



## Department of Chemical Engineering *Energy Systems Research Group*

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### **POST-DOCTORAL POSITION FOR AN ENERGY SYSTEMS RESEARCHER AT THE ENERGY SYSTEMS RESEARCH GROUP (ESRG) AT THE UNIVERSITY OF CAPE TOWN**

A post-doctoral position is being offered for an emerging scholar in Energy Systems analysis to join South Africa's leading energy systems research team to contribute to cutting edge research advancing the state of the art in integrated energy, water, and agriculture nexus modelling for sustainable socio-economic development in Africa.

#### **Scope of the Research**

The primary scope of work will be under the "RE4AFAGRI" project (Renewable Energy for African Agriculture: Integrating Modelling Excellence and Robust Business Models"). The key objective of the project is to carry out influential and relevant research promoting the integration of multi-scale open-source modelling approaches for the nexus between renewable energy, water, and agriculture, while supporting robust business models that can sustainably support private smallholder farmers of Africa in their effort to eradicate poverty and inequality.

The methodology combines bottom-up energy, agricultural, and water resource and demand mapping with larger-scale regional nexus systems modelling platforms to derive multi-scale insights that provide a comprehensive picture of infrastructure requirements and their impact. Large geospatial databases in combination with field data will be used to assess local water needs for irrigation (using agro-climatic analysis and assessing local sustainable groundwater pumping potential) and the associated energy requirements. Additional energy needs for productive and community uses at an appliance-level are also needed to provide a clear picture of the technology and investments required, the economic (micro and macro) benefits, and the environmental impacts.

The researcher will take a leading role in advancing the methodological approaches for the critical evaluation and validation of the developed frameworks - to ensure their applicability and relevance is tailored to meet African realities. The validation and application of the modelling frameworks will initially focus on Rwanda and Zambia, but is ultimately intended to be flexible to tackle contexts across the continent. The use of field collected data, and/or focus groups (if necessary) will be arranged with local partners.

The RE4AFAGRI international project consortium includes partners that have pioneered nexus research developing modelling tools to tackle real problems including the University of Cape Town in South Africa, the University of Zambia, the University of Rwanda and the Politecnico di Milano (PoliMi) in Italy, the International Institute for Applied Systems Analysis (IIASA) in Austria, and TFE Energy in South Africa and Germany.

### **The Research fellow will have, or be required to:**

- Hold a PhD in quantitative Energy/Water/Food systems analysis or related, bringing strong analytical skills and the ability to strengthen intellectual debate and skills of our team of energy systems modellers.
- Have keen interest in aspects relating to overcoming the challenges of energy access in Africa.
- Carve out a contribution in an ongoing project where UCT will be collaborating with other leading international research institutions to develop and validate an open source nexus tool to promote integrated energy solutions for rural Africa with a focus on smallholder farmers.
- Engage in the model development and validation process
- Work independently, but as a member of the ESRG team, attending virtual weekly group meetings and project meetings.
- Good English spoken and written language skills are expected.
- Familiarity with energy, water, agriculture nexus modelling and assessing water and energy needs in rural communities.
- Geospatial data collection and analysis, and experience with Python, R, or other programming or mathematical modelling experience would be an advantage.
- Given current travel and campus access restrictions this position is currently expected to be held off-campus depending on changes in the global and local pandemic situation.

### **The Energy Systems Research Group at UCT**

The Energy Systems Research Group at the University of Cape Town combines modelling of energy and economic systems with policy analysis and field-based research, to generate and enhance knowledge of energy systems at sectoral, regional, national, and sub-continental scales, focused on South Africa and the SADC region. In SATIM, the group holds the only full energy sector model for South Africa, combining electricity and liquid fuels sectors on the supply side with industrial, transportation and residential users on the demand side. A dynamic linking of this energy systems model with a macroeconomic general equilibrium model allows for economic analysis of energy-system decisions and ensures that inputs to SATIM are based in economic forecasts rather than arbitrarily specified. Specialists cover the main industrial sub-sectors, transport, residential, power generation, coal-mining, and renewables. In addition, the group has expertise in modelling on a number of other open-source energy systems platforms. The group in its current format evolved out of the 2019 restructuring of UCT's Energy Research Centre and holds a combined experience of over 70 person-years.

### **The post-doctoral research fellow (PDRF) would have the following opportunities to interact with the team and to thus further their academic career:**

1. Work with the ESRG and several international partners.
2. Participate in the methodological design of the tool and the validation process
3. Discuss and record model assumptions and engage in detailed peer-review
4. Contribute to the preparation of follow up research grant proposals.
5. Contribute in the writing of academic publications describing the approach, methods and results.
6. Further develop their own academic career by interacting with other ongoing projects at the ESRG .

### **Tenure and value**

The fellowship is valued at **ZAR 300,000 and the appointment would be for 12 calendar months, starting 1<sup>st</sup> October**. Given travel restrictions, the fellowship can initially be held remotely. It is a full-time fellowship.

## Conditions of award

- PhD in relevant topic.
- The PhD must have been granted within the past 5 years or provide satisfactory evidence that the PhD thesis has been submitted for examination should be provided.
- The successful candidate will be required to register as a Postdoctoral fellow at the University of Cape Town.
- All registered postdoctoral research Fellows are required to comply with the University's approved policies, procedures and practises of the postdoctoral sector.
- Applicants may not previously have held full-time permanent professional or academic positions.

## Application procedure:

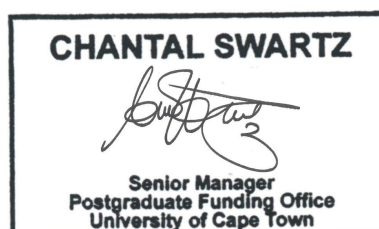
Suitable candidates are required to provide the following:

- a letter of application expressing research experience and interests;
- certified copies of all academic transcripts;
- a full CV, including details of publications; and
- names and addresses of at least two academic referees, with whom the applicant has worked.

Eligible and complete applications will be considered and must be submitted via email to Ms Yumna van der Schyff ([yumna.vanderschyff@uct.ac.za](mailto:yumna.vanderschyff@uct.ac.za)) by 8am on the **27<sup>th</sup> September 2021**. For enquiries, contact Alison Hughes [alison.hughes@uct.ac.za](mailto:alison.hughes@uct.ac.za).

## *The University of Cape Town reserves the right to:*

- disqualify ineligible, incomplete and/or inappropriate applications,
- change the conditions of award upon offer or to make no awards at all



**APPROVED**