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Energy Infrastructure Priorities



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DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY
INDUSTRY, RESEARCH AND ENERGY

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BRIEFING PAPER

Abstract

Energy infrastructure priorities are made on the basis of long-term energy models with underlying assumptions influencing the model results. This briefing paper analyses long-term assumptions up to 2050. It recommends that energy savings targets, CO₂ reduction targets and third country interconnections for renewable electricity import are used as underlying assumptions for a longer term Impact Assessment of infrastructure priorities. Furthermore, it is recommended to set intermediate targets for 2030 and 2040.

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AUTHOR(S)

Ludwig-Bölkow-Systemtechnik (LBST):	Mr. M. Altmann
Ludwig-Bölkow-Systemtechnik (LBST):	Mr. J. Michalski
HINICIO:	Mr. A. Brenninkmeijer

RESPONSIBLE ADMINISTRATOR

Balázs Mellár
Policy Department Economic and Scientific Policy
European Parliament
B-1047 Brussels
E-mail: Poldep-Economy-Science@europarl.europa.eu

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ABOUT THE EDITOR

To contact the Policy Department or to subscribe to its monthly newsletter please write to:
Poldep-Economy-Science@europarl.europa.eu

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LIST OF ABBREVIATIONS

AC	Alternating Current
CCS	Carbon Capture and Storage
CO₂	Carbon Dioxide
DC	Direct Current
HVDC	High-Voltage Direct Current
IEA	International Energy Agency
RES	Renewable Energy Sources

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EXECUTIVE SUMMARY

Background and aim

Based on the European Commission Communication on "Energy infrastructure priorities for 2020 and beyond - A Blueprint for an integrated European energy network" [European Commission, 2010] and the accompanying Impact Assessment [European Commission, 2010b], this briefing paper is devoted to answering the following two questions:

1. *How should the underlying assumptions of the Commission's impact assessment be modified or amended if the 2020 infrastructure targets are developed with a view of the situation in 2050 as opposed to 2030 as in the current impact assessment (e.g. reduction of 80-95% greenhouse gas emissions, high share of renewables, being the most energy efficient economy, reaching the 2020 energy efficiency target, including economically viable and proven technologies, etc.)?*
2. *The PRIMES projections developed under the Energy Infrastructure Communication are limited to 2020 / 2030. When developing a roadmap for 2050, would it be recommended to set intermediate targets for 2030 and 2040?*

Underlying assumptions

Lead and implementation times for energy infrastructures are in the order of a decade or more. Infrastructure investment planning thus needs to be supported by long-term scenarios. Despite uncertainties in energy demand in the longer term it is expected to be beneficial to take decisions today on the basis of longer term scenarios.

It is recommended that the longer term Impact Assessment should be based on the following **additional assumptions**: Achievement of the European 20% **energy savings target** by 2020, commitment to achieving the **long-term CO₂ reduction target** of 80-95% by 2050, **interconnections with North Africa** for solar and wind power import.

It will be necessary to have a **2050 outlook** taking into account expected achievements and additional technical development needs particularly in terms of energy storage.

Natural gas demand and **natural gas infrastructure** requirements critically depend on the technical and economic viability of **carbon capture and storage** (CCS). Assuming the two binding targets of 20% CO₂ reduction by 2020 and of 20% renewable energies by 2020 to be achieved, the use of CCS technologies in electricity production in 2030 is very low according to the Impact Assessment.

Long-term targets

Energy price modelling is based in **fossil resources availability**. The Impact Assessment is based on an optimistic resources availability scenario which is certainly not undisputed in the scientific community. Evidencing the more pessimistic scenarios is the fact that future **energy price forecasts** have increased significantly in recent years – forecasts for 2030 have more than tripled since 2003, and the then worst case scenario has today become the base case scenario.

It is therefore recommended to also carry out **PRIMES scenario model runs** based on pessimistic assessments of **all fossil energy resources** in order to understand system sensitivities and economic risks. The analysis of PRIMES scenario model runs should be updated regularly to evaluate the achievement gaps towards the long-term and the intermediate targets.

Because **uncertainties of energy projections** increase with increasing time horizon and notwithstanding the absolute need to developing longer term targets it will be useful to also develop intermediate targets both for **planning and control purposes**.

It is recommended to set **intermediate targets for 2030 and 2040** when developing a roadmap for 2050 in order to allow for intermediate checks and corrective action upon non-achievement of intermediate targets.

DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT ECONOMIC AND SCIENTIFIC POLICY **A**

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ludwig bölkow
systemtechnik

Ludwig-Bölkow-Systemtechnik GmbH

Daimlerstrasse 15
85521 Munich-Ottobrunn
Germany
Phone: +49 89 60 81 100
E-Mail: info@lbst.de
Web: www.lbst.de



Hinicio s.p.r.l.

Rue des Palais, 44
1030 Brussels
Belgium
Phone: +32 2 211 34 14
E-Mail: info@hinicio.com
Web: www.hinicio.com