INTEGRATED ENERGY & EDUCATION IN MEDITERRANEAN UNIVERSITIES
Beirut, 13th-14th September 2018

Panel 3: Energy in Lebanon - Teaching & Research

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## University Mission / Relevance & Impact

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High Impact Solutions in the Energy Field

- Grounded in Expertise in Key Disciplines
- Address Regional & Global Issues
- Education
- Research
- Outreach/network
- Inter-Disciplinary
- Supported by Research Centers

Does energy as subject have these characteristics?
Does Energy as subject have these characteristics?

- Decisions on energy futures require skilled experts who grasp the technical issues of energy systems and also have a solid understanding of the underlying socio-economic and policy planning complexities.

- Professional education in the fields of energy economics, energy management and energy policy has been limited. A special focus is needed on non-technical issues covering key energy markets (oil, gas, nuclear, renewable and unconventional energy sources).
Does Energy as subject have these characteristics?

- Energy science and advanced material
- Energy conversion technologies
- Energy efficiency and sustainability
- Energy utilization for water production and water use
- Energy policies and environmental planning
- Energy and society
Related Energy Programs at AUB

- PhD programs in physics, and civil, environmental, electrical and mechanical engineering
- Environmental Science Graduate Programs in four faculties
- Master of Mechanical Engineering; Major: Applied Energy
- MSFEA Professional Online Diploma in Green Technologies in three concentrations of Energy, Buildings, and Water
- Master of Science; Major: Energy Studies (Interdisciplinary and accept students from different UG majors)
Does Energy as subject have these characteristics?

The Munib and Angela Masri Institute of Energy and Natural Resources

**Bridging academic and professional collaboration, outreach and knowledge dissemination:**

- Aims to promote research that contributes to the sustainable and responsible use, management, and conservation of natural resources and energy
- Aspires to be the voice of the people towards responsible use of natural resources and protection of the environment and to become Lebanon’s observatory for best practices in the energy sector
- Established a community of AUB scholars from different disciplines in energy and water experts
The Community of Energy and Water Experts

60+ AUB faculty have received funding from the MI and are active members from Five Faculties: FAFS, FAS, MSFEA, FHS, and OSB

Abdel Rahman, Abdel Fattah | GEOLOGY
Abou Najm, Majdi | CIVIL AND ENVIRONMENTAL ENGINEERING
Abu Tarboush, Bilal | CHEMICAL AND PETROLEUM ENGINEERING
Ahmed, Mohammad | CHEMICAL AND PETROLEUM ENGINEERING
Akkary, Haitham | ELECTRICAL AND COMPUTER ENGINEERING
Al-Ghoul, Mazen | CHEMISTRY
Al-Hindi, Mahmoud | CHEMICAL AND PETROLEUM ENGINEERING
Antar, Ghassan | PHYSICS
Artail, Hassan | ELECTRICAL AND COMPUTER ENGINEERING
Asmar, Daniel | MECHANICAL ENGINEERING
Awad, Mariette | ELECTRICAL AND COMPUTER ENGINEERING
Azizi, Fouad | CHEMICAL AND PETROLEUM ENGINEERING
Chaaban, Farid | ELECTRICAL AND COMPUTER ENGINEERING
Chedid, Riad | ELECTRICAL AND COMPUTER ENGINEERING
Chehab, Ali | ELECTRICAL AND COMPUTER ENGINEERING
Chehab, Ghassan | CIVIL AND ENVIRONMENTAL ENGINEERING
Costantine, Joseph | ELECTRICAL AND COMPUTER ENGINEERING
Dagher, Leila | ECONOMICS
Darwish, Marwan | MECHANICAL ENGINEERING
Digambara, Patra | CHEMISTRY
El Fadel, Mutasem | CIVIL AND ENVIRONMENTAL ENGINEERING
El Hajj, Imaid | ELECTRICAL AND COMPUTER ENGINEERING
El Rassy, Houssam | CHEMISTRY
Ghaddar, Nesreen | MECHANICAL ENGINEERING
Ghaddar, Tarek | CHEMISTRY
Ghali, Kamel | MECHANICAL ENGINEERING
Ghauch, Antoine | CHEMISTRY
Hajj, Hazem | ELECTRICAL AND COMPUTER ENGINEERING
Halaoui, Lara | CHEMISTRY
Hmadeh, Mohamad | CHEMISTRY
Jaafar, Hadi | AGRICULTURE AND FOOD SCIENCES
Jabr, Rabih | ELECTRICAL AND COMPUTER ENGINEERING
Kafararani, Bilal | CHEMISTRY
Kanji, Roweida | ELECTRICAL AND COMPUTER ENGINEERING
Karaki, Sami | ELECTRICAL ENGINEERING
Karam, Pierre | CHEMISTRY
Kayssy, Ayman | ELECTRICAL AND COMPUTER ENGINEERING
Kazan, Michel | PHYSICS
Khoury, Hiam | CIVIL AND ENVIRONMENTAL ENGINEERING
Lakkis, Issam | MECHANICAL ENGINEERING
Maddah, Bacel | INDUSTRIAL ENGINEERING AND MANAGEMENT
Mansour, Mohammad | ELECTRICAL AND COMPUTER ENGINEERING
Moukalled, Fadl | MECHANICAL ENGINEERING
Moussawi, Lama | BUSINESS INFORMATION AND DECISION SYSTEMS
Najjar, Shadi | CIVIL AND ENVIRONMENTAL ENGINEERING
Oweis, Ghanem | MECHANICAL ENGINEERING
Saad, George | CIVIL AND ENVIRONMENTAL ENGINEERING
Saad, Walid | CHEMICAL AND PETROLEUM ENGINEERING
Sadek, Salah | CIVIL AND ENVIRONMENTAL ENGINEERING
Salam, Darine | CIVIL AND ENVIRONMENTAL ENGINEERING
Shammas, Elie | MECHANICAL ENGINEERING
Sour, Issam | CIVIL AND ENVIRONMENTAL ENGINEERING
Suidan, Makram | CIVIL AND ENVIRONMENTAL ENGINEERING
Tabbal, Malek | PHYSICS
Yassine, Ali | INDUSTRIAL ENGINEERING AND MANAGEMENT
Zeaiter, Joseph | CHEMICAL AND PETROLEUM ENGINEERING

http://www.aub.edu.lb/units/masri_institute/about/Pages/members.aspx
What MI does in support of high impact research/Education

Guide and support research in renewable energy and energy efficiency, water and mineral resources, and management of natural resources to protect the environment.

- Seminars
- Visiting Fellows
- International Workshops

Support research studies that advance knowledge in areas that promote sustainable development in the region.

- High Impact Conferences
- Research Awards
- Support Educational Outreach Projects (Pro-Green)

Establish Research Clusters and multi-disciplinary research teams crossing boundaries of discipline to address complex problems.

- Alternative energy and energy efficiency
- Exploration and recovery of oil and gas
- Water and Mineral Resources

Organize specialized training workshops, conferences, lecture series, and similar high scholarly events.

- Efficient downstream processing of oil and gas
- Energy management and resource planning
- Policy research & technology need assessment
Conference Organization

ASHRAE and MI organized at AUB

1st International ASHRAE Conference and Exhibition on Efficient Building Design

2nd International ASHRAE Conference and Exhibition on Efficient Building Design

3rd International ASHRAE Conference on Efficient Building Design

October 2-3, 2014

September 22-23, 2016

October 4-5, 2018
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Establish Research Clusters and multi-disciplinary research teams crossing boundaries of discipline to address complex problems.

Organize specialized training workshops, conferences, lecture series, and similar high scholarly events.

Specialized Degree Programs

- **MSFEA Professional Online Diploma in Green Technologies** in three concentrations of Energy, Buildings, and Water

- **Master of Science; Major: Energy Studies** (Interdisciplinary and accept students from different UG majors)
Joint online professional diploma in green technologies (energy, buildings, and water) was launched in January 2015

The Online Professional Joint Diploma in Green Technologies is a unique and focused program that caters to professionals from a variety of engineering and science disciplines aspiring to enhance their skills in green technologies and green businesses and working towards common goals that integrate green technologies in their designs.
MS in Energy Studies

ISSUES
- Energy security
- Environmental responsibility
- Sustainable energy mix
- Regional shortage of skilled labor

CAPACITIES
- Equip graduates with ability to evaluate conventional and alternative sources of energy production, utilization and distribution
- Prepare graduates to understand interdisciplinary approaches in assessing complex energy systems and their use in economic, social and environmental context.

IMPACT: Transform energy research to serve the needs of society
- Contribute to solutions and policies for ‘green-energy’ and for the efficient management of domestic oil and gas reserves
- Convene international symposiums that bridge academia & practice
Canters and Institutes at AUB

• Centers and institutes play a central role in forming teams of faculty to work on interdisciplinary projects addressing complex problems.

• Seed funding is a must for faculty to build their research expertise.

• A research culture develops as internal and external funding grows.

• The presence of strong graduate and PhD programs is essential for success in achieving research results.

• The Anis Makdisi Program in Literature (AMPL)
• Agricultural Research and Education Center (AREC)
• The Asfari Institute for Civil Society and Citizenship
• Center for Advanced Mathematical Sciences (CAMS)
• Center for Arab and Middle Eastern Studies (CAMES)
• Center for Behavioral Research (CBR)
• Center for Research on Population and Health (CRPH)
• Center for Teaching and Learning (CTL)
• Environment and Sustainable Development Unit (ESDU)
• The Farouk Jabr Center for Arab and Islamic Science and Philosophy
• Prince Alwaleed Bin Talal Bin Abdulaziz Alsaud Center for American Studies and Research (CASAR)
• Evidence-Based Healthcare Management Unit (EHMU)
• Health Education Resource Unit (HERU)
• Institute of Financial Economics (IFE)
• Issam Fares Institute for Public Policy and International Affairs (IFI)
• Munib and Angela Masri Institute of Energy and Natural Resources
• Nature Conservation Center
• Science and Mathematics Education Center (SMEC)
• .......
Future Perspective for Research and Education

Lack of Critical Mass  Cooperation & Networking
Lack of Resources  Joint Programs

In Moving Forward

Targeted Research Programs and Funding
New Modality for Master programs Offerings: Blended
Can we afford fragmented research with limited resources?

Reorient to strategic allocation of funds centered on impacting future energy priorities of the region.

Collaborate *across disciplines* and optimize resource distribution to advance viable solutions for societal development.

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Change from open to focused calls for research proposals

Support two (2) multi-year projects focused on one (1) topic in each research call.

Research questions to be developed in consultation with the MI Steering Committee and advisory groups to ensure impact.

Topic determined annually.

Faculty in collaborative research teams bid on project deliverables in ways that ensure expected outcomes.
Potential Project Ideas

- De-carbonization of buildings—innovative affordable solutions towards zero-energy buildings.
- Energy capture and storage—advanced materials for energy applications, solar energy harvesting, etc.
- Advanced materials to enable integration of storage technologies in the electricity grid.
- Optimization tools for impactful management of natural resources and decision support.
- Pioneering and responsible governance of emergent/evolving sustainable energy technologies.
- ???
With success in online education in the green technologies diploma and the reduced credit cost, we can have some courses that are part of current curricula developed as online courses.

Can we reach out to professional community to provide accessible Energy Education?

Generate policy for Online Credit Transfer to regular master program credits.

Start blended master programs!

Allow the completion of 12 credits of course work in online mode out of the regular 30 credits.

Require a proctored comprehensive exam for each online course at AUB to be eligible for transfer.

If admitted as a regular student to the Master’s program, then the online courses can be counted, based on a set criteria, towards the degree requirements of the resident Master’s program.

Pilot blended program could be the Applied Energy Master of Program or MS Energy Studies.
Thank you