



University of Cologne

Department of Economics – Chair in Economics and Energy Economics

Prof. Dr. Marc Oliver Bettzüge

Seminar Energy Economics (Econometrics Focus)

Summer Term 2023

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### **Quantitative Analysis of Determinants and Effects of Renewable Energy Deployment**

Energy consumption and economic growth are closely related. In order to be economically active, businesses and individuals require access to reliable and affordable energy sources. Historically, fossil fuels such as coal, oil, and natural gas have played a major role in meeting this demand. However, burning fossil fuels releases greenhouse gases, including carbon dioxide, into the atmosphere, contributing to global warming. As the Earth's temperature rises, it can result in various negative consequences, e.g., more frequent and severe heatwaves, droughts, storms, and rising sea levels. In an attempt to improve the conditions for more and more stringent policies against the use of fossil fuels, policymakers increasingly look towards measures to increase energy conservation, to improve energy efficiency, and to develop energy procurement from non-fossil sources. In particular, global investment in wind generators and solar PV panels has recently seen remarkable growth, mainly driven by enabling policies, but partially also by steep cost reductions. For example, the share of renewables (excluding hydro) in global primary energy consumption was around 6.7% in 2021, compared to approximately 1.3% in 2010 (BP Statistical Review, 2022).

Due to the importance of renewable energy development, an extensive literature has examined various determinants, particularly financial (e.g., the availability of financing for renewable energy projects), political (e.g., the quality of governance that may affect the investments), and regulatory (e.g., the laws and regulations that govern the production and use of renewable energy) factors. The other main categories of determinants examined are demographic, environmental, and technological innovation factors. Meanwhile, an increasing number of studies focus on how renewable energy consumption can affect the environment (e.g., by reducing the amount of carbon dioxide and other harmful emissions), electricity prices (e.g., its impacts on the relative marginal cost of generating electricity), and socioeconomic indicators (e.g., through net job creation, health, and greater social inclusiveness).

In this seminar, students will review the current state of empirical literature that adopts panel data analysis to model the key drivers of renewable energy deployment, assess the effects of renewable energy

development on the energy sector, society and economy, and examine the comparative advantages in the trade of renewable energy equipment and its technological advances.

### Schedule

06.04.2023 10:00-11:30	Introductory meeting - Organizational Issues - Seminar Introduction and Overview of Topic
19.04.2023 10:00-13:00	Methodologies Seminar: Introduction of Methodologies and basic econometric concepts used in the panel data analysis of the determinants and effects of RE deployment ( <i>part one</i> ).
20.04.2023 10:00-13:00	- Methodologies Seminar: Introduction of Methodologies and basic econometric concepts used in the panel data analysis of the determinants and effects of RE deployment ( <i>part two</i> ). - Presentation and Writing Skills Seminar
<b>20.04.2023 23:59</b>	<b><i>Deadline to Register or Withdraw from the Examination via KLIPS</i></b>
Group Meetings (with Mentor) Main Idea and goal, Structuring of Presentation etc.	
<b>20.06.2023 10:00</b>	<b><i>Deadline Submission of Presentation Slides to ILIAS</i></b>
21.06.2023 10:00-13:30	Group Presentations <b>Mandatory</b>
22.06.2023 10:00-13:30	Group Presentations <b>Mandatory</b>
28.06.2023 10:00-13:30	Group Presentations <b>Mandatory</b>
Tba	Guest Lecture
<b>20.08.2023 23:59</b>	<b><i>Deadline Submission of Final Seminar Paper and Research Proposal</i></b>

### Application

A maximum number of applicants of 30 can be admitted to the course. Please register on KLIPS for the seminar during the first registration period.

After you receive a seat in the seminar, please make sure to register for the examination on KLIPS as well (use the Lehrveranstaltungsprüfung " Seminar Energy Economics (Econometrics Focus)"). Only those who have a seat in the seminar can register for the examination! Thus, if you decide not to take the seminar, please make sure to deregister from the course so your peers are able to enroll for the remaining spots before the exam registration phase ends. Once you have registered for the examination, the registration is binding, and **students who do not give a presentation or do not hand in a seminar paper in time will receive a failing grade**. Thus, please ensure that you can submit all requirements within the deadline and attend the mandatory sessions before registering for the course.

## Examination

The final grade consists of an oral and two written examination parts. To pass the examination, students are required to participate in all parts of the examination.

The final grade for this course will be a weighted average of (the quality of):

- A) presentation of overall topic (35% - 10 minutes - individual grade)
- B) individual seminar paper (50% - 4.000 words)
- C) research proposal (15% - <https://energie.uni-koeln.de/sites/energie/user/Lehre/Lehrstuhl/ProposalTry1.pdf> )

Participation in all examination parts and dates is mandatory in order to complete the course successfully.

### Examination part A: a presentation (April – June):

This is the oral part of the examination. The aim of this part is to provide and receive a general overview of the different facets related to the quantitative analysis of the determinants and effects of renewable energy deployment. Therefore, students will be allocated to one of **six general topics** within the scope of the seminar and distributed to groups (The topic and group allocation are at the sole discretion of the Chair in Energy Economics). **In June**, topics have to be presented to the other peers and discussed with industry experts. Each presentation should provide a general overview of the topic, analyze the current state of literature (introduce relevant literature and methods used in those sources), point out interesting research questions, and critically discuss how the topic might evolve in the future. Students need to structure their topic, distribute the individual parts of their group presentation among themselves, and deliver coherent and consistent presentation slides. Each student is required to present 8-10 minutes. Grading will be done based on individual performance. In case of any questions, a mentor will be able to assist the group when preparing the presentation.

### Examination part B: a seminar paper (June – August):

The aim of this part is for students to **become an expert in one specific topic** within the empirical literature of this seminar. The individual seminar topics will be distributed after the group presentations in June (The topic allocation is at the sole discretion of the Chair in Energy Economics). The seminar topic allocated to a student will be from another area than the presentation topic of the respective student, allowing students to work on two different aspects of this literature. The written paper should be around 4,000 words (+/-10%). Students need to narrow down the scope of their paper by choosing a research question, providing an overview of the literature, and critically analyzing their research question in depth. Each student will have a mentor in case any questions arise when composing the seminar paper.

### Examination part C: a research proposal (June – August):

The aim of this part is to hand in a research proposal, which might serve as a blueprint for your master's thesis. Ideally, in this proposal, you should show the research question, motivation, who cares and why, the contribution to literature, the importance for policy, which method and data used, and what

empirical/methodological challenges are. Use the template given by the chair: <https://energie.uni-koeln.de/sites/energie/user/Lehre/Lehrstuhl/ProposalTry1.pdf>

### General Requirements

The seminar is designed for students to prepare for a Master's thesis in the Empirical Analysis of Energy Economics. The seminar participants are expected to gain in-depth insights into their topic independently. Thus, **we expect students to already have a solid foundation in Energy Economics as well as Econometrics** (i.e., have taken other courses in the Energy specialization and Econometrics) before taking the seminar.

While the seminar topics will be distributed by the chair, students are expected to determine the main focus of their presentations and seminar paper themselves. The emphasis within the own topic as well as the draft structure of the paper, shall be discussed with the mentor at an early stage. Furthermore, students should deal critically with the contributions of other participants. Active participation in the seminar discussion is expected. Attendance during all presentation days is therefore required. We provide a guideline for the preparation of seminar papers. This includes all design requirements. ([https://energie.uni-koeln.de/sites/energie/pdf/Guideline\\_English.pdf](https://energie.uni-koeln.de/sites/energie/pdf/Guideline_English.pdf))

### Further Information

Allocated Modules	<ul style="list-style-type: none"><li>• EM Energy and Climate Change III</li><li>• The remaining seats can be allocated to students in the IMES program.</li></ul>
Credits	6
Language	English
Examiner	Prof. Dr. Bettzüge
Cooperation partners	Tba
Mentor	Markos Farag ( <a href="mailto:mfarag1@uni-koeln.de">mfarag1@uni-koeln.de</a> )
Organization	Markos Farag ( <a href="mailto:mfarag1@uni-koeln.de">mfarag1@uni-koeln.de</a> )