sandbag

Getting in touch with reality

Rebasing the EU ETS Phase 4 cap

June 2016

Summary

The EU Emissions Trading System (EU ETS) has a large and growing surplus of allowances (EUAs). This has led to the system failing to provide effective signals for emissions reductions as the carbon price has remained low.

This problem looks set to get worse after 2020 as Phase 4 begins, even with the Market Stability Reserve (MSR) in place.

Emissions in 2015 were already below the cap for 2020. By the start of Phase 4 emissions will likely be about 10-20% below the cap, with additional surplus allowances generated from the start of Phase 4. This is because the Phase 4 cap is assumed to begin where the Phase 3 cap ends, even though the Phase 3 cap was effectively set in 2010 before many subsequent trends were known, including the growth of renewables and the length and depth of the economic recession.

To avoid risking the EU ETS drowning in a continually-growing surplus of allowances, the Phase 4 cap needs to start at a level that reflects actual emissions (if this is, as expected, below the currently proposed level, which would be an upper bound in any case). Rebasing the cap in this way would lead to a much more effective EU ETS, with a higher carbon price which delivers effective signals for emission reductions and investment, a greater alignment with the 2050 EU climate target, with reduced risk of rapid, and costly, decarbonisation being needed post-2030. Otherwise the EU ETS risks being reduced to little more than an accounting tool, with individual Member States increasingly needing to take their own action to ensure the necessary investment.

Rebasing to actual emissions increases robustness of the system. Aligning the cap with actual emissions tightens the cap more quickly and more effectively than changes to the Linear Reduction Factor (LRF) (that is the amount of annual emission reductions built into the EU ETS during the phase). The LRF would need to approximately double from the currently proposed value of 2.2%, to 4.2%, to have the same effect on cumulative emissions over Phase 4 as rebasing the cap, even in our high emissions case. Even then, changing the LRF reduces the level of the cap more slowly than changing the starting point of the cap. However, increasing the LRF in addition to rebasing the cap helps ensure that surpluses are eroded and do not re-emerge through Phase 4, and so this remains a useful complement to rebasing the cap.

Sandbag therefore recommends that the Phase 4 cap is realigned to match the reality of emissions in 2020, with the LRF also increased to help ensure that the EU ETS is an effective mechanism through the 2020s.

About Sandbag

Sandbag is a London and Brussels-based not-for-profit think tank conducting research and campaigning for environmentally effective climate policies.

Our research focus includes reforming the EU Emissions Trading Scheme and the Effort Sharing Decision; accelerating the phase-out of old coal in Europe; deep decarbonisation of industry through technologies including Carbon Capture Utilisation & Storage.

For more information, visit sandbag.org.uk or email us at info@sandbag.org.uk

Analysis

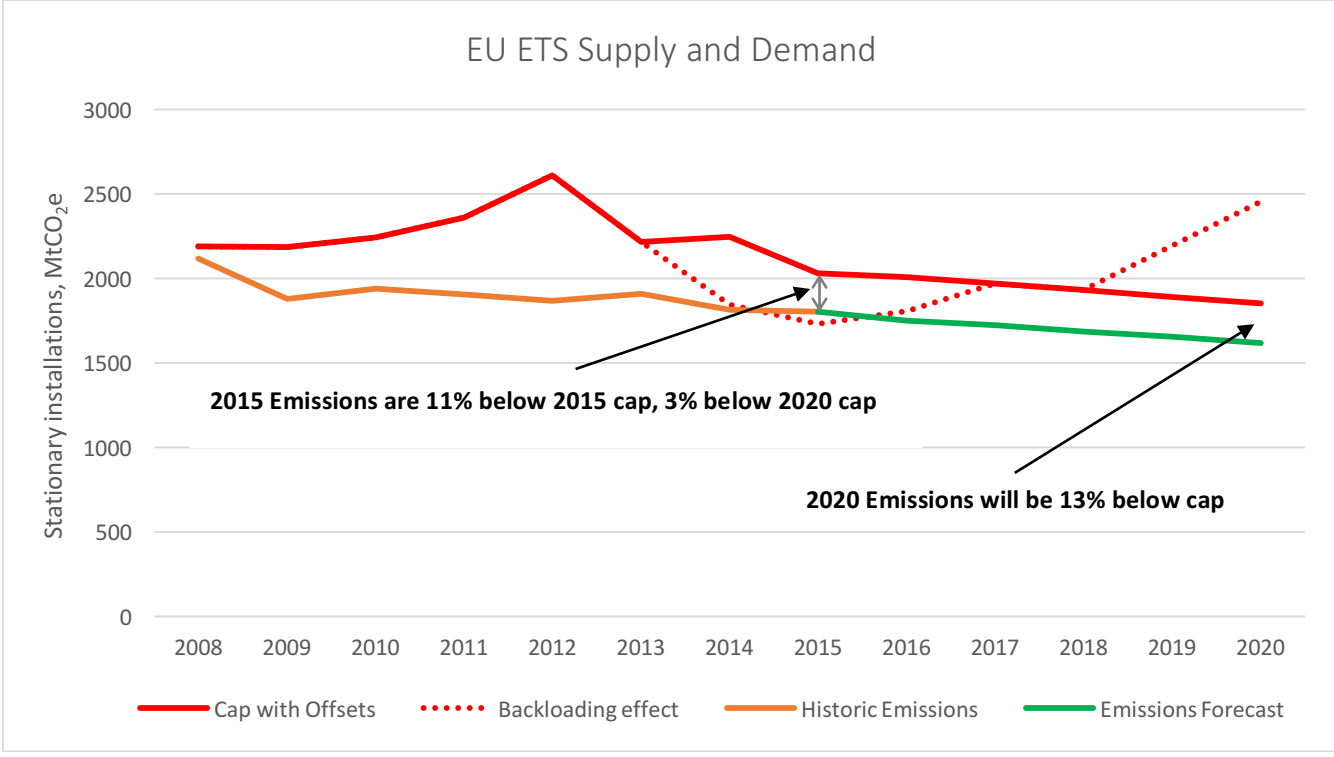
The starting point for the cap for the post-2020 period of the EU ETS (Phase 4) is out of date, since it was effectively set in 2010 together with the cap for Phase 3, as there was an assumption that the Phase 4 cap would be a continuation from where the Phase 3 cap finished. In the meantime, a structural surplus has been accumulating in

the system since at least 2009 as a consequence of reduced electricity demand, the uptake of renewables and the prolonged economic recession. The assumption that the Phase 4 cap should start where the Phase 3 cap, set ten years before, ends now looks likely to lead to surpluses continuing to grow well into Phase 4. This paper examines how realigning the start of the Phase 4 cap to the reality of emissions would make the EU ETS a more effective policy instrument.

Emissions will be well below the cap by 2020 and continue to be so…

In 2015 emissions covered by the EU ETS were already below the level of the cap for 2020[1]. Emissions are expected to continue falling through the remainder of this decade, driven mainly by increasing deployment of renewables and weak electricity demand. By 2020 emissions look likely to be 13% to 23% below the cap at the end of Phase 3.

Chart 1: Currently proposed cap against Sandbag emissions forecasts and 2020 gap to cap

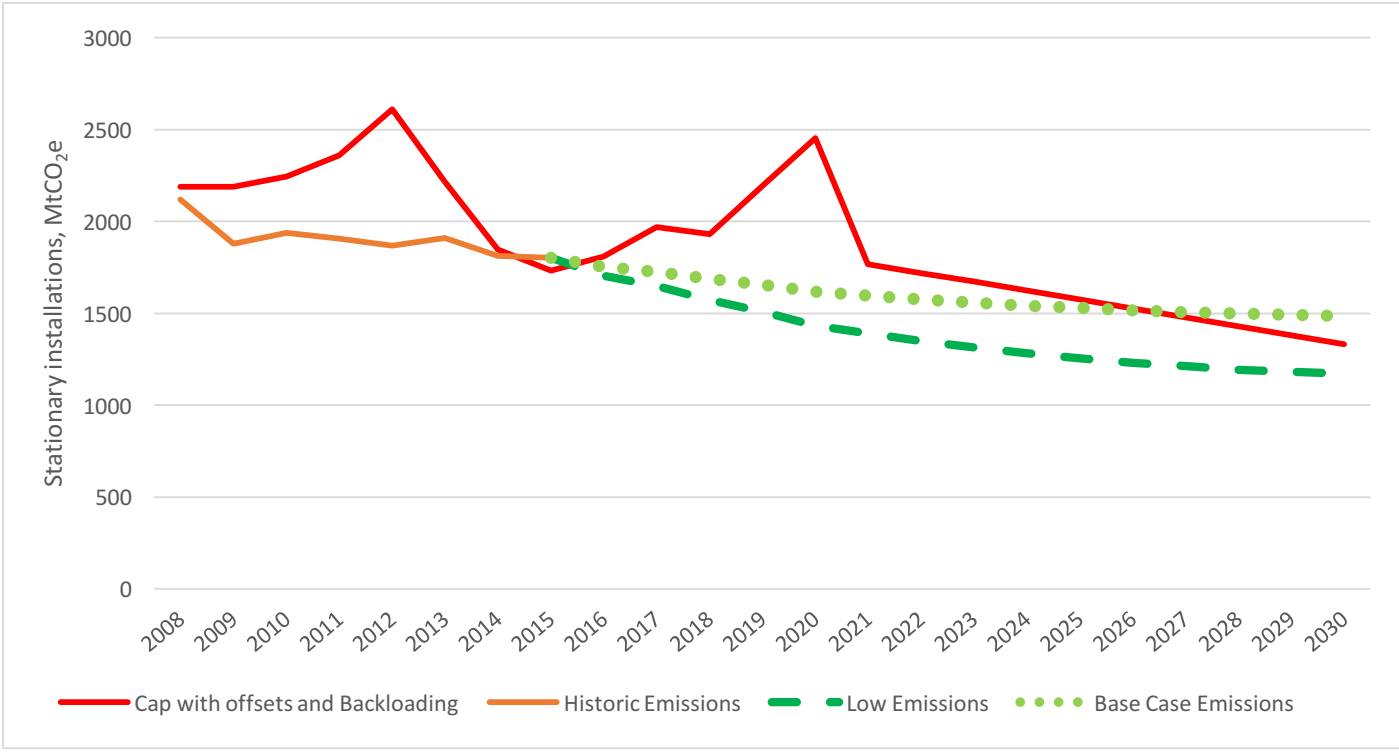


This will lead to the surplus of allowances continuing to grow through most or all of Phase 4 …

Even at the upper end of the range of Sandbag's emissions projections (which we refer to as our Base Case), only small continuing annual decreases in emissions would be necessary to keep emissions below the cap for much or all of the decade of the 2020s (see Chart 2). The total surplus of allowances – including both those immediately available to market participants and those in the MSR – will continue to grow as long as emissions are below the cap. With plenty of supply available, carbon prices will remain correspondingly low and volatile.

[1] The cap for 2020 is 1816 $MtCO_2$ excluding the effects of backloading and use of offsets. Emissions were 1802 $MtCO_2$ in 2015.

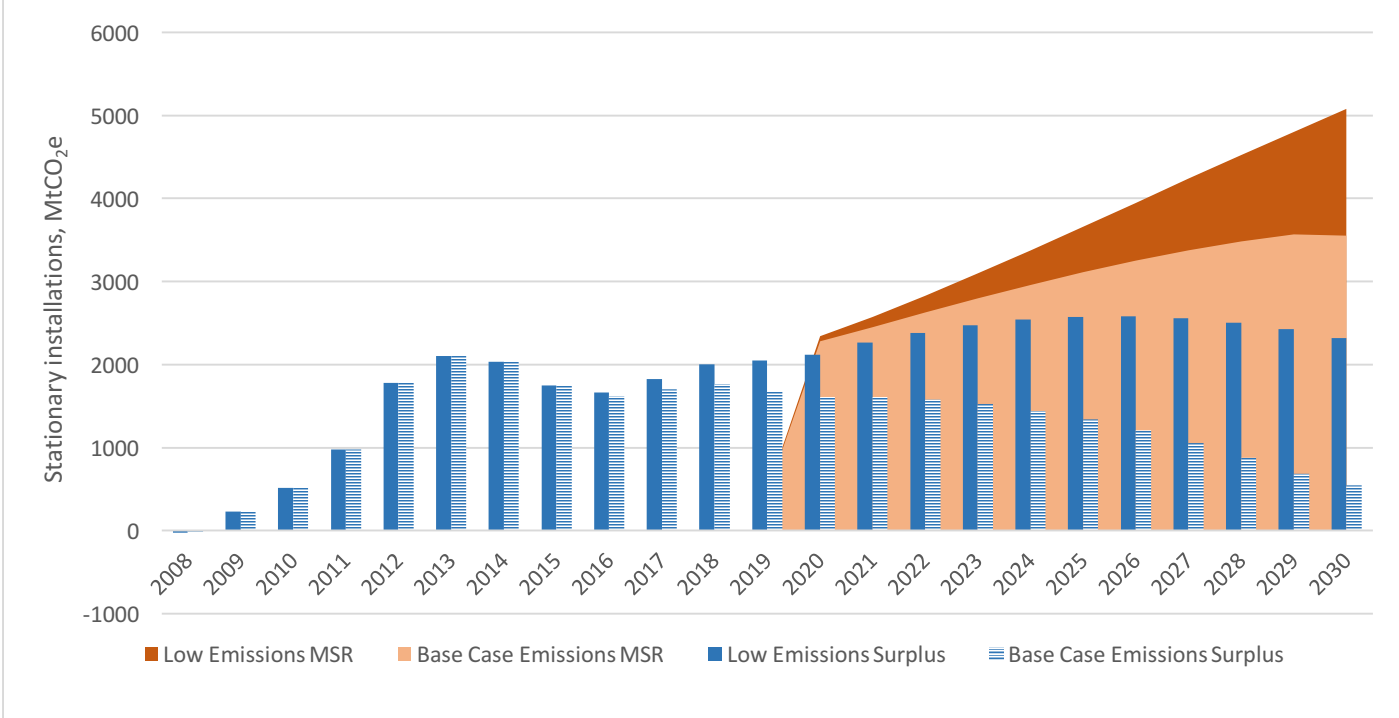
Chart 2: Emissions compared with the cap in Phase 4



Note: Aviation is included only until 2020 and the "stop-the-clock" exemption for Extra-EEA flights is assumed to last until then.

Chart 3 illustrates the surplus for both base and low case emissions scenarios (volumes available to the market and those in the MSR are shown separately). Even with emissions at the upper end of the range, the MSR would contain over 3 billion allowances. These would not begin to be released back to the market from the MSR before 2030. With emissions at the lower end of the range a huge surplus is generated and the number of allowances in the MSR rises to over 5 billion. A further 2.5 billion allowances would remain available to market participants, in part because only 12 per cent of the surplus is removed into the MSR each year, leaving a large proportion of the surplus still available to the market while large annual surpluses continue to be generated.

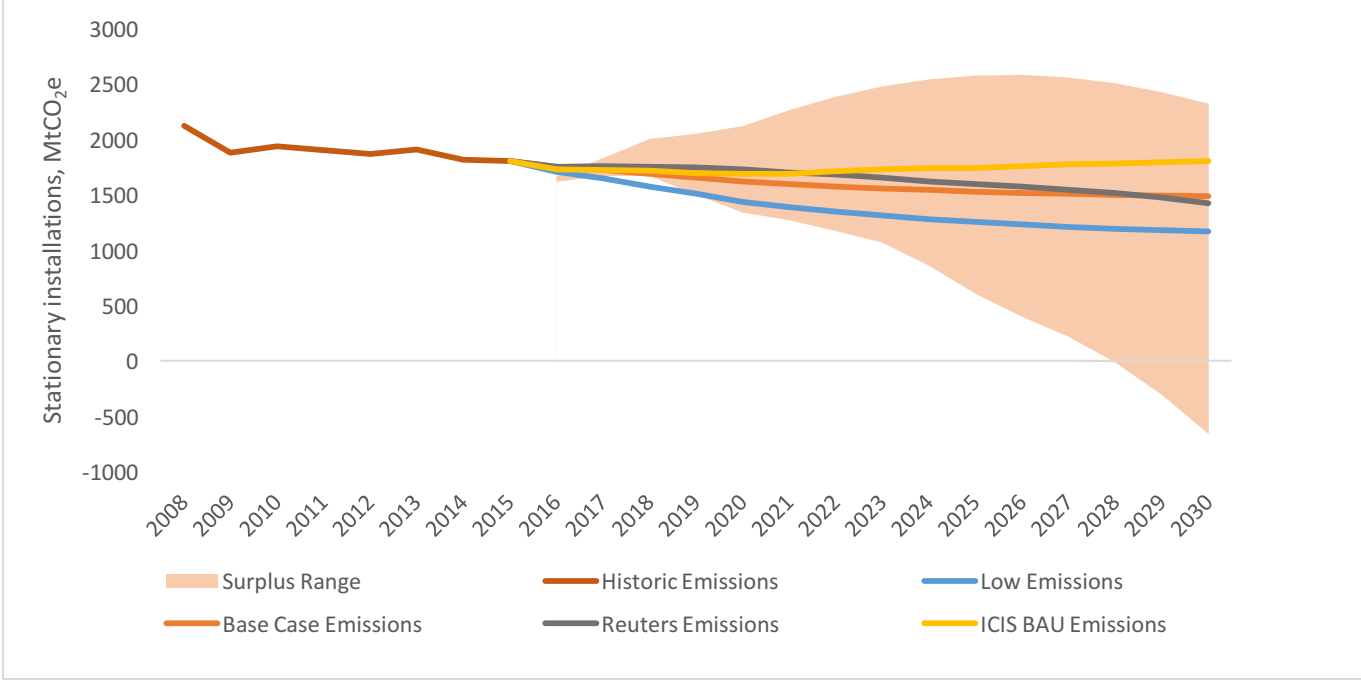
Chart 3: Cumulative surpluses under the low and base case emissions scenarios



This conclusion remains robust if actual emissions differ from projections…

We show our Base Case, the upper end of our range, and Low Emissions scenarios[2] together with emissions forecasts provided by other analysts[3] on Chart 4 to estimate a cumulative expected surplus range for the period 2016-2030. While Sandbag's forecasts differ from the others, actual future emissions can vary in unanticipated ways and the surplus range outcome is a useful test of the robustness of our arguments regarding the accumulating surplus. Even using an emissions forecast that assumes almost no reduction of emissions during the course of Phase 4, the system remains oversupplied – the surplus could disappear only towards the end of the decade while volumes in the MSR remain significantly above 2,000MtCO_2.

Chart 4: Cumulative surplus range (excluding volumes in the MSR) with different emissions forecasts (million tonnes)



This continuing surplus has the potential to further weaken and marginalise the EU ETS …

The continuing surplus, even in the presence of the MSR, will inevitably lead to chronically low and potentially volatile prices, with only weak emission reduction signals and very little incentive to invest in low carbon technologies and energy efficiency. In such circumstances there is likely to be a need for increasing action by individual Member States as they seek to stimulate the necessary investment. The EU ETS may be reduced to little more than an accounting device.

In addition, very large volumes in the MSR risk further destabilising the market due to uncertainty about how they will be treated (see accompanying note on the MSR).

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[2] Our emissions forecasts for 2016 and beyond shown by the low emissions case are unchanged. http://www.sandbag.org.uk/site_media/pdfs/reports/Briefing-2020surplusprojection.pdf Our forecasts for 2014 and 2015 were the most accurate of any analyst and we again are seeing a significant fall this year - as previously predicted - because of large falls in coal generation in the UK and Netherlands. Further, we foresee coal generation continuing to fall quickly in subsequent years not due to the EU carbon price but primarily because we expect renewables to begin to substantially displace coal instead of gas. Coal emissions were 42% of total EU ETS emissions in 2015, and coal generation is highly volatile, so understanding coal emissions is critical of forecasting EU ETS emissions. We have included a further, more moderate fall in emissions to show that many of the problems associated with a continuation of the EU ETS cap are still present even if emissions decrease over the next 5 years are less those included in the low emissions case.

[3] Thomson Reuters and ICIS Tschach Solutions

Without reforms to reduce supply, the EU ETS will be ineffective in stimulating emission reductions over the next 10 years and under many scenarios its weakness appears likely to persist throughout Phase 4. By then the EU ETS would have been in existence for 25 years and in all that time would have provided effective emissions reductions signals only for a short period near the start of Phase 2.

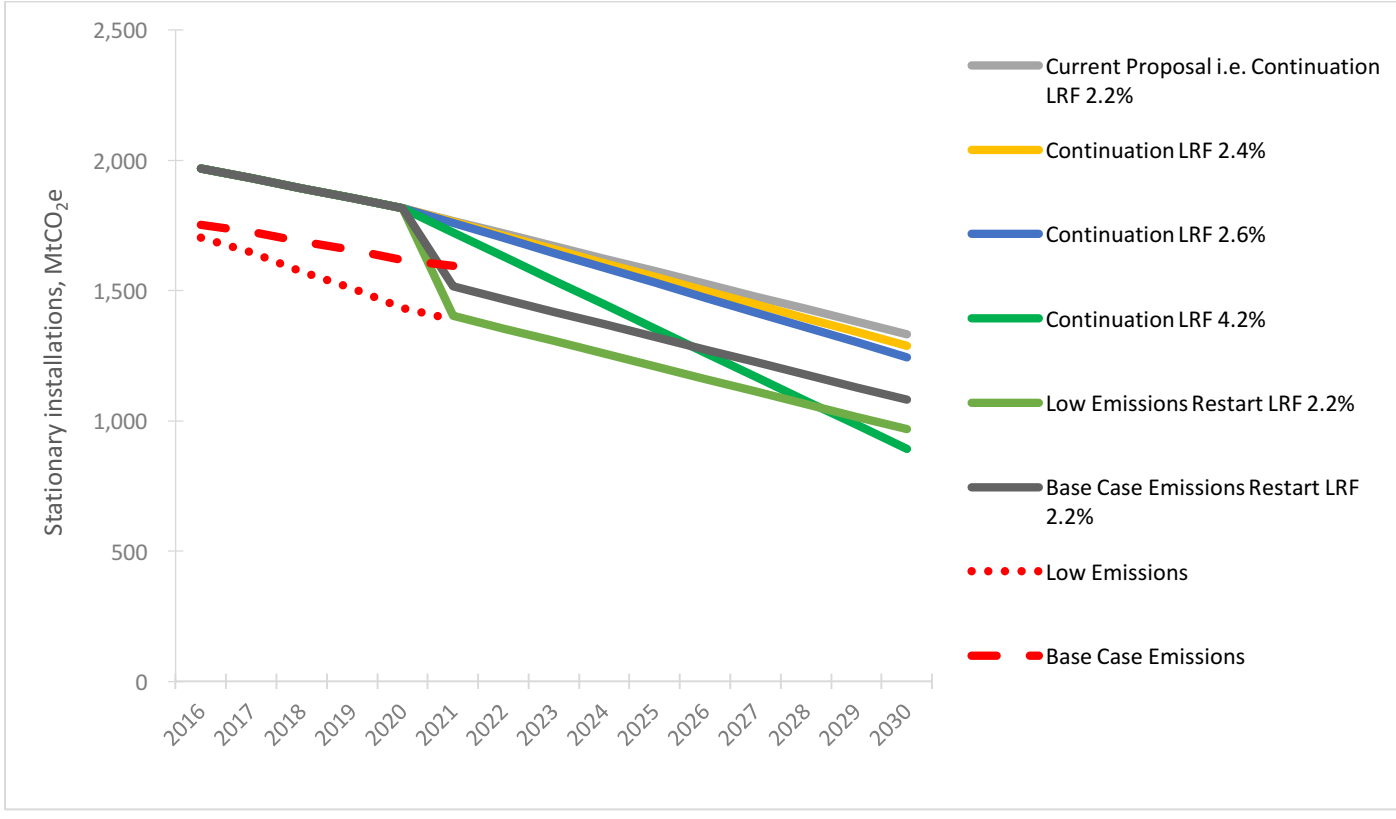
These problems can be addressed by resetting the cap in line with actual emissions …

These problems can be greatly reduced by aligning the cap at the start of Phase 4 with actual emissions, rather than the end of the Phase 3 cap, a target set 10 years previously. Chart 3 shows the effect of rebasing to reflect out-turn emissions and an unchanged linear reduction factor (LRF). It also shows the effect of changing the LRF only, and combinations of the two.

Rebasing the start of the cap while leaving the linear reduction factor unchanged from the proposed value of 2.2% acts to increase the level of ambition for 2030. A variant of this proposal, also shown on the chart, would leave the target for 2030 unchanged. The cap would still be realigned at the beginning of Phase 4, but the linear reduction factor would be adjusted to produce the same 2030 cap as is currently proposed. This would be achieved by setting a lower linear reduction factor.

This approach of rebasing is not dependent on any forecast of emissions. If the fall in emissions to 2020 is less than we expect then the cap will only be readjusted down by a smaller amount. This increases the robustness of the cap in the face of inevitable uncertainty about how much emissions will reduce in the next 5 years. In the highly unlikely event of actual emissions in 2020 being above the cap, with a drawdown of some of the current surplus, the currently proposed cap, continuing from Phase 3, would be put in place.

Chart 5: Options for rebasing the cap

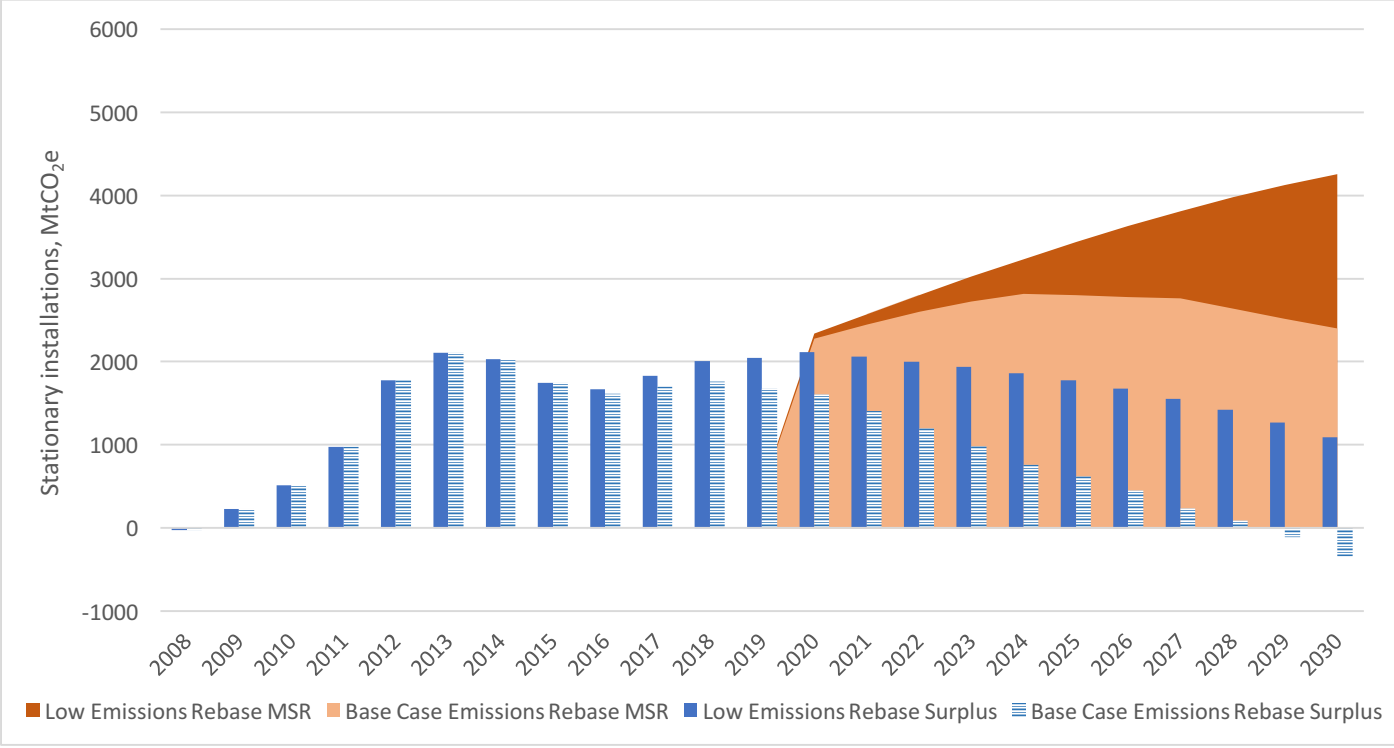


Note: starting point for Phase 4 cap is set at average of 2017-9 emissions adjusted by 3 years' linear reduction factor to take it to 2021.

Resetting the cap to reflect actual emissions prevents a further surplus being generated in Phase 4 on anything like the scale that would occur without the realignment of the cap (In practice it may not do so fully, as there will be some lag between available data for emissions and the cap). The realignment of the cap means that only faster reductions in Phase 4 itself will increase the surplus. This is illustrated in Chart 6, as allowances begin to return from

the MSR. In practice emissions may be reduced somewhat from the values shown, which include an unchanged level of emissions, because prices would be likely to increase in this scenario. The surplus can be more rapidly eroded and the risk of new surpluses emerging reduced by also increasing the LRF.

Chart 6. Effect of the realignment of the cap with reality at the start of Phase 4 on cumulative surpluses



** Rebased 2021 cap calculated as average 2017-2019 emissions reduced by respective LRF for the Phases.*

There remains the possibility of further increases in ambition early in Phase 4 as a result of the five-yearly reviews under the Paris Agreement. For these reasons it is also desirable to build in a further review of the cap allowing for realignment with actual emissions after five years.

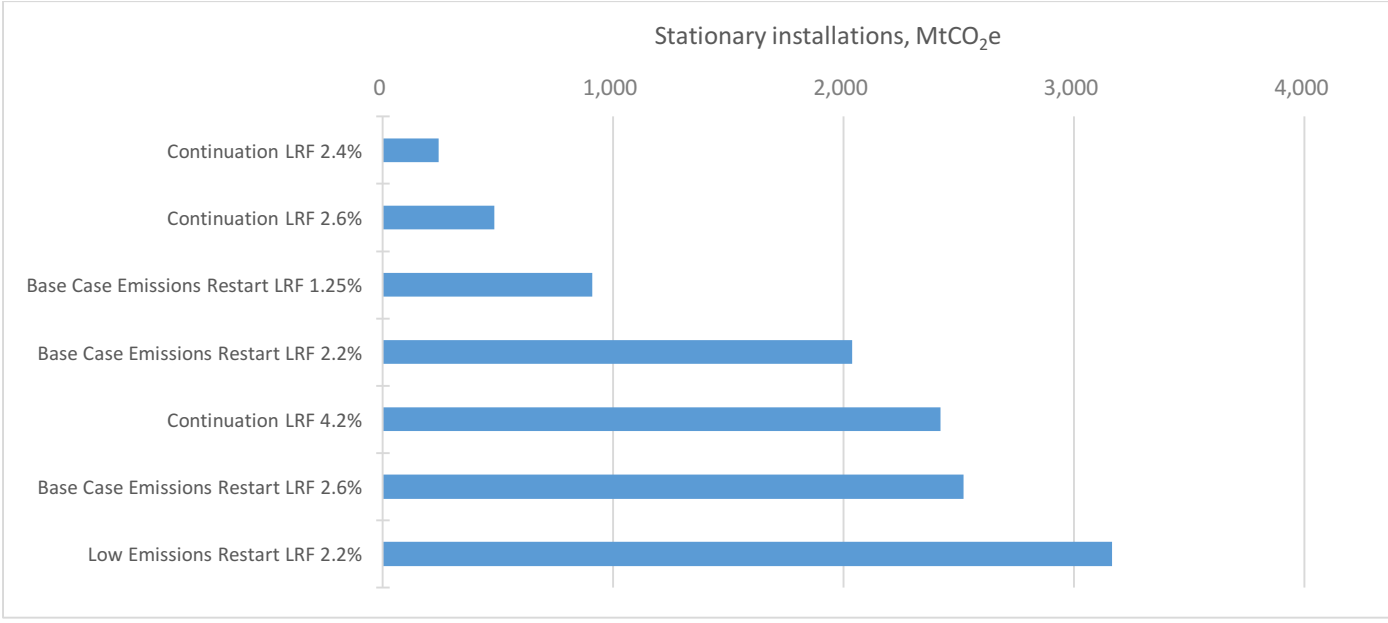
The effect of rebasing is quicker and more material over Phase 4 than adjustments to the LRF …

Rebasing the cap to reflect actual emissions has a large immediate effect on the level of the cap throughout Phase 4. In contrast, changing the linear reduction factor decreases the level of the cap only gradually, although if the higher LRF is sustained in future phases its effect can become quite large over time. Chart 7 shows that increasing the Linear Reduction Factor from 2.2% to 2.4% or 2.6% reduces emissions by some 240 to 480 million tonnes over the 10 years of Phase 4. In contrast, realigning the cap with actual emissions in 2020 reduces the cap by a total of 0.9 to 1.5 billion tonnes if the target is kept the same, and 2 to 3.2 billion tonnes if the 2030 target is reduced and the linear reduction factor is maintained at 2.2%.

Only if the LRF is almost doubled, does the reduction in the total number of allowances come close to that achieved by rebasing the cap at the start of Phase 4. Even in this case, the tightening of the cap would begin earlier with a rebasing at the start of the Phase.

Realigning the cap and increasing the Linear Reduction Factor produces the largest decrease of all, and so is preferred from an environmental point of view. It has the additional advantage of further safeguarding against surpluses emerging due to more rapid emissions cuts in Phase 4, so further increasing robustness.

Chart 7: Decrease in the total Phase 4 cap relative to the current proposal



There are various options for calculating the start of the Phase 4 cap which differ in detail. The table below shows two of the main options.

Table 1: Rebasing options for the 2021 cap (million tonnes)

Cap Reset Base	Base Case Cap	Low Emissions Cap	Notes
2020	1568	1384	*Verified numbers will only become available after the start of Phase IV*
Average 2017-2019	1564	1452	*Assumptions on the LRF will need to be made*

Rebasing the cap is consistent with a range of precedents …

This approach of adjusting caps to reflect the reality of actual emissions, where these diverge from earlier expectations, has been applied elsewhere. For example, in the Regional Greenhouse Gas Initiative in the USA, the cap was reduced from 165 million short tons in 2012-3 to 91 million short tons in 2014 to more closely reflect actual emissions[4]. As a result, prices have moved away from the auction floor price, where they were had previously been stuck.

Looking beyond carbon markets, incentive-based regulation of electricity, gas and water network charges in the UK in the 1990s imposed price caps typically lasting five years. In practice, costs fell more rapidly than was expected when the price cap was set, leading to high margins of price over cost. One-off cuts in the level of prices were implemented at the start of the next phase of the price control to realign the price cap with outturn costs, and thus capture the benefits of efficiency gains for consumers[5].

The new starting point for Phase 4 would also be closer to that which was envisaged under the December 2008 European Council Conclusions[6] in case an international agreement was reached and the EU ETS would start from a

[4] https://www.rggi.org/design/overview/cap

[5] Price was set to increase by inflation (RPI) minus an efficiency factor (X), which played a role analogous to the linear reduction factor in the EU ETS. In practice costs fell more rapidly than expected, outperforming the efficiency gains embodied in the efficiency factor, X. At the beginning of the next 5-year phase of price control there was in many cases a one-off reduction in the price-cap to reflect this, referred to as a P_0 cut. See https://www.nao.org.uk/wp-content/uploads/2002/04/0102723.pdf for a review of this approach to regulation.

[6] http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/104692.pdf

reduction of 30% from 2005 levels by 2020. A 30% reduction from 1990 would, assuming the EU ETS cap to have been reduced in line with the reduction in other sectors, have led to a starting point for the Phase 4 EU ETS cap of approximately 1600 million tonnes, around the upper end of our estimated range of likely emissions at that time. This was made conditional on action by other countries. Commitments to such action have now been made under the Paris Agreement.

The reduction in the cap throughout Phase 4 due to rebasing that start point is also more consistent with the requirements that the EU, along with others, must implement more ambitious emissions reductions as part of meeting its obligations under the Paris Agreement.

The benefits of this would greatly outweigh the costs …

The benefits of this approach greatly outweigh the likely costs if the value of avoided damages from emissions are taken into account. The total benefit would be approximately €70-80 billion, as shown in Table 1, including an estimate of the avoided cost of damages based on US Environment Protection Agency (EPA) data for the global cost of damages from emissions. As allowance prices in the range of €5-€20 are likely to prevail in Phase 4, much emission reduction potential remains available at below the cost of the damage caused that is not signalled by the prevailing price. Reducing the cap would capture some of this, providing a large environmental benefit. Some price increases are expected as a result of rebasing the cap, but this should not adversely affect European industry providing that anti-leakage measures are adequate.

Table 2: Total costs and benefits from realigning the Phase 4 cap (€ billion)

Cost of Benefit	Low Price Impact	High Price Impact
Loss of auction revenue or reduced value of free allocation due to reduced volume	-31	-31
Additional cost of emission reductions	-4	-12
Benefit of reduced emissions	113	113
Net benefit	**79**	**70**
Transfer consumers to government – split depends on free allocation or recycling	39	131

Notes. Based on cumulative reduction of cap of 2.4 billion tonnes over Phase 4. Price responses are €3 and €10/tonne respectively. Benefit of reduced emissions estimated assuming an average cost of damages for emissions in Phase 4 (Social Cost of Carbon) of €47/tCO2 real terms, based on US EPA estimates at a 3% discount rate.

The price increase would also yield additional auction revenue that can be used for climate mitigation measures or other purposes.

If adjusting the cap cannot be delivered, the excess allowances could be placed into the MSR, but this is not our preferred option …

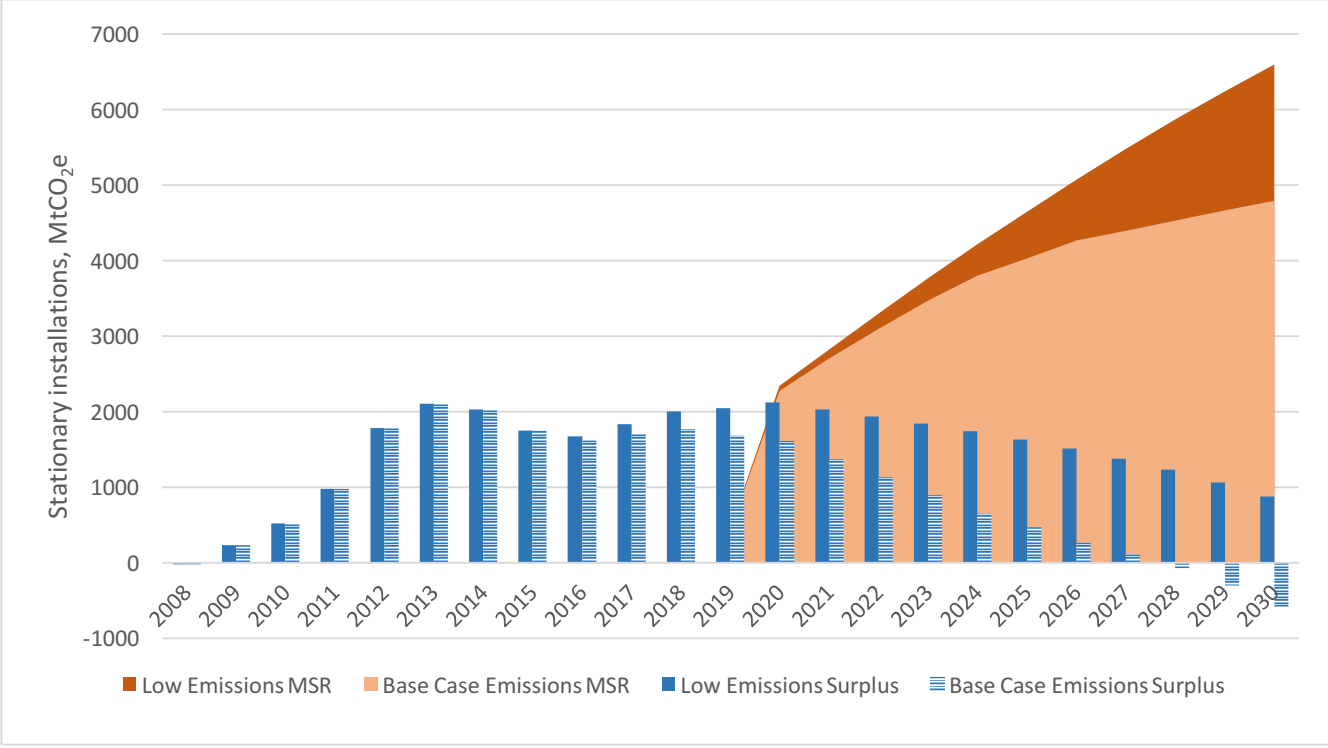
Sandbag is advocating for an adjustment to the cap. If this is not delivered, then there is another, less effective, option, which is nevertheless better than leaving the cap as it is with no supplementary measures.

Some of the benefits of realigning the cap can be achieved by putting the surplus of allowances arising from the divergence between the cap and actual emissions at the start of Phase 4 straight into the MSR.

The difference between the cap and actual emissions in 2020 could be calculated, and that amount withdrawn from auction and put into the MSR each year during Phase 4. For example, if actual emissions were 200 million tonnes below the cap in 2021 an additional 200 million tonnes would be placed in the MSR each year during Phase 4, leading to an additional two billion tonnes being placed in the MSR. The effect of this approach is shown in Chart 8.

This resembles backloading, in that allowances are withdrawn from auction and placed into the MSR. However, such a temporary fix will not actually eliminate the huge accumulated surplus. For our specific proposal on permanently fixing the MSR, see our accompanying paper "Stabilising the market Stability reserve – How to tackle the MSR's obesity problem".

Chart 8: Surplus if difference between 2020 cap and 2020 emissions is placed into the MSR each year



Note: Absence of price response on emissions assumed, but in reality actual emissions will approach low emissions case.

Conclusions

The EU ETS cap has allowed a huge and growing surplus of allowances to accrue, leading to a depressed carbon price and ineffective signals for emission reductions. Sandbag's modelling shows that the MSR and small proposed changes to the LRF will have a minimal impact on this surplus, which seems likely to persist through most of Phase 4 and perhaps beyond. This risks weakening the role of the EU ETS and providing inadequate investment signals up to 2030 and potentially beyond. This in turn could lead to greater action by individual Member States as they try to achieve the necessary long-term investment, reducing the EU ETS to little more than an accounting tool.

Sandbag therefore recommends that Phase 4 cap is realigned to match the reality of emissions in 2020, preferably accompanied by an increase in the Linear Reduction Factor.

Rebasing the cap in this way would lead to a much more effective EU ETS, with a higher carbon price which delivers effective signals for abatement and investment, a greater alignment with the 2050 EU climate target, and reduced risk of rapid, and costly, decarbonisation being needed post-2030.

Aligning the cap with actual emissions tightens the cap more quickly and more effectively than changes to the Linear Reduction Factor (LRF). The LRF would need to approximately double from the currently proposed value of 2.2% to 4.2% to have the same effect on cumulative emissions over Phase 4 as rebasing the cap, even in our high emissions case. Even then changing the LRF would have a slower effect than changing the starting point of the cap. Increasing the LRF in addition to rebasing is nevertheless preferred as a way of improving the effectiveness of the scheme in Phase 4.

About this briefing

We are grateful to the European Climate Foundation for helping to fund this work. Full information on Sandbag and our funding is available on our website (www.sandbag.org.uk).

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