THE BRITISH UNIVERSITY IN EGYPT
Faculty of Engineering
Current and Future Energy-Related Research
Overview

• Egypt is rich in natural sources that qualify it to be one of the major renewable energy producers.

• Egypt is one of the Sun Belt countries endowed with high intensity of direct solar radiation ranging between 2000-3200 KWh per metre squared per annum.
Educational and Research Challenges

• Egypt aims to develop its technical, financial, social and human resources.
• There is a need to create educational and research programmes aiming at exploring technical issues.
• There is also a need to provide human resources capable of handling the new technologies, managing projects, and working in national and international enterprises which are expected to be moving into Egypt, the Middle East and North Africa MENA region.
BUE Vision

• The BUE as a research led, and aiming to be leading, institute is fully aware of the significance and inevitability of establishing research activities on energy related topics as soon as possible.

• The BUE has submitted a proposal to the Supreme Council of Universities SCU to establish an undergraduate degree on energy, or to include focus areas related to renewable energy and environmental impact in one of its approved degrees.
BUE Vision

• The BUE aims to establish a strong research base for energy and energy related topics. A proposal for establishing a research centre for sustainable energy has been prepared and is under discussion.
BUE Vision

• Topics of high priority locally, regionally, and internationally such as energy efficiency, environmental impact of energy, power plants performance improvement and maintenance, fuel cells, renewable energy, upgraded materials for present and new technologies, etc.
BUE Resources

• The BUE is equipped with a diversity of resources that qualify it to be a research leader in the field of energy. These resources include a number of well equipped laboratories in different areas of basic and applied sciences, Centre for Materials Research, distinguished human resources who are highly qualified and eager to work in research activities, and on top of that a clear vision of its mission and objectives to be a research led university.
Current Energy-Related Research Activities of BUE Staff

• Energy saving by developing new materials with higher thermal capacity, lighter weight, better corrosion resistance, and higher strength than conventional alloys.

• Increasing energy efficiency and reducing emissions of Diesel engines by using natural gas (Dual Fuel Engines).

• Basic research related to combustion properties of alternative fuels.

• Outdoor air quality in Industrial areas.
Current Energy-Related Research Activities of BUE Staff

- Environmental Impact Assessment (EIA) due to accidental release of gaseous and liquid fuels.
- Development of Enzyme entrapped liposome which has potency for application as a biocatalyst for bio-fuel cells.
- Exploring and assessing current state of solar thermal technology in Egypt and establishing partnership with industry leading to the involvement of academic staff in manufacturing and technological issues, and creating opportunities for students’ internships.
Current Energy-Related Research Activities of BUE Staff

• Research and industrial collaboration in the field of wind energy with focus on development of turbine blades.

• Preparing a research proposal aiming at providing the necessary know-how for adapting deep water pumps to be working by hybrid solar-wind energy.
BUE Proposed Research Directions in Energy

- Resources management (water, energy, materials, waste).
- Energy conservation in industrial and commercial buildings.
- Renewable energy (solar, wind, and hybrid).
BUE Proposed Research Directions in Energy

• Efficient Utilisation of Energy in Combustion Equipment.
• Environmental impact assessment due to energy generation and utilisation.
• Refrigeration and air conditioning.
• Energy materials: (generation, storage, improved performance, lighter weights, heat resistant, etc…)
BUE Future Directions

- Establishing a research centre for sustainable energy (some details are given below).
- Starting a major research project on renewable energy.
- Collaboration with Loughborough University in some energy-related research projects of mutual interest.
- Establishing a joint postgraduate degree with Loughborough University on conventional and renewable energy systems.
Proposed Energy Research Centre

• Vision: to excel as an applied sustainable energy research centre with regional and local reputation.

• Mission: to perform sound basic and applied research related to energy with a special focus on developing technologies for alternative and renewable sustainable energy sources as well as efficient use of the present ones while minimizing their environmental impact.
Proposed Energy Research Centre

- Objectives:
  - Performing fundamental and applied research of national and global interest.
  - Solving existing energy-related problems.
  - Identifying and developing potential future technologies.
  - Assessing environmental impact due to extraction, transportation, and utilization of different sources of energy.
  - Promoting and disseminating research results.
  - Contributing to the formulation of proper policies related to energy and environment.
  - Contributing to sustainable energy education.
  - Providing energy-related technical services to local industry.
  - Raising the public awareness towards sustainability
  - Establishing a network of international, regional, and local energy researchers who can collaborate on projects of mutual interest.
Proposed Energy Research Centre

In the first stage, fundamental and applied research will be focused in the areas of:

- renewable energy,
- efficient utilization of traditional energy sources,
- conservation of energy use in residential and commercial envelopes and industrial plants,
- energy-related materials, and
- environmental impact assessment of energy production, transportation, and utilization under normal and accidental conditions.
Opportunities for Collaboration with LU

• Setting priority goals for activities and research by the BUE proposed Energy Research Centre.
• Finding mutual areas of common interest with LU.
• Brainstorming and deciding on joint PhD research topics.
• Attracting and recruiting high quality candidates (among BUE TA staff) to carry on the planned research, based on scholarships.
• Developing the research points to wider team research projects.
• Seeking local and international beneficiary bodies and stakeholders who would benefit from these projects, and accordingly secure necessary financial resources.