Call for applications for PhD studies for doctoral degree and Postdocs at the African Center of Excellence in Energy for Sustainable Development (ACE-ESD) within the Research Training Partnership Program on Sustainable Energy

1. 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.

2. The PhD programme

This call is for four (4) PhD students and three (3) postdocs to be enrolled in the program. The following are the type of positions and preconditions for the positions of PhD and Postdoc. The call first describes all PhD positions, then follows Postdoc positions. 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.

3. Funding

Students will be fully funded and they will be supported by Sida through UR Sweden program for research, higher education and institutional advancement

I. 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 in spring 2022.

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

1. **General Eligibility criteria** ***(concerns all PhD student positions. These are stipulated by the UR policy. See explanation in footnote)***

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[1];
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;

I. 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 and Postdoctoral Scholarships. 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. 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.

The following four positions are readvertised. The instructions on how to apply for each position are provided below.

PhD POSITION 1. The role of bioenergy for rural development in Rwanda's future energy system

[1] According to UR Scholarships policy 2.1.1.2: Candidates from outside UR are eligible to apply in areas where UR has failed to attract internal applicants in the first call, provided that immediate employment can be justified by the beneficiary College and negotiated with the University management. If justified and negotiated, a candidate from outside UR shall provide a proof that leaving her/his current employment will be possible (demonstrated by a recommendation from the current employer). Applicants should have 75% in the previous year's evaluation report.

PhD POSITION 2. Scales of solar power for rural development in Rwanda's future energy system

PhD POSITION 3. Combined generation systems – hydro and solar power

PhD POSITION 4. The role of policy and finance in energy development in Rwanda

1. **PhD POSITION 1. The role of bioenergy for sustainable rural development in Rwanda's future energy system**

There are multiple uses of bioenergy and many technologies available for conversion of solid bioenergy to modern energy carriers as electricity and biogas. Bioenergy is connected to deforestation but also to the conversion of biowaste to useful energy. Bioenergy is also still the dominating energy source in rural areas and its use for cooking is leading to severe negative health impacts. Globally, the rate of access to clean cooking solutions in rural areas is only 34% (IEA, IRENA, UNSD, WB, WHO, 2019). The current bioenergy use is often unsustainable but a modern bioenergy use may contribute to sustainable development. However, while such a transition offers many opportunities there are also many barriers to overcome. The rapid electrification and improved electricity access may change the use of bioenergy, may provide a quicker transition to clean energy and might change the incentives for bioenergy use and conversion. This PhD position will focus on these questions and the possible future roles of bioenergy for development in Rwanda with a particular emphasis on rural development. The research will integrate quantitative and qualitative research methods and analysis. Assessments of current trends and transitions will be combined with techno-economic studies for identifying different options and their potential contribution to sustainable development.
The research is to be based on a mixed methods approach. At Chalmers, the student will belong to the research group of Energy, Environment and Systems.

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

1.1.1. Essential criteria:

- Proficiency in written and spoken English
- MSc degree in Energy Systems or Renewable Energy or any other relevant subject (engineering, physics, geography, sustainable development, etc) with suffifient knowledge of energy systems and renewable energy
- 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 theory
- Willingness to apply a mix of qualitative and quantitative methods

1.1.2. Desirable criteria:

1. Knowledge of bioenergy technologies
2. Knowledge of household energy use
3. Experience of energy systems analysis
4. Interest in field data collection
5. Experience of modelling
6. Experience in collecting data through interviews
7. Quantitative data analysis skills

1.1.3. How to apply

Interested applicants should apply via email and submit the following documents:

i. An application letter addressed to the UR Director of Centre for Postgraduate Studies (UR CPGS) for the position, the subject should be **PhD POSITION 1 Bioenergy: Chalmers-ACE-ESD in Sustainable Energy**.

ii. 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).

iii. 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.

iv. 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;

v. Certified copy of the relevant highest prior degree or equivelent (i.e. Master's degree for PhD applicants).

vi. Copies of valid identification card or passport

vii. Copy of the Master dissertation; and-diploma/profiency cerificate in English (if available)

viii. 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.

ix. Literature review of maximum 3 pages (see literature review format below);

1.1.4. *Instruction for literature review (max 3 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 two articles (if you cannot access them online you may request these from the contact person for the position):

- Masera et al (2000). From Linear Fuel Switching to Multiple Cooking Strategies: A Critique and Alternative to the Energy Ladder Model. *World Development* Vol. 28, Shankar et al (2020). Everybody stacks: Lessons from household energy case studies to inform design principles for clean energy transitions. *Energy Policy* 141 (2020) 111468.

Then,

- Provide a brief summary and analysis of the two papers (1/2 - one page each), including a discussion of their assumptions, framework, methodology and key findings; and
- Write one-two pages explaining how you see that the use of bioenergy may develop in rural Rwanda with increasing electrification and electricity access. Present opportunities and challenges and refer to the above two articles if you find it useful. Clearly present the Rwanda-specific assumptions you intend to address through the research (1-2 pages).
- 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 subjected to plagiarism check.

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, 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 Bioenergy: Chalmers-ACE-ESD in Sustainable Energy".

1.2.Submission deadline

The deadline for application is 28th September, 2021

1.3.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

The candidates will be notified if they are called for an interview. The Interview for this position is preliminary scheduled to 15-16 November.
The interview process will, apart from the interview itself, include an exercise, for example reading a scientific article, presenting its summary, analysis and discussions. 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 early 2022.

1. **PhD POSITION 2. 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.

1.1.Specific eligibility criteria for POSITION 2 (for general eligibility criteria see page 2)

1. **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 suffifient 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

2. **Desirable criteria:**

1. Experience of energy systems analysis
2. Interest in field data collection
3. Experience of modelling
4. Experience of conducting interviews
5. Quantitative data analysis skills
6. Understanding of the electricity system
7. Understanding of electricity end use technologies and trends

1.2. How to apply:

Interested applicants should apply by email and submit the following:

i. An application letter addressed to the UR Director of Centre for Postgraduate Studies (UR CPGS) for the position, the subject should be **PhD POSITION 2 Solar power: Chalmers-ACE-ESD in Sustainable Energy**.

ii. 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).

iii. 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.

iv. Applicants from collaborating government institutions much attach letter from employer ensuring the candidate gets study leave for the entire period if chosen for the scholarship;

v. Certified copy of the relevant highest prior degree (i.e. Master's degree for PhD applicants).

vi. Copies of valid identification card or passport

vii. Copy of the Master dissertation/ PhD dissertation; and diploma/profiency certicate in English (if available)

viii. 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.

ix. Literature review of maximum 4 pages (see literature review format below);

1.3.Instructions for literature review (max 4 pages)

1. 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:

2. Name of Applicant, College and Campus, the applied for PhD position.

2. 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.

2.4.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 2 Solar power: Chalmers-ACE-ESD in Sustainable Energy".

2.5.Submission deadline

The deadline for applications is is 28th September, 2021

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 for this position is preliminary scheduled to 15-16 November.
The interview process will, 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 early 2022.

3. PHD POSITION 3. 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.

2.1.Specific eligibility criteria for POSITION 3

1. *Essential criteria:*

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

2. *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.

2.2.How to apply:

Interested applicants should apply by email and submit the following:

i. An application letter addressed to the UR Director of Centre for Postgraduate Studies (UR CPGS) for the position, the subject should be **PHD Position 3. PHD in combined generation system – hydro and solar power**

ii. 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).

iii. 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.

iv. Applicants from collaborating government institutions much attach letter from employer ensuring the candidate gets study leave for the entire period if chosen for the scholarship;

v. Certified copy of the relevant highest prior degree (i.e. Master's degree for PhD applicants).

vi. Copies of valid identification card or passport

vii. Copy of the Master dissertation; and diploma/profiency certificate in English (if available)

viii. 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.

ix. Literature review (see literature review format below);

2.3.*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).

2.4.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 "Position 3 Combined generation system: Chalmers-ACE-ESD in Sustainable Energy".

2.5.Submission deadline

The deadline for application is 28th September, 2021

2.6.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 for this position is preliminary scheduled to 15-16 November.
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 early 2022.

3. PHD POSITION 4. 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.

3.1.Specific eligibility criteria for POSITION 4.

1. *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.

2. *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.

3.2.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):

- 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
- 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.

3.3.How to apply:

Interested applicants should apply by email and submit the following:

i. An application letter addressed to the UR Director of Centre for Postgraduate Studies (UR CPGS) for the position, the subject should be **PHD Position 4. The role of policy and finance in energy development in Rwanda**
ii. 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).
iii. 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.
iv. Applicants from collaborating government institutions much attach letter from employer ensuring the candidate gets study leave for the entire period if chosen for the scholarship;
v. Certified copy of the relevant highest prior degree (i.e. Master's degree for PhD applicants).
vi. Copies of valid identification card or passport
vii. Copy of the Master dissertation; and diploma/profiency certificate in English (if available)
viii. 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.
ix. 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, and 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".

3.4.Submission deadline

The deadline for application is 28th September, 2021

3.5.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 for this position is preliminary scheduled to 15-16 November.
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 early 2022.

II. Postdoc positions

The three **postdocs** will have Swedish mentors and work part time with research during 2 years, and will spend 5 months in Sweden as guest researchers at Chalmers. The positions are funded by Sida and the budget includes travels to Sweden, allowances for stay in Sweden, money for data collection and possibility to present work at a yearly conference.
There are also possibilities to take courses at advanced level at Chalmers. Studies are expected to start in spring 2022. For postdoc candidates, the following apply:

1. **General Eligibility criteria** ***(Apply to all postdoc positions. These are stipulated by the UR policy, see explanation in footnote reference[2])***

The applicant must be:
i. Permanent staff of the University of Rwanda[2];
ii. Citizen of Rwanda
iii. Holding an relevant PhD degree;
v. Ready to continue working at the University of Rwanda after completion of the postdoc;
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 and Postdoctoral Scholarships. Post-doctoral fellowships applicants should have completed their PhD studies within the preceding 5 years. Women are encouraged to apply.
The following three postdoc positions are advertised. See the instructions on how to apply for each position below.

[2] According to UR Scholarships policy 2.1.1.2: Candidates from outside UR are eligible to apply in areas where UR has failed to attract internal applicants in the first call, provided that immediate employment can be justified by the beneficiary College and negotiated with the University management. If justified and negotiated, a candidate from outside UR shall provide a proof that leaving her/his current employment will be possible (demonstrated by a recommendation from the current employer). Applicants should have 75% in the previous year's evaluation report.

Postdoc position 1. Innovation dynamics in developing countries

Postdoc position 2. Technological Innovation Systems (TIS) and scales of solar power for sustainable off grid systems

Postdoc position 3. Life Cycle Analysis (LCA) of electric system components

4. POSTDOC POSITION 1: Innovation dynamics in developing countries

This post doc project relates to innovation dynamics in developing countries, with a focus on renewable energy. It aims to further the state-of-the-art of research topics of how innovation comes about and its role in driving economic development in the specific situation for a developing country. The systemic nature of innovation is a main theme such as how firm level innovation draws on a wider system of actors and resources leading to sectoral and societal changes.

The scientific focus relates to the interaction between an innovation systems functionality and the innovation and growth processes of individual companies or subsectors of firms. The post doc will, for example, engage with the literature on the following themes: evolutionary economics and innovation studies, innovation systems; industrial and sociotechnical transitions: firms as actors in sustainable development, frugal innovation, catching up and leap-frogging, and productive use. The responsibilities of the post doc is to take the lead in an independent research project, in collaboration with the senior cooperation partner.
The post doc will be responsible for designing the theoretical framework and the methodology, and to collect and analyze the original data. Publications will be written together with the senior cooperation partner. During the first year the post doc will collect original empirical data about and analyze the functionality of the innovation system of the renewable energy sector in Rwanda, and compare that to other relevant countries or sectors. Thereafter, the post doc and mentor will jointly decide on further theoretical, methodological and empirical analysis as related to the themes mentioned above.

Possibilities for collaboration with other faculty, post docs and PhD students are plentiful. In particular, a current PhD student works on the theme innovation for household energy services. The Postdoc might also be offered to act as a co-supervisor for Masters or PhD students in relevant areas.

The postdoc will make 1-2 visits to Sweden. The planning of these visits will take into account the needs and requirements of the project.
The senior cooperation partner is Annika Rickne, Affiliated Professor at the Department of Technology Management and Economics, Chalmers University.

The position is expected to start in the first half of 2022 and continue on a 50% basis over two years. Note that the candidate is expected to contribute to teaching at ACE ESD. For general eligibility criteria, see explanation above.

5.1.. Specific eligibility criteria for POSITION 1

1. Essential criteria: The candidate should

- hold a PhD degree in a relevant field. For example, a PhD degree in innovation management, business administration, innovation policy, strategy, energy economics, development studies, political economy, or related subject may be of relevance.
- be highly proficient in writing, reading and speaking in English;
- be able 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.

2. *Desirable criteria:* It is good if the candidate has

- proficiency in some of the relevant theoretical areas;
- proficiency in relevant methodologies and skilled in performing field studies.
- familiarity with and/or direct experience of social science research methodologies e.g. semi-structured qualitative interviews, snowballing techniques, participant observation;
- quantitative data analysis skills;
- an understanding of the global and African electricity systems and recent technological developments in renewable energy;
- an understanding of Rwanda's political economy, innovation actors and users.

5.2. How to apply:

Interested applicants should apply by email and submit the following:

i. An application letter addressed to the UR Director of Centre for Postgraduate Studies (UR CPGS) for the position, the subject should be POSTDOC POSITION 5, Innovation dynamics in developing countries: Chalmers-ACE-ESD in Sustainable Energy.

ii. 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).

iii. Two recommendation letters from people who can comment on the candidate's intellectual curiosity and academic ability to pursue research. One of the recommendation letters should be issued by a previous academic supervisor, preferably the PhD degree supervisor.

iv. Certified copy of the relevant highest prior degree (i.e. PhD degree).

v. Copies of valid identification card or passport

vi. Copy of the PhD dissertation; and English diploma/profiency certificate (if available)

vii. Current CV (maximum of 3 pages) with full name, e-mail, date of birth, sex, formal education at universities, including full specification of the Masters' and PhD degree specialization, teaching experience, previous experience relevant to the program, present position, list of scientific publications and/or any other academic experience that may be relevant, statements of other experience.

viii. Description of current and planned teaching portfolio. Include a plan for how to combine teaching with the post doc position, both in terms of topics and time plan.

ix. A research proposal of maximum 4 pages.

5.3. Instructions for research proposal

A research proposal of appr. 3-4 pages.
This proposal will not necessarily form the basis for the post doc's work. Instead it aims to show that the candidate understands how to design a research study.
The proposal should contain a summary on key opportunities and challenges to the growth of renewable energy in Rwanda (possibly with focus on a specific technology or energy source), comments on the role of various actors (with a specific focus on commercial actors but also the interplay with institutional actors), and outline specifically interesting research questions and how these may be addressed.
The concept should include the following sections: 1) Title/Sub-title, 2) Context and background (2-3 paragraphs), 3) Relevance and justification of the project, 4) Theoretical framework(s),
5) Research questions (main question and sub-questions),
6) Research design and methods (qualitiative/quantitative/mixed, inductive/deductive/abductive, types of data to be collected to answer the research questions, methods for data collection, methods for data analysis), 7) Time plan, 8) References.
For questions about the research proposal please contact Prof. Annika Rickne, annika.rickne@chalmers.se
Note that all texts should be written by the candidate him/herself and cannot be copied from other authors. Documents will be checked using 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 "POSTDOC POSITION 5 Innovation dynamics: Chalmers-ACE-ESD in Sustainable Energy".

5.5. Submission deadline
The deadline for application is 28th September, 2021

5.6. 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. Annika Rickne annika.rickne@chalmers.se
The candidates will be notified if they are called for an interview, which is preliminary scheduled for 26-27 October 2021.
The interview process will, apart from the interview, discuss the research proposal submitted by the Post-Doc applicant who will make a short presentation (no longer than 5 minutes). 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 early 2022.

5. POSTDOC POSITION 2. TIS and scales of solar power for sustainable off-grid systems

The scientific focus of the postdoc project is on the development of a sustainable Technological Innovation System (TIS) for off-grid electrification in Rwanda. This focus draws from GoR's interest and efforts to apply solar PV technologies at different scales to speed up off-grid electricity access. The GoR vision is to reach 100% access to electricity by 2024 of which 52% is grid access and 48% off-grid connections. Solar PV is one of the key technologies for reaching the off-grid targets. There have been a number of studies focusing on PV resources, optimizations, etc but there is scant research on the actual diffusion process. USAID (2019) report shows that off grid solar is diffusing – at an increasing rate - but this is mainly limited to small lantern and lights (less than 5 Wp) as there are very few system above 10 Wp. GoR has developed a tier approach to PV electrification based on usage, but how this model synchronizes with the private sector is not known. For example, 80% of sales are over the counter and 20% tendered projects.

Existing literature has identified different types of companies operating in respective scale (tier) which means there is little cross-over from pico to SHS segment: This is also displayed in larger solar plants and micro/mini-grid sectors.

The research engages with questions related to the actor structure of the TIS and to what extent there is one overall TIS for solar PV or if there are several smaller TISs with little or no overlapping functions. Will there be a consolidation into one TIS or will the mini TISs remain? A related important question is the impact of a fragmented TIS on sustainable off-grid electrification. A second set of research questions focus on the TIS capacity to meet the need for productive use. For instance, questions such as how the companies can adjust to transitions from a lower scale to higher scales that accommodate productive uses of energy will be central.
The research is to be based on a mixed methods approach: The Postdoc candidate should have experience in research design, such as understanding and applying theoretical frameworks and conceptual approaches for addressing an empirical problem. Secondly, qualitative methods for exploring empirical issues, such as case study methods and interview techniques, will be instrumental for this research. The Postdoc will also be offered the possibility to act as a co-supervisor for PhD students in the programme but also to cooperate with other Postdocs and senior researchers at UR and Chalmers University.
The key responsibilities of the Postdoc is to design and plan independently a research project, in collaboration with the Swedish senior cooperation partner who will act as a mentor over the course of project duration. The Postdoc will be responsible for further elaboration and development of the theoretical framework and methodology, including collection and analysis of empirical data. There will be opportunity for co-publications with senior cooperation partner(s), foremost the mentor.
During the first year, the postdoc will develop the framework but also start the data collection relevant for understanding the solar power TIS in Rwanda. The focus is on the actors – type, structure, roles, etc - of the innovation system. In the second year the postdoc tohether with the mentor will jointly discuss and decide on publications plans.
The main cooperation partner is Dr Lennart Bångens, associate senior researcher at Chalmers University of technology.

The postdoc is envisaged to visit Sweden twice (2) over the postdoc period. The planning of these visits will take into account the needs and requirements of the project.
Studies are expected to in the first half of 2022 and continue on a 50% basis over two years. Note that the candidate is expected to contribute to teaching at ACE ESD. For general eligibility criteria, see explanation above on page 15.

5.1.Specific eligibility criteria for POSITION 2

1. *Essential criteria:*

- holds a PhD degree in a relevant field. For example, a PhD degree in energy management, business administration, innovation policy, strategy, energy economics,
- development studies, political economy, or related subject may be of relevance.
- be highly proficient in writing, reading and speaking in English;
- be able 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.

2. *Desired criteria:*

i. PhD related to the diffusion of renewable energy in developing countries
ii. Experience of field work, including carrying out interviews in Rwanda
iii. Documented knowledge of both qualitative and quantitative scientific methods
iv. An understanding of Rwanda's energy sector including government institutions, agencies but also commercial actors and users

5.2. How to apply:

Interested applicants should apply by email and submit the following:

i. An application letter addressed to the UR Director of Centre for Postgraduate Studies (UR CPGS) for the position, the subject should be **POSTDOC POSITION 2 TIS and scales of solar: Chalmers-ACE-ESD in Sustainable Energy**.
ii. 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).
iii. Recommendation letters from two academic or professional referees; In the case of a Postdoc, two recommendation letters from people who can comment on the candidate's intellectual curiosity and academic ability to pursue research. One of the recommendation letters should be issued by a previous academic supervisor, preferably the PhD degree supervisor.
iv. Certified copy of the relevant highest prior degree (i.e. PhD degree).
v. Copies of valid identification card or passport
vi. Copy of the PhD dissertation; and diploma/proficiency certificate in English (if available)

vii. 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' and PhD degree specialization, teaching experience, previous experience relevant to the program, present position, scientific publications and/or any other academic experience that may be relevant.

viii. Description of current and planned teaching portfolio. Include a plan for how to combine teaching with the post doc position, both in terms of topics and time plan.

ix. Research proposal of maximum 3-4 pages (see instructions 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 , and the subprogram team leaders c.kabiri@ur.ac.rw, and helene.ahlborg@chalmers.se. Please name the application folder with your name and "POSTDOC POSITION 5 TIS and scales of solar: Chalmers-ACE-ESD in Sustainable Energy".

5.3.Submission deadline

The deadline for application is 28th September, 2021

5.4.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 Lennart Bångens lennart.bangens@chalmers.se

Eligible and complete applications will be considered and short-listed candidates will be called for an interview. The interview for this position is preliminary scheduled to 15-16 November.
The interview process will, apart from the interview, discuss the research proposal submitted by the Post-Doc applicant who will make a short presentation (no longer than 5 minutes). 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 early 2022.

5.5.Instructions for research proposal

A research proposal of appr. 3-4 pages. The research proposal aims to show that the post doc applicant has the ability to engage with scientific literature, identify the state of the art and research gaps. It will not necessarily form the basis for the post docs work. The proposal should contain a summary on key opportunities and challenges to the growth of renewable energy in Rwanda - with special attention paid to the solar power sector -comments on the role of various actors with a specific focus
on commercial actors but also the interplay with institutional actors and outline specifically interesting research questions and how these may be addressed.
The concept should include the following sections: 1) Title/Sub-title, 2) Context and background (2-3 paragraphs), 3) relevance and justification of the topic (what the project intends to accomplish that

will also include research studies that may be relevant to your work), 4) Framework/models, overall methodology.
This may include disciplines in which you will initially begin to read texts and look for research studies),

5) Research Question (a primary question relevant to your title, plus sub questions if needed), 6) Proposed Research Method, 7) Proposed Timeline/Deliverables (in the first phase – appr. 6 months – discussions about the Literature Review and first drafts of data collection plan including interview instruments, questionnaires, etc.) Questions about the concept note please contact Dr. Lennart.bangens@chalmers.se

6. POSTDOC POSITION 3. LCA of electric system components

Societal development relies on increased productivity which is fundamentally dependent on efficient energy systems. The electricity system (ES) is outstanding in efficiency and can be sourced by many different flowing natural resources – sun, wind and hydro which are to be preferred due to the climate crisis. There are a number of components in an ES, of which production and function give environmental consequences that can be of importance and underpin system design choices.
The scientific focus of this postdoc position is on the application of a specific environmental systems analytical method - life-cycle assessment (LCA). The method shall be applied to a few primary components in order to perform comparative up-to-date life cycle impact assessments for a selected number of environmental impact categories.
Key responsibilities of the postdoc include the performance of a research project from start to end. This includes:
- identification and selection of components of an electricity system (ES) to include in the study;
- development of system models for the selected components with special focus on the operational phase, data gathering, and synthesis;
- writing a scientific article on the study to be published in an international scientific journal;
- if deemed relevant communicate with stakeholders in Rwanda.

The postdoc will make yearly visits to Sweden. The planning of these visits will consider the needs and requirements of the project.
The main cooperation partner is prof. Sverker Molander at the division of Environmental Systems Analysis, Chalmers University of Technology, Gothenburg, Sweden.
Studies are expected to start January 2022 and continue on a 50% basis over two years. Note that the candidate is expected to contribute to teaching at ACE ESD .
For general eligibility criteria, see explanation above on page 16.

6.1.Specific eligibility criteria for POSITION 3

1. *Essential criteria:*

- The candidate must hold a PhD degree in electric engineering or other a relevant field of engineering or natural science;
- The candidate must be able to learn and use relevant LCA-software;

- The candidate must be proficient in English;

2. *Desired criteria:*

- The candidate should have knowledge of various ESs components
- The candidate should be able to work mostly independently, but also when needed, as part of a small team.

Note that the candidate is expected to contribute to teaching at ACE ESD. Women are encouraged to apply.

6.2. How to apply:

Interested applicants should apply by email and submit the following:

i. An application letter addressed to the UR Director of Centre for Postgraduate Studies (UR CPGS) for the position, the subject should be POSTDOC POSITION 3 LCA: Chalmers-ACE-ESD in Sustainable Energy.
ii. 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).
iii. Two recommendation letters from people who can comment on the candidate's intellectual curiosity and academic ability to pursue research. One of the recommendation letters should be issued by a previous academic supervisor, preferably the PhD degree supervisor.
iv. Certified copy of the relevant highest prior degree (i.e. PhD degree).
v. Copies of valid identification card or passport
vi. Copy of the PhD dissertation; and diploma/profiency certificate in English (if available)
vii. Current CV (maximum of 3 pages) with full name, e-mail, date of birth, sex, formal education at universities, including full specification of the Masters' and PhD degree specialization, teaching experience, previous experience relevant to the program, present position, list of scientific publications and/or any other academic experience that may be relevant, statements of other experience.
viii. Description of current and planned teaching portfolio. Include a plan for how to combine teaching with the post doc position, both in terms of topics and time plan.
ix. A research proposal of maximum 4 pages.

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 "POSTDOC POSITION 7 LCA: Chalmers-ACE-ESD in Sustainable Energy".

6.3.Submission deadline

The deadline for application is 28th September, 2021

6.4.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. Sverker Molander sverker.molander@chalmers.se

The candidates will be notified if they are called for an interview, which is preliminary scheduled for 26-27 October 2021.

The interview process will, apart from the interview, discuss the research proposal submitted by the Postdoc applicant who will make a short presentation (no longer than 5 minutes). 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 early 2022.

6.5.Instructions for research proposal

A research proposal of appr. 3-4 pages. The research proposal aims to show that the postdoc applicant has the ability to engage with scientific literature, identify the state of the art and research gaps. It will not necessarily form the basis for the post docs work. The proposal should contain a summary on key opportunities and challenges to the growth of renewable energy in Rwanda - with special attention paid to the environmental consequences of energy production and use, and the expansion of energy infrastructure, outline specifically interesting research questions and how these may be addressed through the use of Life Cycle Assessments methods.
The concept should include the following sections: 1) Title/Sub-title, 2) Context and background (2-3 paragraphs), 3) relevance and justification of the topic (what the project intends to accomplish that will also include research studies that may be relevant to your work), 4) Framework/models (overall methodology. This may include disciplines in which you will initially begin to read texts and look for research studies), 5) Research Question (a primary question relevant to your title, plus sub questions if needed), 6) Proposed Research Method, 7) Proposed Timeline/Deliverables (in the first phase – appr. 6 months – discussions about the Literature Review and first drafts of data collection plan including source for secondary and original data, etc.) Questions about the concept note please contact prof. Sverker Molander.

Note that all texts should be written by the candidate him/herself and cannot be copied from other authors. Documents will be checked against plagiarism software.

Done at Kigali, August 27, 2021

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