

# Newsletter

on the new developments in the project

**Renewable Energy-based E-Mobility in Higher Education**



Source: THI

## Upcoming Event - Announcement Hybrid REMO Conference

*Professor Ahmed Khallaayoun (AUI country coordinator)*

A full day conference named “Electric Mobility and related renewable infrastructure: An Outlook from the Stakeholders” is going to take place at Al Akhawayn University in Ifrane on **November 7th, 2022**.

The conference will tackle e-mobility as part of the mobility transition to a greener and more sustainable one from a perspective of three major stakeholders from three different countries. Academics, industrials and government speakers from Germany, Morocco and Tunisia will present their outlook on the topics of e-mobility and related renewable infrastructure. The conference will accommodate speakers and participants both face to face and online and it is an opportunity for the REMO team partners along with participants from all three countries to develop and further enhance a comprehensive understanding on the challenges facing the e-mobility transition. This helps to eventually foster cooperations between the different stakeholders to come up with technical viable solutions that are in sync with the governmental and industrial visions and objectives.

The REMO conference is free of charge and we hope to see as many of you as possible.

To register for the conference please click on the following conference website:

<https://moroccoconference.blogspot.com/>

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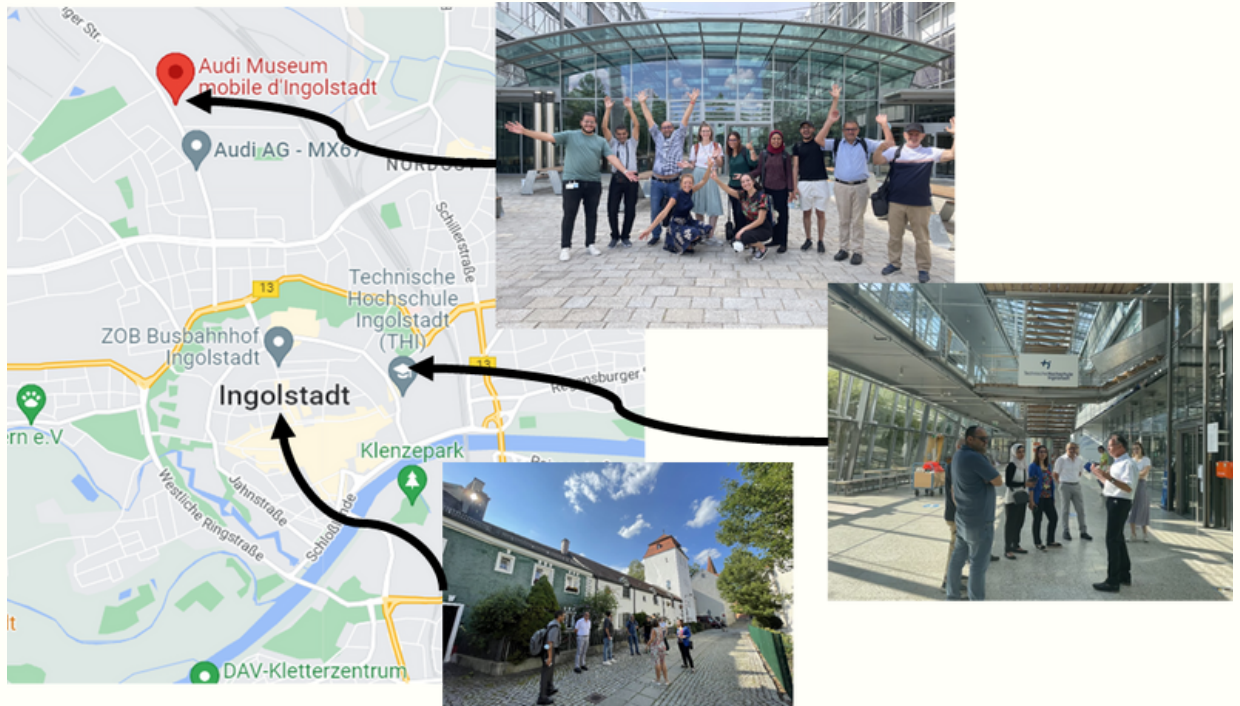
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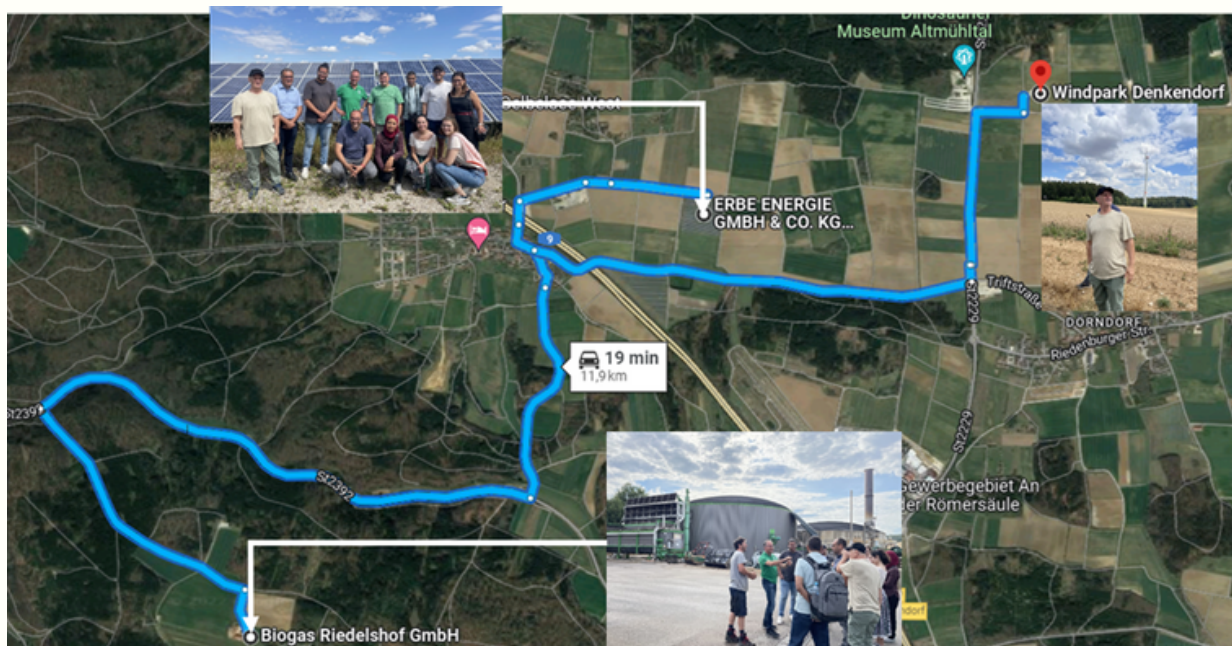
Professor Ikbal Chammakhi Msadaa (ENSTAB Sub-Project 3 Coordinator)

After two years of virtual meetings due to the pandemic constraints, team members of the REMO project have eventually met from 25 to 29 July 2022 in Germany. Three Tunisian coordinators from LaRINA, ENSTAB, University of Carthage and three Moroccan team members from Al Akhawayn University in Ifrane (AUI) visited the Institute of new Energy Systems (InES) at Technische Hochschule Ingolstadt (THI) in Germany. The visit started with a campus and laboratories tour at THI and coordination meetings to assess the progress of the project.



Campus tour at THI, city tour at Ingolstadt and visit to Audi Museum

A visit to three renewables production sites at Denkendorf in the Bavarian region was also part of the programme. The guests had the chance to visit a solar and wind park as well as a biogas plant and to meet investors in renewables and to discuss both technical and economic aspects related to their activities. This helped to better understand the incentives and challenges faced in this sector in Germany.



Visit to three renewables production sites: solar park, wind park and biogas plants in Denckendorf, Bavaria

In the same context, the guests exchanged with a representative from LEW Augsburg, one of the grid operators in Bavaria. During the digital tour, the team discovered that the operator also produces its own electricity to cover part of the demand in the grid. This is primarily generated from hydropower and solar energy. The tour also provided insights into the smart management of the grid and the challenges LEW faces to achieve its strategic goals.

On Thursday, a workshop involving the three academic partners along with industrials from Germany (IBC Solar AG) and Tunisia (The Tunisian Company of Electricity and Gas (STEG) and other Tunisian industry representatives) was organized. After exposing the status quo of renewables policies in both Morocco and Tunisia, the different participants had fruitful discussions about the opportunities and challenges each country is facing in its way to realize its energy transition policy and increase the share of renewables in its overall energy production.

Further discussions related to the international cooperation, funding opportunities and possible future collaborations between the three partners have taken place.

### **AUI report on the first project partner meeting at THI**

*Professor Ahmed Khallaayoun (AUI country coordinator)*

Three faculty members of the REMO partners at Al Akhawayn University in Ifrane (AUI) attended the REMO project partner meeting in Ingolstadt, namely, Professor Khalid Loudiyi, Professor Ahmed Khallaayoun (AUI country coordinator) and Professor Rachid Lghoul.

The meeting was a great opportunity to meet all the partner members face-to-face for the first time since the project started due to the pandemic restrictions. The meeting was an occasion to benefit from a multitude of activities that had a great added value to the project outcomes and it was a great learning experience.

The AUI team enjoyed the campus tour and to see the research facilities at THI related to e-mobility and renewable energies. The latter enabled the AUI team to discuss further research opportunities between AUI and THI. The meetings related to the project progress assessment made it possible to the AUI team to have better visibility on the achieved outcomes and the remaining tasks. Moreover, the AUI team used the face-to-face meeting to discuss in detail the upcoming REMO Conference in Morocco scheduled for November 7th, 2022 (please see the article related to the REMO Conference on page 1). The progress achieved in the different sub-projects were presented by the representatives from AUI such as further enhancement of the undergraduate programme Bachelor of Science in Renewable Energy Systems Engineering at AUI. Through REMO, additional study content has been developed and the number of enrolled students is increasing every year.

Finally, the current research being conducted at AUI under the REMO project was presented and discussed which enabled the REMO team to discuss topics of mutual interest where all the partners can collaborate on.

Professor Ahmed Khallaayoun had the privilege to present the status quo of Morocco's energy and electricity sectors as it is related to e-mobility and the renewable infrastructure during the workshop on Thursday, to give the participants an overview of existing challenges and opportunities in the aforementioned sectors and discuss further research opportunities.

Another important aspect of the meeting was related to the meetings held with the industrial partners and stakeholders, such as the grid operator LEW and the site visits (biogas, solar and wind) which helped the AUI team to develop a better idea on the challenges in Bavaria (high penetration of renewable energies in the energy mix in the region) from a technical and societal perspective as well as related to policies.

The aforementioned activities enabled all of us as to have great discussions while being acquainted to the German and Bavarian culture. We learnt about the amazing history of the city of Ingolstadt during a walking tour and enjoyed its beautiful architecture.

As the author of this article and I also speak for the AUI team, we personally enjoyed and appreciated the garden party organized by Professor Wilfried Zörner at his house. We discovered the kindness and hospitality of the German people. Professor Wilfried Zörner kindly showed us the renewable installations in his house, had an amazing dinner and everyone sat around a campfire for hours. The discussions around the campfire extended beyond the project meeting and we honestly did not feel the time pass. We only wished that the time did not go by so fast.

We feel blessed and privileged to have taken part of this amazing experience and we only wish we can reciprocate.

## Two REMO country coordinators participated in DAAD Conference on Improving graduate employability through capacity building partnerships

*Professor Ahmed Khallaayoun (AUI country coordinator)*

The two coordinators from Tunisia and Morocco, namely Professor Khaled Grayaa (ENSTAB-LaRINA) and Professor Ahmed Khallaayoun (AUI), participated in DAAD's Conference in Kigali, Rwanda from September 12th until 15th.

The DAAD Conference was an opportunity for the REMO coordinators to get acquainted with representatives of the other university-business partnership projects supported by DAAD in the framework of the special initiative to improve graduate employability.



The REMO team members: Professor Khaled Grayaa (1st on the left), Professor Ahmed Khallaayoun (2nd on the left)

Multiple speakers from Germany and various African countries tackled the topics from different angles, namely from the academic, business, and government perspective. Two knowledge café sessions were also part of the programme where the following questions were discussed:

- What can be achieved through university-business cooperation?
- What are the challenges and how can we address them?
- What needs to be done to scale up this kind of partnerships?
- How does the knowledge that exists at universities reach the industry/society (knowledge co-production)?

The programme was very interactive as many of the participants including the REMO team gave their input after each of the programmed sessions. The REMO participants were able to discuss potential collaborations with participants from other universities and businesses in addition to the representatives of DAAD and BMZ.

Finally, the venue along with the side-events made the week even more interesting and enabled the participants to be in a wonderful environment that made it easy to network and discuss opportunities for collaboration within Rwanda and other African countries within the DAAD-funded research projects.

## **New courses dealing with *the fundamentals of electric vehicles* has been introduced in the Sustainability Energy Management Master's Programme at Al Akhawayn University**

*Professor Ahmed Khallaayoun (AUI country coordinator)*

As part of the REMO project, the team has been working on the development of new study content related to (renewable energies RE) and e-mobility. In order to follow a systematic approach and to make sure that the taught contents are related to the needs faced by our businesses, we based this process on the results of a survey and comprehensive benchmark study looking at different study programmes that are already being implemented.

The Moroccan REMO team proposed last year to the School of Science and Engineering at Al Akhawayn University in Ifrane the possibility to introduce a new course, namely, *the fundamentals of electric vehicles* in the Sustainability Energy Management Master's Programme (SEM). Luckily, the School of Science and Engineering has agreed to introduce the newly developed course as a core course in the programme starting this semester.

The course examines the technology associated with each element of e-vehicles' electric power train energy systems. It aims at exploring the operating principles of e-vehicles and introduces the students to the basic design of motors and batteries in e-vehicles. Moreover, it presents a comprehensive systems-level perspective of e- and hybrid vehicles with emphasis on technical aspects, mathematical relationships, and basic design guidelines. Furthermore, the architecture of charging infrastructures of e-vehicles and their site-integration of an optimum deployment are taught. Analysis of the impact of e-vehicles on the environment and how the introduction of high volumes of e-vehicles and their impact on the grid will be explored. Students will also partake in field trips visiting a company that manufactures charging stations in Morocco along with a site visit to an automotive industry stakeholder.

The entire REMO team is extremely pleased about this milestone and excited to see how interest in the new course will grow in the future. Currently, seven Master's students are enrolled in the course.

### **Student of the REMO newsletter – Fedi Abdellaoui**

*Fedi Abdellaoui (Engineering Master's student at ENSTAB)*

I am Fedi Abdellaoui, an Engineering Master's student in Advanced Technologies at ENSTAB. As an undergraduate, I have contributed to multiple projects dealing with data science and artificial intelligence within university clubs such as IEEE Student Branch and various start-ups.

Now, I am part of the REMO research team at the research Laboratory in Smart Grids and Nanotechnologies (LaRINA-ENSTAB), as a Master intern, focusing on studying the electrification of a typical fleet. We estimate the costs and benefits for such transition by developing an agent-based simulation using AnyLogic simulation software.



From March to August 2022, I had the opportunity to join InES research institute of THI as part of the research mobilities within the framework of the REMO project in Germany. In this experience, I greatly benefitted from my stay and the interactions that I had with my research peers and professors at InES where I learned that Germans are punctual and productive which helped me achieve my goals and finish my tasks faster and efficiently as well as benefit from various research projects already taking place at the institute.

It was a pleasant experience living in Germany for the months of the internship where I learned a lot about the German culture and language. I especially loved the festivals that were being organized and great folk music that I never heard before coming to Germany.

Regarding my future plans, I would like to become a distinguished engineer and work as a tech lead in a company that is focusing on new technologies and artificial intelligence.

REMO Consortium

University partners

In Morocco:



In Tunisia:



In Germany:



Industry partners



If you have any inquiries regarding the content of the newsletter or the overall REMO project, please get in touch with the following persons:



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