SUSTAINABLE
DEVELOPMENT
IBN TOFAIL UNIVERSITY

جامعة ابن طفيل
Université Ibn Tofaïl
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Race to Zero Carbone 2025

IBN TOFAIL UNIVERSITY

Introduction

Report on 'the Race to Zero' at Ibn Tofaïl University

A Vision for a Sustainable Future

We are proud to present our detailed report on the race to zero emissions at Ibn Tofaïl University. This document embodies our ambitious and resolute vision for environmental sustainability, as we commit to addressing the pressing challenges of climate change through decisive and tangible actions.

A Firm Commitment to Combating Climate Change

As an academic institution, we recognize our responsibility and have made a clear commitment: to become a carbon-neutral university. This goal demands collective efforts and is built on an innovative and methodical approach aimed at:

- Significantly reducing our carbon footprint: Identifying and minimizing major sources of emissions across our infrastructure, educational activities, and transportation systems.
- Adopting innovative initiatives: Implementing cutting-edge technological solutions and best practices in renewable energy, waste management, and energy efficiency.
- Raising awareness and mobilizing our community: Actively involving our students, faculty, and partners through educational and participatory campaigns.

A Concrete and Measurable Roadmap

Our strategy is anchored in a series of measurable actions aligned with the United Nations Sustainable Development Goals (SDGs), particularly those focused on combating climate change (SDG 13) and promoting clean and affordable energy (SDG 7). Key initiatives include:

- Installing solar systems and green energy solutions across our campuses.
- Implementing systematic waste reduction and recycling policies.
- Promoting sustainable mobility through the development of eco-friendly transportation plans for our university community.

A Call for Innovation and Collaboration

We believe achieving carbon neutrality is an opportunity to foster innovation and establish an inspiring academic model, not only for our region but also globally. This requires close collaboration with experts, businesses, public institutions, and academic partners.

A Shared Mission for a Sustainable Future

This report is an invitation to rethink our environmental impact and take collective action for a sustainable future. Ibn Tofaïl University is committed to becoming a benchmark for sustainability and actively contributing to a world that is more equitable, respectful of natural resources, and resilient to climate challenges.
Together, let us turn this goal into reality and affirm our role as pioneers in ecological transition. Join us in this journey to build a future where education and sustainability go hand in hand.

Zero-Carbon Strategy: Transitioning Toward a Low-Carbon Economy

As previously mentioned, Ibn Tofail University's initial goal was to reduce campus electricity costs by 40%. To achieve this, the university undertook concrete actions—most notably, generating its own clean, renewable energy. This shift enables the institution to gradually gain independence from external energy suppliers by increasing self-consumption coverage.

In this context, solar energy stands out as a renewable solution that allows UIT to produce and consume electricity while respecting the environment and reducing greenhouse gas emissions.
Ibn Tofail University is among the first institutions in Morocco to actively align with the national energy efficiency policy, mobilizing both human and technical resources to reduce the rising financial burden of energy costs.

It is worth noting that energy efficiency is now considered the "fourth energy", alongside fossil fuels, renewables, and nuclear power.

As part of Morocco's national energy efficiency strategy, Law No. **47-09** was enacted to increase energy efficiency and reduce energy waste. Since 2018, this law also includes a thermal regulation for buildings, aimed at minimizing the economic impact of energy consumption.

Implementation of this strategy relies on several core principles: energy performance, efficiency requirements, impact assessments, energy audits, and technical monitoring.

Given the significant number of projects completed or underway, UIT ensures that energy efficiency in construction is fully integrated. Architects and engineering firms involved adopt best practices in sustainable design, including thermally efficient partitions, eco-friendly flooring materials, **LED** lighting, and thoughtful planning of student living spaces, renovations, and long-term building use.



Creation of the National Thematic Institute for Scientific Research on Water: A Key Step Forward

In a landmark event for scientific research in Morocco, the President of Ibn Tofail University, in the presence of the Minister of Higher Education, Scientific Research, and Innovation, signed an agreement to establish the National Thematic Institute for Scientific Research on Water. This new institute is set to become a cornerstone in advancing water-related research, addressing one of the most pressing issues of our time: water resource management and sustainability.

The creation of the institute marks a pivotal moment for national research efforts. It aims to pool expertise, resources, and research initiatives from across Morocco, fostering interdisciplinary collaboration among scientists, engineers, and policymakers. This strategic synergy will enhance the country's capacity to tackle water scarcity, ensure efficient use of water resources, and develop innovative solutions to meet the demands of growing populations and climate challenges.

Addressing a Critical Issue

Water scarcity is a global concern, but it holds particular significance for regions like Morocco, where climate variability and increasing demands place immense pressure on water supplies. The new institute will prioritize research in areas such as:

- Sustainable water management technologies.
- Climate change impacts on water availability.
- Wastewater treatment and reuse.
- Policy frameworks for equitable water distribution.

By consolidating efforts under a single thematic umbrella, the institute will play a critical role in translating research into actionable strategies to safeguard water resources for future generations.

The signing ceremony highlighted the commitment of Moroccan academia and government to address key developmental challenges. The Minister of Higher Education praised the initiative, emphasizing its alignment with the nation's strategic priorities for sustainable development and innovation. The President of Ibn Tofail University also expressed his enthusiasm, noting the institution's proud tradition of fostering groundbreaking research and its readiness to lead this vital initiative.

Towards a Sustainable Future

The National Thematic Institute for Scientific Research on Water is expected to serve as a hub for innovation, attracting national and international partnerships. It will also provide a platform for young researchers to contribute to solving one of the world's most urgent problems while positioning Morocco as a leader in water research on the African continent and beyond.

This step demonstrates the power of collaboration and forward-thinking policies in addressing global challenges through localized solutions. As the institute takes shape, it promises to open new avenues for scientific discovery and sustainable development, ensuring that water, a vital resource, is protected and preserved for all.

Hackathon 2nd Edition : Nexus Water Energy

The president of Ibn Tofail University alongside with the vice-president of the univeristy, the general secretary of the university and other prominent personalities participated in he final of the second edition of the hackathon. The final took place on Friday, November 8, 2024 at 3 PM, in the conference room at Code 212 Center.

The funding partners for events like hackathons play a crucial role in supporting the initiatives and ensuring their success. In the case of the Second Edition of the Hackathon at Ibn Tofail University, the involvement of major companies like Crédit Agricole du Maroc and Eresen would be essential for both financial backing and providing expertise or resources.
Crédit Agricole du Maroc is a prominent banking institution in Morocco, and it is part of the Crédit Agricole Group — one of the largest financial institutions in the world. Crédit Agricole du Maroc focuses on providing a wide range of financial services, including retail banking, corporate banking, investment solutions, and financing for agricultural and rural development.

ERESEN is a company specializing in renewable energy and sustainable development solutions. The company provides services related to the design, construction, and management of projects focused on solar energy, wind power, energy efficiency, and other environmentally-friendly technologies. ERESEN's work is aligned with Morocco's goal to be a leader in renewable energy in Africa and globally.

Crédit Agricole du Maroc and ERESEN represent two key sectors of Morocco's economy - finance and renewable energy. Their partnership with the Ibn Tofail University Hackathon is a strong demonstration of the country's growing support for innovation, technology, and sustainability. By funding and sponsoring this event, they help foster a culture of entrepreneurship and technological development, while encouraging students to develop solutions that can have a real-world impact



Energy Platform

As part of its action plan, and in line with the recommendations and vision of the "Higher Education, Scientific Research, and Innovation Ecosystem Transformation Acceleration Plan" (PACTE ESRI 2030), Ibn Tofail University is actively committed to this energy transition by commissioning a Platform for Experimentation, Research and Training in Renewable Energy Storage.

This research platform is an effective way of providing fully-equipped laboratories that can be shared. These research infrastructures will help, on the one hand, to create synergies and coalitions between the various research teams at Ibn Tofail University, and, on the other hand, to expand their networks and collaborations through partnerships with other national and international universities and industries.

Providing Assistance for Start-Ups in the Low-Carbon Economy

UIT is also dedicated to fostering and supporting start-ups that contribute to a low-carbon economy. The university offers various services and infrastructures, such as fully-equipped laboratories and collaborative networks, that enable start-ups to access the resources and expertise necessary for innovation in the clean energy sector. For example, UIT encourages the development of energy-efficient technologies through its research platform, offering start-ups access to cutting-edge equipment and mentorship in renewable energy projects.
To achieve these objectives, and in line with the United Nations' Sustainable Development Goals, strong collaboration between the different research teams and laboratories will be established through the launch of internal calls for projects on different themes by Ibn Tofail University.

Purpose and interest

The Energy Platform for Solar Energy Production and Storage will be funded by UIT and its partners with the following general objectives:

– Reduce the discounted cost of energy (LCOE) from renewable resources (solar photovoltaic, CSP, biomass…) in combination with green hydrogen and its various applications.
– Develop prototypes with strong links between water, energy and agriculture (NEXUS EEA).
– Add value to regional products and national by-products such as phosphate rock and its derivatives for use in storage materials, construction materials, raw materials, the circular economy and sustainable development.
– Ensure the sovereignty of strategic/critical minerals by recycling end-of-life batteries and solar panels.
– Creating new industrial opportunities in the phosphate, renewable energy and digitalization sectors.

Applying data science to Earth observation measurements and estimating the technical potential of targeted solar and wind sites.

This research platform is an effective way of providing fully-equipped, shareable laboratories. These research infrastructures will occasion synergies and coalitions between the various research teams at Ibn Tofail University and to expand their networks and collaborations through partnerships with other national and international universities and industries.

The value of this platform lies in its ability to provide cutting-edge research and characterization services, essential for research and development in the energy field. By providing access to state-of-the-art equipment, it enhances students' and researchers' technical competencies, and thus facilitates their training and professional development.

Services

The platform is organized into three main units:

- Experimental unit dedicated to the development of green hydrogen technology: Installation of green hydrogen production technologies, such as water electrolysis using renewable energies such as wind and biomass, and solar or thermo-solar processes. Methanol and ammonia production, energy storage, fuel cells and hydrogen storage.

- Experimental unit dedicated to the development of materials for energy and storage: Here, we aim to provide researchers and our various collaborators with a unit featuring the various techniques for elaborating and growing inorganic or hybrid thin films and nanostructures, as well as devices based on them, for applications in solar photovoltaics, energy storage and recovery (e.g. electrodes in batteries), hydrogen storage materials (hydrides and MOFs, piezoelectric and thermoelectric materials etc.).

- Energy characterization unit: includes equipment for evaluating and characterizing devices that meet sustainable development criteria in terms of energy.

In parallel with these units, a transversal cell with the other platforms will be dedicated to the use of software frequently requested by industrialists in the field of dimensioning and numerical simulations of renewable installations.



Biotechnology Platform

The Innovation City's Biotechnology Platform is an ultramodern infrastructure currently being set up to become a key player in the scientific and industrial ecosystem. This platform is dedicated to research and development in the biotechnology and genomics fields.

The platform offers research and development services, as well as technical expertise, to support various applied research projects. By providing access to cutting-edge technologies and facilitating collaboration between researchers, companies and academic institutions, the platform aims to transform innovative ideas into viable products. Areas of application include agriculture, health, the environment, the food industry and biomedical research.

Purpose and Interest

The main objective of the Biotechnology Platform is to foster innovation and research in the field of biotechnology. It seeks to create a collaborative network between researchers, companies and academic institutions to share knowledge, accelerate technology transfer, and promote applied research projects. By responding to current societal challenges, the platform aims to support scientific and industrial development while stimulating strategic collaborations. Its modern infrastructure and advanced technologies enable it to respond effectively to the needs of its partners, facilitating, therefore, the realization of ambitious and innovative projects.

Services

The Biotechnology platform offers a range of high-quality services to support research and development. Included in these services are:

1. **Research and Development:**

o Applied research services in the fields of biotechnology and genomics.
o Technical and scientific support for research projects.

2. **Technical Expertise:**

o Consultation and technical support by a team of qualified scientists.
o Access to state-of-the-art technologies for complex and innovative analyses.

3. **Strategic Partnerships:**

o Facilitation of collaborations between researchers, companies and academic institutions.
o Promotion of partnerships to meet contemporary challenges in the biotech sector.

4. **Access to Innovation:**

o Provision of state-of-the-art materials and equipment for research projects.
o Access to a network of expertise to transform innovative ideas into viable products.

Water Technology Platform (Innovation Hub)

In the context of sustainable development, climate change and increasing demand for water, traditional infrastructures are struggling to meet needs. The global context is marked by increasingly limited water resources, prolonged droughts in several regions, and pollution that degrades water quality. It is within this context that Ibn Tofail University has set up a platform for experimentation, innovation and training in the water sector. The water technology platform aims to provide solutions to improve water management, treatment, reuse and distribution, while minimizing losses and optimizing consumption and reuse.

Platform Strategy

·Objectives

The water technology platform has multiple objectives:

1. Real-time monitoring: The platform collects real-time data on water levels, pipe pressure, wastewater quality, and more.
2. Network optimization: Using artificial intelligence algorithms, it anticipates needs, reduces water losses and improves the efficiency of supply and treatment systems.
3. Prediction and prevention: through predictive analysis, the platform can forecast periods of drought and the risk of water shortages.
4. Education and awareness-raising: Providing tools to raise community awareness of responsible water use through the use of mobile applications that offer personalized advice on how to reduce consumption.

·Services

. Intelligent water management: Real-time monitoring of water network performance, identifying water leaks or malfunctions before they become critical.

. Water quality: Automated sensors and analysis systems continuously monitor the quality of distributed water, ensuring compliance with reuse standards.

. Optimized consumption: The platform provides tools for monitoring and adjusting water consumption, promoting more responsible and sustainable water management.
. Advanced treatment solutions: Integration of innovative dual-circular third-generation treatment technologies to tackle drought and pollution problems at the same time, such as intelligent membrane filtration, recycling and reuse of wastewater using advanced Membrane Bioreactor (MBR) techniques to optimize every drop of water used and move towards zero discharge.





Physico-Chemical Analysis and Characterization Platform

The Innovation City's Physico-Chemical Analysis and Characterization Platform is equipped with advanced scientific instruments devoted to the physico-chemical analysis and characterization of materials. This platform plays a central role in supporting activities pertaining to analysis, expertise and technical services, while enhancing the research work conducted by doctoral, master's, and engineering students and technicians.

Objectives

The main objective of this platform is to federate analysis and expertise activities while offering high-quality services. It also aims to promote and enhance the research carried out by students and researchers in various scientific fields. By centralizing these activities, the platform maximizes the efficiency of resources and fosters synergies between different research projects.

Benefits

The value of this platform is in its ability to provide state-of-the-art analysis and characterization services, which are essential for research and development in various scientific fields. The platform enhances researchers' and students' technical skills as it provides access to high-tech equipment, facilitating their training and professional development. In addition, the platform encourages interdisciplinary collaboration, which is crucial for tackling complex problems requiring an integrated approach. By stimulating innovation, it contributes to the development of new technologies and solutions in diverse scientific fields, offering vital support to the scientific and industrial community.

Services

There are four main categories of services available through the platform:

1. Environmental Analysis
2. Materials Characterization
3. Elemental Analysis
4. Molecular Analysis

The Innovation City also covers a wide range of scientific disciplines such as biology and biochemistry, materials science and nanotechnology.

Available Equipment

To carry out our research and analyses, we currently have a range of heavy equipment at our disposal, including:

– ICP-OES (Inductively Coupled Plasma Optical Emission Spectrometer)
– AAS (Atomic Absorption Spectrometer)
– Flame photometer
– GC-MS (Gas Chromatography-Mass Spectrometry)
– XRD-powder (X-ray powder diffraction)
– FTIR (Fourier Transform Infrared Spectrometry)
– Physico-chemical analysis of drinking water and wastewater

Proposal for new equipment

To strengthen our capabilities and improve the quality of our analyses, we propose the acquisition of the following equipment:
– SEM/EDX (Scanning Electron Microscope with Energy Dispersive Spectrometer)
– ATD/ATG/DSC (Thermodifferential Analysis, Thermogravimetry and Differential Scanning Calorimetry)
– Raman spectroscopy
– Uv-Visible spectrophotometer for liquids and solids
– AFM (Atomic Force Microscope)
– Contact angle measurement equipment
– BET (Brunauer, Emmett and Teller) gas adsorption surface analyzer

FAB-LAB Hub

The Fab Lab at Ibn Tofail University serves as a key driver of innovation, creativity, and collaboration. This state-of-the-art facility offers an open workspace that empowers students, researchers, and local businesses to turn their ideas into reality. Equipped with advanced tools like 3D printers, laser cutters, and CNC machines, the Fab Lab allows users to engage in hands-on learning and experimentation, providing an ideal environment for developing practical skills.

One of the core strengths of the Fab Lab is its ability to bring together individuals from different academic disciplines. Whether in engineering, art, or business, the Fab Lab fosters cross-disciplinary cooperation, encouraging students and researchers to collaborate on complex projects. By combining technical and creative skills, users can develop innovative solutions that have applications in various fields, from technical prototypes to artistic creations, enriching the learning experience for everyone involved.

In addition to its role in education, the Fab Lab is also open to local entrepreneurs and businesses, providing them access to cutting-edge equipment and resources for their research and development (R&D) projects. This collaboration between academia and industry helps businesses reduce their R&D costs while fostering innovation. By supporting local enterprises in developing new products or refining existing ones, the Fab Lab strengthens the link between the university and the economic development of the region.

The Fab Lab plays a crucial role in promoting entrepreneurship among students and local community members. Through workshops, training programs, and mentorship, the lab equips aspiring entrepreneurs with the tools and knowledge to develop business ideas and launch startups. This practical experience helps bridge the gap between academic learning and real-world business challenges, empowering students to turn their ideas into viable enterprises while contributing to the local economy.





The Fab Lab frequently hosts events and workshops that connect students and entrepreneurs with industry professionals and potential employers. These events provide participants with invaluable networking opportunities and a chance to showcase their projects. By bringing together innovators and experts, the lab helps foster collaboration and opens doors for students and entrepreneurs seeking guidance, partnerships, or career opportunities.

Sustainability and social responsibility are central to the Fab Lab's mission. Many of the lab's initiatives focus on promoting environmentally friendly and socially responsible business practices. Workshops on sustainable design, green technologies, and eco-friendly product development encourage students and entrepreneurs to incorporate sustainability into their projects, ensuring that their innovations contribute positively to both the environment and society.

In summary, the Fab Lab at Ibn Tofail University is much more than just a technical workspace; it is a dynamic hub for learning, innovation, and entrepreneurship. By offering access to cutting-edge equipment, promoting interdisciplinary collaboration, and supporting sustainable business practices, the Fab Lab plays a vital role in advancing both academic and entrepreneurial success. Its impact reaches beyond the university, fostering economic and social development in the wider community.





International cooperation in the field of water treatment with Canadian institution 'Cégep of Saint-Laurent'

On November 8, 2024, Ibn Tofail University welcomed a delegation from the Canadian institution Cégep of Saint-Laurent as part of strengthening international cooperation in the field of water treatment.

The president of Ibn Tofail University Mr Mohamed Larbi Kerkeb consistently strives to establish new partnerships and collaborations, emphasizing sustainability as a core value. These initiatives not only align with the university's mission to address global challenges but also reinforce its position as a leader in sustainable development. By fostering international and interdisciplinary collaborations, Ibn Tofail University continues to expand its contributions to innovative research and practical solutions, ensuring a positive and lasting impact on both local and global communities.

Cégep de Saint-Laurent is a publicly funded post-secondary institution located in Montreal, Quebec, Canada. Established in 1968, it is part of Quebec's unique CEGEP system, which stands for Collège d'enseignement général et professionnel (College of General and Vocational Education). These institutions provide pre-university and technical programs that bridge secondary education and university or career entry.

Ibn Tofail University recently hosted a delegation from the Canadian institution Cégep de Saint-Laurent to further enhance their collaborative efforts in international academic and scientific cooperation. The visit focused on exchanging expertise, fostering joint research initiatives, and developing innovative solutions in the critical field of water treatment. This partnership aims to address global challenges related to water management and sustainability by combining the academic strengths and technical expertise of both institutions. Additionally, the collaboration is expected to facilitate student and faculty exchanges, workshops, and the implementation of advanced water treatment technologies.



Ibn Tofail University Hosts African Week on the 17 Sustainable Development Goals in Partnership with the NEF Einstein Forum

Ibn Tofail University, in collaboration with the National School of Chemistry and the Next Einstein Forum (NEF), has proudly hosted the African Week on the 17 Sustainable Development Goals (SDGs). This groundbreaking event brought together thought leaders, researchers, students, and policymakers from across Africa to discuss and advance the United Nations' SDG agenda. The event took place on October, 9, 2024.

A Platform for Sustainable Development in Africa

The African Week aimed to emphasize Africa's role in addressing global challenges by focusing on localized solutions for sustainable development. It provided a vibrant platform for sharing insights, experiences, and innovative approaches to achieving the 17 SDGs, which address pressing global issues such as poverty, inequality, climate change, and education.
This partnership between Ibn Tofail University and NEF reflects a commitment to nurturing a new generation of African scientists and innovators capable of tackling the continent's unique challenges.

Highlights of the Week

1. Workshops and Training Programs:

A series of interactive workshops allowed participants to engage in practical training sessions on topics such as renewable energy, sustainable agriculture, and green technologies.

1. Panel Discussions:

Experts from diverse fields participated in discussions on the integration of SDGs into local and regional policies, emphasizing Africa's potential as a leader in global sustainability efforts.

2. Youth Engagement:

Students from the National School of Chemistry and other institutions presented their projects, showcasing innovative solutions aligned with the SDGs, such as clean energy alternatives and waste management systems.

3. Networking Opportunities:

The event facilitated connections between academia, industry, and civil society to promote collaborative efforts and funding opportunities for SDG-related projects.

Advancing Africa's Role in Global Goals

The African Week underscored the importance of regional collaboration in achieving sustainable development. With Africa being home to some of the fastest-growing economies and populations, its role in the global SDG agenda is both critical and transformative. Events like these highlight the continent's capacity to innovate and lead in areas such as renewable energy, sustainable cities, and inclusive education.

A Step Forward for Ibn Tofail University

For Ibn Tofail University, hosting this event strengthens its reputation as a hub for sustainability-focused research and innovation. By partnering with prestigious organizations like NEF, the university affirms its commitment to fostering education, innovation, and collaboration for a better future.

The African Week on the 17 Sustainable Development Goals at Ibn Tofail University has set a precedent for fostering sustainable development dialogue and action in Africa. It serves as a beacon of hope and progress, uniting minds to create a sustainable future for the continent and the world.



Energy Recovery from Organic Waste through Methanization, Gasification, and Combustion (VLORMAC)

Project Hosting Institution: Institute of Combustion, Aerothermics, Reactivity and Environment (ICARE), Orléans, France

Project Overview:

This project is a collaborative effort between the Institute of Combustion, Aerothermics, Reactivity and Environment (ICARE) in Orléans, France, and Ibn Tofail University in Kenitra, Morocco.

Partners:

. ICARE: Institute of Combustion, Aerothermics, Reactivity and Environment, Orléans, France
. Ibn Tofail University, Kenitra, Morocco

Project Objectives:
The scientific objectives of the VLORMAC project are as follows:

- To develop renewable energies by utilizing biomass and waste, while reducing greenhouse gas emissions;
- To decrease waste volume and reduce the pollutant load of digested waste;
- To deepen understanding of gasification and methanization systems to improve the management of bioprocesses;
- To characterize olive residues in terms of their thermo-physical properties;
- To compare energy recovery processes—gasification, methanization, and direct combustion—both energetically and economically, to select the most appropriate process;
- To characterize the combustion of the obtained products in terms of heat quantity and pollutant emissions based on the composition of the produced gases.

Human Resources:

- SETIME Laboratory, Renewable Energies and Materials Team, Faculty of Sciences, Kenitra, Morocco: Professors, PhDs, Doctoral Candidates, and Students.
- ICARE Laboratory, CB2 team – Biomass Combustion and Biofuels

Material Resources:

- CSTR digesters
- Scientific laboratory equipment
- Gasifier, biomass boiler, measurement and analysis equipment

Outlook and Future Perspectives:

The project aims to treat olive oil waste in an integrated way by combining the biochemical recovery of margines by methanization (liquid fraction) and the thermochemical conversion of the resulting digestate and olive groats (solid fraction) by combustion and gasification. This approach respects the objectives of the circular economy, as it results in zero waste. We propose to study the possibilities of valorizing agricultural and agri-food residues, and in particular waste from olive oil production. The concept is to produce biogas and syngas from these wastes for use as biofuels in boilers, either on an industrial scale, or on the scale of small groups of dwellings (hamlets). The aim of the VALORMAC project is to determine the optimum conditions for using these residues to produce biofuels and burning them in specific boilers, in order to verify burner performance.

Bouchra Zoubaa from UIT Wins First Prize for Innovative Ammonia-Fueled Furnace Project at Prestigious Hackathon

On October, 10, 2024 Bouchra Zoubaa, a talented student from the National School of Chemistry at Ibn Tofail University, has achieved a remarkable milestone by securing the first prize at a prestigious hackathon. This event was jointly organized by the Institute for Solar Energy and New Energies Research (IRESEN) and Mohammed VI Polytechnic University (UM6P). The competition focused on the innovative theme of Ammonia-Fueled Furnace, highlighting the growing global interest in sustainable energy solutions.

A Revolutionary Concept in Energy Innovation

The hackathon, held as part of a collaborative effort between leading Moroccan institutions, aimed to explore practical and sustainable applications of ammonia as an alternative fuel source. Ammonia has gained attention in recent years for its potential to provide a carbon-free energy solution, particularly in industrial and transport sectors. Zoubaa's winning project stood out for its innovative approach to designing and optimizing a furnace powered by ammonia. Her concept combined chemical engineering expertise with a focus on efficiency, safety, and sustainability, addressing key challenges in adopting ammonia as a clean energy solution.

Collaboration and Expertise

The hackathon brought together multidisciplinary teams from across Morocco, creating a dynamic environment for collaboration and knowledge sharing. Participants included students, researchers, and industry professionals, all working to tackle the technical and environmental challenges associated with ammonia-based energy systems. Bouchra Zoubaa's success underscores the high level of education and research being carried out at the National School of Chemistry at Ibn Tofail University. It also highlights the value of fostering partnerships between academic institutions and research organizations to drive innovation in renewable energy.

Recognition and Impact

Winning this competition not only showcases Zoubaa's individual talent but also reinforces Morocco's commitment to leading the way in renewable energy innovation. Her project contributes to the ongoing dialogue on reducing carbon emissions and transitioning to sustainable industrial processes.

Looking Ahead

As Morocco continues to invest in renewable energy and cutting-edge research, initiatives like this hackathon play a critical role in cultivating the next generation of innovators. Zoubaa's achievement is an inspiring example of how young minds can contribute to solving global challenges through creativity and determination. Congratulations to Bouchra Zoubaa for her outstanding accomplishment, which represents a significant step forward in the pursuit of sustainable energy solutions.

Electricity Production via Renewable Energy and Electromobility

Photovoltaic Canopy 1

In addition to its impact on clean energy production, this photovoltaic canopy generates considerable savings. Each month, the building connected to the project benefits from an average reduction of 3,200 Dhs on its electricity bill, demonstrating the efficiency and profitability of the solar installation. Furthermore, due to the reduction in greenhouse gas emissions linked to conventional electricity production, the project also results in average monthly savings of 1.49 tons of CO2, actively contributing to the fight against climate change.

Location: Parking in front of the Presidency
Type: Self-consumption with charging stations for 10 electric bicycles and 2 electric cars.
Installed photovoltaic power: 21 kWc
Average daily photovoltaic production estimate: 94 kWh
Average monthly savings on the connected building's electricity bill: 3,200 Dhs
Average monthly CO2 savings: 1.49 tons

This photovoltaic canopy project embodies our ongoing commitment to sustainability and the transition to cleaner, more environmentally friendly energy solutions.





Electricity Production via Renewable Energy and Electromobility

Photovoltaic Canopy 2

This photovoltaic canopy provides significant savings. The buildings connected to the project will benefit from an average monthly reduction of 9,100 Dhs on their electricity bills, reflecting the efficiency and positive economic impact of this solar installation. Furthermore, the project will also result in average monthly savings of 4.29 tons of CO2, thereby reducing our overall carbon footprint.
This project represents a further step towards our vision of a green and sustainable university, where renewable energies play a key role in our energy future.

Location: Parking in front of the Faculty of Sciences
Type: Self-consumption
Installed photovoltaic power: 60 kWc
Average daily photovoltaic production estimate: 270 kWh
Average monthly savings on the connected buildings' electricity bills: 9,100 Dhs
Average monthly CO2 savings: 4.29 tons

By integrating this photovoltaic canopy into our campus, we strengthen our commitment to sustainable energy transition and the adoption of innovative technologies to promote a responsible approach to energy.



Electricity Production via Renewable Energy and Electromobility

Photovoltaic Canopy 3

The positive impact of this project extends beyond the environment, translating into substantial financial benefits. The buildings connected to the project will enjoy average monthly savings of 5,500 Dhs on their electricity bills, reflecting the efficiency and economic potential of this solar installation. Additionally, the project will lead to average monthly savings of 2.49 tons of CO2, significantly contributing to the reduction of our overall carbon footprint.

Location: Parking in front of the Continuing Education Center
Type: Self-consumption
Installed photovoltaic power: 35 kWc
Average daily photovoltaic production estimate: 157 kWh
Average monthly savings on the connected buildings' electricity bills: 5,500 Dhs
Average monthly CO2 savings: 2.49 tons

This project reinforces our position as a model campus for sustainability, implementing innovative technologies for solar energy self-consumption.



Electricity Production via Renewable Energy and Electromobility

Photovoltaic Canopy 4

Location: Parking at the Faculty of Letters and Human Sciences
Type: Self-consumption
Installed photovoltaic power: 50 kWc
Average daily photovoltaic production estimate: 250 kWh
Average monthly savings on the connected buildings' electricity bills: 7,600 Dhs
Average monthly CO2 savings: 3.5 tons

Beyond the ecological benefits, this project offers significant financial savings. The buildings connected to the project will enjoy average monthly savings of 7,600 Dhs on their electricity bills, demonstrating the efficiency and positive economic impact of this solar installation. Additionally, the project will result in average monthly savings of 3.5 tons of CO2, contributing to the reduction of greenhouse gas emissions.

The integration of this photovoltaic canopy in the parking lot of the Faculty of Letters and Human Sciences reflects our ongoing commitment to sustainability and the adoption of renewable energy solutions. By harnessing the benefits of solar energy, we demonstrate our intention to promote responsible practices and foster a culture of sustainability within our university community.



Electricity Production via Renewable Energy and Electromobility

Photovoltaic Pergola

Thanks to an average daily photovoltaic production estimate of 201 kWh, this project will have a significant impact on our clean energy supply. But the benefits don't stop there. The financial savings resulting from this initiative will also be remarkable. Each month, the building connected to the project will enjoy average monthly savings of 6,850 Dhs on its electricity bill, demonstrating the efficiency and profitability of this solar installation.

Location: Terrace of the University Library
Type: Self-consumption
Installed photovoltaic power: 45 kWc
Furthermore, this photovoltaic pergola will lead to average monthly savings of 4.40 tons of CO2, significantly contributing to the reduction of greenhouse gas emissions.
Average daily photovoltaic production estimate: 201 kWh
Average monthly savings on the connected building's electricity bill: 6,850 Dhs
Average monthly CO2 savings: 4.40 tons

Additionally, this photovoltaic pergola will lead to average monthly savings of 4.40 tons of CO2, significantly contributing to the reduction of greenhouse gas emissions.



Electricity Production via Renewable Energy and Electromobility

Solar Facade

Each day, the average daily photovoltaic production estimate of 112 kWh demonstrates the significant potential of this installation to generate clean and renewable energy. Beyond its environmental impact, this project offers substantial financial benefits. The building connected to the project will enjoy average monthly savings of 3,800 Dhs on its electricity bill, reflecting the efficiency and profitability of this solar installation.

Location: South facade of the University Library
Type: Self-consumption
Installed photovoltaic power: 25 kWc
Average daily photovoltaic production estimate: 112 kWh
Average monthly savings on the connected building's electricity bill: 3,800 Dhs
Average monthly CO2 savings: 2.45 tons

Furthermore, this installation will lead to average monthly savings of 2.45 tons of CO2, actively contributing to the reduction of greenhouse gas emissions.



Electricity Production via Renewable Energy and Electromobility

Solar Benches

The UIT has recently installed innovative new benches on its campus, equipped with photovoltaic modules that produce green electricity, stored for continuous availability, 24/7. These modern benches offer a multifunctional space where students and staff can work, study, or simply relax while benefiting from convenient power sources. Each bench is equipped with a 220V power outlet for charging laptops, as well as USB ports (1A and 2A) for charging phones and tablets.

Location: Covering the entire university campus
Number of benches installed: 30
Number of 220V power outlets on each bench: 1
Number of USB ports (1A and 2A) on each bench: 2

As the first of their kind on a national scale, these smart benches represent a significant advancement for the university, allowing all users, especially students, to charge their electronic devices at any time of day. This initiative reinforces our commitment to renewable energy solutions and our desire to provide a sustainable and practical environment for the university community.





Energy Efficiency: Transition to LED Lighting

The transition to LED lighting at Ibn Tofail University is a bold initiative focused on sustainability. By implementing this project, our university demonstrates its commitment to responsible energy management and its desire to reduce its environmental impact. The shift to LED lighting, carried out across the entire university campus, is a crucial step toward achieving our energy efficiency goals and budget savings.

Location: Covering the entire university campus
Reduction in electricity consumption: Approximately 50% to 80% compared to conventional lighting
Average monthly financial savings: Ranging from 30% to 70% on the electricity bill related to lighting
Reduction in CO2 emissions: About 50% to 80% of CO2 emissions related to lighting can be reduced

With energy consumption reduced by 6 to 10 times compared to conventional lighting, we achieve significant energy savings while optimizing our operating costs. The integration of occupancy sensors in key areas of the campus, combined with LED lighting, further enhances energy efficiency, as lighting will only be used when needed. These concrete measures improve our environmental footprint by reducing greenhouse gas emissions associated with electricity consumption. Moreover, this project provides a more pleasant and secure learning and working environment, thanks to optimal illumination of common areas.





Sustainable biomass conversion into bioenergy through pyrolysis (PyroBioFuel)

The project, scheduled for the period 2022-2024, aims to transform animal slaughtering activities into environmentally friendly and sustainable practices. Key objectives include optimizing rapid pyrolysis, developing processes for converting pyrolysis products into fuels, and creating decision-making tools based on models. To achieve these goals, the project relies on robust pyrolysis technologies that ensure consistent product quality.

Funded by the Ministry of Higher Education and Innovation, the project, named PyroBioFuel, is organized into five integrated work packages. These packages aim to enhance the conversion pathway of biomass into fuel using innovative technologies and digital tools. The project aspires to utilize residual biomasses, such as date palm waste, cotton stalks, corn straw, and olive waste, as raw materials for the pyrolysis process.

Beyond technical aspects, PyroBioFuel anticipates significant impacts. At the micro level, the project promotes small investments led by women, encourages job creation, and contributes to the development of rural communities.

The evaluation of social impacts will encompass effects on individuals and community interactions with their socio-cultural, economic, and biophysical environment. Special attention will be given to potential benefits in terms of women's empowerment and gender equality.

Ultimately, PyroBioFuel aims to validate new biomass conversion technologies with a modular approach. This modularity will help reduce capital costs and facilitate the scalability of units, making them suitable for rural and remote areas disconnected from the traditional electrical grid.



Study of Appropriate Technologies for the Conversion of Organic Waste and Biomass into Renewable Energy and Sustainable Bio-Fertilizer

Funding Partners: CNRST- Ibn Tofail University – Sidi Mohamed Ben Abdellah University– Hassan 1St University.

Description:

The university catering sector is one of the largest producers of bio-waste from food. The enormous amount of waste poses a risk to the environment and public health if it is thrown directly into the environment. Anaerobic digestion is a possible solution for the better management of this type of food waste.

Project Objectives:

Design of a pilot prototype for the methanization of organic waste from the university restaurant in Kenitra.
Project beneficiaries: Restaurants
Means necessary for the realization of the project:

- Human resources: Biomass and Biogas Energy Team, Faculty of Sciences Kenitra-Morocco: Professors, Doctors, and PhD Students. Environmental Biotechnology Team, Biotechnology Laboratory, Sidi Mohamed Benabdellah University: Professors, PhD Students and Students.
- Material resources: CSTR Digester and Scientific laboratory equipment.

Project Status: Prototype, Sample

Project Assessment:

- Innovative aspect: A first university-scale digester for waste treatment
- Environmental Impact: Treatment of university restaurant waste, reduction of greenhouse gases and production of renewable energy
- Development prospects: Pilot scale, capacity expansion, diversification of treatment and recovery types
- Sustainability prospects: Provide the university restaurant with a prototype for processing their waste.



Treatment of High-Pollution Industrial Effluents through Anaerobic Digestion

The Rabat Salé Kénitra (RSK) region, with its prominent position as an agricultural area, is characterized by sustained demographic and economic growth, hosting numerous agri-food industry units. However, this industrial expansion is not without consequences, as these industries are often identified as major polluters.
A concrete example of this issue is reflected in the effluents generated by the Gharb Molasses Transformation Company (Sotrameg), which are characterized by high levels of COD (Chemical Oxygen Demand) and BOD5 (Biochemical Oxygen Demand over 5 days), reaching approximately 60,000 mg/L and 40,000 mg/L, respectively. Alarmingly, when discharged into the sewage system, these industrial effluents mix with domestic wastewater, significantly negatively impacting the quality of groundwater and soil.

he fundamental objective of this project is to conduct an in-depth study of the treatment and valorization of industrial effluents from a food alcohol production unit using molasses as a raw material, which is a by-product of the sugar industry.
This innovative initiative seeks to assess the feasibility of anaerobic digestion as a treatment method, aiming to produce biogas while generating a valuable by-product in the form of a biofertilizer that can be used in agriculture.
The anaerobic digestion process relies on the mesophilic fermentation of molasses by Saccharomyces cerevisiae, resulting not only in biogas production but also in the formation of ethanol as a by-product.

By implementing this integrated approach, the project aspires to provide a holistic and sustainable solution, contributing to mitigating environmental issues while exploring innovative opportunities for local agriculture.



The project of Hybrid Biochemical and Thermochemical conversion of Slaughterhouse Biowaste for Renewable Energy production (BIOTHEREP)

Project Period : 2022-2024

Funding Partners : Leap-Re program

Description:

The BIOTHEREP Circular is a project that aims to create novel and economically viable integrated processes that will help convert slaughterhouse activities into environmentally friendly sustainable practices and reduce the risk of soil, climate, and water pollution.

The project, set to unfold between 2022 and 2024, aims to develop an integrated strategy to produce bioenergy from slaughterhouse wastes and implement solutions that respond concretely to the global and regional sustainable development objectives from a circular economic perspective.

The project's primary ambition is to propose effective, optimized, and innovative multidisciplinary technological solutions to the current problems of SHW management that seriously affect climate, soil, and water resources.
What is the expected impact of the project?
Among the project's primary outcomes will be the creation of an integrated waste management and energy generation system that is ideal for slaughterhouses.

The slaughterhouses in Africa might employ this method directly, or it might be extended to other slaughterhouses that deal with comparable issues like improper disposal of waste heat or inadequate energy supply, particularly in remote regions.
Overall, in BIOTHEREP, several sustainable development goals are targeted. The project has an environmental and social impact on the African continent and responds to population needs. By implementing this integrated approach, the regional slaughterhouse sector can strengthen its competitiveness and growth by becoming more energy efficient. Results obtained could be used beyond this project for investigation in further R&D or international development projects.

The Advanced Control System for Intelligent and Sustainable Operation of Connected Agricultural Greenhouses

Project Period: 2021- 2025

Project Partners: CNRST- MESRSI- UM6P-OCP

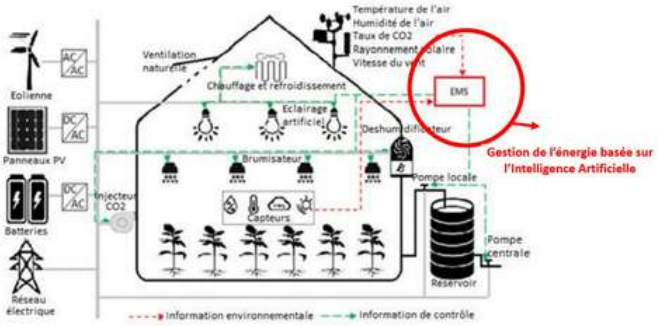
Description:

Among 61 projects selected under the Multi-Thematic Research Call for Projects (APRD), jointly initiated by the Ministry of Higher Education, Scientific Research and Innovation, the OCP Foundation, Mohammed 6 Polytechnic University, and the National Center for Scientific and Technical Research, the project of the Advanced Systems Engineering Laboratory (LISA) stands out. This project, spread over the period 2021-2024, is entitled "Advanced control system for intelligent and sustainable operation of connected agricultural greenhouses connected to hybrid micro-grids."

Project Objectives:

This project aims to develop and validate a smart management product for a network of greenhouses connected to a hybrid micro-grid, based on an innovative centralized predictive control algorithm, taking into consideration stochastic production models and advanced prediction models based on artificial intelligence.

The entire system control platform is based on machine learning to provide real-time management of the entire system. It should enable the real-time collection and analysis of greenhouse bioclimatic indicators. The control platform includes control and decision-making modules developed and optimized for heterogeneous energy distribution systems that can accommodate a large number of renewable energy sources, smart greenhouses, energy storage devices, pumps, water tanks, smart meters, and sensors. The objective is to support the transition to precision and smart agriculture by developing integrated information and control technologies based on both consistent data analysis and high-performance control systems.



Innovative Collaboration between Ibn Tofail University and the Climate-U Network

The collaborative efforts between Ibn Tofail University (UIT) and the Climate-U network, along with their international partners, underscore the importance of transcending borders to tackle the urgent challenges posed by climate change and environmental degradation. This partnership marks a significant advancement toward promoting a culture of environmental awareness and facilitating impactful research initiatives for a more sustainable future.

The Climate-U network brings together universities worldwide committed to working collaboratively to address the climate crisis. It emerged from the initial Climate-U project (Transforming Universities for a Changing Climate), which ran from February 2020 to January 2024, funded by the Global Challenges Research Fund. The network's goal is to enhance climate action within each institution and create new collaborative initiatives through dialogue and international exchange.

Education, Research, and Climate: UIT's Exemplary Collaboration with the Climate-U Network in Support of SDG 13

Ibn Tofail University, dedicated to academic excellence and community engagement, has embarked on a transformative journey to integrate environmental responsibility into its core mission.

Through its strategic collaboration with the Climate-U network, an international platform dedicated to promoting climate action and sustainable development through education and research, UIT has strengthened its commitment to global environmental initiatives. This partnership not only amplifies the university's role as a leader in sustainability-focused education but also opens a range of opportunities for students and faculty members to engage in cutting-edge research and development projects with a global impact.

The collaborative efforts between UIT and the Climate-U network have facilitated the exchange of knowledge, resources, and best practices, fostering a robust ecosystem for developing innovative solutions to climate change. By leveraging the expertise and diverse resources of its international partners, UIT has enriched its academic programs with a strong focus on sustainability and environmental studies. This integration has not only improved the quality of education but has also equipped students with the skills and perspectives necessary to become active contributors to the global sustainability agenda.

Phosphogypsum Amendments: a Promising Solution to Mitigate the Effects of Salt Stress in Citrus Orchards

Project Period : 2022-2025

Projet Description:
This project seeks to reduce soil salinity by replacing gypsum with phosphogypsum, a by-product of phosphoric acid production. The initiative, titled "Phosphogypsum Amendments: A Promising Solution to Mitigate Salt Stress in Citrus Orchards," focuses on leveraging phosphogypsum as an effective soil amendment to combat salinity issues in citrus orchards. This approach not only addresses the problem of soil degradation but also contributes to the sustainable management of industrial by-products, offering a more eco-friendly solution to agricultural challenges.

Partners:
UNIVERSITY MOHAMMED VI POLYTECHNIC (UM6P);
THE NATIONAL CENTRE FOR SCIENTIFIC AND TECHNICAL RESEARCH (NCSTR);
THE MINISTERY OF HIGHER EDUCATION, SCIENTIFIC RESEARCH AND INNOVATION (MHESRI);
IBN TOFAIL UNIVERSITY (UIT).

Scientific, Environmental, and Economic Impact
The aim of this project is to use phosphogypsum, a by-product of the production of phosphoric acid, which is widely available in Morocco, as an alternative to gypsum to reduce soil salinity. However, such amendment can only be considered if the harmlessness of the products has been validated. To reduce the potential presence of toxic elements, bioremediation will be explored by selection of microorganisms and/or plants capable of metabolizing heavy metals in soil, tree and fruit as a result of the application of phosphogypsum.



Olive tree adaptation

Project title:
Olive tree adaptation to climate change: Using genomics and association genetics for varietal selection (ClimGenOlive)

Period of the project: 2022-2025

Aim of the project:
Understanding the biological processes involved in flowering (induction, flowering, cold and heat requirements, flowering rate) and defining the main phenological traits involved in flowering, enabling variety characterization in terms of cold and heat requirements.

.Characterizing drought adaptation mechanisms and defining the main structural and functional traits ensuring the maintenance of a water status that preserves the integrity of the tree's physiological functions and productive state.
Exploiting the new tools of genomics and association genetics to identify the genomic regions associated with the main phenotypic traits linked to cold/flowering requirements and drought tolerance in order to define a combination of genomic markers associated with adaptive traits useful for characterizing local genetic resources and selecting the genotypes best adapted to changes.

Funding partners:
Ministry of Higher education, Scientific Research and Innovation
Hassan II Scientific and Technical Academy – Rabat
Cadi Ayyad University – Marrakech
Ibn Tofail University – Kénitra
National Institute for Agronomic Research – Rabat

Scientific, environmental, and economic impact:
In terms of research
Better understanding of biological processes linked to flower induction, dormancy, cold and heat requirements and flowering rate.
Identification of genetic and environmental effects linked to flowering dates of Mediterranean varieties.
Establishment and validation of relationships between cold and heat requirements and flowering.
Identification of eco-physiological mechanisms explaining differential varietal behavior with respect to drought.
Contribution to the exploration of the genomics of adaptation through the identification of genes and allelic variants involved in the adaptation of olive trees to winter cold and water deficits.
Identification and validation of a combination of genomic markers associated with phenotypic traits related to olive adaptation to winter cold deficit and summer water deficit.
In terms of application:
Classification of 200-205 Mediterranean varieties according to their flowering dates, cold requirements for flowering and drought tolerance.
Selection of elite varieties best adapted to winter cold and summer water deficits.
Definition of a combination of reliable genomic markers for the genetic characterization of olive tree genetic resources.
Identification of the most decisive traits that can be used in the selection program for genotypes adapted to water deficit.
Characterization of the phenotypic plasticity of the Moroccan Picholine variety along the north-south gradient and in correlation with bioclimatic stages, enabling the defining of adaptation maps for the olive tree.

PRIMA: Safe- Sustainable Water reuse practices improving safety in agriculture, food and Environment”

Project Period: 2022-2025

Project Description:
The project aims to improve water resource management and wastewater treatment to support sustainable agriculture in the face of growing global food security challenges. Due to pressures from population growth, climate change, and water scarcity, the goal is to find affordable and efficient solutions to preserve water resources while minimizing negative impacts on soil and agricultural production.

Partners:
Università degli Studi della Basilicata
Istituto Ricerca sulle Acque – Consiglio Nazionale delle Ricerche
Sapienza Università di Roma
Hellenic Agricultural Organization ELGO-DIMITRA (Institute of Plant Breeding and Genetic Resources)
The Catalan Institute for Water Research
Université de Montpellier
Institut Agronomique et Vétérinaire Hassan II
Water Researches and Technologies Center
Lebanese Development Network
Université Djillali Liabes
Faculty of Sciences of Sfax
Université Ibn Tofail

Scientific, Environmental, and Economic Impacts:
The project addresses water scarcity, climate change, and land degradation. Its goal is to optimize water use in agriculture while minimizing environmental impact. This includes reducing micropollutants, managing soil salinity, and improving the quality of irrigation water. These efforts aim to enhance food security, protect soil biodiversity, and support microorganisms essential for sustainable agricultural production. The project will also help reduce the costs associated with wastewater management systems, benefiting farmers and local communities.

SUPREM-MILK

The SUPREM-MILK project focuses on the sustainability and resilience of the milk supply chain in the Mediterranean regions. Here is the analysis of the project in relation to the Sustainable Development Goals 2, 12, 13 and 3.

Description:
SUPREM-MILK aims to provide concrete tools and propose customized and targeted solutions that can help farmers in the Southern Mediterranean Countries (SMCs) to take a step towards net zero carbon and a greener and circular "agriculture" to maximize the 3 forms of sustainability and the resilience of Mediterranean milk. Three SMCs will be part of the project consortium: Egypt, Morocco and Turkey in addition to the Northern Mediterranean partners Italy, France and Spain.

Project Objectives:
Objective 1: Preliminary inventory of the carbon cycle and characterization of sustainability in the ecosystems where the target dairy sectors are located.
Objective 2: Support the adoption and implementation of sustainable technologies, new applications and best practices by local farmers.
Objective 3: Final assessment of the carbon footprint, sustainability, self-sufficiency and competitiveness of the milk supply chains considered and its impact on consumer nutrition and health.

Project period: 2023 – 2026

PROMEDRICE

Description:
PROMEDRICE aims to develop and promote the adoption of innovative and environmentally friendly agricultural practices and to produce evidence to support policymakers in making decisions regarding water resource management. The main objective of PROMEDRICE is to develop and promote the adoption of site-specific agricultural practices that reduce soil and water contamination and salinization while maintaining or improving water use efficiency and productivity in rice agro ecosystems.

Project Period:
October 2023 – October 2026

Researchers involved:
BOUABDLI Abdelhak – Geochemistry/Contamination/Pollution/ Environment – PES
SADIKI Mohamed – Geochemistry/ Hydrology/ Environment – PH
SAIDI Nadia –Microbiology/ Contamination/ Pollution – PES
CHAKIRI Said – Sedimentology/ Environment – PES

Funding Partners:
Ministry of Higher Education, Scientific Research and Innovation Morocco (MHESRIM)

Methodology:
PROMEDRICE will collect and harmonize data regarding both the quality of surface and groundwater in the vast majority of rice-producing areas in the Mediterranean, often located in river deltas and coastal wetlands. The project will directly address the challenge of reducing salinization and contamination of water and soil in rice-based agro ecosystems. He will rely on the prior and shared knowledge of the consortium and experience to save water in rice cultivation, now focusing on optimizing water management coupled with agronomic practices that are likely to cause pollution. The specific objective is to preserve the health of rice agro ecosystems and the ecosystems with which they interact. Depending on the regions, conditions such as salinity, nutrients, pesticides, other compounds, as well as metals like As and Cd will be studied for their impacts on soils, surface waters, and groundwater. In those areas where salinization is a major issue, the salinization of aquifers and soil will be studied in relation to agricultural practices.

Expected Results:
The project will identify and quantify the main pollutants affecting surface water and groundwater in relation to rice production under specific soil and environmental conditions. The implementation of efficient and sustainable agricultural practices to reduce the risks of water pollution and salinization; will be developed studied/demonstrated in seven case studies across the Mediterranean region, from Turkey and Egypt in the East, to Portugal and Spain in the West.

Study of Appropriate Technologies for the Conversion of Organic Waste and Biomass into Renewable Energy and Sustainable Bio-Fertilizer

Funding Partners: CNRST- Ibn Tofail University – Sidi Mohamed Ben Abdellah University– Hassan 1St University.

Description:
The university catering sector is one of the largest producers of bio-waste from food. The enormous amount of waste poses a risk to the environment and public health if it is thrown directly into the environment. Anaerobic digestion is a possible solution for the better management of this type of food waste.

Project Objectives:
Design of a pilot prototype for the methanization of organic waste from the university restaurant in Kenitra.
Project beneficiaries: Restaurants
Means necessary for the realization of the project.
Human resources: Biomass and Biogas Energy Team, Faculty of Sciences Kenitra-Morocco: Professors, Doctors, and PhD Students. Environmental Biotechnology Team, Biotechnology Laboratory, Sidi Mohamed Benabdellah University: Professors, PhD Students and Students.
Material resources: CSTR Digester and Scientific laboratory equipment.

Project Status: Prototype, Sample

Project Assessment:
Innovative aspect: A first university-scale digester for waste treatment
Environmental Impact: Treatment of university restaurant waste, reduction of greenhouse gases and production of renewable energy
Development prospects: Pilot scale, capacity expansion, diversification of treatment and recovery types
Sustainability prospects: Provide the university restaurant with a prototype for processing their waste.



Organic food systems as models for sustainable food systems in Europe and North Africa

Project period: January 2021 – June 2024

Project Description:
SysOrg aims to identify intervention and entry points to enable a transformation process towards resilient and sustainable food systems. It also seeks to identify how pathways to increase sustainable consumption and food production could be successfully designed. To this end, it is necessary to better understand food systems, including the multitude of actors involved, and to identify critical points within the system. The assumption is that food systems have common intervention and entry points to enable transformation processes that are transferable but need to be adapted to the regional level. Thus, the following questions will be addressed:
– What are the common intervention and entry points within the food system to enable a transformation process towards resilient and sustainable food systems?
– How can pathways for increasing sustainable consumption and food production be successfully designed throughout the system?
– What are the reasons, motivations or drivers for actors to opt for the most sustainable solution?
– What are the intervention and entry points for developing, consolidating and disseminating improved organic food and farming, reducing waste and moving towards sustainable diets?
– What are the critical points for bringing these perspectives together in a systematic approach? This is done by mapping and analyzing five case territories (Copenhagen, Cilento, North Hesse, Warsaw, Kenitra).
Four perspectives have been adopted:
– System transition
– Evolution towards sustainable diets
– Improving organic food and farming
– Transdisciplinary waste reduction
This multiple transnational case study will involve a multi-stakeholder approach. SysOrg will result in improved and locally adapted strategies for the transformation of food systems across Europe and North Africa into sustainable, resilient and resource-efficient food systems with less environmental impact and high socio-cultural acceptance.





Anir: A Wave of Change for a Cleaner Planet

Event : November 23, 2024

Anir has always been committed to making a difference, and this Saturday, November 23, we are dedicating an entire day to the preservation of our precious coastline.
Our mission: to restore the natural beauty of our beach by removing waste and pollutants that threaten its purity and ecological balance. This action is not just about cleaning a beach; it's about protecting our planet and preserving it for future generations.

Why it matters:

Every piece of trash removed is a step toward a cleaner, healthier environment. Coastal pollution affects marine life, ecosystems, and even our health. By coming together as a community, we can create a lasting impact and inspire others to take action.

How you can help:

- Join us on November 23 for this cleanup campaign.
- Bring your enthusiasm, some gloves, and a love for nature!
- Together, we can turn small gestures into a big change.

Let's make waves for a better tomorrow. Be the wave of change! As recommended by the memebers of Anir club.



Ibn Tofail University Shines at the First Edition of "Kenitra on Bicycles"

Event : 22 December 2024

On December 22, 2024, Ibn Tofail University actively participated in the inaugural edition of "Kenitra on Bicycles", an event organized by the National Association for Women, Physical Activity, and Sports. This initiative aimed to promote physical well-being, environmental awareness, and community engagement through cycling.

The event witnessed enthusiastic participation from students, staff, and community members, highlighting the importance of integrating sports into daily life. Among the standout participants were students from the IMS (Institute of Sports Management), who achieved remarkable results, showcasing their dedication, teamwork, and athletic prowess.

The activity not only celebrated the spirit of sports but also reinforced the university's commitment to fostering a culture of health and sustainability. The collaborative efforts of the association and the university were widely praised, setting a precedent for future editions of the event.
The success of "Kenitra on Bicycles" reflects Ibn Tofail University's ongoing mission to support diverse initiatives that contribute to societal development, making it a cornerstone of education and community service in Morocco.



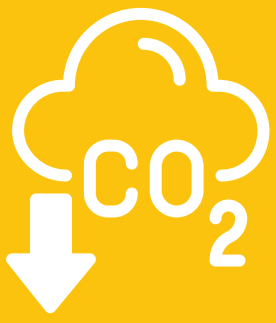
Measure *progress*

63%



Reduction of electricity consumption costs within the university campus by approximately 63% in 2025.

25 tCo2e



The total Scope 1 and 2 emissions in tCO2e (tonnes of carbon dioxide equivalent) amount to 25 tonnes.Using Morocco's national emission factor for electricity (~0.00252 tCO_2e per GJ), Ibn Tofaïl University's total Scope 2 carbon emissions from energy consumption of 9,939 GJ are estimated at approximately 25.0 tonnes of CO_2 equivalent (tCO_2e).

This figure reflects Morocco's growing reliance on low-carbon energy sources and aligns with international standards such as those from the GHG Protocol .

1346



The amount of energy generated on campus from renewable sources is 1346 GJ.

Zero-Carbon Strategy: Transitioning toward a low-carbon economy

Given the increasing demand for electricity at Ibn Tofaïl University and the administration's concern for environmental protection in the face of climate change, the main issue is finding a balance between electricity production and consumption in order to reduce the university's electricity bills.

The initial goal of Ibn Tofaïl University to reduce its energy bill by -40% was exceeded as early as 2020. As a result, the university has set a new target: -80% reduction over the next four years (2023–2026).

In fact, the sustainability strategy to be adopted is the zero-carbon strategy. UIT aims to become a carbon-neutral university by 2030. Carbon neutrality implies reducing all greenhouse gas emissions. This strategy will be implemented as a series of interconnected projects with the following overarching goal:



Measure *progress*

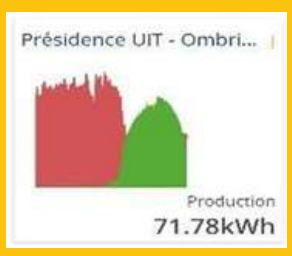
In parallel with these projects, we have implemented our centralized management system, which monitors photovoltaic installations and detects issues before they can have lasting negative impacts, such as inverter downtime or the presence of shaded areas.
Additionally, we have developed our cumulative dashboard. This dashboard provides an overview of all photovoltaic installations, including historical production data, a total overview, and financial performance insights.

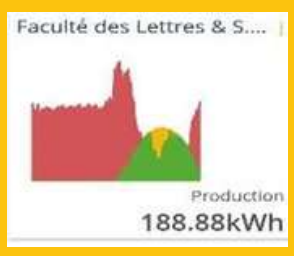




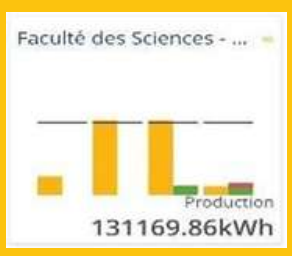












Smart Building

Implementation of the Smart Building System at the University Library

The implementation of the Smart Building system at the university library represents a significant step toward more efficient and eco-friendly resource management. By integrating five key components—centralized technical management, smart metering, DALI lighting control, an occupancy counting system, and the Smart Grid—this project aims to optimize the building's energy and operational performance.

The Smart Building system of the university library is composed of five main components:

1. Centralized Technical Management
2. Smart Metering
3. DALI Lighting Management
4. Occupancy Counting System
5. Smart Grid

Thanks to centralized technical management, all the building's systems are interconnected, enabling real-time monitoring and proactive management of facilities. Smart metering provides precise measurement of energy consumption, allowing project managers to identify potential energy-saving opportunities and implement targeted energy efficiency strategies.

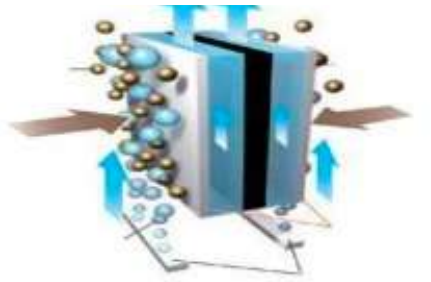
With this transition to the concept of a smart building, the university library is reducing its environmental impact while providing a more comfortable and pleasant space for its users. This project represents a crucial milestone in the university's commitment to sustainability and technological innovation in service of a more responsible future.





Water Conservation

In addition to the previously mentioned projects, Ibn Tofail University has also committed to a series of initiatives to optimize water use and promote clean alternative sources. These efforts include the implementation of projects such as:



Construction of a Wastewater Treatment Station.

Using advanced technologies to enable their reuse to irrigate the university's green spaces.



Water Treatment Station Through Coupling

Powered by photovoltaic and wind energy at Al Anouar High School in Sidi Taibi. This station improves the school's water quality while also contributing to the electricity supply.



Implementation of an Automatic Irrigation System

Promoting more efficient water usage and minimizing waste for the campus' green spaces.

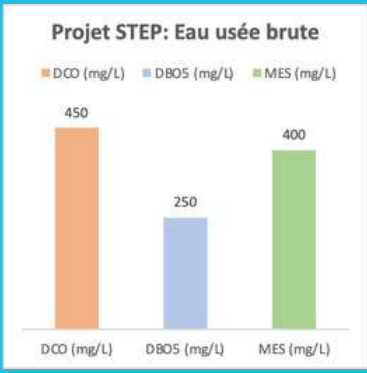
These concrete and operational projects reflect Ibn Tofail University's strong commitment to environmental protection and promoting a sustainable approach on its campus. The university has achieved significant savings through these initiatives, reducing its electricity consumption by approximately 61% in 2023 This responsible approach illustrates the institution's desire to actively contribute to preserving natural resources and building a more environmentally friendly future.

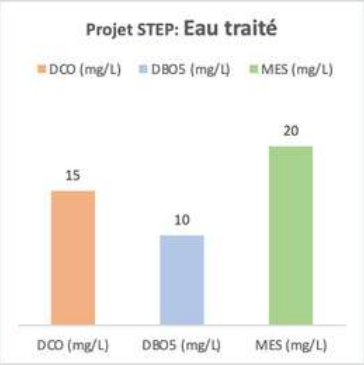
Measuring Progress

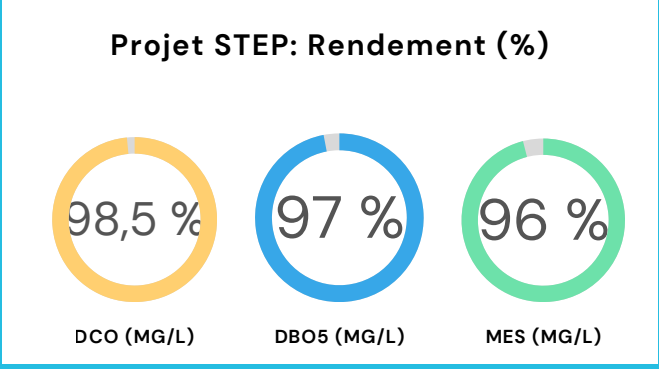
ESTABLISHMENT OF A WASTEWATER TREATMENT, PURIFICATION, AND RECYCLING STATION FOR IRRIGATING GREEN SPACES AT IBN TOFAIL UNIVERSITY

University Water: Biodegradable Wastewater.

Treatment Capacity: 500 m³/day







WATER TREATMENT STATION THROUGH COUPLING: MEMBRANE TECHNOLOGY AND RENEWABLE ENERGIES

Capacity : 2000 Students

School Water: Nitrated and Relatively Saline

Capacity: 3 liters/day

Energy Consumption: 0.2 kWh/m³

Production and Storage of Photovoltaic Electricity	Measurement
Panneaux photovoltaïques	158
Puissance unitaire moyenne /Wc	146,96
Puissance Installée / kWc	24,3
Durée de vie batteries / Cycle	4000
Energie stockée /kWh	40

Wind Production	Measurement
Puissance produit / kWh/an	2000 – 4000
Puissance Installée / kW	2,2

In 2025, the Sidi Taibi station provided drinking water to approximately 4,000 students instead of 2,000.

Conclusion

Ibn Tofail University has consistently prioritized scientific research and environmental issues. In line with this commitment, the university actively seeks opportunities for collaboration and partnership to contribute meaningfully toward achieving zero carbon emissions.

Ibn Tofaïl University's Race to Zero Report demonstrates a proactive approach to addressing climate change and promoting sustainability. By aiming for carbon neutrality and zero emissions, the university emphasizes its role as a leader in ecological transition, indicating that academic institutions can and must play a crucial role in tackling global environmental concerns.

Ibn Tofaïl University is developing innovative solutions through a systematic and verifiable roadmap, including renewable energy systems, waste reduction programs, and sustainable mobility strategies. These initiatives not only correspond with the United Nations Sustainable Development Goals, but they also establish a standard for other institutions to follow. The report demonstrates the university's commitment to raising awareness, engaging the community, and inspiring collaborative action to achieve meaningful and long-term change.

As we work toward our common goal, the journey described in this report serves as both a call to action and a source of inspiration. It invites all stakeholders; students, professors, partners, and the broader community to collaborate in creating a future in which education and sustainability are smoothly intertwined. Together, we can make our ambitions a reality and create a resilient and equitable planet for future generations.

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SUSTAINABLE
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ابن طفيل Ibn Tofaïl

Ibn Tofail University

Towards a Carbon Free Future: A Strategy for Sustainable Excellence