

Forecasting for the weather-driven energy system / IEA Wind TCP Task 51

Weather-induced extreme power system events *BSc Thesis Award 2025*

What is IEA Wind TCP Task 51?

The energy system of the future is a weather-driven one – a system in which weather conditions such as wind and solar irradiation profoundly impact energy generation and transport. Accurate weather predictions are therefore strategically important to ensure efficient and reliable operation of the energy infrastructure. In the next years, the energy sector faces exceptional challenges, such as the ever-increasing complexity of (decentralized) energy systems and the intensification of weather extremes driven by climate change.



Addressing these challenges is at the core of the international IEA Wind TCP Task 51, “**Forecasting for the weather-driven energy system**”. The task is part of the Wind Technology Collaboration Programme (Wind TCP) of the International Energy Agency (IEA). Austrian activities are spearheaded by **GeoSphere Austria, Austro Control Digital Services, and WEB Windenergie**. The aim is to consolidate the expertise of national and global industry leaders and researchers in energy forecasting and to identify and advance current frontiers in research.






BSc Thesis Award 2025 / Announcement

To raise awareness of the important subject and complement their national research activities, the IEA Task 51 Austria is calling for Bachelor theses on the topic of **Weather-driven extreme power system events**. All Bachelor theses submitted at Austrian universities by **31 August 2025** will be reviewed by an interdisciplinary jury – **three excellent Bachelor theses will receive awards**. Detailed information can be found on the next page.



Awards for best BSc thesis

-  **1st Prize: 1000 €**
-  **2nd Prize: 500 €**
-  **3rd Prize: 250 €**



Funding for the awards is provided by the Federal Ministry of the Republic of Austria for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK) through the Austrian Research Promotion Agency (FFG).

Further information & contact

- [IEA Task 51 Austria Homepage](#), [IEA Task 51 Intl. Homepage](#), or iea51@acds.at
- Pages 2-3 of this announcement with details on the timeline for submission, award criteria and the subject of extreme power system events itself.

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Weather-induced extreme power system events

Not all power system events are created equal. There is a broad range of processes influencing the operation of a power grid or the generation of energy therein. Beyond technical and physical aspects, mechanisms of energy markets, cybersecurity etc., weather impact is an essential component. How weather can cause extreme events in the power system, today or in the future, shall be at the centre of the proposed Bachelor thesis.

Inspirations for BSc thesis subjects

- Meteorologically induced extreme power system events – an in-depth state of the art literature review
- Analysis of surveys of extreme weather impact on energy production and interviews with energy experts
- Amplification of extreme power system events through climate change?
- Detecting and forecasting extreme power system events – design of a decision support tool for system operators
- Weather-induced extreme events on energy markets?

These suggestions are closely related to research undertaken by members of the Austrian IEA Task 51 consortium. **Other, original subject proposals by Bachelor students are highly encouraged.**

Prerequisites

The BSc award is meant to stimulate contributions from a range of scientific and engineering backgrounds, e.g., physics, electrical engineering, meteorology. An advanced understanding of the nature of the power grid **or** of the meteorological processes influencing it are likely prerequisites to a rewarding work.

Timeline

- 15.01.2025: BSc Thesis Award announcement published
- 15.03.2025: Interest in selected subjects declared by BSc students (mandatory message to iea51@acds.at)
- 31.03.2025: BSc thesis proposal submitted (2-page outline of planned work)
- 31.08.2025: BSc thesis submitted to IEA Task 51 Austria
- 30.09.2025: Publication of jury decision (award criteria see page 3)
- Autumn 2025: Award ceremony at the 2nd IEA Task 51 Austria Workshop

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Award criteria

For a submitted Bachelor thesis to receive the award, the following formal and scientific criteria will be considered by the award jury.



Formal criteria

- All deadlines according to the award timeline have been met; all related documents (thesis proposal, thesis, code base i.a.) have been submitted.
- BSc thesis is written in English (preferred) or German language.
- BSc thesis has been graded by the academic thesis supervisor (until 31.08.2025) and has received a mark of 1 ("sehr gut") or 2 ("gut").

Scientific criteria

- BSc thesis represents a relevant contribution to the subject of weather-induced extreme power system events demonstrating in-depth thought and reflection on the chosen topic.
- The thesis is well rooted in existing literature or expert knowledge, documented through proper citing of sources.
- Coherent structure and concise composition of the thesis, high quality of writing, robust analysis of data underpinned by high-quality graphics.
- BSc thesis includes a dedicated statement if and how AI (in particular LLMs such as ChatGPT) has been used for research, reasoning, writing, reviewing.

Jury composition

The jury for the award consists of the members of IEA Task 51 Austria:



- **Dr. Irene Schicker**, Lead Scientist for Renewable Energy, GeoSphere Austria
- **Dr. Lukas Strauss**, Head of Energy, Austro Control Digital Services GmbH
- **DI Florian Mader**, Head of Energy Data & Innovation, WEB Windenergie AG
- **Dr. Anna-Maria Tilg**, Meteorologist & Climatologist, GeoSphere Austria
- **Dr. Jakob Messner**, Lead Data Scientist, Austro Control Digital Services

The group is complemented by members of the International IEA Task 51 Austria as well as academic thesis advisers.

Contact

In case of questions, please don't hesitate to contact the members of IEA Task 51 Austria via iea51@acds.at.