ENERGY ROADMAP 2050

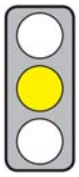
cep **Policy Brief** No. 11/2012 of 12 March 2012

Centrum für Europäische Politik

KEY ISSUES

Objective of the Communication: The Commission presents long-term scenarios for the European energy system in 2050.

Parties affected: The entire economy.



Pros: (1) The Commission shows alternative courses of action and the respective costs for restructuring the energy system by 2050.

(2) The Commission wishes to make the development of renewable energies cheaper through greater convergence in support schemes.

(3) The idea to charge the producers for the additional energy infrastructure that is necessary for the development of renewable energies is going in the right direction.

Cons: The Commission should also have devised scenarios which explicitly take account of the carbon leakage problem.

CONTENT

Title

Communication COM (2011) 885 of 15 December 2011: **Energy Roadmap 2050**

Brief Summary

Note: Unless otherwise stated, the page numbers refer to the COM (2011) 885.

- **Background and objectives**
  - In order to keep global warming below 2°C, in comparison with 1990, the EU wishes to
    - reduce greenhouse gas emissions by 20% by 2020
    - reduce them by 80 to 95% by 2050 (decarbonisation target)
  - To date, the climate protection policy has mainly focussed on 2020 (see CEP-Dossier). According to the Commission, strategies must now be developed for the period following 2020, with particular focus on the period until 2030.
  - If the existing climate policy is continued, greenhouse gas emissions will only be reduced by 40% by 2050 (p. 2).
  - A major part of greenhouse gas emissions which can be influenced is created by the energy sector. The Energy Roadmap 2050 substantiates the Communication on the low-carbon economy by 2050 [COM(2011) 112, see CEP Policy Brief] for the energy sector. It presents scenarios of "an illustrative nature", which demonstrate how modernisation can help contribute to the energy system of long-term EU climate protection targets (p. 3).
  - The Communication is based on a comprehensive analysis of these scenarios for the period until 2050 [SEC(2011) 1565 Part 1 and 2].

- **Overview of scenarios**
  - The Energy Roadmap 2050 is based on seven alternative scenarios, each of which makes different quantitative assumptions in respect of:
    - between 2005 and 2050, a reduction in energy intensity by 53% to 71% and a reduction in primary energy consumption by 32% to 41%;
    - the share of renewable energies in primary energy consumption ranging between19.9% to 59.6% of primary energy consumption;
    - the introduction of carbon capture and storage (CCS) with a capacity of 39 GW to 248 GW;
    - a share of nuclear energy from 3% to 18% of primary energy consumption.
  - As a basis, the Commission defines a reference scenario which is compared to the different options of achieving the set decarbonisation target (decarbonisation scenarios).
  - All scenarios are based on the assumption that comparable climate protection measures are taken not only in the EU but also globally.
    - Consequently, the scenarios do not take into account any possible job losses caused by carbon leakage to third countries [SEC(2011) 1565 Part 1, p. 36].
    - Carbon leakage is created when enterprises move out of the EU because production is cheaper in countries which have less strict climate protection laws. However, this means that emissions are generated there instead and global climate policy targets are not met.
    - "Europe cannot alone achieve global decarbonisation". Therefore, the Commission intends to involve other countries' climate protection policies and carbon leakage issues in future policy measures. (p. 9)
  - Long-term forecasts are not possible (p.2). The presented scenarios serve to demonstrate the options for modernising the energy system and the identification of "clear trends" which do not depend on a certain scenario.

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- **Renewable energies**
  - The share of renewable energies increases significantly in all scenarios, covering at least 55% of gross energy consumption in 2050. The share of renewable energies in electricity consumption lies between 64% and 97% (p.7).
    - Within the scenarios it is assumed that financial support for the generation of electricity from renewable energies will expire for mature technologies (e.g. wind power on land) by 2025 and for other technologies by 2050 [SEC(2011) 1565 Part 1, p. 68].
    - The Commission does not evaluate this assumption in its Communication. In its Communication on renewable energies [COM(2011) 31, p. 11, see CEP Policy Brief] it promotes the view that the subsidization of renewable energies should not be phased out until they are competitive. In order to keep the costs for the development of renewable energies as low as possible, the cooperation between Member States and neighbouring countries is to be further developed. The Commission promotes a "greater convergence in support schemes" for renewable energies (p. 10).
    - It considers an increased internalisation of systeme costs not only for network operators but "also" for energy producers.
  - As the production of electricity from renewable energies is often influenced by fluctuating weather conditions, reserve capacities from other types of power plants are needed in order to ensure a constant energy supply. However, as electricity from renewable energies is fed to the grid as a matter of priority, it increasingly supplants electricity provided by nuclear power plants and fossil fuel-fired power plants.
    - The danger is that not enough is invested in reserve power plants, as these can now only offer their electricity in increasingly short time slots.
    - The Commission is currently assessing models for remunerating the provision of reserve capacities.

- **Fossil fuels**
  - To the extent that coal and oil is to be replaced by gas by 2030 or 2035, greenhouse gas emissions can be reduced through already existing technologies.
  - In all scenarios, higher energy efficiency means less demand for gas in the residential sector. The demand for electricity, however, remains high "over a longer period" (p. 11).
  - The pricing formula for gas should be moved away from oil indexation. The gas market requires greater diversification of supply sources and more storage capacity.
  - In all scenarios, oil continues to be a component of the energy mix, even until 2050, in particular for the long distance passenger and freight transport.
  - CCS plays a major role for electricity generation in most scenarios (exception: scenarios with very high share in renewable energies). CCS is of greatest relevance where the share of nuclear energy in electricity generation is lowest.

- **Nuclear energy**
  - In all scenarios, nuclear energy continues to be used for low-carbon electricity generation until 2050.
  - In 2050, nuclear energy has the highest share in primary energy in the scenario that assumes that the introduction of CCS is delayed (18%); it has the lowest share in the scenarios that assume a high share of renewable energies (3.8%) or no construction of new nuclear power plant (2.6%).
  - In the EU and worldwide the highest standards are applied to ensure safety and security.
  - The costs for nuclear energy safety and for the decommissioning of existing plants and the disposing of waste are likely to increase.

- **Electricity**
  - All scenarios show that electricity will have to play a much greater role by 2050 than now. Its share in energy consumption will double by 2050 by almost 36-39%.
  - The greenhouse gas emissions of electricity generation must be reduced by 2030 by 57-65% and by 2050 by 96-99% if we are to meet the decarbonisation target.
  - Electricity prices will increase by 2030 and then decrease.
    - The increase in prices is caused by three factors: investments in renewable energies; the price for emission allowances under the framework of the greenhouse gas trading system (EU ETS); and the higher oil prices which are expected once the current crisis is over.
    - By 2030, electricity prices will increase the most in the scenario assuming a low share of nuclear energies: compared to the reference scenario [SEC(2011) 1565 Part 2, p. 52, CEP calculations], for industrial electricity by 11% and for household electricity by 5.4%.
    - Between 2030 and 2050, electricity prices will remain almost equal or even fall in most of the scenarios. Only in the scenario assuming a high share of renewable energy will the electricity price continue to rise for industrial electricity by 29.5% and for household electricity by 41.9% [SEC(2011) 1565 Part 1, p. 79].

- **Energy efficiency**
  - In order to meet the climate protection targets by 2050, "very significant energy savings" are needed in all decarbonisation scenarios (p. 7). Primary energy consumption must be reduced by 2030 by 16-20% and by 2050 by 32-41%, as compared to the levels in 2005.

– For this purpose the Commission sets the following priorities (p. 9 et sqq.):
  - energy efficiency in new and existing buildings;
  - energy efficiency in products and production and by prolonging product lifetime;
  - energy-efficient vehicles and behavioural changes by road users;
  - improved control of energy consumption through "smart meters" and other "smart technologies".

- **Energy Infrastructure**
  – In order to ensure the security of energy supplies, despite the growing share of renewable energies, in the generation of power and heat, centralised power plants (e.g. nuclear and gas power plants) "will increasingly have to work together" with decentralised systems (e.g. photovoltaic systems on the roofs of houses) (p. 8). Therefore, it is necessary to develop distribution, interconnection and long-distance transmission infrastructures. For instance, the interconnection capacity must be increased by 40% by 2020.
  – By 2015, energy islands which are not connected to the European energy infrastructure are to be eliminated.

- **Costs of the energy system**
  – All examined scenarios, even the reference scenario, assume that the overall cost of the energy system – fuel and capital costs – will increase from 10.5% in 2005 to 14.6% or 14.58% of gross domestic product in 2050 [SEC(2011) 1565 Part 1, p. 31].
  – According to the decarbonisation scenario, dependence on energy imports will fall to 35-45% in 2050, compared to the 58% cited in the reference scenario (p. 5).
  – The capital costs of the energy system will increase significantly in all decarbonisation scenarios. By 2050, net investments to the volume of 1.5-2.2 trillion Euros will be needed.
  – In all scenarios, household expenditure on energy and "energy-related products" including transport will rise.
    - According to the reference scenario, the energy costs of private households will increase from 9.9% of total expenditure in 2005 to 14.6% by 2050, and to values of between 15.1 and 16.4% in the decarbonisation scenario.
    - The major increase is assumed in the scenario with the highest politically-driven energy efficiency and the highest politically-driven increase in the share of renewable energies to 16.1-16.4% [SEC(2011) 1565 Part 2, p. 50].
    - As this will burden several "vulnerable groups", Member States will have to take measures protecting them from "energy poverty" (p. 17).

Statement on Subsidiarity by the Commission

The Commission does not address the issue of subsidiarity.

Policy Context

In 2007, the European Council adopted the "20-20-20 Decision". Moreover, the Commission proposed as part of the "Europe 2020" Strategy [KOM(2010) 2020; see CEP Policy Brief] the flagship initiative "resource efficient Europe" [COM(2011) 21], under the scope of which it submits long-term plans in the field of transport [COM(2011) 144; see CEP Policy Brief], energy and climate protection. At its "Energy Summit" on 4 February 2011 [see CEP Standpoint in German only], the European Council charged the Commission with examining how the decarbonisation target could be met by 2050 while ensuring the security of energy supply and competitiveness.

Options for Influencing the Political Process

Leading Directorate General:	DG Energy
Consultation procedure:	A consultation procedure is not planned.

ASSESSMENT

Economic Impact Assessment

Ordoliberal Assessment

The overview of scenarios of the Energy Roadmap shows alternative courses of action and the related costs for restructuring the energy system, with which the planned drastic cut in greenhosue gas emissions is to be met by 2050**.** Although scenarios whose focus is 2050 are problematic, because – as the Commission itself admits – uncertainty grows as the time until the deadline increases, by drawing up consistent scenarios against the background of today's knowledge, the energy and climate policy issues of the period following 2020, with a special focus on the year 2030, can be discussed in an objective manner.

The underlying assumption that global climate protection efforts will be made does rather reveal the limits of the long-term planning approach. **The Commission** stresses that the problem of carbon leakage must be taken into account, but then it **should have devised scenarios which explicitly do just that**.

Impact on Efficiency and Individual Freedom of Choice

The development of renewable energies will mean an inevitable increase in electricity prices, as the Commission itself admits. However, **the development of renewable energies is currently unnecessarily expensive**, **for it is primarily carried out** in Member States in which renewable energies are heavily subsidized, **and not where the energy yield is optimal**.

This leads to a wrong specialisation and undermines competition in the internal energy market [see CEP Policy Brief on the development of renewable energies]. Closer cooperation between Member States, as the Commission is calling for, and **"greater convergence" of national subsidy programmes would reduce this inefficiency**.

However, a clear perspective with regard to the phasing out of subsidies is a precondition for increasing the efficiency of renewable energies and their integration into a competitive environment. The Commission's assumption that the opposite is true, that subsidies should not be phased out until *after* renewable energies have become competitive, negates the efficiency-increasing effect of competition. **The** assumed **promotion** of "mature" technologies **until 2025, or** of others until **2050, is far too generous** in this context.

The costs for the development of energy infrastructure needed **for renewable energies should be passed on to the producers in full** and not only partially, as proposed by the Commission, **as only thus can the choice of locations and technologies be optimized**. However, the Commission's considerations are going in the right direction. Currently, a producer of electricity from renewable energies can cause substantial costs to the power system (also in neighbouring countries) without internalising them. This leads to unnecessarily high costs for the development of renewable energies [see CEP Policy Brief on the development of energy infrastructure].

As the scenarios show, in the end it is the energy efficiency policy itself that makes energy consumption more expensive for households. The calculations demonstrate that a politically driven increase in technical energy efficiency in no way leads to economic savings for the consumer – quite the opposite is true. And as an approach to a target-oriented climate protection policy it is equally inappropriate; there are other tools for policy action available, such as emission trading and the taxation of fossil fuels [see CEP Analysis of the Draft Directive on energy efficiency COM(2011) 370].

Impact on Growth and Employment

As the scenarios clearly show, energy costs will increase due to the decarbonisation policy. This has a particularly negative impact on growth and employment in the EU, unless climate protection efforts are made globally, as otherwise undertakings relocate to countries which are less expensive in terms of climate policy.

Impact on Europe as a Business Location

One-sided emission reductions in the EU lead to one-sided energy cost increases in the EU. They impair the quality of Europe as a business location. Worldwide climate protection efforts are the only solution.

Legal Assessment

Legislative Competency

The EU has the power to adopt energy policy measures in order to ensure the functioning of the energy market, the security of the energy supply and to promote the interconnection of energy networks and to support energy efficiency, energy savings and the development of new and renewable energy sources (Art. 194 TFEU). In order to prepare for such measures, the Commission may examine various development scenarios.

Subsidiarity

Currently not assessable.

Proportionality

Currently not assessable.

Compatibility with EU Law

Unproblematic.

Compatibility with German Law

Unproblematic.

Conclusion

The overview of the scenarios of the Energy Roadmap reveals alternative courses of action and the costs needed for a restructuring of the power system by 2050. The Commission should also have devised scenarios which take into account the carbon leakage issue. The "greater convergence" that is called for of national subsidy programmes for renewable energies reduces the efficiency of such programmes. However, the promotion of renewable energies by 2025 and/or 2050 is much too generous, as if the related costs are passed on to the producer in full, a new energy infrastructure will become necessary due to the larger share of renewable energy.