Network of
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Advisory Councils (EEAC)

A Road Map for a competitive Low Carbon Economy and lessons for the Energy and Transport 2050 Roadmaps

EEAC Working Group Energy

Discussion Paper

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Introduction

1 The European Commission Communication on "A roadmap for a competitive low carbon economy" from March 2011 is the first step in a series of communications and policy commitments. It illustrates how the EU wants to contribute to the increasingly ambitious target to keep global temperature increases below 2°C and how it wants to achieve the resulting GHG reductions of 80 – 95% by industrialised countries. It reconfirms global Climate policy leadership in the context of the EU 2020-strategy for smart, sustainable and inclusive growth and its resource-efficiency flagship project. This discussion paper reflects discussions of the EEAC Energy Working Group on the basis of a WG Meeting 15th of April 2011 and a written commenting process. We intend to promote deliberations within and outside of EEAC on the pathways and the further initiatives for a European low carbon economy.

Overall Assessment

2 We welcome the overall approach of the roadmap. For economic actors it is highly important to have a clear sense for the direction of investment and innovation. Therefore the timeline 2050 with an overall mitigation target, the efficiency led sector break-down of this target and intermediate milestones suggest a framework for orientation, which now needs to be politically assessed and confirmed.

3 We share the argument of the European Commission, that investing into decarbonisation is a major contribution to a "green economy" and offers multiple benefits both for Europe´s economy and Europe´s global and credible leadership in climate policy. The transition to a low carbon future may increase the investment share to the European GDP by 1,5% and hence may be a very effective strategy for an ecologically qualified economic recovery strategy. Furthermore market diffusion of innovative domestic solutions to global problems will reduce mitigation cost over time on the basis of learning curves and may strengthen energy security and competitiveness. A unilateral offer of the EU and a very high share of domestic greenhouse gas reductions are vital for the innovation process. As the Commission argues in its Impact Assessment the risk of carbon leakage should not overemphasized and could be minimized by complementary measures.[1]

4 The 2050 Target of a domestic 80% GHG-reduction however is only at the lower and hence easier-to-get-achieved end of estimated needs. The Commission should have assessed the implications of a 95% domestic reduction effort, which might become

[1] European Commission Staff Working Document 2011, A Road Map for moving to a compeotitve low carbon economy in 2050, Impact Assessment from 8.3. 2011, SEC (2001)288final; p. 44: The Argument is interesting: in case of global action, a level playing field may be created, but differential cost of the low-carbon transition is high – in the case of unilateral action, differential cost is lower (due to high carbon and fuel prices), but no level playing field is created.

necessary over time and which is more in line with global equity considerations, that per capita greenhouse gas emissions globally should converge over time. A European 2-tonnes GHG society cannot be globally generalized for 9 Billion people! Reduction efforts should be based upon fair-shares within a limited global carbon budget.[2] A 95%-reduction target might at first sight get into conflict with high economic growth rates – but as unmitigated climate change will backfire to the economy, this trade-off merits more serious reflection. Respect of the limited capacity of the earth system as carbon sink and proper consideration of the long term impact of climate change on international security, the economy, human welfare or biodiversity merit priority consideration over short-term economic objectives.

5 The suggested reduction pathway however is disappointing and underestimates the economic risk of too little innovation at the beginning. The 25%-target for 2020 falls behind the conclusions of the economic assessment of the Commission from 2010 and of many other studies, suggesting at least a 30% reduction.[3] A too slow reduction curve for this decade may increase the lock-in-effect of technologies which deliver modest reductions now, but which are incompatible with the 2050-targets. Modest short term reductions will require a steep reduction curve later and hence cause stranded-investment or failure to meet the targets. The problem is especially persistent in the power and the transport sectors.

6 The suggested strategic technology choices may play an important role for the transition to a low carbon economy. However they should not only be assessed on the basis of economic criteria, such as energy security, cost and competitiveness. Any systems transition should also fit to broader sustainability criteria, such as maintaining the life-supporting functions of ecosystems and respecting biodiversity targets, minimizing burdens and risks to future generations (e.g. nuclear waste storage, nuclear accidents) on the basis of the precautionary principle and the above mentioned equity considerations.[4] Furthermore broad public acceptance of the technology choice is – especially after the nuclear disaster of Fukushima – not to be expected for all low carbon technologies. This needs to be respected especially within the forthcoming energy road-map 2050.

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2 See: WBGU 2009: Solving the Climate Dilemma: The budget approach; http://www.wbgu.de/en/publications/special-reports/

3 European Commission (2010): Communication from the Commission to the European Parliament, the Council, the European economic and social Commitee and the Commitee of the Regions. Analysis of options to move beyond 20% greenhouse gas emission reductions and assessing the risk of carbon leakage. COM(2010) 265 final.
Jäger et al. (2011): A new growth path for Europe. Generating prosperity and jobs in the low-carbon economy, Potsdam, www.european-climate-forum.net; see also the IPCC Special Report Renewable Eneregy Sources (SRREN), May 2011; http://www.ipcc-wg3.de/publications/special-reports/srren

4 A differentiated energy technology assessment on the basis of sustainability criteria develops the SRU(2011) in its special report: "Pathways towards a 100% renewable electricity system by 2050" (http://www.umweltrat.de/SharedDocs/Downloads/EN/02_Special_Reports/2011_01__Pathways_Chapter10_ProvisionalTranslation.html)

7 A strengthened and broadened ETS will play an essential role for creating the economic incentives for the required transitions. The ETS Cap therefore should be adjusted, especially taking into account the high share of the power sector and its high reduction curve. This implies strengthening the reductions pathway by an additional 20 percentage points in order to achieve the 90% plus x % reduction foreseen for the ETS sectors and strengthening the Cap in line with a 30% GHG-reduction target for 2030.[5] However any decarbonisation road map relying only on the economic incentives of the ETS will fail to deliver, as important back-stop technologies, needed for 2050, will not yet be competitive in the short run. This applies especially to renewable energies and their steep learning cost curve as their market penetration increases.[6]

Assessment of Sectoral Reduction Pathways

8 *Power Sector*: We especially welcome the reduction pathway for the power sector. However only a close to 99% reduction of GHG by 2050 is fully in line with with the 2 degrees target. Available economic assessment suggests that the power sector has the lowest long term mitigation costs and the easiest reduction potential.

9 We however strongly disagree with any strategy substantially slowing down renewable electricity growth after 2020. This slowing down is not a necessity but seems to be a consequence and problem of the modelling approach for the roadmap. In 2020 more than a third of Europe´s electricity supply will be provided by renewable sources, according to the respective action plans of member states to implement the 2009 - Renewables Directive. Already today close to 2/3 of new electricity generation capacity in the EU is based upon renewable energy sources. Its share will double during this decade.[7] Hence aiming only for additional 20 Percentage points in the three decades after 2020, does not only underestimate the growth potential of renewable energy but also seriously undermines the decarbonisation target for the power sector. Compared to other low carbon sources cost for most renewable electricity sources will decline over time as costs decrease with market penetration. Conventional fossil sources will become more expensive over time due to the effects of ETS and global energy price increases. For nuclear energy – especially after Fukushima – a negative learning cost curve due to reinforced nuclear safety investments can be expected. Transitional higher cost for renewable energy sources hence are a sound investment in a low cost future.[8]

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5 European Commission 2011, Impact Assessment, p. 54 (s. above)

6 Neij, L. (2008): Cost development of future technologies for power generation. A study based on experience curves and complementary bottom-up assessments. Energy Policy 36 (6), S. 2200-2211.Neij, 2008; see also the IPCC SRREN –Report 2011(s. above).

7 Bloem, H., Monfort-Ferrario, F., Szabo, M., Jäger-Waldau, A. (2010): Renewable Energy Snapshots 2010. Luxembourg: Office for Official Publications of the European Union.

8 SRU 2011 an cited literature; see also: IPPC

10 In the view of complete decarbonisation, CCS can only play a minor role in the future European energy mix. Remaining CO2-emissions from coal based electricity will continue to exceed 100 g/kWh (or only reduce specific emissions by less then 90% at the price of lower efficiency). Furthermore CCS for the power sector meets serious bottlenecks, as regards available storage capacity, which might be needed for other purposes, limited public acceptance and low economic viability in the context of high renewable electricity shares. Despite of generous EU subsidies CCS demonstration projects face serious delays, cuts in number and acceptance problems in several member states.

11 The road map therefore implies that an important share of the energy mix will be borne by nuclear energy. A close to 50% percent nuclear share of the EU power mix by 2050 implies the construction of new capacity in the range of 250 GW (=ca. 166 nuclear reactors with 1500 MW capacity each to be constructed, assuming that by 2050 most of todays 142 Reactors need to be rebuilt). [9] Such a nuclear renaissance will create major objections in most member states especially in the view of the new risk awareness, the unsolved final nuclear waste storage problems and cost considerations. Because of its inherent and unmanageable risks nuclear energy is a source of serious political conflict within countries and between countries. Even in countries, which today strongly rely on nuclear energy, some interest to diversify sources of energy supply during the power plant renewal investment cycle can be observed. Hence such any plan relying on a nuclear renaissance will be unrealistic, puts the implementation of the low carbon road map at risk and might become a severe political barrier to the further integration of the European energy market. Renewable energy is the only source which meets broad consensus over all member states. Its continued support by the EU hence may be an important driver for European integration. The Energy 2050 road map must correct this fundamental mistake!

12 One of the biggest challenges is the 54 – 67% reduction range for transport. Vehicle efficiency and electrification will play a key, yet insufficient role for that transition. Electrification of transport requires strong integration with renewable electricity supply. It may offer a small contribution to the load management challenges of a more volatile renewable energy supply. Increased use of biofuels however is not acceptable because of the direct and indirect effects for land-use.[10] The Commission roadmap for a single European Transport Areas suggests interesting targets for 2030 and 2050, such as the

[9] This is an interpolation of the ECF and Eurelectric Studies, which assume a 320 GW combined capacity for nuclear and CCS in a 2050 decarbonisation scenario with a 40% RES share.

[10] See: EEAC Workshop on Biofuels in 2009; and: Report of the EEAC Annual Conference 2010: http://www.eeac-net.org/
SRU, 2007: Climate Protection by Biomass: http://www.umweltrat.de/SharedDocs/Downloads/EN/02_Special_Reports/2007_Special_Report_Climate_Change.html;
WBGU 2008 - : Future Bioenergy and Sustainable Land Use http://www.wbgu.de/en/publications/flagship-reports/flagship-report-2008-bioenergy/; also the potential analysis of the IPPC SRREN Report;

phase-out of "conventionally fuelled cars in 2050 or a 50% shift of long-distance road freight transport to rail or shipping. The Commission Proposals for clean urban transport and commuting are to be welcomed. However as the EU has limited competence in urban planning and infrastructure policy, the implementation strongly depends on supporting member states and municipal commitment. The suggested pricing and infrastructure policies go in the right direction but need more specification. Otherwise they risk falling far behind the ambition of such targets, especially as regards freight transport. The Commission emphasizes that transport infrastructure investments would have to increase to € 1,5 Trillion over the two decades between 2010 – 2030 [11], but says little how they could be mobilized and channelled for the right priorities. A key instrument could be a greening of the EU budget for infrastructures, especially of its structural and cohesion policy. So overall the transport white paper lacks a coherent policy approach to achieve the overall reduction targets.

13 The management of transport growth should not be neglected, as better mobility does not necessarily imply more transport. This will be a key challenge for spatial and urban planning, for logistics, a more selective approach in infrastructure planning or much more effective pricing policies. The potential of a resource efficient economy to decouple transport volume from economic growth should be much more systematically assessed. [12] In that sense further research on the different options on how transport can match the decarbonisation challenge should receive priority in the forthcoming research framework programme.

14 The reduction targets for agriculture are ambitious. A more efficient use of fertilisers, reducing nitrogen surplus which is both a problem to the global climate and to water pollution is to be welcomed. It would require more effective policy measures including economic incentives. Also the need to better protect important carbon sinks (grassland, wetlands, forests) is important. This implies more extensive uses for those land-use types and effective incentives to maintain the services to climate and biodiversity. The potential of a far reaching reform of Common Agriculture Policies to contribute to such targets therefore should not be missed! A matter of concern is however that increased bioenergy use will intensify land-use conflicts and hence may result in counterproductive intensified production methods.

[11] For a proper sustainable design of transport infrastructure policies: EEAC Statement on Sustainable European Infrastructures, 2009

[12] For a more comprehensive assessment, see: OECD 2006: Decoupling freight transport

Conclusion

15 The Low Carbon Economy Roadmap has been developed by a combination of different models covering different aspects. The Commission rightly states in its impact assessment, that "only by looking at different scenarios is it possible to draw more robust conclusions" (p. 27). Compared to other models the PRIMES model still has a monopoly for energy scenario writing. In principle each model has its strengths, weaknesses and biases inherent to the model design or to the assumptions. The low RES shares for 2050 for instance are result of the assumption of a "gradual phase out" of on-shore wind energy subisides and the overconservative assumption on the cost-reductions for off-shore wind-energy (only 10% by 2050).[13] In general backcasting approaches deliver more optimistic results for system transitions than forecasting approaches.[14] There are only very few studies, which model the challenges as well as the solutions for the high intermittency of RES, on being the ReMIX-Model of the German Aerospace Center.[15] Overall the modelling mirrors the overconservative bias of the road map against the very high low cost renewable energy sources potential.

16 The Low Carbon Economy Road Map as a first important contribution to the necessary transition of the European Economy. But more is possible and necessary to green Europe´s economy and to reduce GHG. We warn against false messages from the road map: Renewable energy sources can deliver more than assumed by the Commission. The Commission hopes for a nuclear renaissance are unrealistic. The suggested transport policy reforms do not match required reductions. Those shortcomings may put the realisation of the reduction targets at risk. It is especially important:

- to work also on the basis of a 95% GHG-reduction scenario
- to commit to a complete decarbonisation of the electricity sector
- to assess the potential of higher shares of electricity from renewable sources up to 100% scenarios
- hence to aim for a non-fossil, non-nuclear transformation of the energy sector;
- to assess a broader set of low-carbon options for the transport sectors, including measures reducing the need to travel both for goods and passengers.

[13] European Commission, 2011, Impact Assessment, p. 110: The ReMIX Modell of DLR assumes cost reductions for off-shore wind by 75% between 2010 and 2050 based upon a learning cost curve of 18,6%.

[14] Hertin, J., Hey, C., Ecker, F. (2010): The Future of the European Electricity Supply: Moving from Energy-Mix Projections to Renewables-Based Scenarios. Renewable Energy Law and Policy Review 1 (2), S. 131-139.

[15] DLR (Deutsches Zentrum für Luft- und Raumfahrt) (2010): Möglichkeiten und Grenzen der Integration verschiedener regenerativer Energiequellen zu einer 100% regenerativen Stromversorgung der Bundesrepublik Deutschland bis zum Jahr 2050 (REMix). Daten und Methodik. Stuttgart: DLR. SRU, 2011