Department of Chemical Engineering

Energy Systems Research Group

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POST-DOC POSITION FOR AN ENERGY SYSTEMS MODELLER AT THE ENERGY SYSTEMS RESEARCH GROUP AT THE UNIVERSITY OF CAPE TOWN

A postdoc position is being offered for an emerging scholar in Energy Systems analysis to join South Africa's leading energy systems research team on its first analysis of pathways towards net-zero greenhouse gas emissions for South Africa.

The Research fellow will have or be required to:

- A PhD in Energy systems analysis, bringing strong analytical skills and the ability to strengthen intellectual debate and skills of our team of energy systems modellers.
- Interest in aspects relating to the trade-off between development and mitigation objectives in a developing world context; Experience with analysis of national level (net-zero) pathway scenarios.
- Carve out a contribution in an ongoing project where ESRG will be using the SATIMGE framework to show how South Africa can become carbon neutral over a 2050-2060 horizon. The model setup is a combination of a TIMES model for South Africa (SATIM) and a dynamic recursive CGE model for South Africa (eSAGE).
- Engage in the updating and testing of various aspects of SATIM; Experience with building up TIMES models is thus required (familiarity with ANSWER-TIMES platform is a plus).
- Work independently, but as a member of the ESRG team, attending virtual weekly group meetings and project meetings. Good English writing skills are expected.
- Coding skills and some experience with Tableau in GAMS would be an advantage.
- Experience with Power Production (dispatch models) such as Balmorel, Flextool (IRENA), Plexos, etc. an advantage.
- Given current travel and campus access restrictions this position will be held off-campus.

Scope of the Research

The project aims to make a first pass at analysing net zero emissions pathways for South Africa, exploring different end points (2050, 2060), and to the extent possible (depending on cost/technology uncertainties) provide sectoral and economy-wide perspectives on techno-economic and policy requirements for such pathways. The analysis itself will be mainly undertaken using the same modelling framework that is currently being used for the technical analysis underpinning the update of South Africa's NDC, namely SATIM: The South African TIMES Model.

Context: Net-Zero for South Africa

South Africa has always been a strong supporter of the Africa Group's position on the importance of a 1.5 degree temperature goal, given the vulnerability of African countries to climate change. A key challenge for South Africa's decarbonization however, and a more ambitious mitigation pathway, given its development challenges, has been the need for a just transition, which would ensure that communities and workers are not left behind. To this end, South Africa's National Planning Commission, building on Chapter 5 of the 2014

National Development Plan ("Ensuring Environmental Sustainability and an Equitable Transition to a Low Carbon, Climate Resilient Economy and Society"), has been conducting a national dialogue on "Pathways for a Just Transition". The draft "Climate Vision for 2050" proposes for the first time a goal of either zero or net zero emissions in 2050. The Vision was to have been finalized in the first quarter of 2020 at a high-level event attended by President Ramaphosa, but this has been postponed due to the COVID-19 crisis. President Ramaphosa, in his statement to the UN SG's 2019 Climate Action Summit, emphasized that in 2020 "We will also be finalising our Just Transition Plan, including defining a vision compatible with the 1.5 degree Paris temperature goal". At the same time, South Africa is also currently finalizing its climate change legislative framework, which includes consideration of the long-term goal. It is highly likely therefore that South Africa will, in the context of a just transition plan, consider a more ambitious long-term goal in the light of equity as enshrined in the Paris Agreement, the 1.5 degree goal, and the latest science contained in the IPCC's Special Report.

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 team to help parameterize SATIM to describe net zero emission pathways for South Africa, both on supply (power, liquid fuels) and demand (buildings, transport and industry). More specifically expertise is required in the power sector and the buildings sector (October 2020-April 2021).
2. Discuss and record model assumptions for technical appendix of report (April-May 2021).
3. Provide input on the synthesis report (May-June 2021).
4. Contribute to the preparation of follow up research grant proposals, for a more in-depth study of net-zero pathways for South Africa (June-July 2021).
5. Take the lead in the writing up of an academic publication describing the methods and results obtained in the first-pass net-zero study for South Africa (June-September 2021).

Tenure and value

The fellowship is valued at ZAR 300,000 and the appointment would be for 12 calendar months, starting soonest. Given travel restrictions, the fellowship can 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 Mrs Carol Carr, Carol.Carr@uct.ac.za by **Monday 16th Oct 2020.** For enquiries, contact Dr. Andrew Marquard, Andrew.Marquard@uct.ac.za or Bruno Merven, brunomerven@gmail.com.

The University of Cape Town reserves the right to:
 disqualify ineligible, incomplete and/or inappropriate applications,
 change the conditions of award or to make no awards at all