing is concerned.

By this we mean that market players in the foreign-exchange market are aware that central banks can intervene at any time in the market if currencies move too far away from perceived or declared target ranges, and this in fact often leads to self-correcting behaviour on the part of market participants if they begin to think that intervention is imminent.

In the same way, a central bank for carbon could be given a very clear mandate to promote the long-term public-policy objectives of the ETS, leaving it to market participants to judge whether price movements were consistent with these objectives and hence whether the central bank might intervene.

All of this being said, as far as the first of our key criteria are concerned we do not think the European Commission would support such an idea, as it has never accepted the need for a central bank or similar mechanism.

On the second criterion, as the linear-reduction factor of 1.74% is enshrined in the ETS Directive (Article 9), and as there is no public agency with the power to modify supply envisaged in the Directive, establishing such a body with such power would require amending the ETS Directive, and would therefore take considerable time.

However, with regard to our third key criterion, we think that establishing a central bank or other such agency with the power to intervene in the market to modulate supply would resolve the structural flaw in the ETS of fixed supply.

As a result, and despite the reluctance of the Commission to tackle this problem and the time it would take to effect such a change, we think this idea deserves serious consideration within the EU policy-making establishment as soon as possible.

In our view, this would maximize the chances of such an idea being implemented for the start of Phase 4 of the ETS.

3. Establishing an *ex-ante* reserve price. The ETS Directive governing the arrangements for Phase 3 says that any allowances not allocated for free should be auctioned, but neither the Directive nor the Auction Regulation says anything about allowing for an *ex-ante* minimum price above the prevailing market price at the discretion of the public authorities.

In other words, whilst the public authorities can always reserve the right to withhold allowances from a given auction if the prices bid are too far *below* the prevailing market price (albeit with the obligation to offer them again

at subsequent auctions), they may not, under the arrangements governing Phase 3, withhold allowances from the auction by setting an *ex-ante* minimum price above the prevailing market price.

Against this backdrop, one idea often suggested for tightening supply in the ETS is to introduce an *ex-ante* minimum price significantly above the current market price.

The obvious appeal of this idea is its sheer simplicity, but we would note the Commission's long-standing dislike of the idea of a reserve price above the prevailing market price on principle, a position it made clear as long ago as 2008 in the ETS Review Q&A, which stated that "*no price level can be guaranteed in a free market*".

As a result, we think it very unlikely that the Commission would support this idea. Indeed, in our view the Commission would be even less enthusiastic about the idea of a minimum price than it would be about the idea of some form of supply-management mechanism.

Furthermore, from a practical point of view we think it would be very difficult to achieve agreement amongst all the EU bodies necessary on what the 'correct' reserve price should be at any given time.

As far as the technical requirements for implementing a reserve price are concerned, it is our understanding that any change to current ETS arrangements allowing for an *ex-ante* minimum price would likely require a modification of the Directive itself, not just the Regulation on Auctions. However, we are not certain of this, and perhaps it would be possible to introduce a reserve price under the less time-consuming Comitology procedure.

Finally, in so far as such an approach would be price rather than quantity-based, it would not ultimately address the essential underlying problem of over-supply. However, against this it could be argued that this would not matter in practice if the ultimate objective were to achieve predictability on long-term pricing.

Overall, we conclude that while there would be significant barriers to overcome to establish a reserve price, the idea at least merits a serious discussion at the policy-making level.

4. Establishing a set-aside of allowances. The idea of withholding a certain amount of allowances from the pool of EUAs to be auctioned over Phase 3 in a so-called 'set-aside' was first floated in a Communication published by the Commission in May 2010.

At that time the idea was aired as a potential way of recalibrating the ETS cap in a manner consistent with a 30% emissions-reduction trajectory.

Subsequently, the idea of a set-aside has been evoked on numerous occasions as a way of reducing the over-supply in the ETS, and in itself the idea is a very simple one: remove a certain number of allowances from the market to compensate for the projected surplus out to 2020.

However, there are two questions that in practice complicate the regulatory and political implementation of a set-aside.

First, there is the question of duration: would any such set-aside be provisional or permanent in nature? In other words, would allowances be set-aside with a view to a possible re-introduction at a future date, or would they be removed and cancelled?

The answer to this question is key to determining whether it would be necessary to amend the Directive or only the Regulation on Auctions.

We think a provisional removal of allowances from the ETS could be done via a simple change to the Regulation on Auctions without the need to re-write anything in the Directive itself. By contrast, a permanent set-aside (i.e. removal and cancellation) would in our view clearly require a change to the Directive, as this would constitute a change to the cap-setting methodology, which is enshrined in the Directive (Article 9a).

Second, there is the question of scope: to the extent that the set-aside being discussed in the EU Parliament at the moment is being raised in the context of the EED, would any withholding of allowances that might ultimately result from this discussion compensate only for the expected incremental CO₂ savings from the new measures contained in the EED?

Or might the scope of an eventual set-aside be broadened not only to compensate for the expected CO₂ savings from the EED, but also to outweigh the entire projected surplus out to 2020 and thereby re-establish a shortfall of allowances and hence meaningful price tension?

The ENVI Committee passed an amendment approving a set-aside of 1.4bn EUAs, a number that would in our view go beyond the impact on emissions of the incremental measures contained in the EED, and that would indeed not only compensate for but actually outweigh our projection for the accumulated surplus out to 2020 attributable to the economic crisis.

By contrast, the compromise amendment passed by ITRE on 28 February removed the reference to a specific number, calling instead for the Commission to make an assessment *"as soon as possible but no later than the entry into force of this directive [i.e. the EED] (...) of the impacts on incentives for investments in low-carbon technologies and the risk of carbon leakage"*.

The ITRE amendment also stated that if on the basis of its assessment it is found necessary to do so, the Commission should amend the Regulation on Auctioning *"to implement appropriate measures which may include withholding of the necessary amount of allowances"*.

In short, while weaker than the ENVI amendment, the ITRE vote nonetheless leaves open the possibility of a set-aside, although neither ENVI nor ITRE specified whether the set-aside they proposed should be permanent or provisional in nature.

As a result, if ITRE's compromise amendment were ultimately accepted by the full EU Parliament and by the Council of Ministers, it would be up to the Commission to clarify this point.

Based on previous statements by the Commission itself, and on our view that the Commission would seek to avoid at all costs any procedure that would entail re-opening the Directive, we think that if and when the Commission ever were to recommend a set-aside it would recommend a provisional withholding of allowances, thereby leaving open the possibility of outright cancellation at a later date.

The advantage of such a procedure would be that it would likely only require an amendment to the Regulation on Auctions, the disadvantage that it would create uncertainty over (i) if and when the allowances withheld would subsequently be cancelled at some stage, and (ii) whether further such interventions in the market on the part of the authorities might be possible.

With regard to scope, the fact that the wording of the ITRE amendment refers to *"the impact on low-carbon investments"* suggests to us that as far as the ENVI and ITRE Committees are concerned it would be possible for the Commission to recommend withholding allowances not only in order to compensate for the projected impact of the EED (which by its very nature is hard to gauge), but also to compensate for the over-supply that already exists today owing to the impact of the economic crisis.

We would also expect the full EU Parliament to back this position in the plenary vote on 11 June, but as we have already indicated above the politics of a set-aside are much more difficult within the Council of Ministers.

Figure 20: Residual abatement required with a 1.4bn EUAs set-aside from the Phase-3 cap (mEUAs/Mt)*

	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E
Available EUA cap – EU-27Phase-3 scope**	2,175	2,098	2,021	1,944	1,867	1,791	1,714	1,637
Available EUA CAP **	2,252	2,175	2,098	2,021	1,944	1,867	1,790	1,713
Reported Emissions	2,278	2,289	2,293	2,308	2,299	2,311	2,323	2,327
Residual abatement required***	90	2	-79	-172	-239	-328	-418	-498

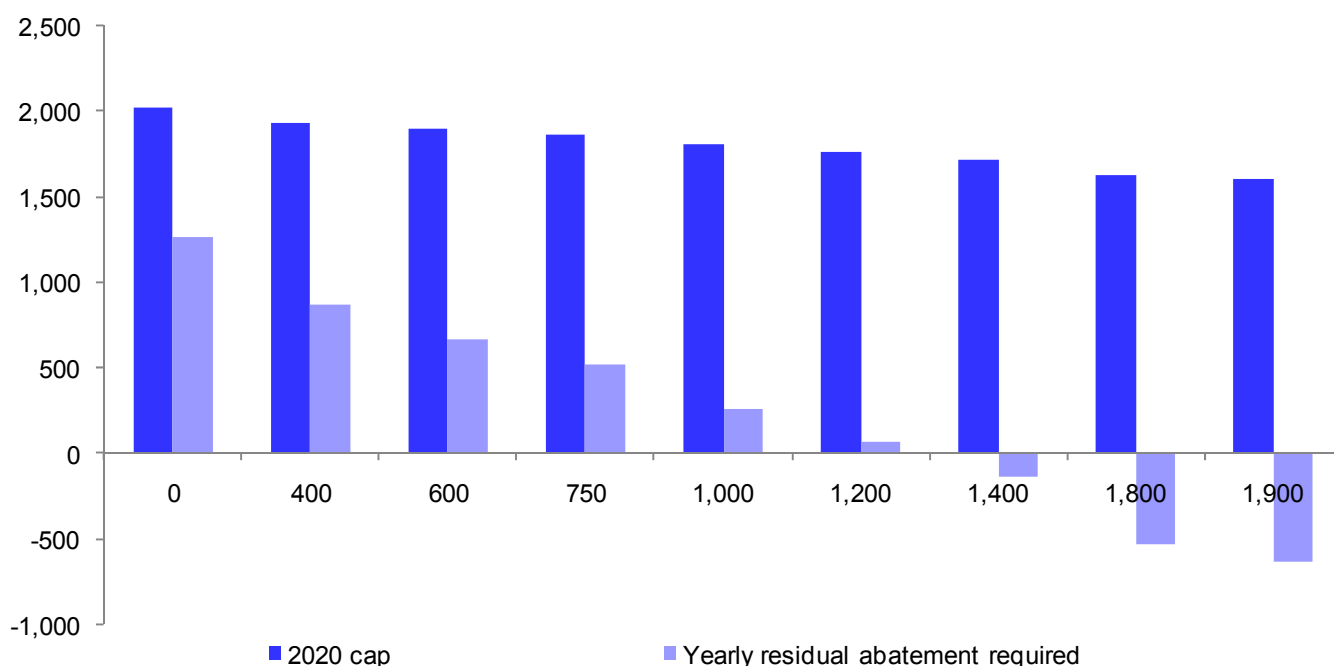
Average Residual abatement required over Phase 3 alone**-205****Average Residual abatement required over 2008-20****-10**

Source: European Commission, Deutsche Bank; * EU-27, plus Norway and Liechtenstein, plus Iceland (some of whose aircraft operators are covered by the EU-ETS from 2012) – we gradually decrease the Phase-3 cap by an additional eighth of 1.4bn each year; **Assumes some surplus NERs' EUAs does not come to market in Phase 2 but that full Phase-3 NER comes to market; *** Total net position (i.e. accounting for the demand of aircraft operators and the use of CERs/ERUs).

Figure 21: DB estimate of impact of different-sized set-asides on EU-ETS supply-demand balance by 2020 (m,Mt)*

Set-aside	0	400	600	750	1,000	1,200	1,400	1,800	1,900
2020 cap	2,024	1,935	1,891	1,857	1,802	1,757	1,713	1,624	1,602
Residual abatement required**	1,264	864	664	514	264	64	-136	-536	-636

Source: Deutsche Bank; * Phase-3 scope for EU-27, Liechtenstein & Norway, accounting for aircraft operators demand, ** Total net position (i.e. accounting for the demand of aircraft operators and the use of CERs/ERUs).

Figure 22: DB estimate of impact of different-sized set-asides on EU-ETS supply-demand balance* by 2020 (m,Mt)**

Source: Deutsche Bank; * Total net position (i.e. accounting for the demand of aircraft operators and the use of CERs/ERUs), **Phase-3 scope for EU-27, Liechtenstein & Norway, accounting for aircraft operators.

In terms of the impact of a potential set-aside on the supply-demand balance in the ETS, Figure 20 shows what the ETS supply-and-demand balance would look like if 1.4bn EUAs from the Phase-3 cap were set aside (as suggested by the ENVI Committee last December).

Figures 21-22 then run through some potential scenarios for different-sized set-asides, showing the impact these would have on the residual abatement required in the ETS (i.e. showing the total net position of the ETS out to 2020 after accounting for the use of CERs/ERUs).

In the final analysis, one can play around with any number of scenarios, but in terms of the impact on our modeling it follows from our revised base-case scenario outlined in Section 2 above that a set-aside of 1,264m EUAs would be required simply in order to eradicate our projected surplus out to 2020.

As a result, on our numbers, and as shown in Figure 22, a set-aside of 1.8bn or more would be needed to reinstate the kind of scarcity originally foreseen in the EU-ETS and thereby make up for the impact of the economic crisis.

(For those interested, Annex A sets out a range of set-aside permutations, in some cases combining these with other measures).

However, and as we explain in greater detail in Section 4 below, this does not necessarily mean that a set-aside would have to be in the range of 1,800m in order to force prices up towards fuel-switching levels within a reasonable near-term timeframe.

This is because the key to pricing in the ETS is the extent to which the power sector's obligation to buy is matched by the willingness of the other industrial sectors to sell (despite the overall EUA surplus we are projecting for the ETS out to 2020, our model shows that the power sector will still have a material net short position over 2008-20, while the other industrial sectors will have a very large surplus).

In our view, therefore, the key to re-creating meaningful price tension via a set-aside is to increase the short position of the power sector to a point where it has to buy significant amounts of EUAs over 2013-15 (owing to the large amount of CERs/ERUs the power sector can use for compliance in Phase 2, and to the forward selling of the so-called NER300 allowances by the European Investment Bank, we do not think generators have a significant EUA buying requirement over 2013-15 at the moment, despite the forward-hedging liabilities beyond 2015 that it will incur over 2013-15).

*That said, and for the reasons given in Section 4 below, in order to **guarantee** that prices rose to the fuel-switching level within a reasonably near-term timeframe it would indeed be necessary to re-engineer a deficit for the entire ETS system by 2015, rather than the power sector alone, and we simply do not think that the kind of set-aside required for this purpose would be remotely politically feasible (in this respect we would note that the industrial sector will have a surplus of 1,718m EUAs/CERs/ERUs out to 2015). This is why we focus in Section 4 below on the size of the set-aside necessary to engineer a sufficiently large deficit within the power sector over 2013-15.*

In terms of our three key criteria, we think that the Commission would support the idea so long as the support from both Parliament and the Council of Ministers were forthcoming in June, and that a way could probably be found to introduce a set-aside on a provisional basis initially, thus circumventing the need for an amendment to the Directive.

However, because a set-aside would, by definition, be a one-off measure it would not address the structural issue of fixed supply in the face of variable demand. As a result, while it would re-base the cap it would still leave the scheme vulnerable to any further demand shocks to the downside that might happen in future.

Conclusion: A set-aside is necessary but not sufficient

Whether the idea of a set-aside will be approved by the Council of Ministers, or, as mentioned in Section 2 above, whether certain Member States will prevent this from even being considered within the framework of the EED, remains to be seen, but what is clear to us is that a set-aside would not address the fundamental structural problem inherent in the ETS.

That being said, and since it is the only option that can realistically have an impact on the market in the near term given the time it would take to reform the ETS, we now turn to a brief analysis of the potential pricing impact of a set-aside.

#4 The potential pricing impact of a set-aside

In any market, the clearing price is ultimately a reflection of buyers' willingness and/or need and/or obligation to buy on the one hand, and sellers' willingness and/or need and/or obligation to sell on the other.

In this respect, an interesting feature of the EU-ETS is that there is an asymmetry between the power sector on the one hand, and the other industrial sectors covered by the scheme on the other. This is because from the very beginning of the ETS the cap has always been set in such a way as to place the burden for reducing emissions exclusively – or at least overwhelmingly – on the power sector, as all governments have been keen to protect the international competitiveness of their industrial sectors.

To give an indication of what this means in practice, let us start first of all by comparing the various ETS sectors' emissions versus their EUA allocations (at this stage we are not taking into account the allowed use of CERs/ERUs, or the impact of the aviation sector on the net ETS balance).

As shown in Figure 23 below (all of the numbers we give in the following paragraphs are in Figure 23), we estimate that in 2011 the power sector had an EUA deficit relative to emissions of -20m (this is the net position after adding back the EUAs auctioned in some Member States and assuming that all of these were bought by the power sector), whereas the other industrial sectors had an EUA surplus relative to emissions of +200m.

Over Phase 2 as a whole, we estimate that the power sector's EUA shortfall against emissions will be -318m (again assuming the power sector purchases all of the EUAs auctioned), while the EUA surplus relative to emissions of all the other industrial sectors combined will be +889m.

And we think this pattern will hold true in aggregate over Phase 3 too, as we forecast that the power sector will have a net EUA deficit of -2,272m relative to emissions over 2013-20, and the other industrial sectors an EUA surplus relative to emissions of +1,134m.

What all of this means is that within the ETS there are two distinct groups of players:

- i) buyers who have an *obligation* to buy a given amount in any given year to meet their compliance requirements (i.e. companies in the power sector);

- ii) potential sellers who do not have an obligation to sell but will likely be willing to sell at a given price, or may need to sell at times depending on their individual cash-flow position (companies in the other sectors).

However, if we then take account of the use we expect ETS installations to make of their Phase-2 quotas of CERs/ERUs, we project that generators will actually end Phase-2 with a net surplus of EUAs/CERs/ERUs relative to emissions of +243m, and the other industrial sectors a much bigger Phase-2 surplus of EUAs/CERs/ERUs of +1,138m. This means that it is only when we take into account the impact of Phase 3 that the power sector ends up with a net-deficit position after its allowed use of CERs/ERUs (as can be seen in Figure 23, the net position of the power sector over Phase 3 after taking into account the allowed use of CERs/ERUs is -1,679m).

Overall, then, we project that over the entire period 2008-20 covered by Phases 2 and 3, the power sector will have a net deficit of EUAs/CERs/ERUs relative to emissions of -1,436m, and all the other industrial sectors combined a net surplus of EUAs/CERs/ERUs relative to emissions of +2,534m.

In short, over Phases 2 and 3 combined, and even after taking into account the allowed use of CERs/ERUs, our basic proposition holds: there is a group of buyers with an *obligation* to buy, and a group of *potential* sellers who may sell at their discretion but without any obligation.

If we then add in the aviation sector, which joined the scheme in 2012, we can see that like the power sector it too has a projected net deficit of EUAs relative to emissions in our model, in this case of -385m over the period 2012-20 (as with the power sector, this is after taking account of the allowances made available for auction).

Adding the net positions of these three sectors together gives us our projected accumulated EUA surplus by 2020 of +1,264m.

The question is, what does all this mean in terms of how big a set-aside would have to be in order to re-create meaningful price tension in the ETS?

In our view the best way to think about this question is to look at the net position of the power sector over 2013-15 and ask how many EUAs would have to be withheld in order to create a big enough shortage by the end of 2015. This is because 2013-15 is the forward-hedging timeframe for generators over the next 12 months and hence the timeframe within which a set-aside would have to make a meaningful impact to the generators' net balance in order for them to bid up prices towards their cost of internal abatement (i.e. the fuel-switching price between coal and gas).

Figure 23: 2008-2020 assumed sectoral position (Mt, mEUAs)

	COMBUSTION/POWER SECTOR					AVIATION		INDUSTRY				Sold/ auctioned NER surplus	Early Auctions	EUAs monetized from NER300	Implied net positio n	Cumulate d net position
	Combustion/ power sector free allocation ¹	Combustion/ power sector emissions ²	Combustion/ power sector EUA net position before average auctioned EUAs ³	Combustion/ power sector EUA net position after average auctioned EUAs ⁴	Final combustion/ power sector net position after CERs/ERUs use ⁵	Assumed demand for EUAs from aviation	Final aviation net position after CERs/ERUs use	Accounting for new sectors and gases from 2013								
								Other sectors free allocation ³	Other sectors emissions ²	Other sectors EUA net position	Final other sectors net position after CERs/ERUs use					
2008	1,257	1,511	-254	-185	-128	n.a.		700	609	92	117				-11	-11
2009	1,268	1,381	-113	-45	12	n.a.		706	498	208	233				245	234
2010	1,281	1,413	-132	-63	31	n.a.		707	525	181	224				255	489
2011	1,289	1,378	-89	-20	156	n.a.		712	512	200	278			12	446	935
2012	1,297	1,370	-73	-5	172	-19	-9	718	510	208	286	65	60	188	762	1,697
2013	175	1,411	-1,237	-216	-142	-30	-21	788	626	161	194	65	60	100	257	1,954
2014	150	1,426	-1,276	-255	-181	-37	-28	774	616	159	192				-17	1,937
2015	125	1,436	-1,311	-230	-156	-44	-35	761	602	159	192				1	1,938
2016	100	1,446	-1,346	-265	-191	-52	-42	748	600	147	180				-53	1,884
2017	75	1,439	-1,364	-283	-209	-60	-50	734	590	145	178				-82	1,802
2018	50	1,444	-1,394	-313	-239	-68	-58	721	588	133	166				-132	1,671
2019	25	1,451	-1,426	-345	-270	-76	-66	708	587	121	154				-183	1,488
2020	0	1,446	-1,446	-365	-291	-84	-75	695	586	109	142				-224	1,264
Phase-2	6,393	7,054	-661	-318	243	-19	-9	3,543	2,654	889	1,138				1,697	
av.Phase-2	1,279	1,411	-132	-64	49	-4	-2	709	531	178	228				339	
Phase-3	698	11,500	-10,802	-2,272	-1,679	-450	-376	5,929	4,795	1,134	1,397				-433	
av.Phase-3	87	1,437	-1,350	-284	-210	-56	-47	741	599	142	175				-54	
TOTAL	7,091	18,554	-11,462	-2,590	-1,436	-469	-385	9,471	7,448	2,023	2,534				1,264	
av.Total	545	1,427	-882	-199	-110	-36	-30	729	573	156	195				97	

Source: Deutsche Bank. ¹Assuming the proposed exemption for 698Mt free allocation for electricity generators in eastern Member States submitted to the Commission is the final number; ²Assuming that emissions in the combustion/power sector and in other industrial sectors each change in line with our total yearly estimated emissions; ³Accounts for a reduction of the year-on-year 2013-2020 EUAs (either to be auctioned or allocated freely) of 300m EUAs as they are to be monetized from the NER300 over 2011-2013 and, also accounts for the early auctions; ⁴68.5m EUAs auctioned on average per year in Phase-2 and assuming 1,081m EUAs auctioned on average per year over Phase-3; ⁵As per the year-by-year use of the CERs/ERUs quota detailed in our note Scoping the Phase-3 scope (for Phase 2 this breaks down as 810m used in total, of which 560m by the power sector and 250m by other sectors).

(We could also look at the net position of the aviation sector and pose the same question, but because we do not have a track record by which to judge airlines' buying behavior as we do for power generators, we prefer here to keep the analysis simple and focus purely on the power sector as the largest natural buyer of allowances.)

With this in mind, and looking at Figure 23 again, we estimate the power sector will finish Phase 2 with a net surplus of EUAs/CERs/ERUs of +243m after meeting all of its Phase-2 compliance obligations, but that from 2013 onwards the power sector will have a net deficit every year even after allowing for the use of CERs/ERUs.

However, we then need to make two sets of adjustments to the annual balances of the generators beyond 2012 shown in Figure 23, one on the supply side, and one on the demand side.

First, as far as the supply side is concerned, we need to take account of the three factors that will boost the supply of EUAs available at the end of Phase 2 and the beginning of Phase 3 that are not shown in the generators' annual balances but that we assume will be bought by power generators, namely: (i) the selling back to the market of EUAs left over in the Phase-2 NERs (we assume a total of 130m will be available to sell back at the end of Phase 2); (ii) the monetization of 300m EUAs from the Phase-3 NER (the so-called NER300); and (iii) the "early auctioning" of 120m Phase-3 EUAs to help generators cover their forward power-hedging requirements.

This means that on our numbers the power sector will be carrying over from Phase 2 a surplus of +243m EUAs/CERs/ERUs, and will then **also have at their disposal**: (i) the EUAs bought from the sale of Phase-2 NER surpluses (we assume 65m in 2012 and 65m in 2013); (ii) the EUAs bought under the NER300 (we assume 200m by the end of 2012 and a further 100m in 2013); and (iii) the EUAs bought under the early-auctioning procedure (we assume 60m in 2012 and 60m in 2013).

Second, as far as the demand side is concerned, we need to bear in mind that power generators typically hedge their electricity sales on a forward basis, with the German utilities in particular selling a significant portion of their power two and three years ahead of time. This means that over 2013-15 generators will be selling increasing volumes of power for delivery into the period beyond 2015, and that they will need to hedge the carbon liability attached to these forward power sales in real time as and when the power sales themselves are executed (i.e. over 2013-15). In other words, the forward selling by generators beyond 2015 adds to the demand for EUAs before and up to the end of 2015.

Adjusting first for the three elements that will add to the supply of EUAs available to generators over 2012-13 (i.e. before taking into account the impact of forward power sales beyond 2015), Figure 24 shows that this would leave the power sector with a cumulative net surplus of +314m by the end of 2015.

Figure 24: Cumulative net surplus/deficit of power sector out to 2015 with supply adjustments but before forward power sales (m EUAs/CERs/ERUs)

	Net position	Assumed other EUA purchases	Net position after other EUA purchases	Cumulative net position
Phase-2 carry-over	+243	+325*	+568	+568
2013	-142	+225**	+83	+651
2014	-181	0	-181	+470
2015	-156	0	-156	+314

Source: Deutsche Bank; *Assumes 65m from surplus EUAs in Phase-2 NERs, 200m from NER300, and 60m from early auctioning of Phase-3 EUAs; **Assumes 65m from surplus EUAs in Phase-2 NERs, 100m from NER300, and 60m from early auctioning of Phase-3 EUAs

Adjusting next for the forward sales of generators, Figure 25 then shows the impact that we would expect generators' demand for EUAs to hedge power sales beyond 2015 to have on the sector's cumulative net balance over 2013-15.

We assume total demand for EUAs over 2013-15 attached to the hedging of forward power sales beyond 2015 of 525m, breaking down as 75m in 2013, 175m in 2014, and 275m in 2015 (the actual number on out-turn could be higher or lower than this, but we think this is a very fair working assumption).

Figure 25: Cumulative net surplus/deficit of power sector out to 2015 with supply adjustments and after forward power sales beyond 2015 (m EUAs/CERs/ERUs)

	Net position after other EUA purchases*	EUA hedging need beyond 2015	Final adjusted net position	Cumulative net position
Phase-2 carry over	+568	0	+568	+568
2013	+83	-75	+8	+576
2014	-181	-175	-356	+220
2015	-156	-275	-431	-211

Source: Deutsche Bank; *After accounting for other EUA purchases over 2012-13 (i.e. from Phase-2 NER surpluses, the NER300, and the early auctioning of Phase-3 EUAs).

As can be seen, this means that after making all of our adjustments on the supply and the demand sides, we would expect generators to have a cumulative net deficit of -211m by the end of 2015.

However, whether a net deficit of this relatively small size would be enough to create meaningful price tension is very doubtful in our view, as we think such a shortfall could very easily be covered by purchases in the secondary market from industrials willing to liquidate a small part of their enormous surplus at prices well below the fuel-switching price.

In this respect, we would emphasize that a net balance of -211m would represent only 12% of the industrial sector's cumulative net surplus of +1,716m out to 2015.

As a result, the question is how a set-aside could be engineered to bring the cumulative net position of the power sector into a much more material negative net balance by the end of 2015 such that the scale of secondary-market purchases required would be much more likely to push EUA prices up towards the fuel-switching level.

There are two ways of looking at this.

First, on the assumption that a set-aside were designed in such a way that the allowances withheld were removed equally from each year's allotted pool of auctionable EUAs over Phase 3, we think that a set-aside in the order of 1,200m might well create a sufficiently large cumulative negative balance by 2015 to move prices up towards the fuel-switching level.

Figure 26 shows how such a set-aside would change the net position of the power sector versus the BAU position shown in Figure 25 above. With 150m EUAs set aside each year over 2013-15 (i.e. 450m over the period), the power sector would have a cumulative net deficit by 2015 of -661m, instead of -211m under our BAU scenario.

Figure 26: Cumulative net surplus/deficit of power sector out to 2015 after impact of set-aside (m EUAs/CERs/ERUs)

	Final adjusted net position*	EUAs withheld in set-aside**	Final net position after set-aside	Cumulative net position after set-aside
Phase-2 carry-over	+568	0	+568	+568
2013	+8	-150	-142	+426
2014	-356	-150	-506	-80
2015	-431	-150	-581	-661

Source: Deutsche Bank; * After accounting for other EUA purchases over 2012-13 (i.e. from Phase-2 NER surpluses, the NER300, and the early auctioning of Phase-3 EUAs), and for hedging requirements attached to forward power sales beyond 2015; ** Assumes a set-aside of 1,200m spread evenly over 2013-20, or a set-aside of 600m concentrated over 2013-16.

A cumulative net negative balance of -661m would represent a much larger proportion of the industrials' +1,716m surplus by 2015 – nearly 40% – and would

therefore greatly increase the chances of EUAs rising towards the fuel-switching price. This is because we think it unlikely – although certainly not impossible – that industrials would sell such a large proportion of their surplus before prices were to rise to the cost of internal abatement for generators.

Alternatively, a set-aside could be envisaged whereby the EUAs withheld were removed only from the pool of allowances to be auctioned over 2013-16, and in this case a set-aside of 600m would have exactly the same impact over 2013-15.

In short, on balance we think that a set-aside in the range of 600m-1,200m EUAs might well be enough to move prices up towards the fuel-switching level, depending on whether the allowances withheld were removed equally over the whole 2013-20 period or concentrated only over 2013-16.

The question is, what is the likely range for the fuel-switching price over the next 12-18 months?

The potential pricing impact of a set-aside

Figure 27 sets out our estimate of the 2013 fuel-switching price between coal-fired generation with a thermal efficiency of 35%, and gas-fired generation with a thermal efficiency of 50%.

We take our average 2013 commodity-price forecasts of \$120/t for coal (plus \$10/t for delivery to the power plant), and €25.4/MWh for gas. We assume a €/€ exchange rate of 1=1.3 to calculate the cost of coal to generators. As can be seen, these numbers would imply a fuel-switching price of €17.5/t.

Figure 27: DB economics of SRMC* of fuel switching

	SRMC* of coal-fired generation at 35% efficiency	SRMC* of gas-fired generation at 50% efficiency
Without CO2 included (€/MWh)	41.4	50.9
CO2 price	17.5	17.5
CO2 intensity of fuel (t/MWh)	0.95	0.4
CO2 price to each fuel (€/MWh)	16.6	6.9
With CO2 included (€/MWh)	58.0	57.8

Source: Deutsche Bank; *Short-run marginal cost.

In short, we think it plausible that a set-aside of 1,200m EUAs spread over 2013-20, or a set-aside of 600m EUAs spread over 2013-16, could engineer a sufficiently large deficit for generators within their forward-hedging timeframe out to 2015 that this could push EUA prices into a range of €15-20/t over the course of 2013.

However, we would emphasize that there could be no guarantee of such an outcome, as if industrial companies sold in sufficiently large volumes at prices below the fuel-switching level – and with their collective long position this would certainly be a possibility – it would not require prices to reach the fuel-switching level in order for generators to cover their shortfall.

Indeed, we would argue that this is a further argument in favour of promising structural reform of the ETS to make the cap more flexible in future.

This is because industrials would, in our view, be much less willing to sell significant volumes of EUAs in the short run if they thought that structural reform were in the offing and hence that the cap might be more responsive to demand in future.

Conclusion: Reform would reinforce set-aside impact

We think it plausible that a set-aside of 1,200m spread equally over 2013-20 or one of 600m concentrated over 2013-16 could engineer an EUA shortfall amongst generators sufficiently great to push EUA prices up to the fuel-switching level over the course of 2013.

However, we would make two qualifications.

First, in the absence of structural reform of the ETS, a bigger set-aside of up to 1.8bn would be required to *guarantee* a deficit by 2015 large enough to push prices up to fuel-switching levels in 2013.

This is because it is always possible that industrials would sell enough of their surplus to cover the generators' shortfall without the need for fuel switching.

Second, and conversely, if a set-aside were implemented at the same time as a commitment to structural reform to make the cap more flexible in future, then we think a set-aside of 1,200m spread equally over 2013-20 or one of 600m concentrated over 2013-16 would almost certainly be enough to raise prices to €15-20/t over 2013.

This is because we think industrials would be much less likely to sell large volumes if there were the prospect of a more demand-responsive cap in future, as this would increase the future value of their current surplus.

#5 Conclusion: EU policy-makers face a double challenge

In our view, the challenge facing EU policy-makers today goes beyond the urgent need to re-establish a meaningful degree of scarcity in the ETS as quickly as possible (vital though that objective certainly is); at the same time the challenge is to send a signal that they have understood that the ETS as currently configured has proved itself structurally flawed, and needs at some point in the future to be radically overhauled.

As a result, we think the best outcome for the carbon market over the next few months would comprise two elements.

The first element would be for the Parliament and Council both to back the idea of a set-aside in June, and for the Commission then to publish a proposal before the end of the year to withhold a significant amount of EUAs from the pool of allowances to be auctioned over 2013-20 – 1,200m spread evenly over 2013-20, or 600m concentrated over 2013-16 – in a way that could be done under the Comitology process.

The second element would be for the Commission to use the opportunity of a report later in the year to start a debate over future structural reform of the ETS relating to the need for supply-side flexibility.

This would allow time for a wide-ranging debate in which the parties that actually matter most in this discussion – i.e. the industrial investors that the policymakers expect to make the low-carbon investments for the future – can make their voices heard about the institutional arrangements necessary for delivering future pricing predictability.

At the moment, the prospect for a set-aside is in the balance, while there is currently no discussion at all about the need for structural reform of the ETS with a view to introducing a mechanism to make the cap more flexible.

We think this betrays a lack of urgency given the extent to which the ETS is currently failing to deliver on the question of incentivizing the investment necessary to move the EU towards a low-carbon future.

In our view, without the promise of such a mechanism in the future, the risk is that even if a material set-aside can be agreed in the near term, power companies will still not feel sufficiently confident in the *long-term* pricing outlook for EUAs to make the enormous capital outlays required for the transition to a low-carbon future.

As such, without the promise of structural reform of the ETS we think the most likely default outcome will be an EU-wide dash for gas over the second half of this decade, with implications for (i) the EU's long-term emissions trajectory, (ii) its security of supply, and (iii) the efficiency of the single EU market.

In other words, without structural reform there will likely be an over-reliance on gas for new capacity, and a need for costly complementary measures in any Member State wanting to incentivize low-carbon generation (indeed, the UK's Carbon Price Support Rate is already an example of this).

Accordingly, we think that the issue of structural reform of the ETS needs to be raised urgently at the EU policy-making level.

Annex A

Figure 28 summarizes on a comparable basis the impact different set-asides or changes in the annual linear-reduction factor would have on the overall supply-demand balance in the EU-ETS.

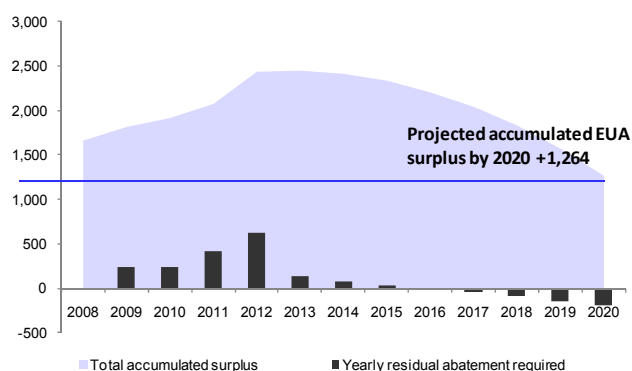
Figures 29 to 38 then show each of the 10 scenarios set out in Figure 28 in diagrammatic form.

Figure 28: Impact of setting aside EUAs and changing the annual linear factor on the ETS residual abatement required by 2020 (Mt)*

Scenario	Annual linear reduction factor from 2013/2014	Set-aside	Decrease to the cap**	2020 cap	Gap to EUA cap***	Residual abatement required ****
20% base-case scenario: -1.74% annual linear factor without any set-aside	-1.74%	0	0	2,024	-480	1,264
1,400m EUAs set-aside, decreasing the Phase-3 cap by an additional eighth each year	-1.74%	1,400	-1,401	1,713	-1,881	-136
Change to the annual linear reduction factor from 2013 so as to decrease the Phase-3 cap by 1,400m EUAs	-2.97%	0	-1,400	1,754	-1,880	-136
Change to the annual linear reduction factor from 2014 so as to decrease the Phase-3 cap by 1,400m EUAs	-4.02%	0	-1,400	1,673	-1,880	-135
-2.25% linear reduction factor from 2014 AND set-aside of 1,400m EUAs	-2.25%	1,400	-1,710	1,634	-2,190	-445
-2.25% annual linear reduction factor from 2014	-2.25%	0	-310	1,945	-790	955
Annual linear reduction factor necessary from 2013 to have 0 surplus by 2020	-2.91%	0	-1,264	1,780	-1,744	0
Annual linear reduction factor necessary from 2014 to have 0 surplus by 2020	-3.80%	0	-1,264	1,707	-1,744	0
Change to the annual linear reduction factor from 2013 in line with going to a 2020 EU-wide 30% emission-reduction target	-3.09%	0	-1,910	1,680	-2,389	-645
Change to the annual linear reduction factor from 2014 in line with going to a 2020 EU-wide 30% emission-reduction target	-3.77%	0	-1,514	1,680	-1,993	-249

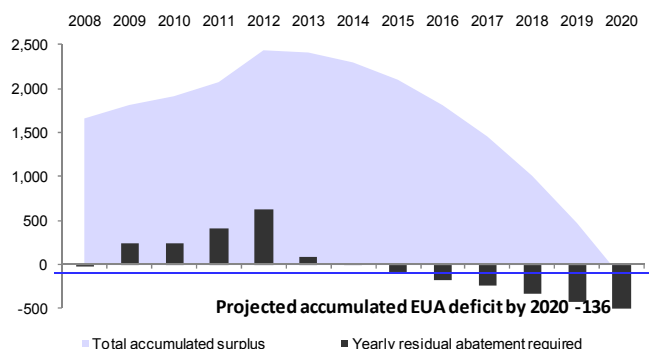
Source: Deutsche Bank; * Phase-3 scope for EU-27, Liechtenstein & Norway, accounting for aircraft operators demand, **Decrease to the cap compared with the base-case under a comparable scope, *** Net EUA position (i.e. before accounting for the demand of aircraft operators and the use of CERs/ERUs), **** Total net position (i.e. accounting for the demand of aircraft operators and the use of CERs/ERUs).

Figure 29: DB base-case projected accumulated surplus out to 2020 (mEUAs/Mt)



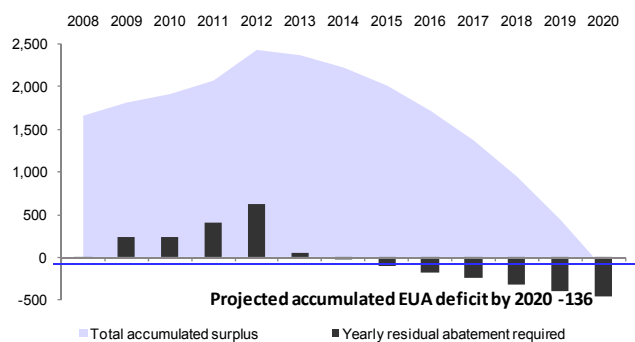
Source: Deutsche Bank.

Figure 30: DB estimate of accumulated deficit out to 2020 with a set-aside of 1.4bn (mEUAs/Mt)



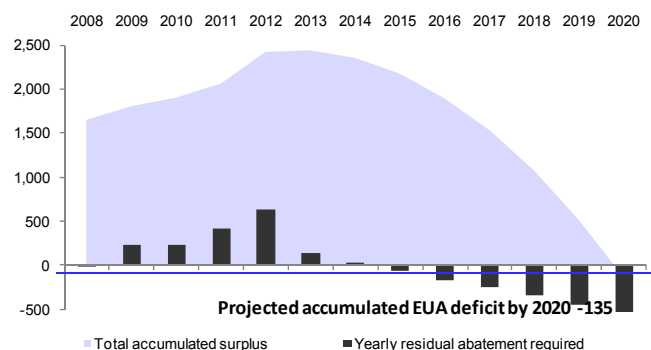
Source: Deutsche Bank.

Figure 31: DB estimate of accumulated deficit out to 2020 with an annual linear reduction factor from 2013 to decrease the Ph3 cap by 1.4Bn EUAs (mEUAs/Mt)



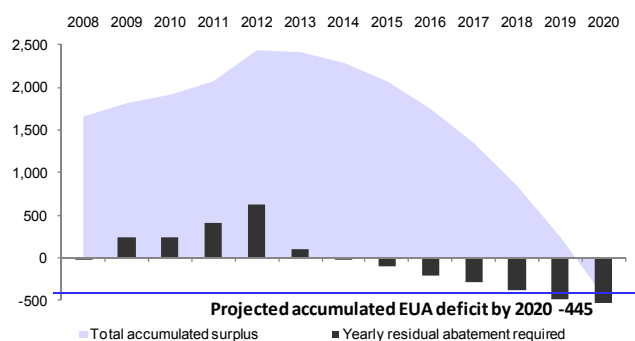
Source: Deutsche Bank.

Figure 32: DB estimate of accumulated deficit out to 2020 with an annual linear reduction factor from 2014 to decrease the Phase-3 cap by 1.4bn EUAs (mEUAs/Mt)



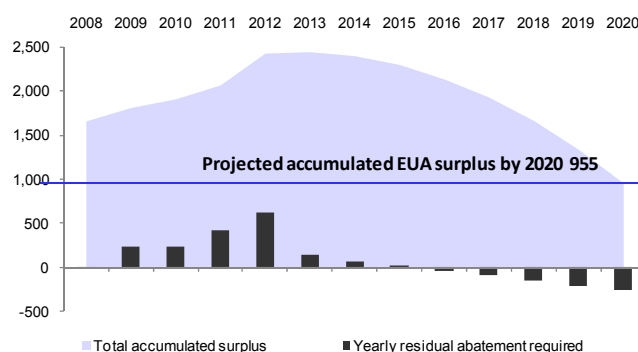
Source: Deutsche Bank.

Figure 33: DB estimate of accumulated deficit out to 2020 with an annual linear reduction factor of -2.25% and a 1.4bn set-aside (mEUAs/Mt)



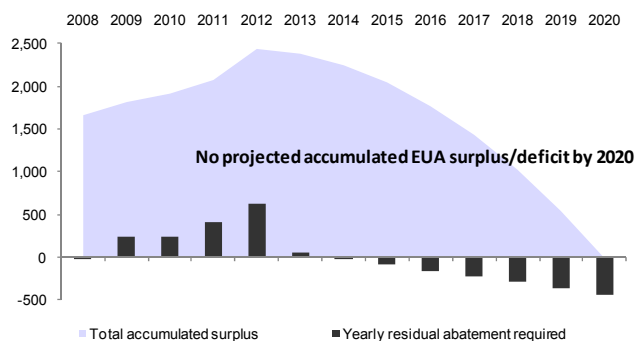
Source: Deutsche Bank.

Figure 34: DB estimate of accumulated deficit out to 2020 with an annual linear reduction factor of -2.25% from 2014 (mEUAs/Mt)



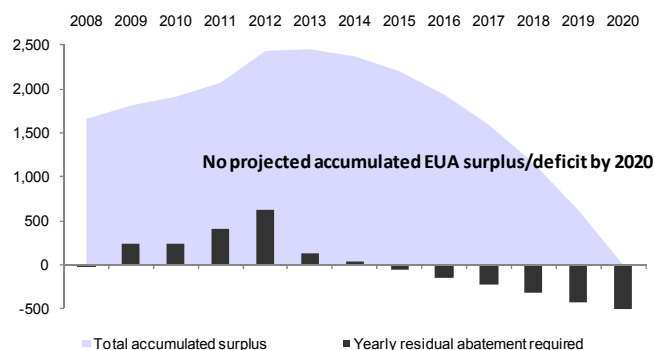
Source: Deutsche Bank.

Figure 35: DB estimate of accumulated deficit out to 2020 with an annual linear reduction factor necessary from 2013 to eradicate the surplus by 2020 (mEUAs/Mt)



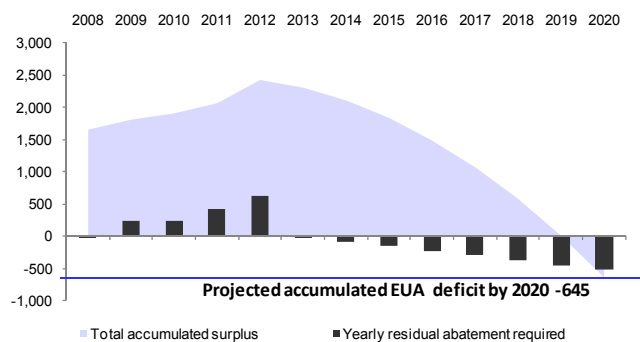
Source: Deutsche Bank.

Figure 36: DB estimate of accumulated deficit out to 2020 with an annual linear reduction factor necessary from 2014 to eradicate the surplus by 2020 (mEUAs/Mt)



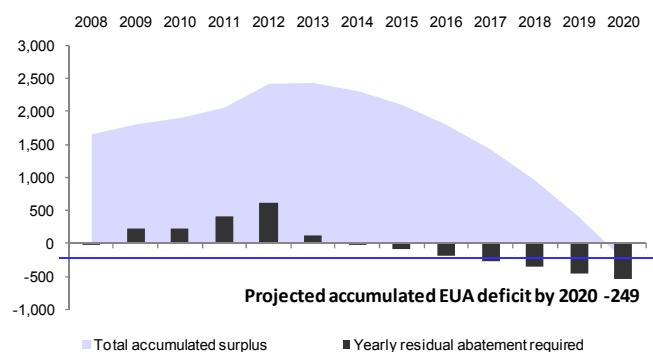
Source: Deutsche Bank.

Figure 37: DB estimate of accumulated deficit out to 2020 with an annual linear reduction factor from 2013 in line with an EU-wide -30% 2020 target (mEUAs/Mt)



Source: Deutsche Bank.

Figure 38: DB estimate of accumulated deficit out to 2020 with an annual linear reduction factor from 2014 in line with an EU-wide -30% 2020 target (mEUAs/Mt)



Source: Deutsche Bank.

Appendix 1

Important Disclosures

Additional information available upon request

For disclosures pertaining to recommendations or estimates made on a security mentioned in this report, please see the most recently published company report or visit our global disclosure look-up page on our website at <http://gm.db.com/ger/disclosure/DisclosureDirectory.eqsr>.

Analyst Certification

The views expressed in this report accurately reflect the personal views of the undersigned lead analyst(s). In addition, the undersigned lead analyst(s) has not and will not receive any compensation for providing a specific recommendation or view in this report. Isabelle Curien/Mark C Lewis

Deutsche Bank debt rating key

CreditBuy ("C-B"): The total return of the Reference Credit Instrument (bond or CDS) is expected to outperform the credit spread of bonds / CDS of other issuers operating in similar sectors or rating categories over the next six months.

CreditHold ("C-H"): The credit spread of the Reference Credit Instrument (bond or CDS) is expected to perform in line with the credit spread of bonds / CDS of other issuers operating in similar sectors or rating categories over the next six months.

CreditSell ("C-S"): The credit spread of the Reference Credit Instrument (bond or CDS) is expected to underperform the credit spread of bonds / CDS of other issuers operating in similar sectors or rating categories over the next six months.

CreditNoRec ("C-NR"): We have not assigned a recommendation to this issuer. Any references to valuation are based on an issuer's credit rating.

Reference Credit Instrument ("RCI"): The Reference Credit Instrument for each issuer is selected by the analyst as the most appropriate valuation benchmark (whether bonds or Credit Default Swaps) and is detailed in this report. Recommendations on other credit instruments of an issuer may differ from the recommendation on the Reference Credit Instrument based on an assessment of value relative to the Reference Credit Instrument which might take into account other factors such as differing covenant language, coupon steps, liquidity and maturity. The Reference Credit Instrument is subject to change, at the discretion of the analyst.

Regulatory Disclosures

1. Country-Specific Disclosures

Australia and New Zealand: This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act and New Zealand Financial Advisors Act respectively.

Brazil: The views expressed above accurately reflect personal views of the authors about the subject company(ies) and its(their) securities, including in relation to Deutsche Bank. The compensation of the equity research analyst(s) is indirectly affected by revenues deriving from the business and financial transactions of Deutsche Bank.

EU countries: Disclosures relating to our obligations under MiFiD can be found at

<http://www.globalmarkets.db.com/riskdisclosures>.

Japan: Disclosures under the Financial Instruments and Exchange Law: Company name - Deutsche Securities Inc. Registration number - Registered as a financial instruments dealer by the Head of the Kanto Local Finance Bureau (Kinsho) No. 117. Member of associations: JSDA, Type II Financial Instruments Firms Association, The Financial Futures Association of Japan, Japan Securities Investment Advisers Association. This report is not meant to solicit the purchase of specific financial instruments or related services. We may charge commissions and fees for certain categories of investment advice, products and services. Recommended investment strategies, products and services carry the risk of losses to principal and other losses as a result of changes in market and/or economic trends, and/or fluctuations in market value. Before deciding on the purchase of financial products and/or services, customers should carefully read the relevant disclosures, prospectuses and other documentation. "Moody's", "Standard & Poor's", and "Fitch" mentioned in this report are not registered credit rating agencies in Japan unless "Japan" or "Nippon" is specifically designated in the name of the entity.

Malaysia: Deutsche Bank AG and/or its affiliate(s) may maintain positions in the securities referred to herein and may from time to time offer those securities for purchase or may have an interest to purchase such securities. Deutsche Bank may engage in transactions in a manner inconsistent with the views discussed herein.

Russia: This information, interpretation and opinions submitted herein are not in the context of, and do not constitute, any appraisal or evaluation activity requiring a license in the Russian Federation.

Risks to Fixed Income Positions

Macroeconomic fluctuations often account for most of the risks associated with exposures to instruments that promise to pay fixed or variable interest rates. For an investor that is long fixed rate instruments (thus receiving these cash flows), increases in interest rates naturally lift the discount factors applied to the expected cash flows and thus cause a loss. The longer the maturity of a certain cash flow and the higher the move in the discount factor, the higher will be the loss. Upside surprises in inflation, fiscal funding needs, and FX depreciation rates are among the most common adverse macroeconomic shocks to receivers. But counterparty exposure, issuer creditworthiness, client segmentation, regulation (including changes in assets holding limits for different types of investors), changes in tax policies, currency convertibility (which may constrain currency conversion, repatriation of profits and/or the liquidation of positions), and settlement issues related to local clearing houses are also important risk factors to be considered. The sensitivity of fixed income instruments to macroeconomic shocks may be mitigated by indexing the contracted cash flows to inflation, to FX depreciation, or to specified interest rates – these are common in emerging markets. It is important to note that the index fixings may – by construction – lag or mis-measure the actual move in the underlying variables they are intended to track. The choice of the proper fixing (or metric) is particularly important in swaps markets, where floating coupon rates (i.e., coupons indexed to a typically short-dated interest rate reference index) are exchanged for fixed coupons. It is also important to acknowledge that funding in a currency that differs from the currency in which the coupons to be received are denominated carries FX risk. Naturally, options on swaps (swaptions) also bear the risks typical to options in addition to the risks related to rates movements.

David Folkerts-Landau

Managing Director
Global Head of Research

Guy Ashton
Head
Global Research Product

Marcel Cassard
Global Head
Fixed Income Research

Stuart Parkinson
Associate Director
Company Research

Asia-Pacific

Fergus Lynch
Regional Head

Germany

Andreas Neubauer
Regional Head

Americas

Steve Pollard
Regional Head

Europe

Richard Smith
Regional Head

Principal Locations

Deutsche Bank AG London

1 Great Winchester Street
London EC2N 2EQ
Tel: (44) 20 7545 8000

Deutsche Bank AG New York

60 Wall Street
New York, NY 10005
United States of America
Tel: (1) 212 250-2500

Deutsche Bank AG Hong Kong

Filiale Hongkong
Intl. Commerce Centre
1 Austin Road West Kowloon,
Hong Kong
tel: (852) 2203 8888

Deutsche Securities Inc. Japan

2-11-1 Nagatacho
Sanno Park Tower
Chiyoda-ku, Tokyo 100-6171
Tel: (81) 3 5156 6770

Deutsche Bank AG Frankfurt

Große Gallusstraße 10-14
60272 Frankfurt am Main
Germany
Tel: (49) 69 910 00

Deutsche Bank Ltd.

Aurora business park
82 bld.2 Sadovnicheskaya street
Moscow, 115035
Russia
Tel: (7) 495 797-5000

Deutsche Bank AG Singapore

One Raffles Quay
South Tower
Singapore 048583
Tel: (65) 6423 8001

Deutsche Bank AG Australia

Deutsche Bank Place, Level 16
Corner of Hunter & Phillip Streets
Sydney NSW 2000
Tel: (61) 2 8258 1234

Deutsche Bank Dubai

Dubai International Financial Centre
The Gate, West Wing, Level 3
P.O. Box 504 902
Dubai City
Tel: (971) 4 3611 700

**Subscribers to research via email
receive their electronic
publication on average 1-2
working days earlier than the
printed version.**

**If you would like to receive this
or any other product via email
please contact your usual
Deutsche Bank representative.**

Publication Address:

Deutsche Bank AG
London
1 Great Winchester Street
London EC2N 2EQ
Tel: (44) 20 7545 8000

Internet:

<http://gmr.db.com>
Ask your usual contact for a
username and password.

Global Disclaimer

Investing in and/or trading commodities involves significant risk and may not be suitable for everyone. Participants in commodities transactions may incur risks from several factors, including changes in supply and demand of the commodity that can lead to large fluctuations in price. The use of leverage magnifies this risk. Readers must make their own investing and trading decisions using their own independent advisors as they believe necessary and based upon their specific objectives and financial situation. Past performance is not necessarily indicative of future results. Deutsche Bank may with respect to securities covered by this report, sell to or buy from customers on a principal basis, and consider this report in deciding to trade on a proprietary basis. Deutsche Bank makes no representation as to the accuracy or completeness of the information in this report. Target prices are inherently imprecise and a product of the analyst judgement. Deutsche Bank may buy or sell proprietary positions based on information contained in this report. Deutsche Bank may engage in securities transactions, on a proprietary basis or otherwise, in a manner **inconsistent** with the view taken in this research report. In addition, others within Deutsche Bank, including strategists and sales staff, may take a view that is **inconsistent** with that taken in this research report. Deutsche Bank has no obligation to update, modify or amend this report or to otherwise notify a reader thereof. This report is provided for information purposes only. It is not to be construed as an offer to buy or sell any financial instruments or to participate in any particular trading strategy.

Unless governing law provides otherwise, all transactions should be executed through the Deutsche Bank entity in the investor's home jurisdiction. In the U.S. this report is approved and/or distributed by Deutsche Bank Securities Inc., a member of the NYSE, the NASD, NFA and SIPC. In Germany this report is approved and/or communicated by Deutsche Bank AG Frankfurt authorized by the BaFin. In the United Kingdom this report is approved and/or communicated by Deutsche Bank AG London, a member of the London Stock Exchange and regulated by the Financial Services Authority for the conduct of investment business in the UK and authorized by the BaFin. This report is distributed in Hong Kong by Deutsche Bank AG, Hong Kong Branch, in Korea by Deutsche Securities Korea Co. This report is distributed in Singapore by Deutsche Bank AG, Singapore Branch, and recipients in Singapore of this report are to contact Deutsche Bank AG, Singapore Branch in respect of any matters arising from, or in connection with, this report. Where this report is issued or promulgated in Singapore to a person who is not an accredited investor, expert investor or institutional investor (as defined in the applicable Singapore laws and regulations), Deutsche Bank AG, Singapore Branch accepts legal responsibility to such person for the contents of this report. In Japan this report is approved and/or distributed by Deutsche Securities Inc. The information contained in this report does not constitute the provision of investment advice. In Australia, retail clients should obtain a copy of a Product Disclosure Statement (PDS) relating to any financial product referred to in this report and consider the PDS before making any decision about whether to acquire the product. Deutsche Bank AG Johannesburg is incorporated in the Federal Republic of Germany (Branch Register Number in South Africa: 1998/003298/10). Additional information relative to securities, other financial products or issuers discussed in this report is available upon request. This report may not be reproduced, distributed or published by any person for any purpose without Deutsche Bank's prior written consent. Please cite source when quoting.

Copyright © 2012 Deutsche Bank AG