Stakeholder meeting on adaptation challenges and opportunities for the European energy system, 20 September 2018, European Environment Agency (EEA), Copenhagen

Concept note on planned EEA Report 'Adaptation challenges and opportunities for the European energy system'

Introduction

Europe needs to decarbonize its energy system rapidly in order to fulfill its commitments under the UNFCCC Paris Agreement. The transition to a low-carbon energy system involves, in particular, a massive expansion of renewable energy sources. Whereas most energy technologies are sensitive to climate change and variability, this sensitivity is particularly high for renewable energy sources, such as hydropower, wind power and solar power. Hence, climate variability and change are an important concern for the current operation of the energy system as well as for its future transformation.

Efforts to assess and minimize climate-related risks to the current and future energy system are usually termed as 'adaptation to climate change' or as 'building climate resilience'. The goal of these efforts is to ensure that the transition to a low-carbon, increasingly interconnected and increasingly electrified energy system is resilient to changes in mean climate and in climate extremes, in order to ensure security and affordability of energy supply.

Recent policy developments

The Energy Union is one of the priorities of the current European Commission. It comprises five policy areas, which address the three main pillars of energy policies: security of supply, competitiveness and environment. The Energy Union comprises a proposed Regulation on the Governance of the Energy Union, which requests among others that EU Member States develop National Energy and Climate Plans (NECPs), as well as several other revised or new Regulations and Directives, which are presented in the Clean Energy for all Europeans package. Several documents in this package emphasize the need to consider the impacts of a changing climate. For example, the Impact Assessment for the legislative proposal on Electricity Market Design stresses the large socio-economic damages caused by black-outs, which are most often caused by extreme weather events and that can affect several countries.

The EU Strategy on Adaptation to climate change (adopted in 2013, currently under evaluation) focuses on three objectives and eight actions. Action 7, *Ensuring more resilient infrastructure*, is particularly relevant for the energy system, which is characterized by long-lived infrastructure. Various related Commission documents are relevant for making the energy system climate-resilient, such as the staff working document on *Adapting infrastructure to climate change* and the non-paper *Guidelines for Project Managers: Making vulnerable investments climate resilient*.

CEN-CENELEC are taking up an EU mandate to review existing standards relevant for infrastructure and to examine which should be prioritised to include adaptation standards. Energy infrastructure is one of the three priority areas for revised standards. In 2016, CEN/CENELEC held a workshop *Adapting energy infrastructure to climate change: the role of standardization*, in order to identify priority standards for revision. The revised standards would be relevant for both national infrastructure and the Trans-European Networks for Energy (TEN-E), which focus on linking the energy infrastructure of EU countries.

Recent developments in the knowledge base

A modelling study for DG Energy from 2011 has assessed the investment needs for adapting the electricity supply in Europe for one scenario, but this study is somewhat outdated by now. The JRC PESETA II project (concluded in 2013) has provided a first economic assessment of *The Impact of Climate Change on the European Energy System*. More detailed information is expected in the coming months from the recently concluded PESETA III project. Many other scientific institutions, EU-funded and national research projects have also provided relevant information on this topic.

The JRC has created a Unit Knowledge for the Energy Union, which provides model-based analysis for the Energy Union Package. Adaptation-relevant activities include the WATERFLEX project, which assesses the water-energy nexus. The Horizon 2020 project Heat Roadmap Europe, in which the JRC is involved, supports the development of a low-carbon heating and cooling strategy for Europe.

The development of adaptation solutions is further supported by the ongoing development of the Copernicus Climate Change Service (C3S). Its Sectoral Information System includes two recently concluded demonstrator projects of climate services for the energy sector: ECEM (European Climate Energy Mixes) and CLIM4ENERGY (a service providing climate change indicators tailored for the energy sector). The Joint Programming Initiative Connecting Climate Knowledge for Europe (JPI Climate) is also advancing the development of Climate Services through several 2016 Call Projects financed through the ERA-NET Cofund for Climate Services (ERA4CS). Of particular relevance for the European energy sector are the projects Clim2Power, CLISWELN and WINDSURFER.

Most EEA member countries have included energy in their national climate change vulnerability assessments (see this EEA Report). Individual countries have introduced reporting obligations related to critical infrastructure, including energy. Various non-European countries have also developed relevant resources, including online toolkits (USA), guidance material (USA) and case study collections (Canada). Finally, several international organisations (such as the International Energy Agency, the World Energy Council and the OECD) have published reports and held workshops aiming at making the energy system resilient to climate variability and change.

Recent activities of the EEA and its European Topic Centres

Last year, the EEA published the report *Climate change, impacts, and vulnerability in Europe 2016*, which includes a dedicated section (5.4) on energy. This section comprises an indicator on heating and cooling degree days (developed jointly with the JRC) and further information on the expected impacts of future climate change on energy demand, electricity production and energy infrastructure.

Over the last few months, EEA, supported by an external consultant, developed an internal scoping paper for a potential EEA report on climate change adaptation in the energy system. This scoping paper briefly reviews the available evidence regarding climate change impacts on energy production/conversion, transportation/transmission, storage and demand. It also gives an overview about relevant policies in Europe and presents a selection of early adaptation actions.

EEA is using this scoping paper as the starting point for an EEA report with the working title *Adaptation challenges and opportunities for the European energy system: Facilitating a climate-resilient transition to a low-carbon energy system*. This EEA report will reflect in particular how government policies and other actions by public actors can facilitate the adequate consideration of adaptation needs in the transition to a low-carbon energy system. It will be prepared jointly with an external consultant and possibly an expert from a European Topic Centre. The author team is supported by an external Stakeholder Group consisting of representatives from international organisations, the European Commission, EEA member countries, scientific organisations and industry associations.

The plans for this EEA report were discussed with experts from EEA member countries at the 12th Eionet Workshop on Climate Change Impacts, Vulnerability and Adaptation (6-7 June 2018). Topics for discussion included the consideration of the energy system in national climate change vulnerability and risk assessments, adaptation strategies and action plans; the cooperation between various stakeholders; and the scope of the report. The scope and content of the report will be further discussed at a stakeholder meeting on adaptation challenges and opportunities for the European energy system on 20 September 2018 at the EEA. The draft report is scheduled to be sent for stakeholder consultation (including Eionet) in winter 2018, aiming for a publication in spring 2019.