

SECURES: SECURING AUSTRIA'S ELECTRICITY SUPPLY IN TIMES OF CLIMATE CHANGE

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Motivation

The transition of Austria's electricity system towards a safe and sustainable future in times of climate change brings a broad range of challenges and opportunities into the policy debate where timely decisions on the way forward are of key relevance. On the one hand, energy demand in general and especially electricity demand will undergo significant changes through new demand patterns impacted by climate change and increased sector coupling. On the other hand, the supply side of the system has to undergo a major transformation process. Austria's electricity sector has to comply with ambitious decarbonisation targets, for example concerning the domestic expansion of renewable energy sources (RES) where the Austrian government aims for generating renewable electricity by 2030 to the extent that the national total electricity consumption is fully covered (at a yearly balance) – cf. the Austrian Climate and Energy Strategy (#Mission2030) and the National Energy and Climate Plan (NECP). Austria's electricity sector will consequently have to deal with increasing flexibility needs because of high shares of non-dispatchable renewable energy sources. Moreover, electricity generation patterns of hydro, wind, solar PV as well as thermal power plants will be increasingly affected by changing weather conditions caused by ongoing climate change in the future.

Core Objectives

The overarching goal of SECURES is to provide targeted support to Austrian policy makers by taking a closer look at the challenges and opportunities arising for Austria's electricity system in future years, acting as a safeguard for securing a reliable, sustainable and cost-efficient electricity supply in times of climate change. SECURES aims to enable Austrian policy makers and stakeholders to overcome and solve conflicts in policy targets for security of energy supply, the need for decarbonisation and the consequences for the Austrian economy, all increasingly affected by impacts arising from climate change.

Methodology

The first one is a thorough analysis of changing patterns in weather, electricity demand and supply driven by climate change and the required decarbonisation. Here, we analyse changing patterns in weather conditions that can be expected in times of climate change in Europe. This serves for deriving key parameters that determine the potential and operational conditions of the future power plant fleet (incl. temperature, wind speed, precipitation and corresponding hydro flows) in a timely and geographically high resolution. Apart from changing supply patterns driven by climate change, we analyse expected developments and changes in electricity demand, driven by climate change & decarbonisation.

The second pillar is the modelling and the corresponding analysis of prospective scenarios. Thus, building on the assessment of changing patterns we undertake a model-based analysis of Austria's

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future electricity sector. The basket of scenarios incorporates all identified key options on both supply and demand of electricity including the relevant sectors like electric cooling & heating, electric transport, and decarbonisation of the industry: For the supply side, we consequently assess distinct technology portfolios and supply patterns (reflecting climate impacts) in line with (2030 and beyond) policy targets. Concerning demand, we build on the detailed analysis of future demand trends, reflecting decarbonization needs and climate change impacts. Since the overall assessment focuses on supply security, assessed scenarios will incorporate the identified changes in weather conditions, and we will take a closer look at extreme circumstances (i.e. expected droughts, heat waves, dark doldrums).

The third pillar concerns our way to enhance the decision-making process, facilitating a sound and transparent stakeholder dialogue and the provision of targeted support for Austria's policy makers. Thanks to the being established open model and database platform we will then also openly share our outcomes and assumptions, enhancing stakeholder feedback and stipulating the public discourse.

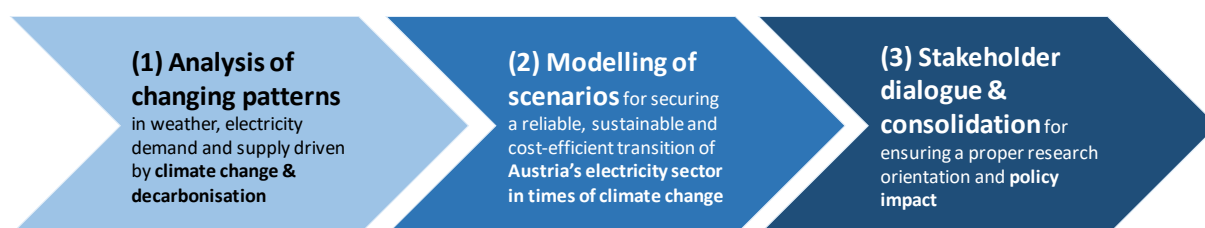


Figure 1: Approach

Expected Results

We aim for identifying scenarios that allow for securing a reliable, sustainable and cost-efficient transition of Austria's electricity sector to cope well with the expected changes. In the upcoming period the results are expected to be available: scenario design, analysis of sector coupling (e-cooling, e-heating, e-transport, e-industry) on the electricity demand in future years, of changing weather patterns in times of climate change, and of state-of-the-art methods for assessing supply security assessments. Another expected result is the summary of current and future expected techno-economic characteristics of flexibility options and the identification of most promising methodologies and useful indicators for the subsequent analysis of the most critical system points for Austria.

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