

Indicative Assessment of Carbon Abatement

This memo briefly sets out how the Authority would go about calculating the carbon impacts of an amendment.

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To	WG1
CC	
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Disclaimer

1.1. This memo is intended to be used by WG1 for information when considering the relevant analysis necessary for inclusion in subsequent amendment reports to the Authority in relation to amendments that deal with calculating carbon abatement and other relevant costs and benefits, but does not constitute our definitive view of how we will produce our final analysis in relation to CAP148.

1.2. The information contained in this memo should be treated as indicative and not directly relevant to the discharging of the functions of the Authority.

Introduction

1.3. At its meeting on 8 July 2008, WG1 asked the Authority's representative if more information could be provided on the approach it was taking to assess the impacts of CAP148 particularly from the perspective of assessing abatement of carbon. The Authority representative agreed to provide indicative information on the kinds of approach it considers would be appropriate.

General principles

1.4. As a first step, a profile of connected generation capacity with and without a particular feature being implemented, for example CAP148, should be established. This would help identify the impact of that feature. Where possible, this should be conducted on a project by project basis but other approaches may be appropriate such as average or zonal.

1.5. In the case of an amendment along the lines of CAP148 or CAP164, we may establish a baseline scenario of generation projects that will come online in the absence of the relevant amendment out to a particular time period – for example 2020 - (the "counterfactual") and then examine how the amendment might accelerate the connection of a given project (or group of projects if using a wider approach).

1.6. In the case of an amendment such as CAP148 or CAP164, it is likely that the incentive property of the amendment would not in itself lead to an increase in the ultimate capacity of (renewable) generation in GB. The rationale for this being that the ultimate capacity will depend strongly on factors such as available sites and available subsidies, and that CAP148 or CAP164 may make only a marginal difference to project economics. What these amendments are likely to do therefore is shift forward the profile of viable generators.

Creating the base case

1.7. The generation background should be constructed from published information in the SYS and TEC register. However, where information is not available for the relevant time period, assumptions would need to be made regarding connection and closure dates. Reasonable assumptions for closure might be that nuclear plant will close in line with

publicly available information, auxiliary GTs will close at the same time as the main plant and LCPD opted out generation will close by 2015.

1.8. In later years where there is no information on connections, a suitable assumption may be that generation is added to maintain a minimum plant margin of, for example, 16%. This may be a mixture of generation, but is likely to be predominantly CCGT.

1.9. At this stage, it may not be apparent that the base case would deliver the government's 2020 targets, so it may be appropriate to introduce at least one scenario where the renewable target is met as part of the base case.

1.10. Given the nature of the information on generation project status in the TEC register and SYS, when creating a base case build profile, it may be appropriate to assume a defined lead time of, for example, 2 years between achieving planning consents and commissioning. Similarly, projects listed as "under consideration" or "application refused" may have a long lead time, potentially around 6 years (if at all) before they are connected. For those projects in the TEC register classified as "scoping" or "no information", other time frames will need to be assumed. Once all these assumptions have been made the counterfactual generation background can be created.

1.11. In the case of CAP148 or CAP164 which would accelerate generation, we would need to make certain assumptions on how quickly such generation will be brought forward. In the case of CAP148 there is a lead time of 3 or 4 years following potential implementation, such that no generation would benefit from it until 2013 at the earliest. Similarly assumptions would need to be made about the extent to which a project can be advanced – i.e. a maximum number of years by which it can be brought forward. The time period by when the transmission system has "caught up" with the generation requirements would also need to be considered so there is an end date for the analysis.

Modelling the effects

1.12. At this point, what we may wish to do with the analysis for the Impact Assessment for CAP148 would diverge from what the group could reasonably be expected to produce for CAP164 or other amendments. Once we have our generation base case, and our amended profile based on the features of CAP148 we would model the system. This includes modelling for a range of scenarios and for the relevant alternative amendments: how the market would be dispatched, making assumptions for demand in representative blocks, volumes of generation based on merit order dispatch, outage plans and availability and transmission system constraints. In doing this, we would create a series of costs and benefits. In modelling these costs, we would develop an indicative zonal flow analysis.

1.13. In terms of carbon abatement, as we would model generation output using a zonal flow analysis, we would be able to plot theoretical output by station before and after CAP148. We would then take the calorific value of the main fuel sources, and the emissions in CO₂e per tonne of fuel to get to a tonne CO₂e/MWh figure (which includes NO_x but the value is very low) for the counterfactual and post implementation of the relevant amendment. This is then multiplied by Defra's Shadow Price of Carbon to calculate a financial cost of carbon abatement associated with that amendment.