



Is there a need for government interventions to adapt energy infrastructures to climate change? A German case study

Markus Groth and Jörg Cortekar
Climate Service Center 2.0

The option of adapting to climate change is becoming more and more important in climate change policy. Hence, responding to climate change now involves both mitigation to address the cause and adaptation as a response to already ongoing and expected changes. These changes also have relevance for the current and future energy sector in Germany. An energy sector that in the course of the German Energiewende also has to deal with a fundamental shift in energy supply from fossil fuel to renewable energies in the next decades.

Thereby it needs to be considered that the energy sector is one critical infrastructure in the European Union that needs to be protected. Critical infrastructures can be defined as organisations or facilities of special importance for the country and its people where failure or functional impairment would lead to severe supply bottlenecks, significant disturbance of public order or other dramatic consequences.

Regarding the adaptation to climate change, the main question is, whether adaptation options will be implemented voluntarily by companies or not. This will be the case, when the measure is considered a private good and is economically beneficial. If, on the contrary, the measure is considered a public good, additional incentives are needed.

Based on a synthesis of the current knowledge regarding the possible impacts of climate change on the German energy sector along its value-added chain, the paper points out, that the power distribution and the grid infrastructure is consistently attributed the highest vulnerability. Direct physical impacts and damages to the transmission and distribution grids, utility poles, power transformers, and relay stations are expected due to more intense extreme weather events like storms, floods or thunderstorms. Furthermore fundamentals of utility poles can be eroded and relay stations or power transformers can be flooded, which might cause short circuits etc. Besides these impacts causing damage to the physical infrastructure, there might also occur efficiency losses in electricity transmission due to very high or very low temperatures. While vulnerabilities in power generation primarily result in efficiency losses, interferences on the grid level could cause power outages with cascade effects influencing other sectors of society and economy.

The paper argues that these possible impacts of a changing climate should be taken into account in the upcoming infrastructure projects in the course of the Energiewende. Therefore governmental intervention – like legal obligations or incentives by the use of economic instruments – are for example justifiable regarding measures to adapt the grid infrastructure as a critical infrastructure that needs to be protected against current and future impacts of climate change.