

The Rt. Hon. Gregory Barker MP
Minister of State
Department of Energy and Climate Change
3 Whitehall Place
London SW1A 2AW

14 April 2014

Dear Greg,

Decision on whether to carry forward emissions from first to second carbon budget

The first carbon budget (2008-12) has been met, with emissions around 1% below the level of the legislated budget.

While this is a small difference given the uncertainties inherent in setting carbon budgets, the Climate Change Act requires you to make a decision on whether to carry forward the difference to the next budget period.

Our assessment is that such carrying forward would increase costs and risks associated with meeting longer-term emissions targets:

- While carrying forward emissions might be justified if policy delivery was ahead of schedule, this is not the case.
- To carry forward emissions to the next budget period in these circumstances would undermine incentives for further development and implementation of policies that are required to be on track to meeting the 2050 target. This would ultimately raise the costs and risks associated with meeting the target.
- There is no benefit to carrying forward emissions given that the next two budgets could be met comfortably if current policy plans are successfully implemented. This is true for a wide range of assumptions on GDP, energy prices and population.

- The second budget reflects the UK's commitments in the EU context, where carrying forward emissions from the first budget period cannot contribute to later targets. In other words, while carrying forward emissions would effectively ease the second carbon budget, it would not count towards meeting EU targets.

We therefore recommend that you should not carry forward any of the difference between emissions and the first carbon budget through to the second budget.

A decision not to carry forward emissions would preserve incentives, and act as a signal of the Government's commitment to its policies, and to implementing the cost-effective path to the 2050 target. We set out principles under which carrying forward emissions would be appropriate, and an assessment against these principles, in the attachment to this letter.

Yours,



Lord Deben, Chairman, Committee on Climate Change

Attachment: Assessment of case to carry forward emissions from the first carbon budget

This attachment sets out the evidence base supporting our advice on whether or not to carry forward the difference between emissions and the first carbon budget.

In formulating our advice we have considered the case in relation to a set of principles which reflect the role and value of carbon budgets. In particular, it would be sensible to carry forward the difference if the following conditions were satisfied:

- The difference was due to policy delivery being ahead of schedule. This would allow effort to be brought forward to earlier budget periods if cheaper abatement options were available in the earlier period to reach the same level of cumulative emissions.
- Carrying forward emissions, thereby loosening the next carbon budget, would not undermine actions to prepare for subsequent carbon budgets and/or the 2050 target (to reduce emissions by at least 80% relative to 1990).
- Loosening the next carbon budget would avoid incurring excessive costs. This could be the case, for example, if – reflecting changes since it was set – the next budget is expected to require purchase of carbon credits beyond levels implied by international commitments, or if the budget can only be met by very expensive or disruptive changes that are not required on the path to the 2050 target.

We set out our assessment in five parts covering these areas:

- i. The UK net carbon account for the first carbon budget period
- ii. Was policy delivery ahead of schedule in the first carbon budget?
- iii. Would a higher second carbon budget prepare effectively for the 2050 target?
- iv. Would a higher second carbon budget avoid excessive costs?
- v. Conclusion

(i) The UK net carbon account for the first carbon budget period

The first carbon budget was legislated at 3,018 MtCO₂e. This is the maximum level for the UK net carbon account over the years 2008 to 2012. The net carbon account is defined as the level of UK greenhouse gas emissions across the economy, excluding international aviation and shipping, and net of any trading of emissions allowances in the EU Emissions Trading System (EU ETS) or other specified trading systems.

Final emissions data published in February 2014 confirm that the budget has been met (Table 1).

- Gross emissions across the economy were 2,945 MtCO₂e. This is 2.4% below the legislated budget.
- However, carbon budgets relate to the net carbon account, for which emissions covered by the EU ETS are adjusted for purchases and sales of allowances.
- The UK was a net seller of 37 MtCO₂e allowances in the EU ETS.
- The net carbon account was therefore 2,982 MtCO₂e.
- This is 36 MtCO₂e (1.2%) below the budget of 3,018 Mt CO₂e.

Table 1: Annual emissions, emissions trading and the net carbon account compared to the carbon budget (2008-12).

MtCO ₂ e	2008	2009	2010	2011	2012	Total (2008-12)
Total UK greenhouse gas emissions (excluding international aviation and shipping)	636	583	598	555	574	2945
Net UK purchases/(sales) of emissions allowances	20	(13)	(7)	(24)	(14)	-37
UK net carbon account	616	595	605	579	587	2982
Carbon budget						3018
Difference between budget and net carbon account*						36

*Positive number indicates budget was met.

One implication of the accounting rules is that the net carbon account for those parts of the economy covered by emissions trading schemes – mainly power generation and energy-intensive industry – is determined by the UK's share of the EU ETS cap¹, not the absolute level of UK emissions. It is important to implement policies to reduce emissions in these sectors in order to prepare for future carbon budgets and the 2050 target, which require full decarbonisation of electricity. However, for a given EU ETS cap and a given UK share of that cap, whether the first carbon budget is met is determined by the level of emissions in the rest of the economy.

Therefore, in this attachment we focus on policy delivery outside of the EU ETS – in the “non-traded sector”.

¹ In turn, the UK share of the cap is determined by the share of auctioning rights for allowances assigned to the UK according to EU rules, the share of free allowances allocated to UK installations and the share of allowances in the New Entrant Reserve claimed by UK firms.

(ii) Was policy delivery ahead of schedule in the first carbon budget?

The first carbon budget was set at the level recommended by the Committee in our first report² in 2008. That report identified that the budget could be met based on a set of policy actions to reduce greenhouse gas emissions to which the Government was committed in principle, but where policy development and implementation was still required. In this section we first consider policy performance relative to that ambition, and then we consider the impact of other factors on emissions.

Policy performance compared to Government ambition

We developed a scenario to underpin our recommendation on the level of the first carbon budget³. This was in line with high-level Government ambition at the time and included policy actions delivering 36 MtCO₂e of abatement in the non-traded sector over the first carbon budget period 2008-12.

Available data do not suggest significant progress beyond the level initially assumed:

- Data to assess performance are directly available for the transport, heat and residential buildings sector. These cover 22 MtCO₂e (61%) of the 36 MtCO₂e total savings in our scenario. The data suggest that measurable actions delivered 23 MtCO₂e of abatement over the first carbon budget period, very similar to our scenario (Table 2). Within this, some areas were more successful, most notably new car efficiency, which is regulated at the EU level. We will draw out potential lessons for future policy in our progress report to Parliament in July this year.
- Data to assess performance is not directly available for non-residential buildings or industrial sectors, covering 14 MtCO₂e (39%) of the assumed emissions reduction. However, the indirect evidence suggests that there has been no outperformance in these areas; if anything, progress may have been more limited. Policy ambition to reduce emissions in the relevant sectors (non-residential buildings and industry) has been very limited; and, in non-residential buildings in particular, there is no observable trend towards lower emissions intensity (Box 1).

The evidence overall therefore suggests that low-carbon policy did not deliver ahead of schedule in the first carbon budget.

² CCC (2008) *Building a low-carbon economy – the UK's contribution to tackling climate change*.

³ This 'Extended Ambition' scenario was developed further in CCC (2009) *Meeting carbon budgets – the need for a step change*.

Table 2 – Scenario and outturn abatement in residential buildings, heat and transport

Measure	Scenario		Outturn	
	Deployment	Abatement (MtCO ₂)	Deployment	Abatement (MtCO ₂)
Residential buildings				
Cavity wall insulation	3.9 million units	1.4	2.7 million units	1.0
Loft insulation (incl. DIY)	4.3 million units	0.3	5.6 million units	0.4
Solid Wall insulation	0.5 million units	0.3	0.1 million units	0.1
<i>Residential buildings total</i>		2.0		1.5
Heat (TWh heat output)				
Solar thermal	0.4 TWh	0.0	1.3 TWh	0.2
Biomass (residential buildings)	0.1 TWh	0.0	2.6 TWh	0.9
Biomass (non-residential buildings)	0.2 TWh	0.1	0.4 TWh	0.4
Biomass (industry)	2.6 TWh	0.4	1.4 TWh	0.5
Biogas	2.6 TWh	0.2	0.4 TWh	0.0
District heating	0.8 TWh	0.1	0.6 TWh	0.1
Heat pumps (residential buildings)	1.5 TWh	0.2	0.8 TWh	0.1
Heat pumps (non-residential buildings)	0.4 TWh	0.4	0.2 TWh	0.2
Heat pumps (industry)	0.4 TWh	0.0	0.0 TWh	0.0
<i>Heat total</i>		1.4		2.5
Transport				
Conventional car efficiency	166.3 gCO ₂ /km fleet average	1.1	164.8 gCO ₂ /km fleet average	4.4
Plug-in hybrid electric cars	0 cars	0.0	918 cars	0.0
Battery electric cars	25,000 cars	0.1	2,700 cars	0.0
Car drivers trained in eco-driving	> 1 million drivers trained	0.2	30,000 drivers trained	0.0
Strict enforcement of the 70mph speed limit	100% enforcement	1.3	No strict enforcement	0.0
Conventional van efficiency	203.6 gCO ₂ /km fleet average	0.3	204.2 gCO ₂ /km fleet average	0.2
Plug-in hybrid electric vans	0 vans	0.0	0 vans	0.0
Battery electric vans	750 vans	0.0	Zero vans	0.0
Van drivers trained in eco-driving	130,000 drivers trained	0.0	4,800 drivers trained	0.0
HGV drivers trained in eco-driving	0 drivers trained	0.0	32,400 drivers trained	0.0
Biofuel penetration	3.6% by energy	15.3	2.5% by energy	14.5
<i>Transport total</i>		18.3		19.2
All measures		21.7		23.2

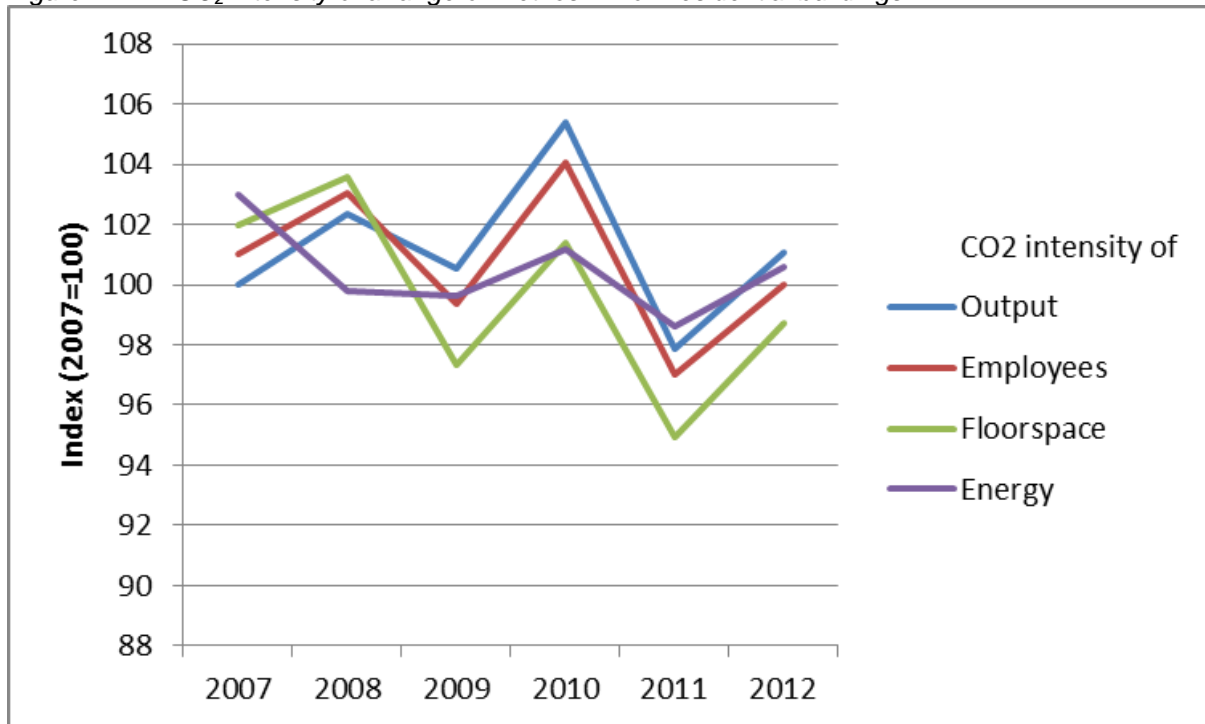
Box 1 – Indirect evidence of low-carbon actions

In addition to the measures set out in Table 1, our scenario includes measures delivering 14 MtCO₂e savings over the first carbon budget period for which data to assess performance is not directly available. The greatest savings are delivered by measures in non-residential buildings (4.6 Mt) and industry (5.1 Mt)

In **non-residential buildings**, although data on implementation of specific measures (i.e. installation of insulation etc.) is not available some inferences can be made based on energy intensity. If low-carbon measures had been installed we would expect emissions per employee, unit of output, energy and/or unit of floor space to decrease. However, this has not been the case (Figure B1.1).

Furthermore, DECC estimate that the combined impact of policies to reduce GHG emissions in non-residential buildings (Business Smart Metering, Building Regulations 2010 Part L, Non-Domestic Green Deal, and the Carbon Reduction Commitment Energy Efficiency Scheme) was a cumulative saving of 0.3 MtCO₂e in the first carbon budget period, significantly less than the 4.6 MtCO₂e in our scenario.

Figure B1.1 – CO₂ intensity of a range of metrics in non-residential buildings

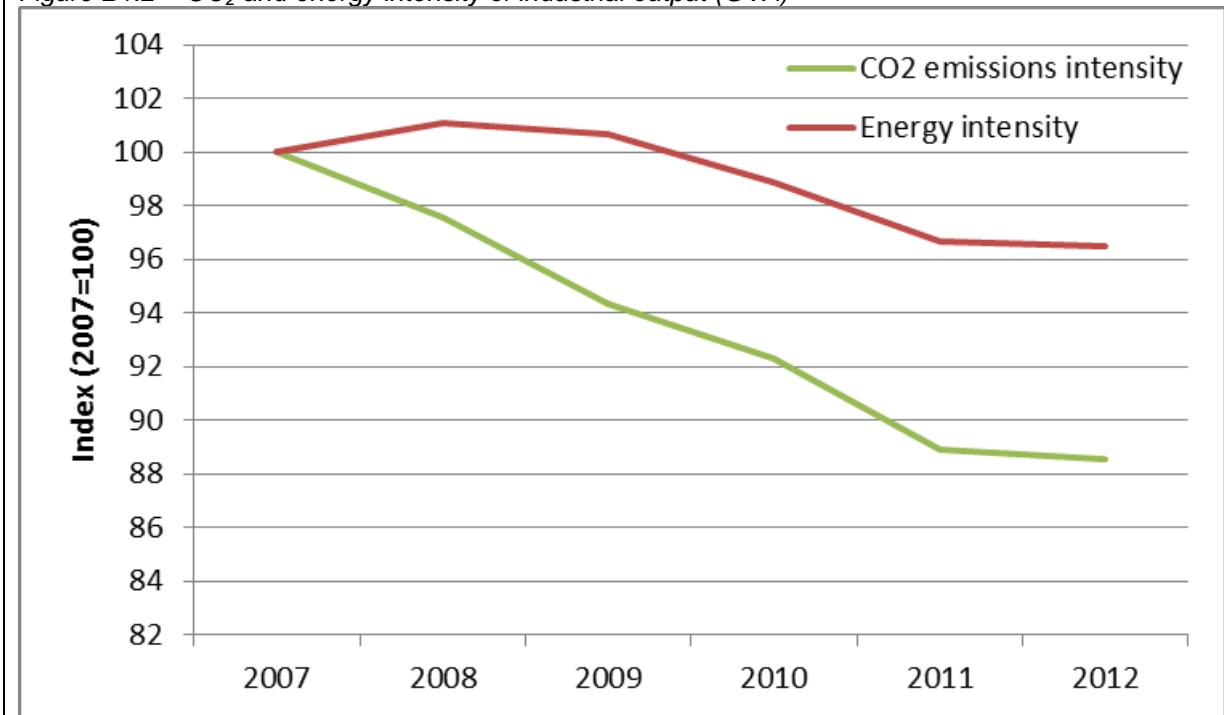


In **industry**, data indicates a 4% reduction in energy intensity, and an 11% reduction in the emissions intensity of industrial output (Figure B1.2), which might suggest some progress in decarbonising the sector.

However, this is unlikely to be the result of Government policies, given that these have been very limited for industry outside the EU ETS. New policies are: Building Regulations 2010 Part L and the Carbon Reduction Commitment Energy Efficiency Scheme, for which DECC estimate a combined cumulative impact of less than 0.1 MtCO₂e in the first carbon budget period, significantly less than the 5.1 MtCO₂e in our scenario.

The limited introduction of policies in this sector, and their small expected impact in the first carbon budget period suggests that the reduction in energy and CO₂ intensity of industrial output is due to structural changes in the industry sector, and/or the impact of high energy prices, and not to implementation of measures to reduce GHG emissions.

Figure B1.2 – CO₂ and energy intensity of industrial output (GVA)



Impact of other factors on emissions in the first carbon budget period

The fact that emissions were very close to the budgeted level is unsurprising in this context given that two other factors are likely to have broadly offset each other:

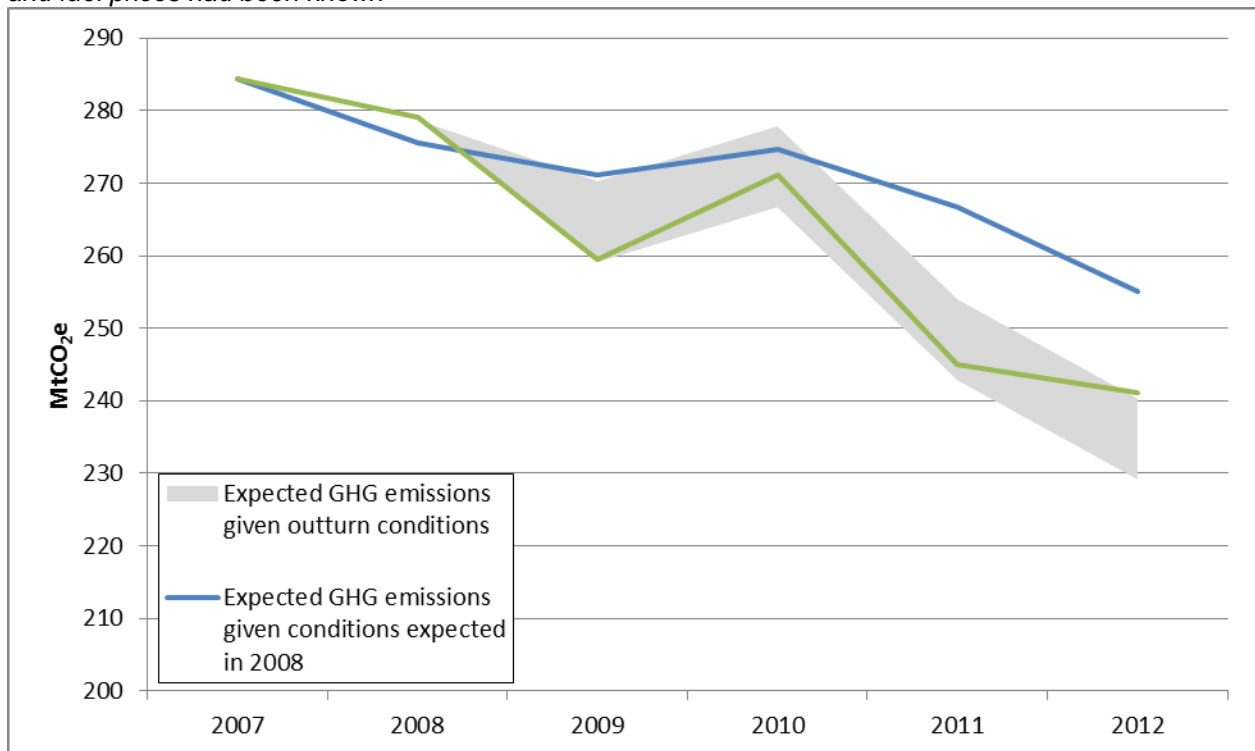
- The economic downturn is likely to have had a significant dampening effect on energy demand and emissions.
 - We have highlighted the impact of the downturn on emissions in our annual progress reports to Parliament. For example, 2009 saw a 5% reduction in GDP and an 8% reduction in emissions.
 - Last year we commissioned Cambridge Econometrics to estimate the impact of conditions (i.e. economic activity, fuel prices and temperature) on GHG emissions over the first carbon budget period. Overall, conditions were estimated to have reduced

emissions over the first carbon budget period by 1-4% compared to expectations (Figure 1).⁴

- Offsetting the impact of the recession, recent improvements in the approaches used to measure emissions in the National Accounts Emissions Inventory (NAEI) have led to an upward revision to emissions estimates. This revision increased emissions by up to 2.5% over the budget period.

Given that significant uncertainty will attach to all emissions scenarios, some unexplained divergence from outturn is to be expected, and emissions around 1% below the level of the legislated budget represents a small difference.

Figure 1 – Projected emissions in 2008, and how these would have changed if outturn GDP, temperature and fuel prices had been known



Source: Cambridge Econometrics, DECC, CCC analysis

Notes: Expected GHG emissions given outturn conditions is presented as a range. The upper bound of this range reflects a modelled emissions forecast that does not account for the large drop in 2009 GHG emissions, while the lower bound reflects the modelled emissions forecast adjusted for the assumption that the otherwise unexplained drop in 2009 GHG emissions was the result of the recession and the 5% reduction in GDP in that year.

⁴ Within this, the impact of cold winters in 2008 and 2010 somewhat offset the impact of the economic downturn.

(iii) Would a higher second carbon budget prepare effectively for the 2050 target?

The UK's 2050 target (i.e. to reduce emissions by at least 80% relative to 1990) requires steady effort across budget periods. Early actions are important as they are required to develop markets and to drive down technology costs through deployment. They also pave the way for further improvements to build on early progress.

As set out in section (i), carbon budgets relate to the net carbon account, for which emissions covered by the EU ETS are adjusted for purchase and sale of allowances. This means the net carbon account for sectors covered by the EU ETS is defined by the UK's share of the EU ETS cap rather than the level of actual emissions (with purchase or sale of allowances ensuring that these balance).

When designing carbon budgets, we made assumptions about the future UK share of the EU ETS cap. To the extent that these assumptions differed from the subsequently agreed EU ETS cap and UK allocation, this will change the allowed emissions in the non-traded sector for a given economy-wide budget. This could result in an inconsistency between the budget and actions required to reduce emissions in the non-traded sector on the path to meeting the 2050 target.

In practice, the UK's share of the EU ETS in the second budget period is lower than we assumed when the budget was set, allowing significantly more emissions in the non-traded sector than are compatible with meeting the 2050 target (Figure 2).

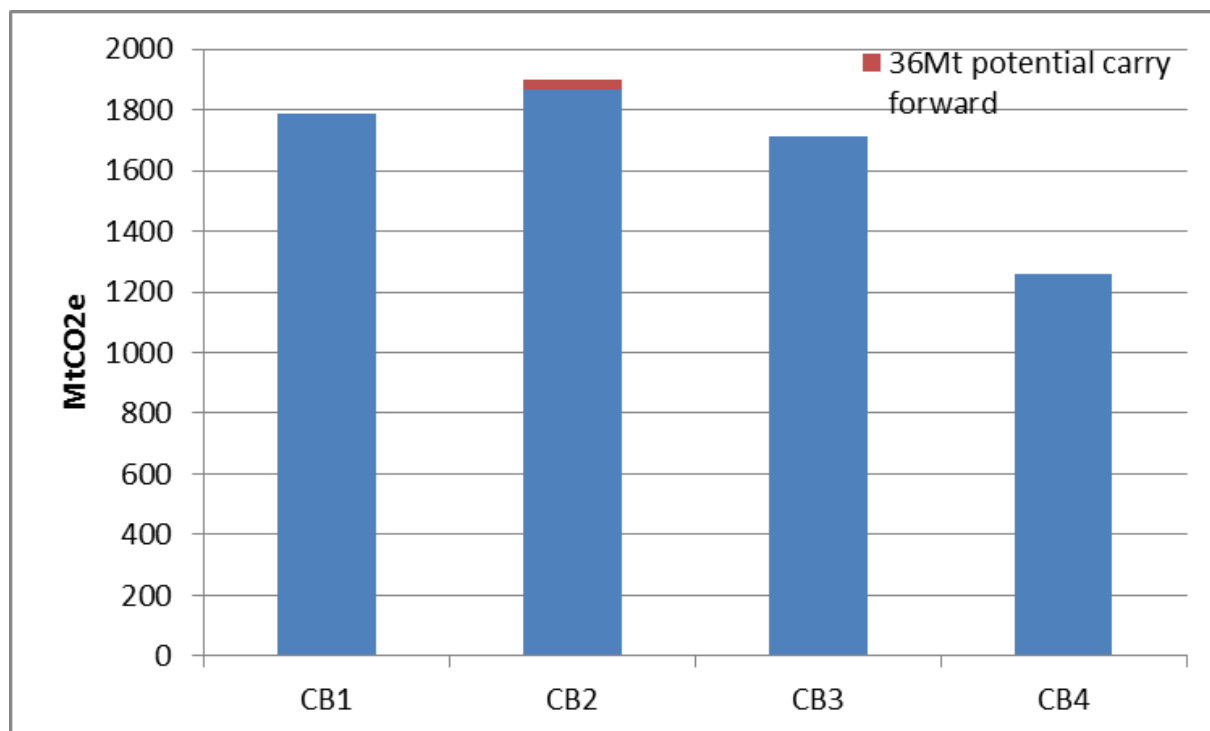
- Latest data for the UK share of the cap in Phase III of the EU ETS implies lower UK emissions in the traded sector during the second carbon budget on a net carbon account basis than previously assumed.
- This translates to higher allowable emissions for the non-traded sector under the legislated budget.
- As a result, allowed emissions in the non-traded sector under the second carbon budget are considerably higher than intended when the budget was set and 4% higher than allowed under the first carbon budget. If emissions were carried forward from the first budget, then the loosened budget would imply an even larger increase (6-7%) in allowable non-traded emissions.
- This contrasts to a 17% average reduction needed every five years across the economy to meet the 2050 target.

This allowable increase in non-traded emissions already significantly undermines the incentives to reduce emissions to meet future carbon budgets and the 2050 target. It suggests the need for a technical

adjustment to the budget, bringing this in line with the latest information on the EU ETS; we will return to this in separate advice to the Government.

For the issue addressed in this letter it is clear that further loosening the second carbon budget by carrying forward emissions from the first budget, would exacerbate the current problem.

Figure 2: Allowable non-traded emissions based on latest EU ETS rules and data (carbon budgets one to four)



The Government has committed to ambition in line with our scenario, and has set out options for increasing ambition as required to meet the fourth carbon budget. The challenge now is to deliver on that ambition. The decision on carrying forward the difference in emissions should be consistent with this level of ambition in order to signal the Government's commitment.

(iv) Would a higher second carbon budget avoid excessive costs?

As set out in section (iii), final rules for the EU ETS suggest less effort is required in the non-traded sector than originally intended. This allows a 4% increase in non-traded sector emissions between the first and second budgets.

This compares to a 7% reduction in the Government's projections based on existing plans to deliver emissions reductions consistent with the cost-effective path to the 2050 target. The official projections

therefore imply emissions in the non-traded sector 11% below the level legislated for the second carbon budget (Figure 3).

Given that the set of policies identified as being cost-effective are expected to drive emissions in the non-traded sector significantly below their allowed level, further loosening the second budget would not confer any meaningful benefit from additional flexibility to avoid excessive costs.

This is notwithstanding the inherent uncertainty in emissions projections. Even in the most extreme case modelled by DECC – capturing uncertainty in GDP, fuel prices and policy delivery – emissions would still fall by 6% (compared to a potential rise currently allowed by the legislated budget).

The UK's commitments under the EU climate package reinforce this finding. Even if the budget were loosened, the UK would not be able to reduce effort given the UK's EU commitments, which are more stringent than the legislated budget and do not allow banking of effort from the first budget period (Figure 4).

Figure 3 – Government's official emissions projection compared to the carbon budgets (2008-2027, non-traded sector)

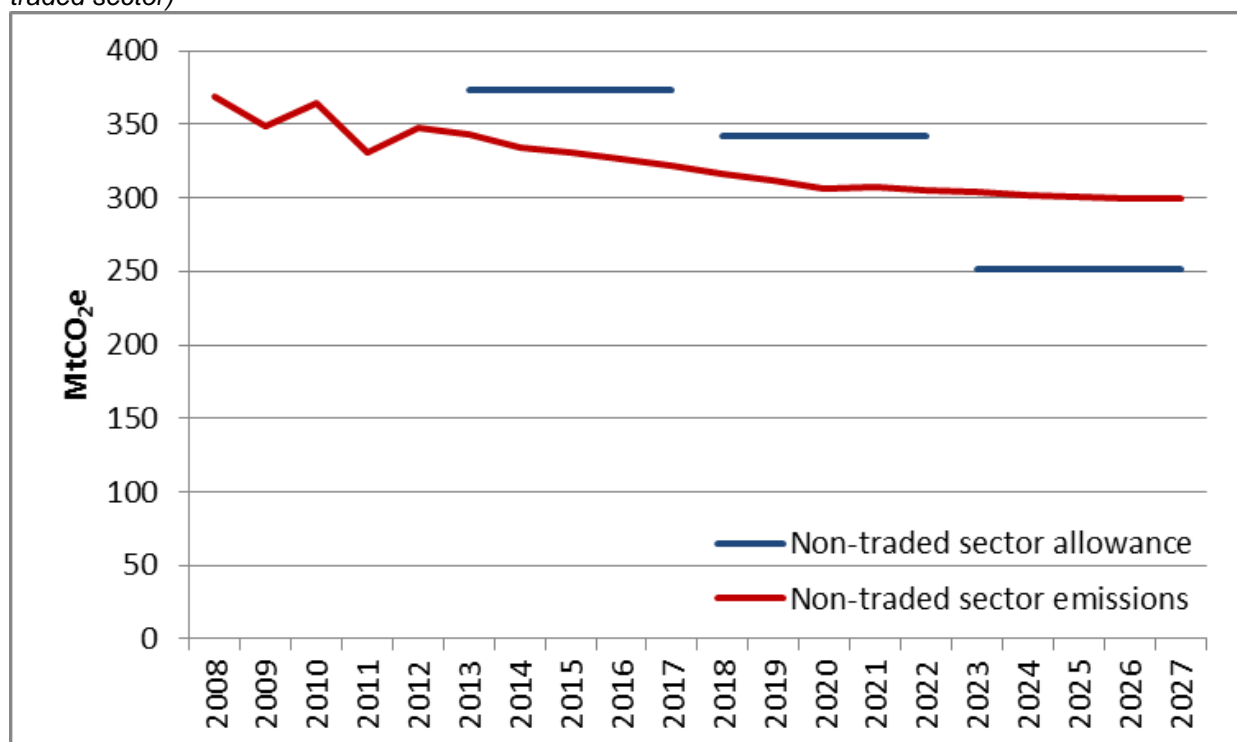
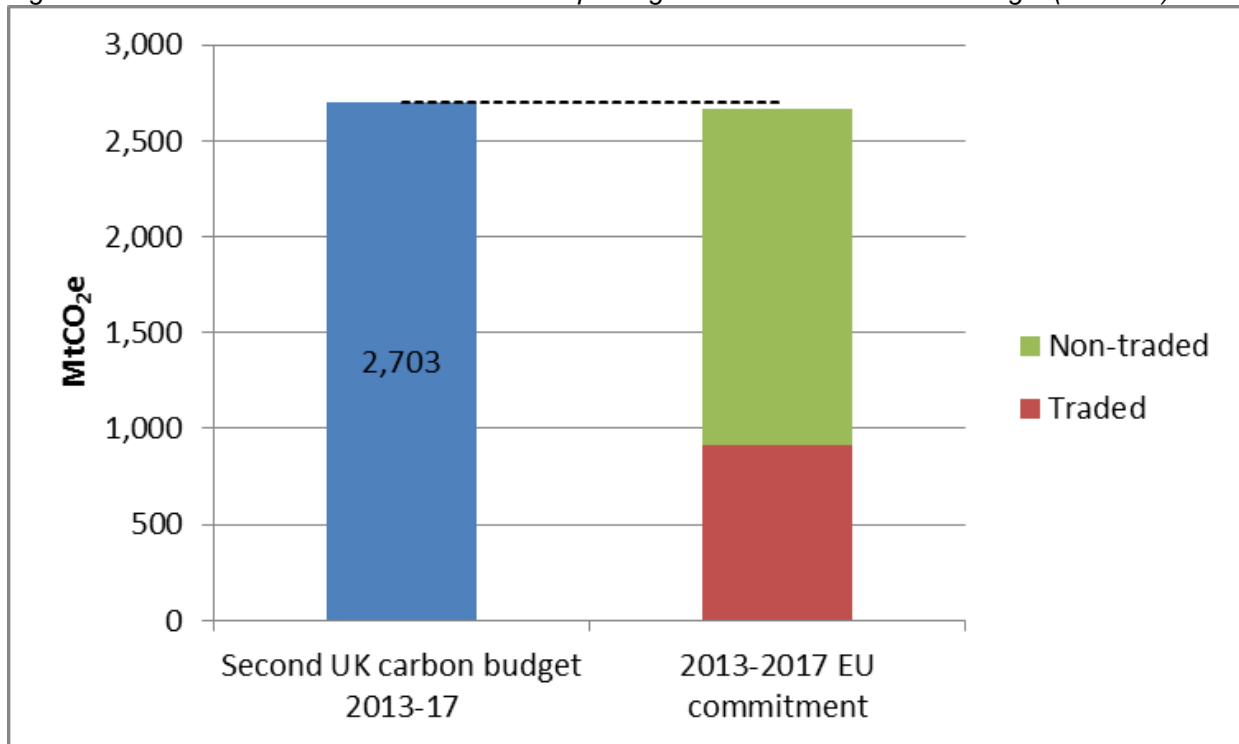


Figure 4: Maximum UK emissions under the EU package and the second carbon budget (2013-17)



(v) Conclusion

The best ways to limit costs of carbon budgets are to maintain ambition, to bring forward policies that will deliver low-carbon actions on the cost-effective path to the 2050 target, to monitor and to make sure these policies are effective, and to provide clear signals of continued commitment to this course. In relation to this decision, that will best be served by not carrying forward any part of the amount by which the first carbon budget exceeds the net UK carbon account for the period.