



Re-advertisement call for applications for PhD studies at the African Center of Excellence in Energy for Sustainable Development (ACE-ESD) within the Research Training Partnership Program on Sustainable Energy

Background

The African Center of Excellence in Energy for Sustainable Development (ACEESD), at the College of Science and Technology (CST), University of Rwanda (UR), is funded by the World Bank. This is an approved ACE II project Center of Excellence envisioned to address key economic challenges resulting from low rural energy access, poor adoption of energy technologies in rural areas, and poor inter-state energy trading in the Eastern and Southern Africa region. The ACE-ESD is partnering with Chalmers University of Technology in a five-year Research Training Program (2019-2024) funded by the Swedish International Development Agency (Sida) aiming to strengthen research capacity on Sustainable Energy.

The PhD programme

This call is for three (3) PhD students to be enrolled in the program. The following are the type of positions and preconditions for the positions of PhD. The partnership program is focused on interdisciplinary and policy-relevant energy research on the theme: *Smart electrification for rural and urban development using locally available renewable energy resources appropriate to Rwanda*. The program investigates Rwanda's future energy system, exploring the interaction between energy demand and energy system design. The program will contribute to addressing real world problems of importance to Rwanda's development challenges and developing appropriate local solutions, establishing a link between researchers and energy sector actors that is currently missing. There is an emphasis on problem-oriented research, energy systems design (production-supply systems as a whole, rather than improvements of specific materials or components), field studies and stakeholder interactions.

PhD positions

The PhD students will undertake a **PhD degree in Sweden, at Chalmers University of Technology**, sandwich mode. During the PhD process the candidate will spend time in Sweden to take courses and interact with colleagues, and in Rwanda to work on empirical studies. Visits to Sweden will typically be 3-7 months (in total a maximum of 29 months). Courses are primarily taken in Sweden, but may also be e.g. administered on distance learning mode or courses at other universities as decided by the supervisor/examiner. Also, short courses specific to the program are given in Rwanda at ACE ESD. Students will be supervised jointly by Swedish and UR senior staff. PhD positions, included the allowances paid during visits in Sweden, are funded by Sida. Studies are expected to start mid 2022.

All PhD positions are readvertised, and the following general eligibility criteria apply:

General Eligibility criteria (concerns all PhD student positions. These are stipulated by the UR policy.) The applicant must be:

- i. Staff of the University of Rwanda (permanent or on temporary contract), employed at a collaborating government institution, or external MSc holders;
- ii. Citizen of Rwanda
- iii. Holding a relevant MSc degree;
- iv. Ready to spend a maximum of 29 months in Sweden in multiple visits, not exceeding 7 months/year;
- v. Ready to continue working at the University of Rwanda after completion of the PhD studies;



As per the policy, male applicants below the age of 40 years of age and female applicants below 45 years of age are given priority for PhD Scholarships. Women are encouraged to apply and there is a gender equality component in the program that will provide some financial support for parents who travel with children. Candidates must be prepared to return immediately after receiving a letter confirming satisfactory completion of the degree to serve in Rwanda. For PhD scholarships, the candidate should be prepared to work full time on the project and not in possession of another fellowship for PhD studies. Note that the candidate is expected to contribute to teaching at ACE-ESD. However, during the study period, 20% of the teaching load will be respected according to the University guideline. Other side activities, assignments, consultancies or employment are strongly discouraged. The following four positions are readvertised. The instructions on how to apply for each position are provided below.

PhD POSITION 1. Scales of solar power for rural development in Rwanda's future energy system

PhD POSITION 2. Combined generation systems – hydro and solar power

PhD POSITION 3. The role of policy and finance in energy development in Rwanda

PhD POSITION 1. PhD in Scales of solar power for rural development in Rwanda's future energy system

Solar power is highly scalable, from available solar lantern to power plant scale. This makes it important to assess how different solar power technologies and system scales best fit into and contribute both to the development and future power system of Rwanda. This PhD research should focus on the possible roles of solar photovoltaics (PV) in the future power systems of Rwanda and the contribution of the deployment of solar PV to development with special emphasis on the role for rural development. Thus, the research should contribute to energy and power planning through assessments of optimal electrification strategies with regards to deployment of different solar PV scales and system designs, grid-based and off-grid. There should be focus on how the deployment of solar PV is contributing to development e.g. through providing electricity for productive use purposes. Thus, load considerations will be important. The research thus covers different solar PV scales, and technoeconomic, socioeconomic and organizational characteristics of these PV scales, and resource and demand distributions and loads. The research engages with questions such as: what is the optimal spatial distribution of different solar PV scales contributing to development in Rwanda (with a special emphasis on rural development); how does this distribution depend on the development of electricity demand and other locally specific preconditions, and on alternative electrification options and other system solutions, such as stand-alone systems (solar home systems) and extension of the national grid?

The research is to be based on a mixed methods approach. The PhD student will have possibilities to collaborate also with other PhD students and seniors in the program. At Chalmers, the student will belong to the research group of Energy, Environment and Systems.

Specific eligibility criteria for POSITION 1 (for general eligibility criteria see page 2)

Essential criteria:

- Proficient in written and spoken English
- MSc degree in energy systems, electric power engineering or any other relevant subject (engineering, physics, geography etc) with sufficient knowledge of energy systems
- Ability to work independently as well as within an inter-disciplinary, cross-continental team
- Ability and willingness to think and write critically, and to interrogate techno-economic assumptions.



- Interest in systems thinking
- Willingness to apply a mix of qualitative and quantitative methods

Desirable criteria:

- Experience of energy systems analysis
- Interest in field data collection
- Experience of modelling
- Experience of conducting interviews
- Quantitative data analysis skills
- Understanding of the electricity system
- Understanding of electricity end use technologies and trends

How to apply:

Interested applicants should apply by email and submit the following:

- An application letter for the position, the subject should be **PhD POSITION 1 Solar power: Chalmers-ACE-ESD in Sustainable Energy**.
- A personal motivation statement for the programme of study. This statement should demonstrate commitment, motivation and reasons for interest in the program (max 2 pages).
- Recommendation letters from two academic or professional referees; In the case of a PhD, two recommendation letters from people who can comment on the candidate's intellectual curiosity and academic ability to pursue research, leading to a PhD in the specified thematic area: one of the recommendation letters should be issued by a previous academic supervisor, preferably the Master's degree supervisor.
- Applicants from collaborating government institutions must attach letter from employer ensuring the candidate gets study leave for the entire period if chosen for the scholarship;
- Certified copy of the relevant highest prior degree (i.e. Master's degree for PhD applicants).
- Copies of valid identification card or passport
- Copy of the Master dissertation/ PhD dissertation; and diploma/proficiency certificate in English (if available)
- Current CV (maximum of 3 pages) with full name, e-mail, date of birth, sex, formal education at xx university (please specify), including full specification of the Masters' degree specialization, teaching experience, previous experience relevant to the program, present position, scientific publications and/or any other academic experience that may be relevant.
- Literature review of maximum 4 pages (see literature review format below);

Instructions for literature review (max 4 pages)

The literature review aims to show the applicant has the ability to engage with scientific literature, identify the state of the art and research gaps. It must include the following: Name of Applicant, College and Campus, the applied for PhD position.

Please read the following three articles (if you cannot access them online you may request these from the contact person for the position):

- Ngowi et al. (2019). Benefits and challenges to productive use of off-grid rural electrification: The case of mini-hydropower in Bulongwa-Tanzania. *Energy for Sustainable Development* 53: 97-103. <https://www.sciencedirect.com/science/article/pii/S0973082619303096>



- Hartvigsson et al (2021). Linking household and productive use of electricity with mini-grid dimensioning and operation. *Energy for Sustainable Development* 60: 82-89. <https://www.sciencedirect.com/science/article/pii/S0973082620303409>
- Kirubi et al (2009). Community-based electric micro-grids can contribute to rural development: Evidence from Kenya. *World Development*, 37(7), 1208e1221. <https://doi.org/10.1016/j.worlddev.2008.11.005>

Then,

- Provide a summary and analysis of two or three of the above papers (approx. one page each), including a discussion of their assumptions, framework, methodology and key findings; and
- Write a one-page summary on what you see as the key opportunities and challenges to the large-scale introduction of solar photovoltaics of different scales in Rwanda. Please include references to any of the above three articles if you find it useful. Clearly present the Rwanda-specific assumptions you are doing (1 page).
- Include all references that you base your description on, with citations in the text and full references in a reference list (Maximum ½ page)

The candidate should avoid copy paste from other sources and quotes should be clearly referenced. The document will be checked against plagiarism software.

Please send the above mentioned (scanned and saved in one document) to the following email: UR CPGS: ur-cpgscholarship@ur.ac.rw, with a , and the subprogram team leaders c.kabiri@ur.ac.rw, and helene.ahlborg@chalmers.se. Please name the application folder with your name and “PhD POSITION 1 Solar power: Chalmers-ACE-ESD in Sustainable Energy”.

Submission deadline

The deadline for applications is 11th March, 2022

Contact details for more information: For further information about the program setup please contact UR team leader Charles Kabiri: c.kabiri@ur.ac.rw For questions about the scientific focus and training, please contact prof. Erik Ahlgren, Chalmers: erik.ahlgren@chalmers.se or Dr. Jimmy Ehnberg jimmy.ehnberg@chalmers.se

The candidates will be notified if they are called for an interview.

The interview process may, apart from the interview, include an exercise, for example reading a scientific article, presenting a summary of it, and analyzing and discussing its. The recruitment team includes senior staff from both UR and Swedish universities. Successful candidates will be notified a couple of weeks after the interview and expected to start on their new position mid 2022.

PHD POSITION 2. PHD in combined generation systems – hydro and solar power

This PhD research is focused on the role of combined energy supply systems, mainly hydro and solar, in Rwanda's future energy system. Starting in the current role played by small-scale hydropower, the research will then study and evaluate hydropower technologies in combinations with solar PV to get a more robust system like increased generation reliability or allowing more intermittent power production but also to be able to provide ancillary services. The value will be investigated both for interconnected microgrids (that is, connection to the national grid) and for other connection options. The research will combine an engineering perspective on hybrid hydropower-based system design for micro-grid electricity provision with attention to socioeconomic and environmental preconditions and consequences.



The candidate preferably has a background in electric power engineering. Also candidates with other relevant backgrounds are welcome to apply. The PhD candidate will possibly work in a team with a postdoc researcher. The candidate will belong to the research group of Energy, Environment and Systems.

For general eligibility criteria, see explanation above on page 2.

Specific eligibility criteria for POSITION 2

Essential criteria:

- The candidate should hold a MSc degree in an Electric Power Systems or similar
- The candidate must be English proficient;

Desired criteria:

- The candidate should be able to work independently as well as work in a team;
- The candidate should be able to work in a multidisciplinary context and represent the technical aspects in discussion and for cooperation.
- The candidate should be interested in and be able to perform field data collection, both qualitative and quantitative data.

How to apply:

Interested applicants should apply by email and submit the following:

- An application letter for the position, the subject should be **PHD Position 2. PHD in combined generation system – hydro and solar power**
- A personal motivation statement for the programme of study. This statement should demonstrate commitment, motivation and reasons for interest in the program (max 2 pages).
- Recommendation letters from two academic or professional referees; In the case of a PhD, two recommendation letters from people who can comment on the candidate's intellectual curiosity and academic ability to pursue research, leading to a PhD in the specified thematic area: one of the recommendation letters should be issued by a previous academic supervisor, preferably the Master's degree supervisor.
- Applicants from collaborating government institutions must attach letter from employer ensuring the candidate gets study leave for the entire period if chosen for the scholarship;
- Certified copy of the relevant highest prior degree (i.e. Master's degree for PhD applicants).
- Copies of valid identification card or passport
- Copy of the Master dissertation; and diploma/proficiency certificate in English (if available)
- Current CV (maximum of 3 pages) with full name, e-mail, date of birth, sex, formal education at xx university (please specify), including full specification of the Masters' degree specialization, teaching experience, previous experience relevant to the program, present position, scientific publications and/or any other academic experience that may be relevant.
- Literature review (see literature review format below);

Instructions for literature review (maximum 3,5 pages)

1. The applicant shall review the article <https://doi.org/10.1016/j.esd.2020.12.004> and show that she/he has the ability to engage with scientific literature by summarizing the key findings, identify the state of the art and research gaps. (max 1 page)



2. Summary of current situation for Rwanda's power system
Second, the applicant shall describe the state of power systems in Rwanda in general, and the situation in terms of solar PV and small-scale hydropower in specific. Relate the situation in Rwanda to the wider African context, with reference to scientific literature and policy documents. (Maximum 1 page).
3. Identified knowledge gaps
Describe what you identify as the main knowledge gaps when it comes to a) the role small scale combined generation systems may play in Rwanda's future power system, and b) what you see as the main knowledge gaps specifically for solar PV and/or small-scale hydropower with reference to literature. (Maximum 1 page)
4. References
Include all references that you base your description on, with citations in the text and full references in a reference list (Maximum ½ page).

Please send the above mentioned (scanned and saved in one document) to the following email: UR CPGS: ur-cpgscholarship@ur.ac.rw, with a copy to the subprogram team leaders c.kabiri@ur.ac.rw, and helene.ahlborg@chalmers.se Please name the application folder with your name and "Position 2 Combined generation system: Chalmers-ACE-ESD in Sustainable Energy".

Submission deadline

The deadline for application is 11th March, 2022

Contact details for more information: For further information about the program setup please contact UR team leader Charles Kabiri: c.kabiri@ur.ac.rw For questions about the scientific focus and training, please contact Dr. Jimmy Ehnberg jimmy.ehnberg@chalmers.se or Prof. Erik Ahlgren, Chalmers: erik.ahlgren@chalmers.se

The candidates will be notified if they are called for an interview.

The interview process will, apart from the interview, include an exercise, for example reading a scientific article, summarizing and analyzing its content and discussing it. The recruitment team includes senior staff from both UR and Swedish universities. Successful candidates will be notified a couple of weeks after the interview and expected to start on their new position mid 2022.

PHD POSITION 3. The role of policy and finance in energy development in Rwanda

This PhD research will undertake a political economy analysis of the role of policy and finance in the development of Rwanda's renewable energy sector, particularly its electricity sector. The first part of the research will consist of a political economy analysis of Rwanda's energy sector, including a historical analysis of its evolution and the formation of the key institutions and actors currently involved in its governance and finance. The research will also undertake a critical analysis of the country's contemporary energy policy landscape and how it has evolved over time in line with technological, political-economic and socio-cultural shifts. With the political economy context clearly established, the second part of the research will undertake a critical in depth study into the role of different modes of public, private, national and international finance within the different sites and scales of the country's electricity sector e.g solar home systems, mini-grids and the centralised system of utility-scale generation, transmission and distribution.



Such an analysis will seek to understand the extent to which the priorities and demands of finance and investment have shaped and determine the national renewable energy pathways. In analysing how technological change is intrinsically bound up with political, economic, social, cultural and environmental factors, theoretically the research is likely to draw from a number of often overlapping frameworks and literatures from geography, development studies and/or sustainability transitions. These could include geographical political economy (Bridge and Gailing 2020); energy geography (Kumar et al 2021); political ecology (Ahlborg and Nightingale 2018); and the financialisation of renewable energy (Baker 2015).

The candidate preferably has a masters degree in energy economics, development studies, human geography, political ecology, political economy, sociology, international relations or related subject, but also interested candidates with other degrees are welcome to apply. The PhD student will have possibilities to collaborate also with other PhD students and seniors in the program. At Chalmers, the student will belong to the research group of Energy, Environment and Systems. For general eligibility criteria, see explanation above on page 2.

Specific eligibility criteria for POSITION 3.

Essential criteria

- Proficient in written and spoken English
- Masters' degree: in energy economics, development studies, human geography, political ecology, political economy, sociology, international relations or related subject, but interested candidates with other degrees are welcome to apply.
- Ability to work independently as well as within an inter-disciplinary, cross-continental team.
- Ability and willingness to think and write critically, and to interrogate techno-economic assumptions.

Desirable criteria

- Familiarity with and/or direct experience of social science research methodologies e.g semi-structured qualitative interviews, snowballing techniques, participant observation and theoretical frameworks.
- Familiarity with and/or experience of undertaking research in an academic or policy-focused setting.
- Quantitative data analysis skills e.g using Excel.
- A basic understanding of the electricity system and recent technological developments in renewable energy.
- An understanding of Rwanda's political economy.

Instructions for Literature Review (maximum 3 pages)

Please read the following two articles (if you cannot access them online you may request these from the contact person for the position):

1. Rodríguez-Manotas, J., Bhamidipati, P.L., and Haselip, J. (2018) 'Getting on the ground: Exploring the determinants of utility-scale solar PV in Rwanda', *Energy Research & Social Science*, (42) 70-79. <https://doi.org/10.1016/j.erss.2018.03.007>
2. Baker, L. et al. (2014) 'The Political Economy of Energy Transitions: The Case of South Africa', *New Political Economy*, 19:6, 791-818. <https://doi.org/10.1080/13563467.2013.849674>



Then,

- Provide a summary and analysis of the above two papers (one page each), including a discussion of their: theoretical framework and themes; empirical themes; methodology; key findings.
- Write a one-page summary on what you see as the key opportunities and challenges to the introduction of renewable energy in Rwanda. Please include further references as you see fit.
- Include all references that you base your description on, with citations in the text and full references in a reference list (Maximum ½ page)

The candidate should avoid copy paste from other sources and quotes should be clearly referenced. The document will be checked against plagiarism software.

How to apply:

Interested applicants should apply by email and submit the following:

- An application letter for the position, the subject should be **PHD Position 3. The role of policy and finance in energy development in Rwanda**
- A personal motivation statement for the programme of study. This statement should demonstrate commitment, motivation and reasons for interest in the program (max 2 pages).
- Recommendation letters from two academic or professional referees; In the case of a PhD, two recommendation letters from people who can comment on the candidate's intellectual curiosity and academic ability to pursue research, leading to a PhD in the specified thematic area: one of the recommendation letters should be issued by a previous academic supervisor, preferably the Master's degree supervisor.
- Applicants from collaborating government institutions must attach letter from employer ensuring the candidate gets study leave for the entire period if chosen for the scholarship;
- Certified copy of the relevant highest prior degree (i.e. Master's degree for PhD applicants).
- Copies of valid identification card or passport
- Copy of the Master dissertation; and diploma/proficiency certificate in English (if available)
- Current CV (maximum of 3 pages) with full name, e-mail, date of birth, sex, formal education at xx university (please specify), including full specification of the Masters' degree specialization, teaching experience, previous experience relevant to the program, present position, scientific publications and/or any other academic experience that may be relevant.
- Literature review (see literature review format below);

Please send the above mentioned (scanned and saved in one document) to the following email: UR CPGS : ur-cpgscholarship@ur.ac.rw, with a copy to the subprogram team leaders c.kabiri@ur.ac.rw, and helene.ahlborg@chalmers.se Please name the application folder with your name and "Position 4 Policy and finance: Chalmers-ACE-ESD in Sustainable Energy".

Submission deadline

The deadline for application is 11th March, 2022

Contact details for more information: For further information about the program setup please contact UR team leader Charles Kabiri: c.kabiri@ur.ac.rw For questions about the scientific focus and training, please contact Dr. Lucy Baker L.H.Baker@sussex.ac.uk or Dr Helene Ahlborg helene.ahlborg@chalmers.se



The candidates will be notified if they are called for an interview.

The interview process will, apart from the interview, include an exercise, for example reading a scientific article, summarizing and analysing its content and discussing it. The recruitment team includes senior staff from both UR and Swedish universities. Successful candidates will be notified a couple of weeks after the interview and expected to start on their new position mid-2022.

Done at Kigali, January 27, 2022



Prof. Nosa O. Egiebor
Deputy Vice Chancellor for Academic Affairs and Research
University of Rwanda