Scenarios and Policies for Decarbonisation

Chairman's Conclusions

On 22 March the workshop, "Scenarios and Policies for Decarbonisation," analysed energy transition scenarios towards a low carbon energy future in the view of the need for a reduction of greenhouse gases on the order of 80 – 95% of 1990 emission levels by the middle of the century,. Some of the studies examined the entire energy system, others focused on the electricity sector. There was broad agreement that decarbonisation of the electricity sector by 2050 through a complete or at least near to complete shift to renewables is achievable. The workshop assessed the potential for a transition to a low carbon energy future while meeting Europe´s energy demands. Participants also discussed the differing levels of national and European Union institutional capacity and political and societal support for large scale expansion of renewables. The workshop was organised by the energy working Group of EEAC (European Environment and Sustainable Development Advisory Councils) with support from the SRU (German Advisory Council on the Environment) and the Sustainable Development observatory of the European Social and Economic Council (EESC).

A half/dozen high-profile, cutting edge and recently or soon to be released low-carbon energy scenarios were presented and discussed. The scenarios address the conditions under which Europe's electricity and energy needs can be wholly or in large part met by renewable energy sources. Most scenarios adopted a back-casting approach, starting from scientifically determined greenhouse gas reduction objectives for 2050 and then working back in time to understand what kind of energy transformation is needed in Europe to meet these goals. The seven scenarios[1] presented or discussed[2] share the assessment, that renewable sources in Europe have the potential to provide most future electricity and a large share of primary energy needs. Several of the scenarios reach the conclusion that a 100% renewables supplied electricity system can be achieved. This can be done in a cost competitive way that respects biodiversity and ensures that electricity demand can be met at all times of the day and night and throughout the seasons. Fluctuations in energy generation and intermittency of renewable energy supply can be balanced through inputs of different renewable sources across Europe and through development of storage capacity. The scenarios illustrate, that electricity from renewable sources can be a sustainable, low carbon solution to present and future electricity and primary energy needs.

The scenario which focused on the electricity sector only shows that in the long run having nuclear power or coal with CCS in the electricity mix would make the transition more expensive and less secure. Another study, which also incorporates nuclear and CCS as part of the energy mix, assumes compatibility. The issue of a potential misfit between an intermitting and a less flexible power supply hence merits further scrutiny.

[1] Scenario author teams presenting were: Ecofys; Prof. Mark Z. Jacobson, Standford University; SRU based upon the REMIX Model of DLR; Greenpeace-EREC; European Climate Foundation

[2] PWC - PIK

The scenarios differ in methodology and critical assumptions, but the overall result that a renewables based electricity sector is feasible, is generally consistent. The studies agree that renewables are a critical component of Europe´s energy future and that they will become cost competitive. That seven distinct scenarios, using various methodological approaches reach such similar conclusions argues for their robustness. Linking a renewable energy technology approach to macro-economic modelling is likely to further strengthen the robustness of the results.

The scenarios reach several common policy conclusions:

- successful energy demand management will reduce considerably the cost of a transformation towards RES
- Cost for renewable energy strongly declines over time with their successful market deployment. Within roughly the next decade they will reach levels which are lower than the costs of other low carbon technologies
- upfront investments for RES are economically justifiable and required
- wind and solar energy will be the most cost-effective backbone of a renewable electricity system
- security of supply can be enhanced by long-distance HVDC-links as well as better cross-border interconnectors
- research and market-incentives for storage must be enhanced especially for new storage technology and future renewable energy technologies (e.g. tidal wave energy).

The transformation towards RES is already under way. Analysis shows that the investments of the last decade in new power were primarily directed toward wind, solar and gas. It is critical to maintain and strengthen this trend. This implies a gradual phase-out of conventional power plants as they reach the end of their technical – and economic life.

There is an emerging European-wide trend toward the expansion of renewables in part a result of European directives, in part a result of national developments. However a full political consensus for a transformation to renewables has yet to be achieved and national differences on the power mix remain a major issue. The interests of the centralized fossil energy and nuclear power sectors still are very influential both in member states and at EU level. A key challenge ahead is to strengthen political and societal support for the transitions portrayed in the scenarios.

The European Commission should seriously consider in its energy scenarios for the future a scenario that relies fully on RES in the electricity sector and in large part for total primary energy in its planned 2050 Road Map. RES provides a path to decarbonisation that does not require reliance on politically more controversial technologies. A RES pathway is moreover comparatively strong on sustainability criteria (including safety, long term storage and resource constraints, overall system cost, GHG-lifecycle assessment of different technologies). Energy assessments should critically review the full costs (financial, technical, safety, security) of different energy mixes.

The focus of the Commission on development and extension of a grid system capable of handling future growth in renewable energy sources is welcomed. Care should be taken that the energy 2050 roadmap and infrastructure planning are

closely interlinked. Different energy systems rely on different infrastructures as the location and the needs of renewable energy are different from those of conventional power. Increased levels of capital investment will be crucial. Capital may be mobilised by improving bankability of investments as well as by measures to reduce investment risk. The Commission should consider at the earliest possible stage a road map for RES beyond 2020 in order to create a certain environment regarding future grid-needs.

It is critically important to keep the pathway towards RES open. Political acceptance of RES as a low carbon energy source with the capacity to provide Europe´s energy demands will grow with the continued successful growth and market penetration of RES. Impact assessments and energy strategies in Member States and the EU should take into consideration the consequences of all energy policy decisions and subsidies on the renewable energy sector. Decisions which could slow the development of renewables should be avoided.

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