# Young Energy Researchers Conference
and
# Best Young Energy Researcher Award

## Winners 2025 -
## Energy Efficiency and Biomass

**Competitive, collective, climate-neutral!** This was the motto of the World Sustainable Energy Days 2025 (WSED). Staying on target for climate neutrality is a key challenge in changing political and economic frameworks. The aim is clear: no more fossil fuels! Becoming the first climate-neutral continent will offer Europe a key competitive advantage and increase our resilience in all sectors. The 2025 World Sustainable Energy Days focussed on how to gain momentum and presented policies, programmes and innovation to reach our goals together.

The WSED took place from 4 – 7 March 2025 in Wels/Austria. Over 650 experts, from the public and business sectors and the research community, from 59 countries participated in the event.

Organised by the OÖ Energiesparverband, the regional energy agency of Upper Austria, the WSED are a leading conference on the energy transition and climate neutrality. An important event of the WSED 2025 was the **Young Energy Researchers Conference** on 4 March. With two tracks, Energy Efficiency and Biomass, the conference offers young researchers from universities, research institutions and companies the opportunity to present their work to experts. For many young researchers, it is a first-time opportunity to address an international audience.

For the 2025 edition, **136 papers from over 40 countries were submitted**. These were reviewed and evaluated by an international scientific committee consisting of 46 high-level experts from academic institutions, professional associations, companies, and other institutions in the field of sustainable energy. Selected papers were invited for oral or poster presentation.

Every year, a highlight of the event is the presentation of the 2 "Best Young Energy Researcher Awards" to outstanding young researchers. It was an honour to present this year's awards to:

## Best Young Energy Efficiency Researcher

**Fatima Ravazdezh, University of Ottawa, Canada**
**Paper: "Urban Street Trees and Energy Efficiency: An Investigation in Cooling Energy Savings"**

Fatima Ravazdezh is a PhD Candidate in Environmental Sustainability at the University of Ottawa in Canada. She holds a Master of Science in Environmental Planning and a Bachelor's in Environmental Engineering from the University of Tehran in Iran.

In urban areas, overheating of buildings and infrastructure is a particular concern due to urban densification and the Urban Heat Island effect. The paper analyses the relationship between urban tree canopy (UTC) and residential energy savings using an innovative quasi-experimental design. Aerial imagery of the UTC is combined with electricity billing data for 2,000 houses in Ottawa, Canada, to revisit the causal links between the UTC and residential electricity demand.

The paper estimates that a 10 % change in the UTC within 12.5-meter buffer of houses corresponds to 2.9 % reduction in electricity consumption for cooling. The analysis was expanded by investigating how proximity and orientation of trees relative to the dwelling affects electricity consumption. Further investigations into how the effects of UTC are moderated by weather variables were conducted by combining causal analysis with machine learning.

# Best Young Biomass Researcher

**Surika van Wyk, TNO, The Netherlands**
**Paper: "Development of physics-informed machine learning model for biomass gasification"**

Surika van Wyk is a Scientist Innovator at TNO, the Dutch Organisation for applied scientific research. She holds a PhD in Chemical Engineering from the University of Twente and a Master's in Chemical Engineering from North-West University in South Africa

Biomass and biogenic waste are renewable energy sources which can be used to produce syngas and green methane through thermochemical processes such as gasification. Modelling is required to further develop and optimise this process for different biomass streams and applications.

Machine learning is an innovative method for modelling the complex biomass gasification process. Various data-driven models have already been developed, though without taking physical constraints into account. This can lead to scientific inconsistencies.

The paper presents a physics-informed machine learning model that incorporates the conservation of carbon mass to predict the product gas yield and composition of indirect biomass gasification in a fluidized bed reactor. It shows the potential of machine learning models in gasification modelling and is a promising first step towards refining data-driven machine learning models for thermochemical system applications.