

**Faculty of Science and Engineering, University of Groningen
Energy and Sustainability Research Institute Groningen (ESRIG)**

Profile report:

**Energy Systems and Scenario Development and Evaluation
Energiesystemen en ontwikkeling en evaluatie van scenario's**

Discipline: Energy System studies

Level: Tenure Track Assistant or Associate Professor

Domain: Research

FTE: 1.0 (full time)

1. Scientific Disciplines

Environmental Sciences or economics, focusing on energy systems and scenario evaluation.

2. Vacancy

This position is opened by the Board of the Faculty on request of ESRIG (ref. esrig.GMC.09-2023). It will be embedded in the [Energy and Sustainability Research Institute Groningen \(ESRIG\)](#), basic unit [Integrated Research on Energy, Environment and Society \(IREES\)](#). The position falls within the framework of the faculty's career system [Career Paths in Science and Engineering](#). As the focus domain of the position is research, the criteria of the career path with a focus on research apply. Please see the link for more information.

3. Selection Committee (BAC)

Prof. dr. Nasser Kalantar-Nayestanaki, director of ESRIG (chair)

Prof. dr. Klaus Hubacek, IREES, chairman board of ESRIG, chair of IREES

Prof. dr. Evrim Ursavas, Full Professor in Energy Logistics, FEB

Prof. dr. Eize Stamhuis, Associate Professor of Marine Zoology & Biomimetics, Director of Education of ESRIG

Prof. dr. Saskia Lavrijssen is full professor of Economic Regulation and Market Governance

Dr. Franco Ruzzenenti, Assistant Professor in Complexity Sciences, IREES

Student representative Rebeka Béres

HR advisor tbc

4. Research Area

Keyword for the area of research is "Energy Transition": the road that inevitably must be taken in the coming decades from the present era of fossil fuels into a future of (decentralized) systems based on renewables. Major subjects along this road are: which sources of energy will be chosen and for what reason(s), who will be the future actors and stakeholders, and what will be the economic, social and environmental impacts. Researchers with a view on the dynamics of the energy system are urgently needed to produce balanced and scientifically sound results on present and future production and consumption systems all over the world. The outcome of such studies will help shape the energy future. The research of the Energy, Environment & Society group (IREES) focuses on how these changes in energy systems will affect sustainability and whether we can identify options to improve the sustainability of these systems. The research varies from local energy supply systems in the

Netherlands to global supply systems. The successful candidate also focuses on energy strategies for specific end-use sectors, such as households, services, transport, and industry. Identification of promising local and sector specific solutions are key in this research considering life cycle impacts. This focus will complement and strengthen present research at IREES the best.

5. Embedding institute (and base unit)

Energy and climate change, sustainable society, artificial intelligence, and healthy aging are the key focuses of the University of Groningen and are the main topics of the newly established Schools within the University. Within the Faculty of Science and Engineering, the Energy and Sustainability Research Institute (ESRIG) covers Energy and Climate Change and wider Sustainability themes. The position will therefore be embedded in ESRIG. This institute is comprised of six base units, that all contribute to the [MSc Programme on Energy & Environmental Sciences \(EES\)](#) and also contribute to Science & Society-related education in other degree programs. Within ESRIG, the Integrated Research on Energy, Environment & Society base unit (IREES) focuses on the key challenge to address the energy transition that requires a substantial transformation of the economy and shifts towards a more sustainable society. Research at IREES is performed to assess and explore the energy transition, energy systems, and the circular economy. Systems analysis, energy modeling and scenario development are the most frequently used scientific methodologies. IREES will be the host of this position within the research line on [Decarbonization, energy transition and system integration](#). IREES offers the opportunity to perform independent research on one of the themes mentioned or on topics where these meet, as well as intensive collaboration with colleagues working on similar topics. The new position is essential for the continuation and expansion of the current Energy Systems research within the faculty and beyond.

6. Local, National and International Position

Sustainability and Energy are two of the main themes at the UG. In addition, Innovation, Responsibility, and Interdisciplinarity are recognized as key approaches for our research for UG. IREES has a long and fruitful tradition in cooperation with groups from other Faculties, such as Spatial Sciences, Law, Economics and Business, Philosophy, Arts, and Behavioural and Social Sciences, and has a unique position because of its focus on human-environment and science-society interactions. Since Energy and Sustainability have been selected as focus areas, cooperation in research and teaching with other research groups at the Faculty of Science & Engineering (FSE) and within the UG has been intensified. The candidate will further represent IREES and try to acquire a prominent position for IREES and ESRIG in these areas as far as interactions concerning science, technology, and human-environment interactions are concerned.

Models and scenarios are essential to combine insights, in both research and teaching activities. Furthermore, scenarios are a powerful tool for knowledge dissemination and as frameworks for engaging stakeholders. In turn, the new schools provide a high-profile environment with significant international visibility. Its partnerships with businesses, governments and NGOs form a valuable interface and enable innovative forms of collaborations for knowledge production and circulation.

At the national level, IREES is a member of the national research school SENSE (Socio-Economic and Natural Sciences for the Environment), along with related groups from other Dutch universities (Wageningen, Free University Amsterdam, Leiden, and Utrecht).

In Europe, groups with a similar profile as IREES are, e.g., found in the Nordic countries (Lund and Gothenburg, Trondheim, Turku), in Spain (Barcelona) and in Austria. Especially the International Institute for Applied Systems Analysis (IIASA) in Austria is a renowned research institute, to which IREES has several long-standing connections.

In this international setting, IREES strives to get and maintain a leading role in system dynamics analysis and modelling by addressing energy transitions and contributing to long-term energy and environmental scenario development. To achieve this, IREES aims at opening new pathways in the field of data complexity analysis.

Globally, IREES has strong research ties with groups in Europe, the US, China, and other Asian countries and Africa, which has led to joint research projects and proposals and the exchange of researchers in both directions. For example, we have a joint virtual research center with the University of Maryland in the US and Shandong University in China with funded joint research projects, publications, joint students, and faculty exchange. In addition, IREES successfully collaborated on a teaming proposal with 15 million Euro EU and 25 million Euro co-funding to set up a joint energy research center at the University of Cyprus and the Technical University of Denmark (DTU). In all these collaborations, energy systems are of growing importance. In this context, IREES strives to attain and maintain a substantial role in developing interdisciplinary approaches to informing the energy transition.

7. Expected contribution to Research

The candidate initiates and develops an internationally competitive research programme, addressing the energy transition and its societal context, using the fundamental principles of integrated system analysis, in which both integrated modelling and scenario designs are applied.

Preferably, the candidate's research is expected to interface with other research groups in ESRIG, and preferably also with groups at other faculties, possibly via the Wubbo Ockels School for Energy and Climate. The research programme should lead to publications in leading journals. Obtaining substantial external funding for (PhD) projects is crucial. Supervision of PhD students is an important part of research activities.

8. Expected contribution to Teaching

The candidate will teach in the degree programmes within the faculty (Bachelor- and Master levels) and contribute to training of Ph.D. students. One particular programme in which the candidate will teach is the master program Energy and Environmental Sciences, in which IREES plays a vital role. This master within the Faculty of Science and Engineering is the only master's program within the university that clearly addresses the key foci of the university. Furthermore, the candidate will contribute to bachelor programmes with substantial energy-related elements, such as the track "energy and environment" in the Physics Bachelor's degree programme, and the university-wide minor programmes Future Planet Innovation, and "Energy". Depending on the background and interests of the candidate, contributions to one of the many other degree programmes in the faculty is also possible.

9. Expected contribution to the Organisation

The candidate is expected to actively contribute to the management and organizational tasks of the institute and faculty, for example by participating in working groups and committees on teaching, research, and management. The candidate will also contribute to relevant organizational activities on the national and international level. Furthermore, a prominent role by initiating and leading new initiatives is expected in the university-wide schools on energy ([Wubbo Ockels School for Energy and Climate](#)) and sustainable development ([The Rudolf Agricola School for Sustainable Development](#)) and inter-university collaborations such as Research School for Socio-Economic and Natural Sciences of the Environment ([SENSE](#)). As outreach is increasingly important, the candidate

will be involved in outreach and engagement activities of FSE, such as supporting energy systems research components in grant proposals and stimulating cooperation between partners from science, industry, and society.