There are many possible policies for decarbonising the electricity sector, and the UK has tried most of them. This paper is a very good discussion of their underlying economics, highlighting the difficulty of setting either an appropriate carbon tax or emissions cap. Its recommendation – long-term contracts for low-carbon generation – broadly coincides with the current UK policy.

I believe this is a significant contribution and that the analysis is correct (with a couple of things that might be tidied up in a revision). The big take-away for this reviewer was the sensitivity of the break-even carbon price to factors such as the price of gas, for I had not previously thought of the problem in those terms. In a sense, this paper is dual to one of mine (itself a modelling exercise to explore the impact of combining two of David's insights): "Carbon Tax or Carbon Permits: The impact on generators' risks" (*Energy Journal*, 2008, vol 29. no. 3). That paper found that the profits of a nuclear power station would vary strongly under stochastic gas prices and a fixed carbon price, and nuclear power would only form a significant proportion of an optimal portfolio if long-term fixed-price contracts were available. The current paper shows that the carbon price needed to give fixed (zero) profits for low-carbon generators varies, and which factors it is most sensitive to. It would have been helpful to have given the carbon price needed to make wind power competitive with gas stations under the central case assumptions – this would help set the absolute variations in the carbon price in perspective, although they can already be compared to the range of carbon damage estimates given earlier in the paper.

I would generally agree with the policy conclusions in part 3 of the paper. The discussion of emissions performance standards (adopted in the UK in 2013) might be taken to imply that the emissions allowed from existing plants have to decline over time, and discusses the possibility of pre-announcing the path of that decline. The EPS in the UK did not actually affect existing plants (their operation has declined because of growing renewable output and high carbon prices). My personal "take" on the EPS was not that it was a ban on coal plants – that had existed de facto for several years, when ministers had made it clear they would not give consent to new coal-fired stations without at least some CCS. Instead, the innovation was a guarantee to new gas-fired generators that the limit would not be tightened before 2044 (without new primary legislation). I took this as a measure to ensure investment was not deterred by uncertainty over future decarbonisation policy. However, I think I would agree that a pre-set tightening path – if only it could be credible – might have advantages.

I think one prediction within the algebraic discussion of the carbon price sensitivities needs to be clarified. The paper states that the value of e over gamma (efficiency divided by carbon intensity of the fuel) will fall over time as peaking plant is installed instead of baseload stations (page 11). I agree that the capacity mix should change towards a higher proportion of peaking plant, but don't think this would lead to a gradual change in e; instead, we'd get one value for new baseload CCGTs and one for new peakers, and their equilibrium running hours should be such as to give them both zero profits.

A couple more minor points on the policy section: having assured capacity payments ensures low risks and financing dominated by debt (page 20), but not during the construction phase of nuclear plants. The last paragraph of section 3 calls for long-term hedging contracts for renewable generators based on nodal prices, but the natural interpretation (to me) is that these insure the generator against flcutations in that nodal price, and hence against the risk that too many other

plants locate in the same area and drive the price down. It would be better to provide hedging against a market-wide or "hub" price, leaving the generator exposed to the basis risk between their location and the hub as a whole. This could in turn by hedged by financial transmission rights, but if too many generators are heading for the same area, their price will be high, discouraging the excess.

Finally, a consolidated list of notation might be helpful.