

Questions to IEA

Question from the United States of America

There are various 'bottom up' engineering assessments on cost, which distinguish from the top down economic modelling. We'd like to know if a reconciliation has been undertaken between bottom up (engineering-based) calculations and top down (economic) models as they give us different answers regarding cost of individual options, optimization of when individual options might come in, as well as timing and expectations around technology.

Response from IEA

In Energy Technology Perspectives (ETP) we have not attempted to reconcile our results with those produced with other type of models. However, at the IEA we do employ different kinds of modeling, both top down and bottom up, and our findings are broadly consistent.

The ETP model is a technology rich, bottom-up model. Each sector can be modelled in detail, with costs associated with individual technology options. This type of studies has historically often resulted in lower cost estimates than what so-called top down models produce. These models aim to integrate all activities in the economy, with less detail in each sector.

There are at least two important reasons why top down models often give higher mitigation cost estimates than bottom up models do. Firstly, they have less technology detail and fewer mitigation options available. Secondly, they typically assume that there are no mitigation options with negative costs, which engineering studies often indicates exist. For example energy efficiency is nearly always cost effective in the longer term (net fuel savings pays for the up-front technology cost). The advantage of top down models are that they can capture interactions and spill over effects between sectors in a better way than bottom up models can do. There have been studies made to compare the results from bottom up and top down models. For instance, the IPCC AR4 had a section on this. Generally, the literature seems to suggest that the differences between modeling approaches are becoming smaller, in particular at an aggregate level. Larger discrepancies are usually present at the sectoral level, as can be expected.

Question from China

Given those conclusions and messages, how can we understand the distributional effects linking equity with the definition of system to provide for right incentives for stakeholder to adopt clean technology, and to share the cost.

Response from IEA

ETP 2012 contains a section dedicated to the finance and the investment challenge; how much capital will be needed, and where could that capital come from. An important conclusion is that the absolute cost to cut emissions seem manageable. Instead, the distribution of costs – and benefits – between and within societies, and over time, is likely to be a more important barrier to the transformation.

ETP also analyses in what regions investments will be needed to be made, at what point in time and in what sector and technology. From this it is possible to draw conclusions on what incentives and policy instruments are needed to in order to achieve the desired energy system.

However, the analysis does not provide a full answer to broader questions around equity, perceived fairness and historical responsibility. For example, while it is clear that a carbon tax in an ideal setting may reduce emissions at least to society, the distributional effects will be very different depending on how the revenues from that tax are used. The same is true at the international level: although a set of incentives may produce efficient results for the international community as a whole, there will undoubtedly be winners and losers within that

group of countries.

Moreover, if one region invests heavily in research, development and deployment of new technology, the resulting technology cost reductions are likely to benefit other regions as well.

This forms a strong case for international collaboration. Not only will it be physically impossible to achieve the 2 degree target if only a limited number of countries take action - the cost of reducing emissions would also rise significantly because technologies would be more expensive if fewer countries had a stake in developing and deploying them.

Question from China

How can we define the costs here? Does it mean technological costs, engineering costs, market costs, social costs?

Response from IEA

ETP 2012 gives total direct system cost. This includes capital costs and to a large extent also running costs, although in some cases these are difficult to quantify. Taxes paid by operators are not included in these costs, as they from a societal perspective are redistributed to the government who can then recirculate them into the economy. Social costs that may arise from redistribution of resources or restructuring of the economy are not included.

Question from South Africa

The IEA highlighted a number of technology options. How can the options reflected assist us collectively in working towards closing the gap?

Response from IEA

ETP 2012 shows the range of options that are available to reduce emissions. Also, it is clear that the the appropriate technology mix and strategy for transforming the energy system will differ depending on context. ETP 2012 contains analysis of scenarios for nine regions (including South Africa) that shed some light on this. Our hope is that the analysis will provide guidance on suitable policy and technology pathways.

Question from South Africa

A point that appears in both the UNEP and IEA presentations pertains to the fact that all the scenarios drawn are around a certain level of confidence, which now brings us to another discussion about the implications on adaptation. What are the related adaptation costs related to the various likelihood scenarios related to the projections put forward.

Response from IEA

ETP 2012 does not consider potential costs for adaptation or damages resulting form climate change. The positive return on investment in clean energy is based on comparing what additional investments are needed, with the economic value of the fuel savings those additional investments would generate.