SDG7: Affordable and Clean Energy

Modern society depends on reliable and affordable energy services to function smoothly and to develop equitably. This goal aims to “ensure access to affordable, reliable, sustainable and modern energy for all,”

7.1. Pharos university Plan to conserve energy

In Pharos University, and according to the records of the university administration, all external lighting posts at the university are lightened by the use solar panels. In addition to the replacement of high energy lamps by energy saving LED and Fluorescent lamps . The university also has the policy to disconnect all air conditions during the winter period (about 4 months) to conserve the annual energy consumption.

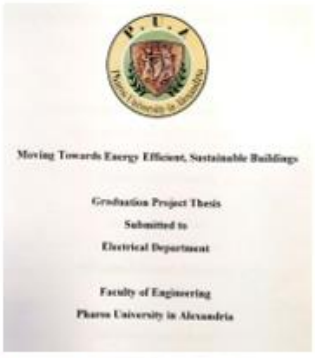
7.2. Graduation Projects

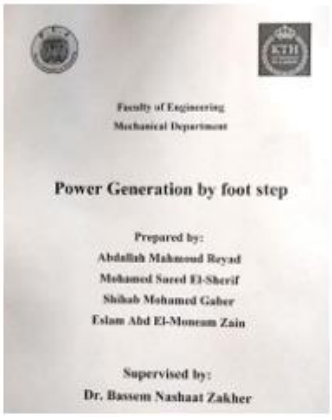
Renewable Energy is becoming increasingly important for Higher Education Institutions (HEIs) in tackling high carbon footprint. Identifying and contributing to solving problems related to energy is one of the concerns of Pharos University. The Faculty of Engineering conducted several graduation projects for the Academic year 2018 as follows:

- Design and optimization of network solar collectors for swimming pool heating application
- Design, Modeling and performance analysis of solar still
- Energy storage and waste heat management
- Renewable energy applications
-

7.3 Competition Among Engineering Students in “Towards Sustainable Tomorrow Competition”

The graduation projects of *Faculty of Engineering* organized the above competition for the departments of (Petrochemical, Architectural, Mechanical and Electrical Engineering). Eight projects were selected to compete in the competition of “Towards Sustainable Tomorrow” that was organized by the Faculty of Engineering in the coordination with **Birla Carbon Company**. The company presented three financial awards for the best three projects.
The two presented projects from Petrochemical Engineering Department came in the first place among eight graduation projects that were selected to participate in Birla Carbon Company competition. The first project, entitled “Production of Liquid Fuels from Waste





Polystyrene Foam and Molded Polystyrene", The second project was about "Production of Slow Release Urea Fertilizer" These two projects won a 17000 L.E award. The Electrical Engineering Department came in the second place for a project entitled "Moving Towards Energy, Efficient and Sustainable Building". and received a 12000 L.E award. See Figures
https://www.pua.edu.eg/petrochemical-engineering-department-won-the-first-place-in-towards-sustainable-tomorrow-competition/
https://www.pua.edu.eg/a-strong-competition-among-engineering-students-in-towards-sustainable-tomorrow-competition/

Another Competition was organized by the *Faculty of Engineering* For school students for Robots.

The "Egypt Open Robotics Competition in the Academic year 2018- 2019" was held on 8–9 September, 2019. This competition was held for the third consecutive year, which is considered, a doorway for the Arab Robotics and AI Association. This was held in joint coordination between Pharos University and the Arab Robotics and AI Association. About 163 teams consisted of 700 students from different governorates participated in this competition. The age group that participated in this competition started from 6 years old to the students of universities.

The competition consisted of 4 rounds: Sumo, Ball collector, Line Follower and Innovation competition.
The students of the faculty of Engineering- Pharos University participated in this competition by presenting two projects in the Free Innovation round.
https://www.pua.edu.eg/egypt-open-robotics-competition/

7.4. Cooperation in the field of Renewable Energy

The faculty of Engineering- Pharos University signed a cooperation protocol with the New and Renewable Energy Authority on Tuesday 6/11/2018 on the premises of the faculty. The New and Renewable Energy Authority (NREA) which is affiliated to the Ministry of Electricity and Renewable Energy On signing the protocol, This protocol aimed at exchanging experiences and information. between the two parties and providing the faculty's students and researchers with training programmes.
https://www.pua.edu.eg/the-faculty-of-engineering-pharos-university-signed-a-cooperation-protocol-with-the-new-and-renewable-energy-authority/

In the light of this cooperation, the Electrical Engineering Department of the Faculty of Engineering organized a field trip to the New and Renewable Energy Authority (NREA) on Sunday 16/12/2018 to develop the skills of its students and link the academic study to the requirements of the labour market. The students were acquainted with the NREA authorities and its relationship with the certification of electrical products. This visit was considered the first after the cooperation protocol signed between the NREA and Pharos University on the 6th of November 2018. During the visit, the two parties exchanged ideas about how to put the signed protocol into force and promote cooperation between the two institutions in many activities like providing training for PUA students and facilitating researches. The delegation was also apprised of the results of the tests conducted by the NREA laboratories. By the end of the visit, the two parties exchanged plaques in celebration of this cooperation.

https://www.pua.edu.eg/the-electrical-engineering-department-organized-a-field-trip-to-the-new-and-renewable-energy-authority-nrea/
https://www.pua.edu.eg/a-visit-to-the-new-and-renewable-energy-authority/

7.5. Conferences

The *Faculty of Engineering* in cooperation with the *Royal Institute of Technology (KTH), Stockholm, Sweden*
organized the "2nd International Conference on New Trends for Sustainable Energy (ICNTSE)" on 5-7 November 2018 .

The recommendations of the conference are as follows:

1. *Enacting laws and legislations related to renewable energy, protecting innovations in this field, and coordinating Arab laws and legislations in support of complementarity in the energy field.*
2. *Focus on applications of the use of new and renewable energies in universities and scientific research centers, with a focus on the topic of sustainability and sustainable development and its relationship to energy.*
3. *The need to consider replacing traditional energy sources in industrial establishments with alternative sources, especially agricultural, household and industrial biological wastes, taking into account compliance with environmental standards and international agreements related to pollution control and environmental protection.*
4. *Benefiting from the successful international experiences in the field of renewable energy, especially the experiences of Japan, India and Brazil.*
5. *Spreading awareness on the importance of sustainable development and new technologies in the field of energy and activating national efforts aimed at accelerating the entry into the era of new and renewable energy.*
6. *Prepare for the future for the use of hydrogen energy as the energy of the future that is less expensive, safer, clean and environmentally friendly.*
7. *Exempting the components of new and renewable energy industries from customs, especially batteries and spare parts.*
8. *Attention be given to rationalizing electric energy consumption, reducing power, and setting programs to develop awareness of the importance of energy and rationalizing its use at home and industry.*
9. *coordination between the Ministry of Electricity and Energy and the private sector that intends to invest in the private sector in terms of: type and capacity of new energy, quality of the outlet, impact on the network, and planning to increase the capacity of transmission lines in the network.*
10. *Speed up the completion of the network code for new and renewable energy.*
11. *Enhance applied research cooperation between universities and research and industry centers, and to emphasize on the outputs of real models of new and renewable energy systems.*
12. *Work on developing technical cadres necessary for the industry of new and renewable energy technologies of all kinds so that to support investment in this sector.*
13. *Proposing the Faculty of Engineering at Pharos University in Alexandria to be a center for launching awareness initiatives on developments, technologies, developing reports*

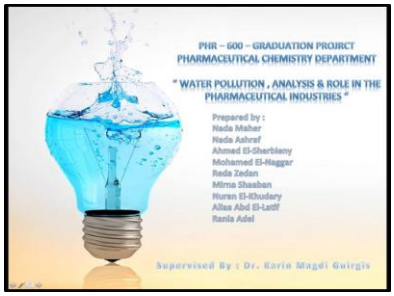
related to sustainability, and proposing to organize training courses and develop curricula in this field.

14. *Follow up these recommendations and ensure its continuation in the coming years.*
15. *Composing a forum consisting of Pharos University and Cairo University and the companies that participated*

https://www.pua.edu.eg/faculty-of-engineering/conferences/icntse-2018/

7.6. Awareness Activities

The Faculty of Pharmacy staff and students designed brochures to spread awareness about energy conservation in the university premises and in daily life. The brochures were printed and distributed to students and staff member. The following represent a sample of these brochures:



7.6. Research Publications

According to SCOPUS database , Pharos University published the following papers:

Power Allocation for Full-Duplex MISO Underlay Cognitive Radio Networks with Energy Harvesting

El-Malek, A.H.A., Aboulhassan, M.A., Abdou, M.A.
(2018) IEEE International Conference on Communications, 2018-May, art. no. 8422856, .
https://www.scopus.com/inward/record.uri?eid=2-s2.0-85051419417&doi=10.1109%2fICC.2018.8422856&partnerID=40&md5= DOI: 10.1109/ICC.2018.8422856

Full-energy peak efficiency of asymmetrical polyhedron germanium detector

Abbas, M.I., Yoseph, S., El-Khatib, A.M., Badawi, M.S., Gouda, M.M., Thabet, A.A.
(2018) Nuclear Technology and Radiation Protection, 33 (2), pp. 150-158. Cited 1 time.https://www.scopus.com/inward/record.uri?eid=2-s2.0-85053236508&doi=10.2298%2fNTRP1802150A&partnerID=40&md5=b2 DOI: 10.2298/NTRP1802150A