

Review of DECC draft - Carbon valuation in UK policy appraisal: a revised approach

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06/04/2009

This brief review assesses the paper *carbon valuation in UK policy appraisal: a revised approach* as provided to me on March 24 2009.

General observations

The paper is a long and complex response to a very complex set of issues. It grapples with most of the issues, including some I hadn't previously considered, and does so in a serious and intelligent manner. It reveals the depth with which the issues have been considered in Whitehall and the extent to which analysis is being brought to bear on these crucial issues. Its overall conclusion (or premise) that some measure of the marginal abatement cost should be used in policy appraisal seems right. It correctly identifies the issues in possibly setting different prices in the traded and non traded sectors and considers the long and the short run.

Presentationally, it requires a substantially enlarged and improved executive summary and outline of structure to help the reader through. Each chapter could also do with a summary/conclusion with a set of the key points. Given the complexity of the arguments the failure to provide clear conclusions and summaries at the end of each chapter renders the paper harder to follow than need be. Indeed more clarity and structure would help throughout.

I am, I think, in broad agreement with the direction the paper is taking. There is a good case for moving away from the use of the SCC in appraisals and towards a valuation based in some way on marginal abatement costs. In that context there are three elements to consider:

1. Why move from an SCC to a MAC based approach;
2. How to estimate values based on the MAC approach;
3. How to apply the values.

This is indeed how the paper is structured. However, it is currently unbalanced to the extent that the third of these elements gets very little attention. Yet it seems to me crucial to understand this in order to understand and motivate the earlier discussions. For example I am left genuinely unclear over how and when to use short run and long run values.

Recommendation 1. The *use* of the different carbon values estimated by this method needs further explanation. And not just to help practitioners – no doubt that can be done separately. Without such a discussion it is difficult to understand in the abstract the importance of some of the assumptions and distinctions made.

I presume the intention is that in order to appraise an investment carried out today which reduces carbon emissions each year between now and 2050 then emissions reduced up to 2020 should be valued at the short run price and emissions reduced (by today's investment) in 2050 should be valued at the long run price. This issue (so far as I can see) is not addressed. That may be because it is considered obvious. But it is not obvious to this reviewer.

In part that reflects the lack of discussion about the economic *meaning* of including, in an appraisal, a carbon price based on the maximum MAC required at any point to meet a target. Economic appraisals generally use economic values to assess costs and benefits. It is not clear to me that the marginal cost of abating an additional tonne of carbon by the most expensive method required to meet a target is an economic value in the usual sense.

Recommendation 2. More discussion is required up front regarding the *economic meaning* of the carbon valuation derived in this way. This is really rather crucial to understanding how to understand and apply the outputs.

Related to this, the discussion of the economics involved in making the valuation choices is, despite the overall length of the paper, actually rather limited. The paper could, in the opinion of this reviewer, be considerably clearer about the reasons for its core recommendation. For those less wrapped up in the economics and policy of climate change the logic is often difficult to grasp. After all traditional economics is pretty clear about how externalities should be valued – at their marginal social cost. Deviations from this need to start with the basic economics and explain why, in this particular case, a different approach may be appropriate.

The problem is, of course, that the natural response of the economist to some of the arguments put forward here – that the SCC may be inconsistent with targets and international agreements – is that this just reveals the incoherence of the targets and agreements. I am not in that camp, but the paper needs more explicitly to rebut that view.

The current chapter 2 is inadequate as an explanation of alternative approaches.

Recommendation 3. A chapter focussing clearly on the economic arguments for change would be helpful. The structure of the logic is reasonably clear:

- Climate change is global and poses uncertain global risks with potential for catastrophe;
- We can, in much the way that Stern did (but also the CCC), come to views about reasonable targets for emissions. These targets will involve a combination of responses to uncertainty, risk and ethical judgements. This paper could, it seems to me, leave the argument at this for now, or it could repeat some of the Stern or CCC arguments. At present it is less clear than it might be;
- Given a target there are real problems in using an SCC (as set out);
- In fact, given a target, the consistent approach is to value carbon in such a way as to ensure we hit the target.

Interestingly the paper sets out an approach suggesting a radical move away from the use of Social Cost of Carbon (SCC) but says very little about its close relative the Shadow Price of Carbon (SPC) which was recommended in DEFRA guidance published as recently as December 2007 – around 15 months before this paper was completed. Whilst the 2007 paper did flag the need for further review this is a short gap and suggests a degree of instability in thinking in this area.

Recommendation 4. Whilst this is not at all a bad paper, it remains unclear in some places, this and other reviews have taken place at short notice and it follows hard on the heels of an earlier paper which took a quite different approach. The focus of the coming months should be on consolidating the approach and disseminating widely the arguments and assumptions.

Subject to these points I do broadly agree with the arguments for using estimates of marginal abatement costs in policy appraisal once targets have been set (question 1). There is a clear problem with using an SCC approach in which the SCC may be lower when targets are more stringent. Nevertheless chapter 3 on the use of the SCC approach is less than transparent. I should have thought it would be helpful to have four sections outlining:

- How SCCs are estimated;
- To what extent and why estimates are uncertain;
- Why estimates may be path dependent;
- How SCCs are used in setting targets;

Social damage cost estimates

I am asked whether I agree that social damage cost estimates should still be used along with other evidence to when setting emissions reductions targets. I am going to duck that question by simply saying that I really don't think this paper needs take any view on whether estimates of the SCC are useful in target setting. It's not clear to me why that is relevant to the question at hand. The paper seems to me to get itself into some logical knots at this point. But this is not the question it sets itself.

Different values in traded and non-traded sectors

The paper recommends using different values for appraisal in traded and non-traded sectors. The basic logic is clear. In the EU ETS if we operate policies which involve different carbon valuations than those at which carbon is traded then we will be getting the opportunity cost wrong. If we use a price higher than the traded price then fewer emissions will occur in the UK, but more will occur in other countries in the ETS. The outcome is a price applied in the non traded sector which is much higher than that in the traded sector.

The paper takes us through the logic of how we end up there. It is driven by the two constraints under which we are working. The first is an EU wide trading system incorporating only about half of emissions. The other is a UK specific target, including a target specifically for the non traded sector. As this paper demonstrates the result is very different prices in the two sectors. There are obvious potential economic inefficiencies that could be created when operating a dual system like this.

Given this dual system it is probably inevitable that different prices need to be used. The analysis exposes the inefficiency that is created by this approach bringing in to sharp relief the lack of coherence of the current policy framework in which half of emissions are within, and half outside, the ETS.

Recommendation 5. The individual logic for setting different prices in traded and non-traded sectors is clear. It would be nice if the paper could set out the “second best” nature of this outcome more clearly.

This is an area also where some further explanation of the circumstances in which carbon values should be used would be helpful. Since firms operating in the traded sector will be facing a carbon price, and cap, and presumably responding accordingly, it would be very helpful to clarify or exemplify the circumstances under which this carbon valuation would be used, in addition, in appraisal.

In the traded sector the choice of a modelled value for the traded price of carbon seems inescapable.

Setting short term carbon values in non traded sector

This raises a number of issues, extensively discussed in the paper. One needs, among other things:

- A baseline;
- Abatement cost curve against baseline;
- Emissions target;
- Cost and volume of abatement to include;
- Method to translate point estimates to a price schedule;
- To decide between using “by policy” MAC curves and “feasible technical” MAC curves;
- To decide whether to include policy costs.

Uncertainty

There is some uncertainty associated with most of these, including the shape of the abatement cost curve against baseline. My concern is that the scale of uncertainty has not been taken account of in the calculations of upper and lower bounds for the price. In table 7.1 and in the preceding discussion much is made of the uncertainty over what might be achieved from the transport sector and from non CO₂ GHGs. But almost nothing is made of uncertainty regarding other aspects of the MAC curve. Given the sensitivity of the results to just these two issues, and given what is in reality considerable uncertainty also about other aspects of abatement costs (and indeed BAU emissions), this seems to me to be a potentially major omission. I am not left with any clarity about the probability that the “correct” price lies between £50 and £90/t CO_{2e}.

It *appears* for example from figure 7.4 that only a relatively small overestimate of feasible reductions below £90 a tonne – perhaps of the order of just 10% - could push the marginal cost of achieving required reductions up by almost 100%. Equally figure 7.1 *appears* to show that if reductions prove even a little easier or cheaper than assumed the required marginal cost could fall rapidly towards zero.

Recommendation 6. Clearly decisions need to be made over what value to use in appraisals. That said the discussion of setting the short run non traded price (and elsewhere) probably requires an enhanced discussion of uncertainty. Most aspects of the calculation are inherently uncertain. The MAC curve should not be taken as certain and nor should BAU emissions. The paper should illustrate and quote the possible range of prices under reasonable assumptions rather than appearing to

suggest that uncertainty is limited to certain aspects of transport and other GHGs. An enhanced analysis of uncertainty might throw up a different central value. It might also allow the paper to take a more explicit stance on *risk*. If it is important to be really sure of achieving targets then a higher central value might be indicated – what risks to that are acceptable?

There are three specific assumptions in this section which maybe need greater justification or explanation:

- The decision to use technical MACs rather than policy MACs. This is not really justified (start of section 7.3) rather stated as obvious. It is not obvious to this reviewer that that is the right choice. The technical potential may not be easily unlocked. Some idea of the impact of using policy MACs would be helpful – indeed essential for understanding the risks and uncertainties involved;
- This perhaps relates to the decision not to include policy costs. It is not quite clear to me from the discussion what counts as policy costs. The discussion suggests that such costs are “likely to be high particularly for negative cost abatement potential” where “barriers to behaviour are high”. I agree. The implication would be that if the MAC curve showed that all that was needed was the uptake of all options with zero or negative cost, the carbon value would be zero, but the policy cost could be significantly positive and thus the required abatement would not occur. This is another area where an analysis of sensitivity to the assumption would be useful;
- Translating point estimate into a price schedule. I am unclear why a “real cost of carry” of 1.5% has been used (footnote 38). My instinctive inclination would have been to use the same real discount rate (3.5%) as elsewhere. The choice needs to be more clearly justified.

The long run price of carbon

Perhaps because I am unfamiliar with the GLOCAF and other models (DIMA, GCOMAP and POLES) referred to here I found this part of the paper (chapter 8) particularly hard going to the extent that I find it very hard to provide useful comments. The broad approach looks to be in line with what is proposed for the short run but it is not possible, in my view, to provide any view on the basis of what is here as to whether the suggested results are robust.

What is very striking is how different carbon prices look with and without global free trade (table 8.2) especially in 2030.