Committee on Climate Change

Rt Hon Chris Huhne
Secretary of State
Department for Energy and Climate Change
3 Whitehall Place
London SW1A 2AW

8th March 2011

Dear Chris,

Electricity market reform consultation

I am writing to you in response to your consultation on electricity market reform. As you know, we have highlighted the need for new electricity market arrangements to drive sector decarbonisation, which in turn will drive economy-wide emissions cuts required to meet carbon budgets. We therefore welcome your proposals, which are consistent with the high-level recommendations in our advice on the fourth carbon budget. Specifically, we believe that new arrangements based on long-term contracts to provide more revenue certainty for investors (e.g. your proposed Contracts for Differences) would deliver the required investments at least cost to consumers.

As you move to more detailed proposals, there are four key points from our fourth budget advice which we recommend that you consider:

- **A quantity rather than price-based instrument would provide most confidence over delivery**:
  - Given the crucial importance of decarbonising the power sector and extending low-carbon power to other sectors, it will be necessary for the Government to determine the appropriate pace of decarbonisation and to translate this into a contracting strategy.

  - Although such a quantity-based approach carries a risk of over-investment in low-carbon capacity, our analysis suggests that associated costs are limited. The alternative approach, which relies on setting the price for low-carbon generation and allowing the market to determine quantity, would risk significant under-investment with high associated costs. We set out the analysis underpinning this argument in the attachment.

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  - Our assessment is that the aim should be to reduce average emissions to around 50 gCO_2/kWh by 2030 through the addition of 30-40 GW (baseload-equivalent) low-carbon capacity through the 2020s.

  - Following an overall commitment to a contracting approach, more detailed analysis of the appropriate decarbonisation path would be required, and any initial strategy should include flexibility to adjust the pace of investment in response to new information (e.g. around technology costs, demand.)

- **Contracts for Differences would deliver investments at significantly lower cost than Premium Feed-in Tariffs**:
  - Specifically, leaving wholesale price risk with investors will raise their cost of capital, which will have a particularly pronounced impact on total costs given the capital-intensity of low-carbon technologies.

  - Although there may currently be benefits from exposing vertically integrated energy companies to electricity price risk in the current gas based system (e.g. energy companies provide some insurance for consumers against short term gas price volatility), these are eroded in a decarbonised system, where gas price risk is less relevant.

  - There are specific issues related to the treatment of gas price risk in the context of gas CCS under the new arrangements (e.g. CfDs including a cost sharing element for gas CCS could be considered).

- **New arrangements will have to include differentiated technology support for a transitional period.** Ideally the new arrangements would be technology neutral. However, given different stages of technology maturity, minimum levels of key technologies are likely to be required in order to develop a portfolio of options for sector decarbonisation in the 2020s and beyond (e.g. to be achieved through reserving some contracts for each of the less mature technologies). We will comment further on this issue in our review of renewable energy, to be published in May 2011.

- **There is scope for strengthening investment incentives through complementary levers**:
  - Ideally the carbon price would be strengthened through EU-level instruments (e.g. tightening the EU ETS cap, and an EU carbon price underpin).

  - Given current limited scope for action at the EU level, there is a strong case for introduction of a carbon price floor in the UK. We believe that the indicative trajectory for price set out in the consultation document is broadly appropriate.

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However, present proposals to fix the precise level on an annual basis would leave uncertainty about the future path, undermining the strength of investment incentives created. Ideally a means should be found to make a clear commitment to a future price trajectory.

- The proposed emissions performance standard set at the Government's favoured level of 600 gCO_2/kWh will not have a material impact on investment decisions. A tighter emissions performance standard, alongside Contracts for Differences for CCS retrofit, would help to ensure that any investment in new coal is with the intention that this will be CCS retrofitted.

- An emissions performance standard or similar instrument strictly limiting investment in new unabated gas plant beyond 2020 could also strengthen incentives for investments in low-carbon capacity. Alternatively, a requirement that energy suppliers forward contract for low-carbon capacity could be introduced (this option was not included in your December proposals). Such approaches should not be ruled out at the current stage.

We provide more details on the above points in our advice on the fourth carbon budget, and would be happy to discuss further with you if this would be helpful.

Yours ever,

Adair Turner
Chair, Committee on Climate Change

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Attachment: assessment of risks and costs under quantity- and price-based approaches

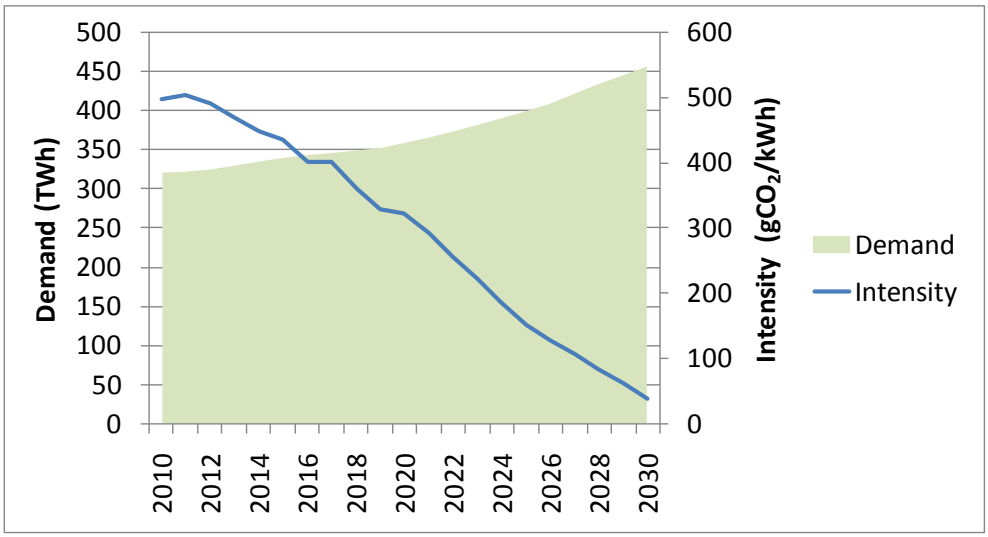
There are six steps in demonstrating why costs and risk are lower under a *quantity*- rather than *price-based* approach, and why a quantity-based approach should be introduced now rather than following a transitional price-based approach:

- Setting out the path for power sector decarbonisation.
- Showing the importance of demand from new markets for electric vehicles and heat.
- Showing the sensitivity of low-carbon technology economics to load factor.
- Assessing risks and costs under a price-based approach.
- Assessing risks and costs under a quantity-based approach
- Considering the timeline for investment to meet new demand.

The path for power sector decarbonisation

We developed our scenarios for decarbonisation of the power sector through the 2020s based on an assessment of capital stock turnover, the relative cost of low-carbon and other technologies, projected carbon prices, and projected demand growth including from new markets for vehicles and heat. Our lead scenario included low-carbon capacity investment of around 30-40 GW (baseload-equivalent) through the 2020s resulting in average emissions falling from current levels of around 500 gCO_2/kWh to around 50 gCO_2/kWh in 2030 (Figure 1).

Figure 1: Scenario for electricity demand and emissions intensity (2010-2030)



Source: CCC

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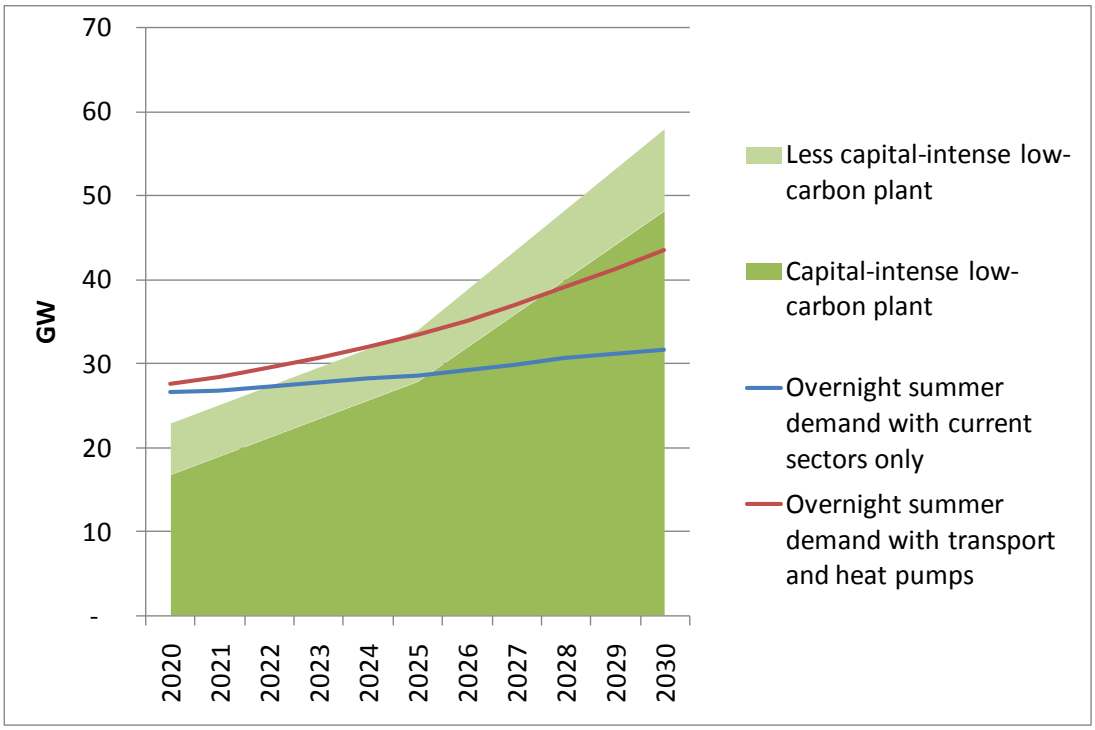
Demand from new markets for electric vehicles and heat

Electricity demand projections for our fourth budget scenarios incorporated detailed analysis of demand from new electric vehicle and heat markets:

- Our lead scenario for transport sector decarbonisation includes strong growth in (pure battery and plug-in hybrid) electric vehicles through the 2020s, such that these account for 60% of new vehicles purchased in 2030 and around 30% of the vehicle stock.
- Our lead scenario for heat sector decarbonisation includes around 50 TWh of demand from heat pumps by 2030 (i.e. around 40% of total demand for heat from buildings).
- Demand from new electric vehicle and heat markets accounts for around one quarter of baseload demand in 2030 in our lead scenario (Figure 2).

Figure 2: Overnight summer demand with and without new heat and transport demand (2020-2030)



Source: CCC

Notes: Demand is lower in summer and overnight, so summer overnight demand represents demand which will be on the system throughout the year.

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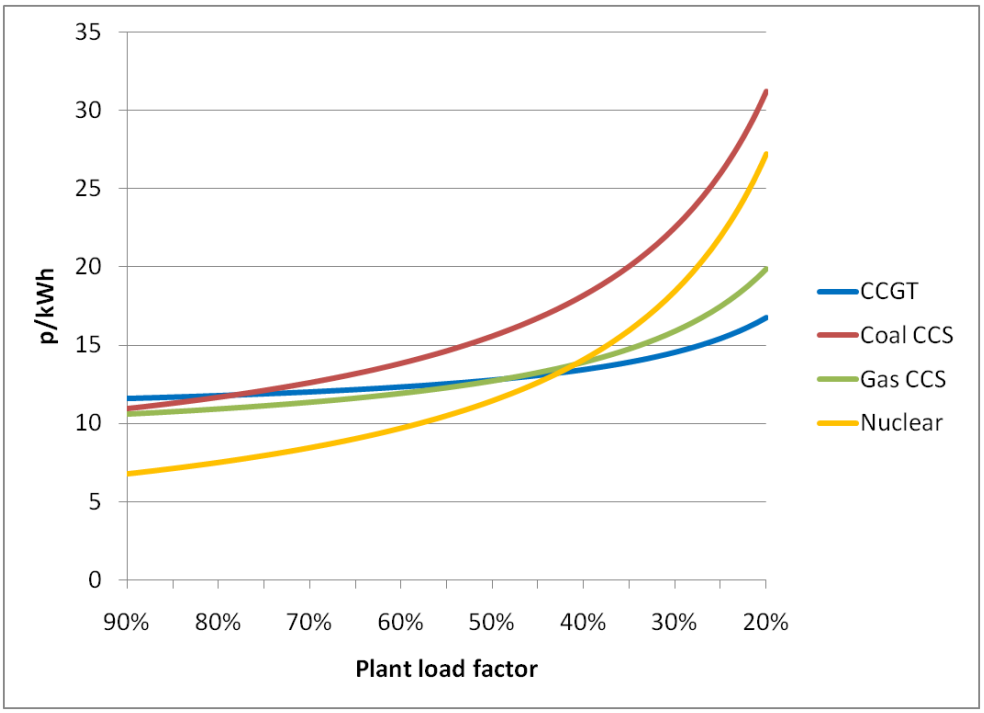
Sensitivity of low-carbon technology economics to load factor

Low-carbon technologies are capital-intense, and therefore the economics of these technologies are sensitive to the load factor at which they operate, which in turn is determined by the level of baseload demand. For example, there is a 70% cost penalty (per kWh) for nuclear plant operating at a 50% load factor compared to running at baseload (Figure 3).

Figure 3: Levelised cost of generation technologies by load factor



Source: CCC based on Mott Macdonald (2010) *UK Electricity Generation Costs Update*
Notes: Based on DECC central fuel and carbon prices, 10% discount rate, nth of a kind generation technologies.

Risks and costs under a price-based approach

There is a general risk under a price-based approach that this will result in under-investment or economic rents for investors:

- Under a price-based approach, the price to be paid for low-carbon technologies would be set, and the market left to determine the quantity of investment.
- Given the high degree of underlying cost uncertainty, it is likely that any price would be set either too high or too low.
- In the event of a low price, there would be under-investment in low-carbon technologies. At higher prices, there could be more investment but at an unnecessarily high cost to consumers.

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Even if it were possible to set prices to reflect underlying costs, it is unlikely that investors would build in anticipation of baseload demand from new vehicle and heat markets, given significant uncertainties around development of these markets from an investor perspective. A price-based approach would therefore be likely to support only in investment to decarbonise existing baseload demand.

We estimate that the result would be a shortfall of low-carbon capacity of around 12 GW in 2030 relative to baseload demand with heat and transport included (see Figure 2 above), with the need to build and run higher-cost plant (e.g. CCGT with a carbon price) in its place. The annual costs associated with this shortfall would be of the order of £2 billion in 2030, rising with the carbon price through the 2030s.

Risks and costs under a quantity-based approach

The risks for government/society in anticipating new baseload demand are limited, both because this new demand from heat and transport electrification will be required in order to meet carbon budgets, and because government has policy levers available to support development of new markets (e.g. fiscal incentives for purchase of low-carbon vehicles, control of the planning framework for electric vehicle charging infrastructure, control of buildings regulations for deployment of heat pumps).

In fact, there would be very limited cost associated with building this plant for the government/ society even if electric vehicle and heat market development were to occur at a slightly slower pace. The reason for this is that low-carbon plant is likely to be competitive with high-carbon alternatives even at mid-merit dispatch (see Figure 3 above). In addition, there may be opportunities for use of spare overnight capacity to generate for export or production of hydrogen.

Timeline for investment in low-carbon capacity

Annual average investment of around 3-4 GW (baseload-equivalent) low-carbon capacity through the 2020s is required to deliver a largely decarbonised power sector by 2030. Given long lead times for projects (e.g. at least seven years for nuclear investment), investment decisions consistent with the decarbonisation trajectory are required from as early as 2013.

Therefore it is not the case that new arrangements should be designed to decarbonise existing baseload demand, with further reform to support investment in low-carbon capacity to meet demand from new markets. Rather, new market arrangements should be designed to support decarbonisation of existing baseload demand together with mid-merit demand / baseload demand from new markets for electric vehicles and heat.

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