

Costs for the USA of Compliance with the Kyoto Protocol: a Critical Assessment of Official US estimates.

The US government's official reason for abandoning the Kyoto Protocol is its supposed cost to the US economy, especially in the light of the growth in the American economy and its carbon emissions over the last 10 years. US government spokesmen have emphasised a supposed cost of \$300 bn per annum (about 3.5% of forecast GDP in 2010) as reasons for claiming Kyoto is unfair on the USA and too expensive to comply with.

The source of these estimates is presumably the US Energy Information Agency's (EIA) 1999 assessment, 'Greenhouse Gases and the Kyoto Protocol', which can be found on <http://www.eia.doe.gov/oiaf/kyoto/execsum.html>.

Comment.

1. The claim that Kyoto compliance would cost \$300 bn per annum or 3.5 % of GDP is based on an assumed permit price of \$350 per tonne of carbon, which EIA forecast would be needed to achieve emissions averaging 3% below 1990 levels over the period 2008-12 (this is assumed to constitute compliance with Kyoto, once tree planting is taken into account, without need for purchasing permits from abroad).
2. **This estimate is vastly out of line with general equilibrium studies** (eg Rutherford, 1998, or Parry et al) who estimate a carbon tax in the range \$100-160 would be needed, and GDP costs would be ¼ to ½% of GDP.
3. Examining the EIA figures in more detail, the \$300 bn figure turns out to represent just the cost in one year, 2010, when costs are assumed to

peak, due to the costs of rapid adjustment and of assumed macroeconomic disequilibrium (the EIA forecasts a severe recession as a result of the tax change). The costs are much lower - in the range of 0.7% of GDP – from 2015 onwards. **→To represent this cyclical peak as an ongoing annual cost, as the DOE have done, is false.**

4. The 3.5% GDP cost also turns out to apply only to the case where permit auction revenue is recycled as lower income taxes. The EIA's own model indicates a lower cost (1.6% of GDP in 2010, falling thereafter) if social security taxes are rebated instead. **→The DOE appear to be deliberately choosing expensive recycling policy options, in order to exaggerate costs.**
5. There are also **considerable reasons to doubt the credibility of the EIA's modelling.** The macroeconomic model used appears unsuited to this work. The possibility of macroeconomic policy accommodation is ignored. The macroeconomic model is unlikely to capture the important supply-side effects of the revenue recycling. The assumed implementation scenarios are more rapid (and consequently require much higher taxes) than Kyoto requires. **→All of these cases of poor modelling are likely to exaggerate the estimated cost greatly.**

In conclusion, **the DOE is guilty of misrepresenting the EIA's own work in this area, to greatly inflate the implied costs of Kyoto. Their cost estimates are grossly misleading, quite probably overestimating costs by a factor of 10.** There are also considerable flaws in the EIA's methodologies, which again serve to inflate costs. I suggest, in the light of the importance of this policy decision, these require urgent attention from outside bodies (eg the Congressional Budget Office) and deserve the scrutiny of independent experts in the field.

More Detailed Comments on the DOE/EIA's modelling.

There are detailed doubts about the methodology used to obtain the DOE's cost estimates (even the more modest figures available on the EIA website, rather than the selected misleading numbers DOE spokesmen have been using). These can broadly be divided into questions over implementation assumptions and over the model.

Implementation assumptions.

Under Kyoto, the USA would probably have to reduce its average carbon emissions for the period 2008-2012 to 3 % below 1990 levels. The speed of the assumed adjustment is crucial, because short run demand price elasticities for energy are much lower than longer run elasticities.

1. The EIA assumes the USA has to achieve its target IN EACH YEAR of the 2008-2012 period, rather than being able to reduce emissions gradually during the period.
2. The carbon reduction policy is only assumed to start in the year 2005. This means that the USA has to achieve very sharp emission cuts in just three years (and in a model where the policy is largely unanticipated except by power generators). It is therefore no wonder that permit prices have to rise so sharply: by 2020 they fall back from \$350 to \$250 per tonne carbon.
3. Rather than using the macroeconomic section of the model to estimate the required macroeconomic stabilisation policy, it is used to forecast a continuing and prolonged recession. Why are not fiscal and monetary policy assumptions altered to avoid this ?

Modelling assumptions.

The forecasts come from a system of models: quite a detailed dynamic energy sector model developed by the EIA has been used in conjunction with a relatively crude macroeconomic model from DRI. It is the DRI model which greatly inflates the medium-run implementation costs (though see point 3 above).

4. How detailed is the supply side of the DRI model? Is this model really appropriate for estimating the potential supply-side gains from recycling revenue to reduce other taxes (the 'double-dividend')?
5. Indeed, is the DRI model's treatment of the differences of various taxes sufficiently empirically and theoretically robust to make it suitable for estimating the behavioural effects of what is essentially a microeconomic change, where a new tax (or auctionable permit) is used to fund a cut in other taxes in a fiscally-neutral package?
6. The model is being used to predict changes 9 to 19 years ahead. Are its long-run properties (both in terms of empirical stability and of theoretical consistency) sufficiently well-researched to make it a reliable tool over this period? Given the difficulties macroeconomic forecasters have in predicting even the next couple of years, can we take seriously a model which predicts a severe recession 9 years hence?
7. Given the famed flexibility of the US labour markets, how is such a prolonged and severe disequilibrium reaction possible?
8. Why have EIA not used a model with more general equilibrium characteristics (eg McKibben) for the medium-long run aspects of their analysis?
9. Why was the DRI model used for short-run implementation issues rather than the US Treasury model?

10. Why does the energy sector model fail to allow for forward expectations (except by power generators) of a pre-announced Kyoto policy from the first year of simulation (ie now) onwards ?
11. There are always questions about long-run energy simulation models, over whether long-term price elasticities are really adequate – including capturing effects on technical progress. The track record of past models, especially those produced by energy supply industries, is a tendency to underestimate such price responses.
12. CGE simulations (eg Edwards and Hutton) imply important terms of trade gains for advanced countries when they implement carbon permit/tax policies. Is this adequately taken account of by the EIA/DRI models ? And do they take account of the effect (see Whalley and Wigle) on global energy prices ? Energy prices are currently seen as a topic of some concern by the US administration – why therefore is a policy which would reduce energy demand frowned upon ?
13. Has any account been taken of the benefits in terms of reduced emissions of other pollutants, or of reduced road congestion (see for example the CSERGE Blueprint series) ?

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30 July 2001.