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The Swiss electricity system in 2035 and 2050: Insights from a model inter-comparison

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Extended Abstract

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Abstract Summary

In this study, we compare five electricity system models and examine policy-relevant scenarios to address the uncertainty around the future energy system. The objective is to identify features and common trends on the development of the Swiss electricity system and the electricity exchange with other European countries in the medium- (2035) and long-term (2050). Each electricity system model uses different system representations and assumptions. Therefore, comparing various models reduces the bias of individual models and helps elicit valuable consensual insights for decision-makers in industry and public policy. This intercomparison highlights how a renewable generation target in Switzerland can lead to a more diverse electricity mix and lower electricity imports. Without a renewable energy generation target and with more centralised generators in Europe, Switzerland tends to be a net importing country in 2035 and 2050, consistently shown across all models. Although the models respond differently to the addition of new nuclear power plants, there is consensus that nuclear generators lower imports to a minor degree compared to the reference scenario and less than in scenarios with a renewable generation target, while partially replacing renewable generators. Demand-side flexibility from heat pumps and electric vehicles facilitates higher shares of new renewable generation by decreasing curtailment and lowering storage requirements. This research contributes to understanding the impacts of different developments in Europe considering renewable capacity, policy decisions such as having a renewable generation target in Switzerland or

opting for domestic nuclear generation, and the availability of demand-side flexibility in 2035 and 2050.

Presenting Author Biography

Selina Kerscher obtained a BSc in Physics from the University of Regensburg, Germany, and an MSc in Sustainable Energy Systems from the Technical Universities of Stuttgart, Rothenburg and Ulm, Germany. She holds an international PhD with distinction in Energy and Process Control from the University of Oviedo, Spain. She currently works as a postdoctoral researcher at the University of Geneva, focusing on the modelling of electricity systems at national and sub-national scales. Her research interests include the potential design of regulation for the integration of distributed and renewable energy resources into the energy system and energy community models.