



Abstracts of Lectures

International Summer School on Renewable Energy Sources



Virtual: August 27–29, 2025

On-site: September 1–5, 2025 – Velenje & Krško, Slovenia

Wednesday, August 27, 2025

Chair: Asst. Prof. Brigita Ferčec

13:00 - 13:30

**Welcome and Presentation
of the Faculty of Energy Technology**
Asst. Prof. Brigita Ferčec, University of Maribor,
Faculty of Energy Technology, Slovenia


13:30 - 15:00

**Sustainable Development as Legal Concept in the
Context of European Union Energy Law and Policy**
Narda Krnetić, mag. iur., teaching and research
assistant, doctoral student, University of Rijeka,
Faculty of Law, Croatia

15:15 - 16:30

**From Producer to Consumer:
How the Electricity Market Works**
Asst. Prof. Klemen Sredenšek, University of Maribor,
Faculty of Energy Technology, Slovenia

Lecture Title: Sustainable Development as Legal Concept in the Context of European Union Energy Law and Policy

 **Speaker:** Narda Krnetić Blečić, mag. iur., teaching and research assistant, doctoral student, University of Rijeka, Faculty of Law, Croatia

Abstract:


Sustainable development is a legal concept utilized by the UN, EU, and national laws. It encompasses economic, social, and environmental concerns, approached in an anthropocentric rather than eco-centric manner. The definition of sustainable development is crucial for the interpretation and application of existing EU law. This body of law is now evolving in alignment with the European Green Deal, which has led to the creation of extensive corpus of legislation aimed at achieving the aims outlined in this political document. However, it remains to be seen whether these aims will be achieved, as some crucial structural problems remain unaddressed. Additionally, the impact of new geopolitical developments on these goals is yet to be determined.

Short CV:

Narda Krnetić Blečić is a Research and Teaching Assistant at the University of Rijeka, Faculty of Law, in the Department of European Public Law, and a PhD candidate at the same faculty. Her research lies at the intersection of EU energy law, environmental law, and sustainable development, with a particular focus on the EU constitutional framework. She is an active member of the Institute for Democracy, Social Justice, and Sustainability, as well as the Jean Monnet Inter-University Centre of Excellence Opatija. As part of her academic training, she has participated in several summer schools, workshops, seminars and conferences abroad in the field of her research interests.

Currently, she is participating in the UNIRI project “Regulation of Artificial Intelligence for Sustainability”. She received support from the Croatian Science Foundation to pursue part of her doctoral research at the University of Maribor, Faculty of Law in 2025.

Lecture Title: From Producer to Consumer: How the Electricity Market Works

 **Speaker:** Asst. Prof. Klemen Sredenšek, University of Maribor, Faculty of Energy Technology, Slovenia

Abstract:

The lecture explores the fundamental mechanisms of how the electricity market functions in the European Union – from generation to final consumption. Participants will gain insights into the roles of key actors, such as producers, suppliers, transmission system operators, and market intermediaries, as well as the importance of cross-border exchange and regulation within the integrated EU energy market. The lecture also highlights how electricity prices are formed and how market mechanisms support the energy transition and sustainability goals of the EU.

Short CV:

Klemen Sredenšek received his bachelor's, master's, and doctoral degrees from the Faculty of Energy Technology, University of Maribor, in 2014, 2017, and 2024, respectively. During his work at the Faculty of Energy Technology (Laboratory for Applied Electrical Engineering), he has been involved in various research, development, and market-oriented projects. His research focuses on modelling and optimisation, energy efficiency, photovoltaic systems, energy market and renewable energy sources, with an emphasis on innovative technologies.

Thursday, August 28, 2025

Chair: Prof. Bojan Štumberger

10:00 - 11:00

**Hydrogen and Methanol Technologies –
Production, Transport and Storage**

**Prof. Jurij Avsec, University of Maribor,
Faculty of Energy Technology, Slovenia**

11:15 - 12:30

Hydrogen in Energy Transition


**Assoc. Prof. Ankica Kovać, University of Zagreb,
Faculty of Mechanical Engineering and
Naval Architecture, Croatia**

13:30 - 15:00

**Hydrogen-Powered Regional Aviation:
Infrastructure, Aircraft Design, and Economic Viability
for 19-Seat Operations in Europe**

**Asst. Prof. Anita Praprotnik Brdnik, University of
Maribor, Faculty of Civil Engineering, Transportation
Engineering and Architecture, Slovenia**

Lecture Title: Lecture Hydrogen and methanol technologies - production, transport and storage

 **Speaker:** Prof. Jurij Avsec, University of Maribor, Faculty of Energy Technology, Slovenia

Abstract:

In the field of hydrogen technologies, progress and development of hydrogen and methanol technologies are taking place extremely quickly. For this purpose, the lecture will look at the history of the emergence of hydrogen technologies and the chronological development of technologies. Then, the current state of development of hydrogen and methanol technologies in Slovenia and in the world will be presented. The initial set of lectures will be supported by the basic reasons for the use of hydrogen technologies, such as ecological problems, reducing the carbon footprint... At the beginning of the lectures, we will look at the processes of obtaining hydrogen and methanol, with a particular emphasis on the presentation of the processes of obtaining hydrogen from water using heat and electricity. We will then look at the processes of obtaining hydrogen from water using renewable sources. In addition to the production of hydrogen and methanol, in the second set of lectures we will look at the processes of storing hydrogen and methanol and transport. Lectures will be supported by computational examples and laboratory exercises.

Short CV:


Prof. Jurij Avsec is a full professor at the Faculty of Energy Technology, University of Maribor, Slovenia. His teaching and research focus on thermodynamics, mechanics, and hydrogen technologies, with a strong emphasis on linking theoretical modeling with practical engineering applications.

He is Head of the Laboratory for Thermomechanics, Thermal Energy, and Nanotechnologies, where his work addresses energy system analysis, hydrogen production and storage, and applications of nanotechnology in energy engineering. He has published widely in peer-reviewed journals, contributed to international conferences, and participated in numerous national and EU-funded projects.

As an educator, Prof. Avsec has supervised many graduate and doctoral theses and has contributed to the development of modern curricula in energy engineering.

Through academic leadership and international collaboration, Prof. Avsec actively promotes the transition to low-carbon and hydrogen-based energy solutions.

Lecture Title: Hydrogen in Energy Transition

 **Speaker:** Assoc. Prof. Ankica Kovač, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Croatia

Abstract:

We need to embrace hydrogen as a worldwide energy option now more than ever in the race to decarbonize our planet. With hydrogen, we open doors for the nation's economic development, generating a sizable number of new jobs while also safeguarding the environment. It is important to stress that the crisis is currently occurring and that we urgently require investments, infrastructure, and legislation because clean hydrogen is essential to solving the climate issue.

A significant milestone in establishing Europe's decarbonization trajectory was the adoption of the EU Hydrogen Strategy, which has goals that are probably going to rise in the years to come. There are many uses for hydrogen, including thermal, electrical, or even cooling energy wherever it is required. It can be applied to general energy systems, transportation, industry, households, and power grid balancing. Today, nobody ignores hydrogen anymore. The focus now is on how hydrogen's potential may be developed, increased, and used to help achieve climate goals rather than on whether it plays a part in the energy transition and the attainment of energy independence.

Short CV:

Ankica Kovač is Associate Professor at the University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture in Croatia where she holds position of Head of Power Engineering Laboratory working on both experimental energy system development and modelling and simulation. She holds her PhD in a renewable hydrogen production. Her research interest is focused on **green energy transition**. She is the Guest Editor of the scientific journals: *International Journal of Hydrogen Energy* and *Energies Journal*. Ankica has authored and co-authored numbers of scientific papers published in international scientific journals and conference proceedings, edited a book published by Springer, and authored editorials for Special Issues of scientific journals. She serves as an evaluator in the programmes of Horizon Europe and Clean Hydrogen Partnership, as well as in national programmes of Croatian Science Foundation.

Ankica is founder and chair of the Renewable Hydrogen Energy Convention–RH2EC (<https://rh2ec.com>). She designed first Croatian hydrogen-powered bicycle and installed first Croatian hydrogen refuelling station. The latest project in which Ankica participates is North Adriatic Hydrogen Valley, funded by Clean Hydrogen Partnership/Horizon Europe, as the faculty group leader. The project is a international consortium of 37 partners. Ankica is the Croatian representative in Hydrogen Europe Research and in The Collaboration Programme on Advanced Fuel Cells.

Lecture Title: Hydrogen-Powered Regional Aviation: Infrastructure, Aircraft Design, and Economic Viability for 19-Seat Operations in Europe

 **Speaker:** Asst. Prof. Anita Praprotnik Brdnik, University of Maribor, Faculty of Civil Engineering, Transportation Engineering and Architecture, Slovenia

Abstract:

The decarbonization of regional air transport is gaining momentum, with hydrogen emerging as a promising zero-emission fuel. This lecture explores the feasibility of hydrogen-powered flight for 19-seat regional aircraft. We begin by outlining the key requirements for hydrogen production and supply, focusing on the challenges of airport-side infrastructure, including refueling systems and safety considerations. A conceptual design of a hydrogen-fueled regional aircraft is presented, along with a mass estimation model to determine its Maximum Take-Off Mass (MTOM). We then analyze the economic performance of such an aircraft by calculating its Direct Operating Costs (DOC), comparing these to conventional turboprop alternatives. Finally, the lecture identifies existing European airlines operating 19-seat aircraft and discusses the potential for fleet replacement with hydrogen-powered models. The findings offer insight into both the technological readiness and market opportunities for hydrogen in short-haul regional aviation.

Short CV:

Anita Prapotnik Brdnik earned her Ph.D. in Physics in 2004 at the Faculty of Mathematics and Physics, University of Ljubljana. Early in her career, she conducted research in high-energy physics. After completing her doctorate, she joined the Faculty of Civil Engineering, Transportation Engineering and Architecture, where she continues to work in the field of applied and building physics. In 2023/24, she spent a year as a visiting scholar at Villanova University in the United States, working with the Department of Astronomy.

From 2019 to 2021, she participated in the European project **MAHEPA (Modular Approach to Hybrid Electric Propulsion Architecture)**, where, together with colleagues from transport economics at Faculty of Civil Engineering, Transportation Engineering and Architecture, she studied the infrastructure requirements for hydrogen- and battery-powered aircraft, as well as the economic feasibility of hydrogen aviation in the 2030–2050 timeframe.

Friday, August 29, 2025

Chair: Prof. Jurij Avsec

10:00 - 11:00

Challenges of Wind Power in Slovenia

**Asst. Prof. Matej Fike, University of Maribor,
Faculty of Energy Technology, Slovenia**


11:15 - 12:15

The Sava River and Renewables:

A Model of Sustainable Use

**Boštjan Pišotek, M.Sc. Eng. (Mech. Eng.),
HESS Ltd. (Hydroelectric Power Plants on the
Lower Sava River)**

Lecture Title: Challenges of Wind Power in Slovenia

 **Speaker:** Asst. Prof. Matej Fike, University of Maribor, Faculty of Energy Technology, Slovenia

Abstract:


This lecture provides an overview of the current state of the electricity sector in Slovenia, with a focus on the development and integration of wind power. It introduces the basic principles of wind power plants and highlights the specific environmental, spatial, and regulatory challenges associated with implementing wind energy projects in Slovenia. The session aims to foster discussion on how to overcome these barriers and promote sustainable wind energy development in the region.

Short CV:

Matej Fike is a professor at the Faculty of Energy, University of Maribor. He earned his Ph.D. in Mechanical Engineering from the Faculty of Mechanical Engineering, University of Maribor in 2013. His work is driven by a strong commitment to advancing innovations in energy efficiency, renewable energy solutions, and environmental protection.

His research focuses on wind energy, hydro energy, computational fluid dynamics (CFD), laboratory measurements, and environmental sustainability.

Lecture Title: The Sava River and Renewables: A Model of Sustainable Use

 **Speaker:** Boštjan Pišotek, M.Sc. Eng. HESS Ltd., Slovenia

Abstract:

This lecture explores how Slovenia's Sava River hydropower projects demonstrate a balanced, technically sound, and environmentally responsible approach to renewable energy development. By integrating energy security, environmental sustainability, and socio-economic benefits, the lower Sava hydropower chain proves that hydropower is not only a clean and reliable energy source, but also a catalyst for regional development, biodiversity enhancement, and climate resilience. Key insights include the role of hydropower in enabling other renewables, the importance of lifecycle assessments for energy technologies, and the RCPL model (Responsibility, Collaboration, Profitability, Lean) as a framework for a sustainable green transition.

Short CV:

Boštjan Pišotek graduated from the University of Maribor with a degree in Energy, Process, and Environmental Mechanical Engineering. He completed the Managerial & Organization & Entrepreneurship program at the University of Glasgow, earned an MBA from the London School of Economics and Political Science, and attended the Executive Leadership program at the University of Oxford.

He is currently employed at HESS (Hydroelectric Power Plants on the Lower Sava) as a Project Manager for Complex Projects, responsible for investment, socio-environmental, and development projects. As the client's representative, he actively participated in the construction of the Brežice Hydroelectric Power Plant, a multipurpose infrastructure project. He is currently leading the Mokrice Hydroelectric Power Plant project, which is the final segment of the multipurpose chain of hydroelectric plants on the Lower Sava River.

Boštjan is an active member, lecturer, and delegate of the Slovenian Project Management Association within the International Project Management Association (IPMA). He was one of the founders of the Young Project Managers Section, which he led for several years. He has also worked in project teams developing new technical solutions for companies such as BSH GmbH and Gorenje.

Monday, September 1, 2025

13:30 - 15:00

**Lecture: Liberalization of the European
energy sector: fundamental legal aspects**

**Prof. Aleš Ferčič, University of Maribor,
Faculty of Law, Slovenia**

Lecture Title:

Liberalization of the European energy sector: fundamental legal aspects

 **Speaker:** Prof. Aleš Ferčič, University of Maribor, Faculty of Law, Slovenia

Abstract:

The energy sector has been part of the European integration process from the very beginning. However, due to several technical and economic reasons, it largely remained under the domain of Member States for decades. This began to change in the mid-1990s when the EU initiated a long-term liberalization process that fundamentally transformed the energy sector. This transformation has been driven by significant developments in EU law and policy, including the adoption of four comprehensive legislative reform packages. Additionally, numerous legislative acts were adopted between these reform initiatives. The liberalization of the energy sector has led to the application of EU economic law, which primarily deals with the free movement of production factors (goods, services, persons, and capital) and market competition. These rules significantly impact the actions of energy undertakings and public authorities. Alongside energy market reforms, the sector is now under considerable pressure due to environmental concerns. A few years ago, the EU adopted the comprehensive legislative package "Clean Energy for All Europeans." It is evident that the energy sector has undergone significant structural transformation, and this process appears to be ongoing. However, as long as EU law is shaped according to the Lisbon Treaty, energy policy will remain subordinated to the internal market, which has important implications.

Short CV:

Aleš Ferčič, PhD, is a full professor of law at the University of Maribor, Faculty of law. He serves as the vice-dean for quality, personnel and development; leads the doctoral study programme »Law«; and heads both the Institute of public law and the Center for energy law and green transition. He is also a member of the university's working group for green future. On the international stage, he is affiliated with the European Law Institute, the European Constitution Network, and the Research Network on EU Administrative law. He is specialized in public law, also including energy law and sustainable development. As a project leader, he has successfully completed both international and national projects. He remains active in the field, conducting training sessions and providing expert opinions. His research has been published by reputable publishers, including Oxford University Press, Springer, Kluwer Law International, Europa Law Publishers, C. H. Beck Verlag, C. F. Müller Verlag, and Verlag Österreich.