

Sorry for the slightly late response to your request for comments on your Carbon Valuation paper peer review. I appreciate the opportunity to comment and hope my views will be helpful.

I have set out my comments below in two parts - (1) high level comments and observations on the general messages of the paper; (2) detailed comments which elaborate on these higher level points,

High level comments:

(1) I agree with the general thrust of the paper which is to encourage policy-makers to factor in higher carbon prices into their decision-taking than the current assumptions imply. But you might consider whether you have the right profile for prices. If we treat price as a driver of economic behaviour, arguably we want to see a sharper rise in carbon prices in the period to 2020/30 - over which the most significant shifts in technology and economic behaviour are needed. Prices may then flatten out at a lower level.

(2) I do not agree with the differential approach to the pricing of carbon emissions in the non-traded and traded sectors of the economy. If policy-makers view that traded prices are likely to be too low in the short-term because of the slow development of carbon markets, it does not make sense to reinforce this "market imperfection" by taking policy decisions based on artificially low prices when they apply to the traded sector.

(3) The paper focuses very heavily on the technical discussion of various approaches to valuation, but the application of carbon pricing within the overall carbon reduction strategy is as important if not more so. The paper needs an introductory section which explains the role of carbon pricing in the nation's carbon reduction strategy. And the section on application needs fleshing out substantially. There is otherwise a danger that the findings of the paper will be mis-applied, and the policy impact will be highly sub-optimal.

(4) I am surprised that a wider range of studies are not referenced, given that there is a very wide literature on this topic.

Detailed comments (I have numbered these to link in with the above general points):

(1a) Relative to the current SPC (Annex 4), the most significant shifts in carbon price take place in the longer time horizons. For the traded sector, you have reduced the prices 2008-23, and for both the traded and non-traded sectors, the biggest increases in prices take place after 2030. This appears to reflect a "scarcity" view of pricing, but there is another perspective which focuses on how we will make the transition to a low carbon economy. If we are to make the transition to a low carbon economy, that will require individuals, companies and governments to adapt their behaviour and invest heavily in low-carbon technologies over the next 20-30 years. Kevin Anderson at the Tyndall Centre and others have made this point forcefully in favour of early action. The full impacts of this behavioural and technological change will be seen over a much longer time horizon: 50-100 years. But the price signals which drive this change will need to be apparent much earlier than this. If we take the view that price signals will be a driver of change rather than simply reflecting scarcity, this points to a rather different profile of prices: high prices in the period where we are looking to drive change, with prices levelling out later. It is possible carbon prices could fall in the very longer term, though I don't think you could make that the basis of your projections for obvious reasons.

(1b) Given that you are seeking to influence policy, this view of price as a driver of change rather than as a reflection of scarcity seems more appropriate. Also, if you want to influence business thinking and the climate of public opinion, it makes much more sense to adopt a profile of prices which I am suggesting above. The business and the public are much more responsive to price signals and other initiatives which are happening now or in the more foreseeable future. The further you push the profile into the future, the more you are sending a signal that we can wait and delay action. Indeed, a whole characteristic of the climate change debate is that difficult decisions can be deferred by 20+ years, which is the message your price profile is reinforcing. A more sudden rise to £100/tonne of CO₂ by c.2025 would send a much clearer signal to policy-makers and all those who relate their decisions to

the same policy signals. The low-carbon economy is coming sooner rather than later and they need to take decisions accordingly.

(1c) While you need to couch your analysis in terms of climate models and technical analysis, it is worth noting that £200/tonne of CO₂ is a very high level of prices to apply across all sectors of the economy. It effectively imposes the carbon tax equivalent of motor fuel duty to all carbon-using energy sources, which may stretch the political credibility of such a proposal. Again, this raises the issue that if we believe such high carbon prices will ultimately be needed, why a stronger price signal should not be sent over a shorter-term horizon.

(2) I did not understand the rationale for taking a different view of the appropriate carbon price for the traded and non-traded sectors of the economy. I understand the point that market prices may take time to rise to the appropriate level because of the slow pace of development of markets and underpinning international agreements. But in terms of UK policy, we should surely be imposing the "right" shadow price of carbon across all sectors in policy decisions, and hence not introducing distortions between sectors of the economy through an inconsistent policy approach. There is a clear precedent for applying different prices in policy analysis from market prices in terms of the treatment of social costs vs private costs. It is widely recognised that social costs can be different from private costs - so just because the private cost of carbon is low at present and in the immediate future, that should not be factored into the social cost of policy decisions which have much longer term consequences. You are merely locking in an imperfect market signal into the longer term.

(3a) I felt the paper needed an early chapter which set the context of carbon pricing in the carbon reduction strategy which we have for the UK. Though I am an economist and a believer in the price mechanism, it seems to me that too much weight is being put on carbon pricing & trading as an instrument, given the broad range of technological and behavioural change which is required to drive us towards a low-carbon society. My concerns about this are: (i) carbon markets will take a long time to develop in the depth and breadth that we need and other policy instruments will inevitably be needed while this development occurs; (ii) personal and business behaviour does not respond purely to price signals - many other factors can be important in influencing action; and (iii) there is a danger we assume carbon pricing exists when it doesn't. So it underpins all sorts of assumptions which are made about future society, but not the behaviour of society itself. In this context, I was struck by recent comment from National Grid, who had based their infrastructure decisions on government energy projections, but were finding that demand was outstripping this (because consumers were not reducing their energy consumption in line with the projections)! Recognising these points, I think the paper needs to make clear how the inclusion of carbon pricing in policy decisions will help us move to a low carbon society, in the context of other measures that will be taken. I think this would also add to the credibility of the carbon pricing approach you are suggesting.

(3b) The sections on the application of carbon pricing (in Part 3) also look underdeveloped. A report such as this needs clear guidance on how it should be applied in different policy contexts and to a range of policy decisions. Also, there is a need for application to be consistent, in that other assumptions need to be consistent with the carbon prices you are assuming. It was not clear how this would be achieved. (A minor point, the numbering of chapters as described in the Overview is not consistent with the numbering later in the report.)

(4a) I was surprised a wider range of studies and carbon price estimates were not quoted as the basis for this report. A lot of weight appeared to be put on the Stanton, Ackerman and Kartha study, for example. This is a recent working paper and has not yet been published in an established journal where it might have been refereed. Indeed, only one of the papers quoted in the bibliography appeared to be from a refereed journal. The rest were books/working papers/government reports.

(4b) In terms of looking at a wider range of studies, I would recommend the work of David Anthoff who works with Richard Tol and others at the ESRI in Dublin. He recently gave an excellent paper at a seminar we hosted at Warwick: "Optimal Global Dynamic Carbon Taxation" - available on his website: www.david-anthoff.de. One of the key points of his paper was that many (low) estimates of carbon prices assume transfers between nations on a scale which are unlikely to occur. In the absence of these transfers, richer nations should face much higher carbon prices than poorer ones - particularly in the short-term - to generate the necessary reductions in emissions. The prices he came up with in

the absence of transfers were not out of kilter with your paper, once you adjust for the fact that he was talking in terms of tonnes of carbon and you are talking about tonnes of CO₂e.

(4c) While I am on this point, I think it is important to highlight that you are clearly using CO₂ as your metric for the price of carbon rather than carbon itself. I've seen earlier government papers on this topic focussing on t/C rather than t/CO₂. I think this needs to be explained very clearly, alongside a conversion factor to enable people to relate one measure to the other ($3tC = 11tCO_2$), because the literature has not yet standardised on a common metric.

I hope these comments are helpful. There is a lot of good stuff in the paper, so I hope you will accept that I am focussing on areas where I feel some attention is needed. Good luck in developing the guidance and if you would like me to elaborate on any of the above or supply further views, please get in touch.

Best wishes

Andrew