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2023 Admissions into International Master Program in Energy and green hydrogen Technology (IMP-EGH)

Specialty: GREEN HYDROGEN PRODUCTION AND TECHNOLOGY

1. Background

The West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL) under the sponsorship of the German Federal Ministry of Education and Research (BMBF) is pleased to announce application for its Interdisciplinary Master Program in Energy and green hydrogen (IMP-EGH) in all fifteen (15) ECOWAS countries partners namely: Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea Bissau, Guinea Conakry, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

WASCAL is a wholly West African international organization with focus on academic and transdisciplinary research, building graduate-level scientific capacity and serving policy makers in West Africa with science-based advice on adaptation to climate change impacts and land use management. It cooperates with many agencies and universities in the region, providing a knowledge platform of excellence for its partners. WASCAL is funded by BMBF, multilateral and bilateral partners and its West African member countries.

The Interdisciplinary Master Program in Energy and Green Hydrogen (IMP-EGH) is innovative for the West African region, and it is designed to prepare the next generation to address the energy challenges of adaptation and resilience to climate change in West Africa. The program interdisciplinary approach will allow a better understanding of present-day energy infrastructures in West Africa, their strength and weaknesses, energy policies, practices in a changing climate context and the search for sustainable solutions.

Energy is a major issue in the world. More than 80% of the energy comes from fossil fuels, a finite resource unevenly distributed beneath the Earth's surface. Thus, reserves of fossil fuels are progressively decreasing, and their continued usage produces harmful pollutants and greenhouse gases (GHGs) associated with global warming and climate change. Furthermore, energy is a basic necessity for human activity, economy and social development.

In its Fourth Assessment Report, the Intergovernmental Panel for Climate Change (IPCC, 2014) has confirmed that climate change is real, and Africa is "one of the most vulnerable continents to climate change and climate variability". The continent's vulnerability is exacerbated, by endemic poverty, economical and institutional weakness, and limited access of technological and energy infrastructures. Thus, Africa needs more energy for its ongoing development despite the vulnerability to climate change.

Moreover, the region continues to face several critical challenges related to its energy sector such as energy access, energy security and unsustainable use of wood resources. The main challenge remains how to satisfy the increasing energy demand without exacerbating observed social, economic, and environmental problems caused by climate change. This international

Master's Program in Energy and Green Hydrogen (IMP-EGH) option **Green hydrogen production and technology** led by Université Felix Houphouët Boigny (UFHB) of Abidjan in Cote d'Ivoire and implemented in collaboration with Julich and Aachen and other renowned African, German, and other international universities and institutions, aims at offering top-ranking students an integrated learning environment to develop skills to be qualified as Renewable Energy and Green Hydrogen specialists.

Therefore, UFHB is launching the second call for Application of the International Master's Program in Energy and Green Hydrogen Technologies (IMP-EGH): Option: **Green hydrogen production and technology** for the academic year 2023-2024. The program of the IMP-EGH provides full scholarship to successful candidates from ECOWAS member countries: Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, the Gambia, Ghana, Guinea Bissau, Guinea Conakry, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. Potential candidates from these countries are invited to submit their applications for selection.

2 Missions

The mission of this program is to provide training on state-of-the-art tools used in renewable energy, green hydrogen technology and policy (politics) with the view of forming adequate human resources to boost the sector of energy technology and guide policy formulation across the region.

3 Objectives

The main objective of this Master is to prepare and train a new generation of interdisciplinary professionals capable of proposing adapted solutions to ongoing energy crisis. Therefore, Graduates will be well skilled in order to jointly fulfill the two following points:

- demonstrate an understanding of the science related to a changing climate and global warming, knowledge of the impacts of climate change, vulnerability of natural systems and the built environment, and methods for adaptation;
- develop a comprehension of energy production, delivery, and consumption for both traditional systems and sustainable energy alternatives with special emphasis on energy efficiency, energy management and locally available renewable energy.
- Identify and popularize the methods of production and valorization of green energy (hydrogen) from georesources (water and wind).

4 Employment opportunity

Graduates of the master H2 with the specialty **Green hydrogen production and technology** will be immediately operational in various fields of renewable energy production. In the private sector, all agro-industries will be able to use their knowledge to produce green hydrogen. They will be the first human resources for electrolysis factories of Water Resources in clean and renewable energy (hydrogen).

5 Eligibility criteria

Interdisciplinary Master Program in Energy and Green Hydrogen (IMP-EGH) is open to students:

- from partner countries in West Africa (Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissao, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.);
- with a minimum background of a B.S. degree or equivalent in scientific discipline or in engineering. Candidates with technical strengths in physics, chemistry, electrical, statistician or mechanical engineering or equivalent are required;
- Having a good English proficiency will be an asset for final selection;
- Female candidates are highly encouraged to apply;

6 Outline of the program

The Interdisciplinary Master Program in Energy and Green Hydrogen is a well-structured program consisting of three (3) semesters of taught courses, lab activities, field visits and interaction with stakeholders and one (1) semester intended to the student field work, thesis research, final write up and defense.

6.1. Training

The training includes modules divided into semesters and specified in the following way:

Semesters	Courses	Credits
Semester 1 in Niger	• Physics of solids and fluids	5
	• Semiconductor, electrical and electronic engineering	6
	• Thermodynamics	6
	• Electrochemistry	6
	• Atmospheric Sciences	4
	• Climate Change and sustainable development	3
Semester 2 in Niger	• Conventional energy and Energy security	3
	• Renewable Energy	6
	• Green Hydrogen	6
	• Renewable energy (RE) Technologies and Applications	6
	• Energy systems and infrastructure	6
	• Energy Policy and Market	3

Semester 3 in Cote d'Ivoire	<ul style="list-style-type: none"> • Hydrogen and Materials • Conversion and Economy of H2 • Nuclera reactions and nhydrogen • Energy efficiency and Energy Policies • Hydrogen and applications • H2 Production and Safety • Research methodology 	<p>4</p> <p>6</p> <p>3</p> <p>3</p> <p>8</p> <p>3</p> <p>3</p>
Semester 4	<ul style="list-style-type: none"> • Internship in Germany (4-6 months) • Master thesis defense in Cote d'Ivoire 	30

6.2 Research

Phase I: Writing and validation of the research project

Phase II: Field study

Phase III: Internship in Germany

Phase IV: Final writing of the Master Thesis

Phase V: Master Thesis defense and graduation in University Félix HOUPHOUËT-BOIGNY

7. Working Language

English

8. Application procedures

- Form duly filled, scanned, and sent to required addresses
- Curriculum Vitae signed with information about relevant experience and professional training
- Cover letter
- Two (2) reference letters, one of whom should preferably be from the undergraduate lecturer in the equivalent science discipline or in engineering; preferably one letter from an academic and one from a former employer precise availability of the candidate for the all period of master program. Reference letters must be written in English or French and must be signed / stamped

- Two passport size photographs.
- Passport copy or national identification card
- Certified copies of diplomas and transcripts (Baccalaureate and Bachelor)

9. Selection procedures

- Only short-listed candidates will be notified for interviews (4 per country)
- Interviews will be done in English by a committee
- Final selection: one student per country will be selected for **Green hydrogen production and technology**
- A scholarship letter will be sent to the selected candidate by WASCAL Headquarter

10. Self-funding

Those who will not be selected for scholarship, but they wish to take the courses will be able to do so as a fee-paying student. Costs will be specified later.

11. Duration

Duration of the IMP-EGH is up to 28 months including 4 months' language training in English proficiency for Francophones and French proficiency for Anglophones. During the course work phase, students will be required to develop a detailed research program (proposal) (including budget). The proposal plan should be completed and validated by the student's principal advisor and the MRP Director.

12. Scholarship and research support

- Scholarship: 350 Euros per month
- Accommodation provided up to 100Euro
- Research Budget
- Travel ticket for language courses in Cape Coast or Lomé
- Travel Ticket to Germany
- Tuition

Applications must be submitted to:

- **Link:** www.greenH2.wascal-ci.org; and copy cbd.hydrogen@wascal.org

Start date of Call for application: February 15th, 2023

Deadline for applications: April 16th, 2023

Note: The number of admitted applicants will be limited to 15 students.