Sustainable Energy Engineering ‘SEE’

Ahmed Abouzaid, PROGRAM COORDINATOR

Sustainable

- Oxford English Dictionary:
  - *Keep going overtime or continuously*

Energy

- The strength and vitality required for sustained activity
- Power derived from physical or chemical resources to provide light and heat or to work machines
- The property of matter and radiation which is manifest as the capacity to perform work

Engineering

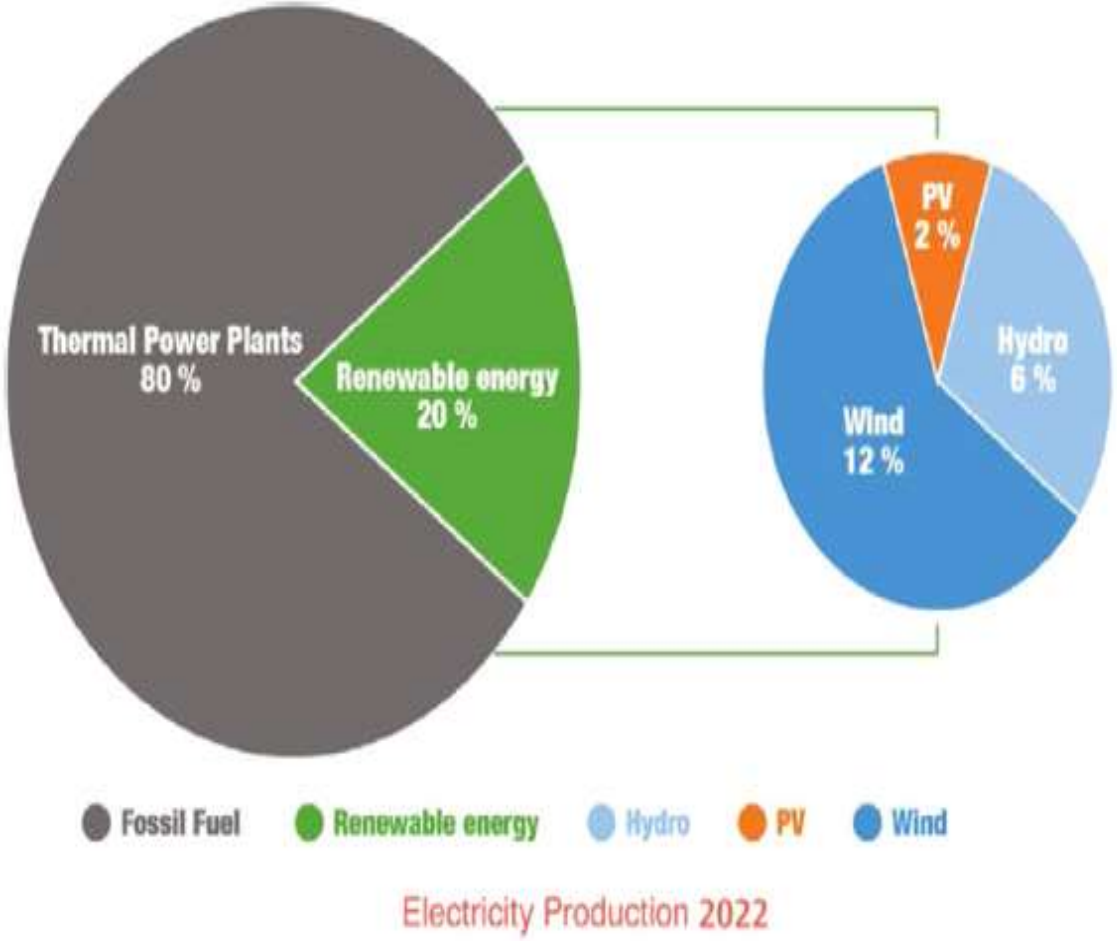
- The branch of science and technology concerned with the design, building, and use of engines, machines and structures.
- The practical application of scientific ideas and principles
- A field of study or activity concerned with modification or development in a particular area

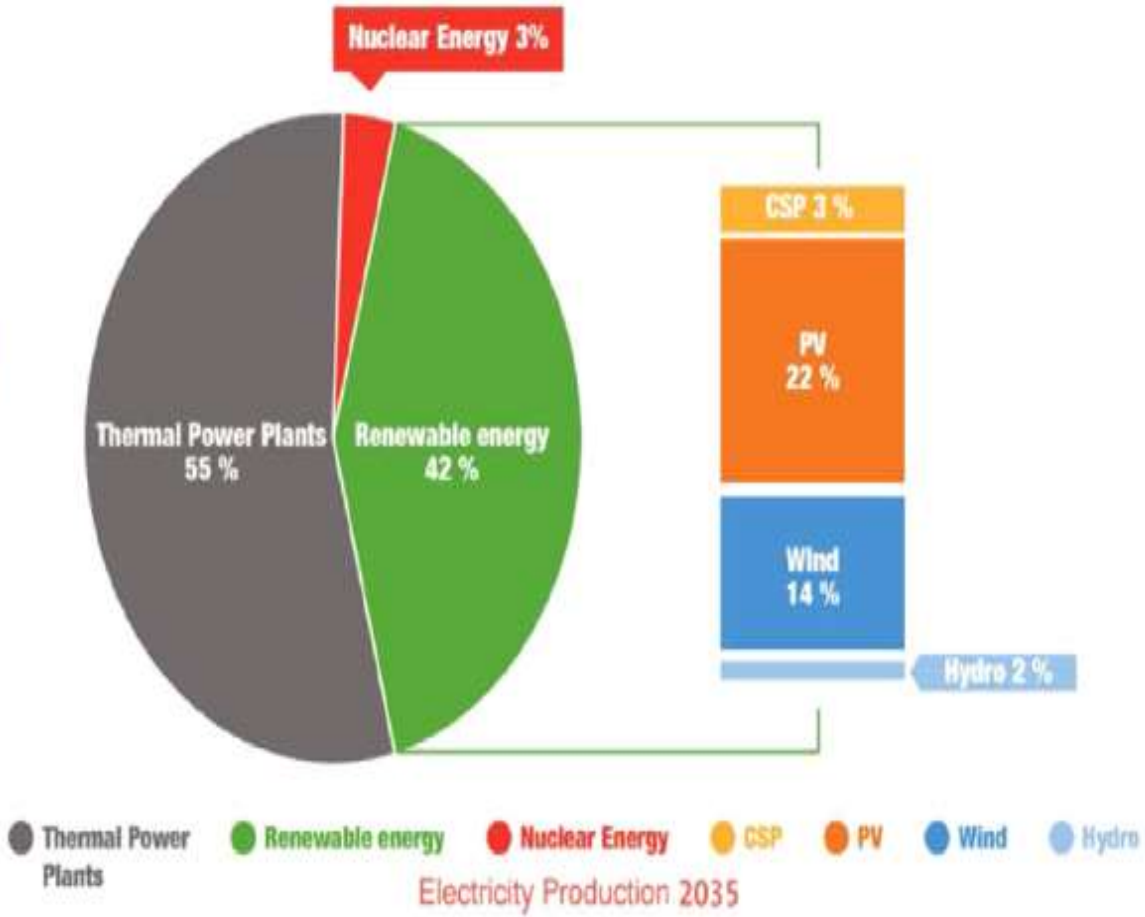
SUSTAINABLE ENERGY ENGINEERING

THE PRESENT PROBLEM

- Annual increase in population of 2-3 million inhabitants
- Improvement of living standards requires extra amounts of energy generation
- Political and geographical challenges for existing water resources required for humans, animals, and irrigating agriculture
- >95 % dependence on fossil fuels in our present 50 GW capacity which is depleting
- Co_2 emissions to the environment

Egypt Energy Mix





Why Sustainable Energy

- Pollution Problem
- Clean Energy
- Alternatives to Fossil Fuels
- Fresh water shortage
- Development from what we have
- Above 80 similar programs in the USA and Europe.

Importance of SEE

Vision 2030:

- Expansion in Total Energy Generation from 50 GW to 120 GW
- New and Renewable Energy Component to reach 35%
- Solar and wind energy to reach 42 GW

International Standards:

- Each new MW create between 5 to 15 job opportunities
- Assuming 1/3 of created job opportunities are for Energy Engineers there is a need of 140,000 Energy Engineers

Examples of Potential Job Opportunities for SEE Graduates

- Solar, wind, and hydel power energy equipment manufacturing companies.
- Solar, wind, hydel, etc, installation companies.
- Nuclear stations.
- Green buildings
- HVAC systems
- Automobile engineering
- Design engineer, in the designing side of the equipment and machinery.

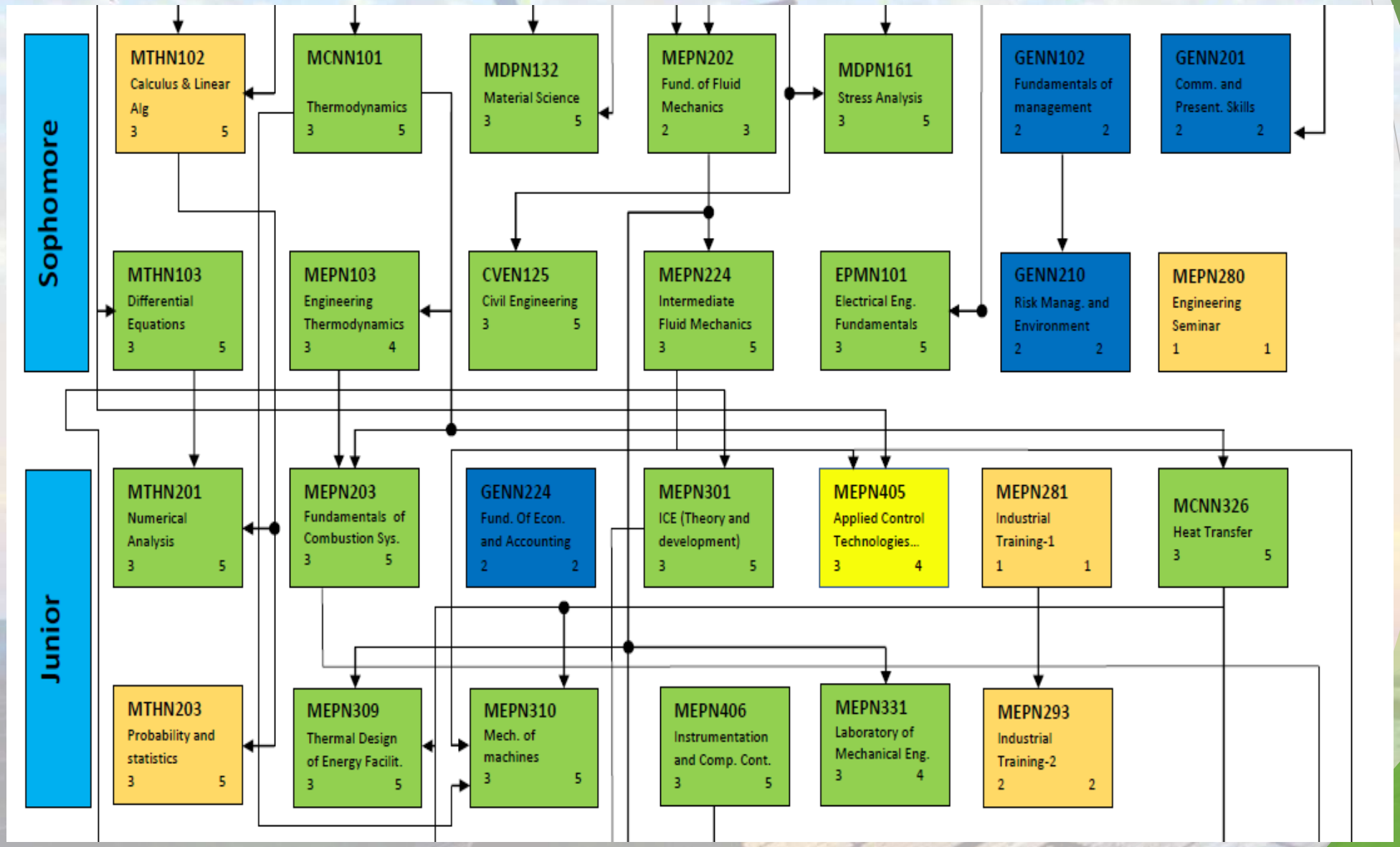
Examples of Potential Job Opportunities for SEE Graduates

- Energy Audit and Energy Management
- Air and water quality control
- Power stations and petrochemical plants.
- Establishments concerned with cars, ships, energy generation or aerospace and refrigeration and air conditioning.
- Safety and environmental concerns.
- Energy Service Companies

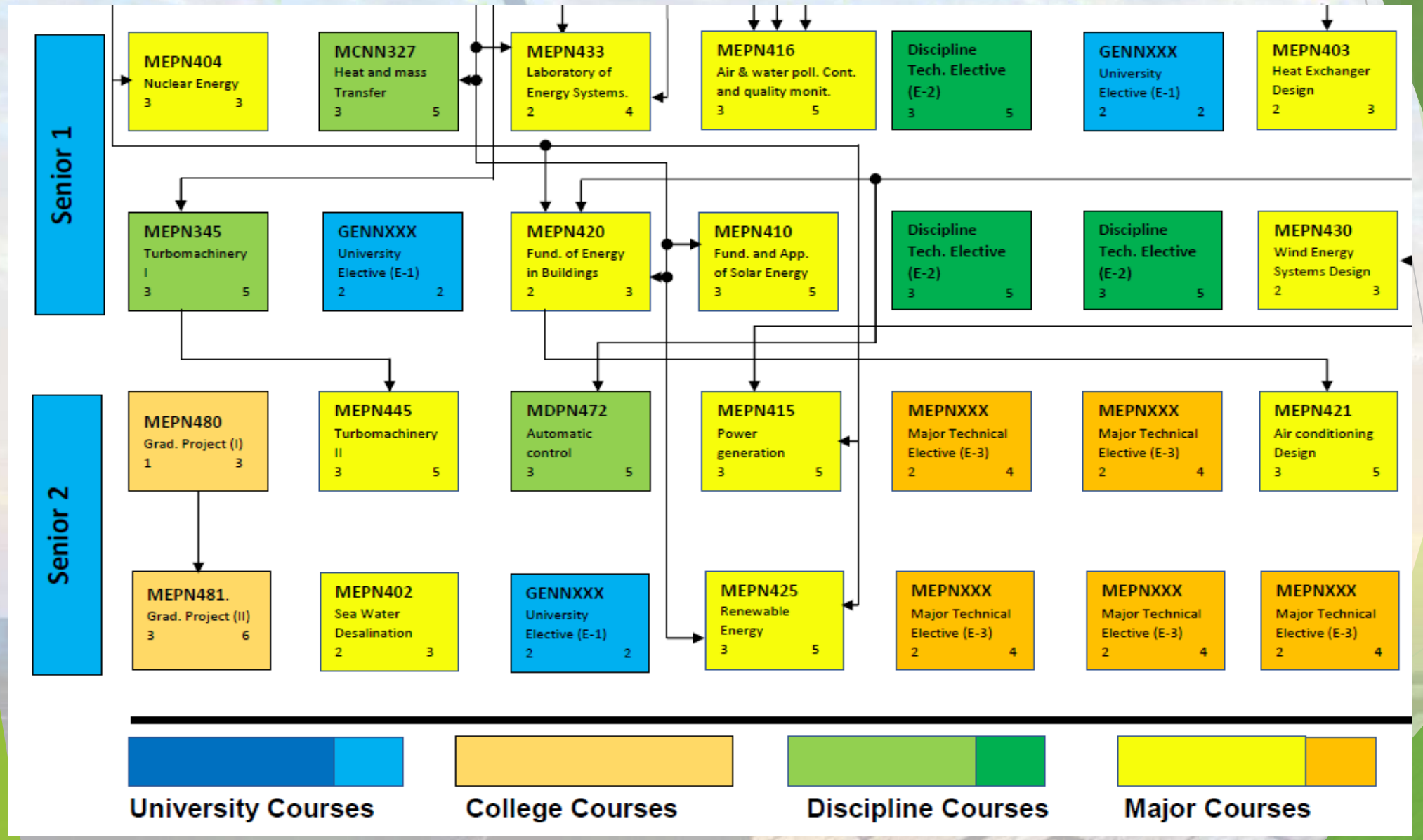
Overview of the courses offered

Category	Freshman	Sophomore	Junior	Senior-1	Senior-2	Total Credits	%
Humanities and Social Sciences	3	2	6	0	2	13	7.6
Basic Sciences	22	9	4	2	0	37	21.7
Engineering Sciences	5	18	16	20	0	59	34.7
Computer and Computer Applications	3	2	4	5	3	17	10.0
Applied Engineering Sciences	0	0	0	6	23	29	17.1
Project and Practice	0	4	4	3	4	15	8.9
Total	33	35	34	36	32	170	100
University Requirements	5	4	8	2	0	19	11.2
College Requirements	28	9	4	0	4	45	26.5
Discipline Requirements	0	22	22	28	0	72	42.3
Major Requirements	0	0	14	6	28	34	20.0
Total	33	35	34	36	32	170	100

Course Map – Sustainable Energy Engineering (SEE)



Course Map – Sustainable Energy Engineering (SEE)



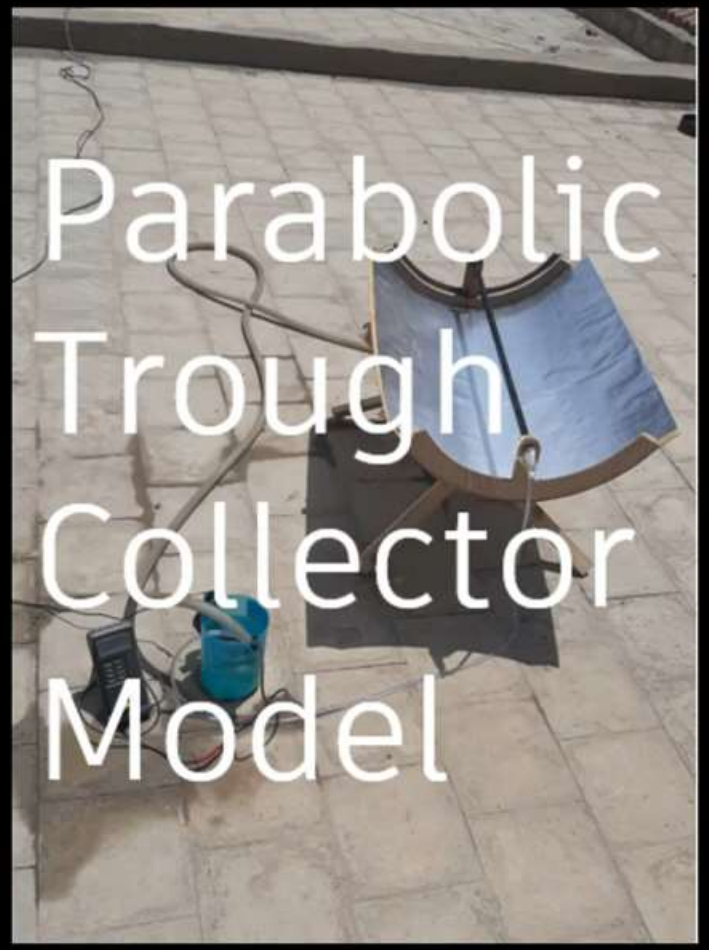
Available Infrastructure and laboratory facilities and additional needs and requirements

- Flat plate solar water heater simulator with a USB connection to PC.
- Parabolic trough solar thermal concentrator (with PV tracking) connected to water heat exchanger and controlled by PC.
- Permanent magnet 1500 Watt wind turbine installed on the building roof and connected to control box and battery at the Laboratory.
- Wind turbine test bench including 500 W wind turbine and air blowers with inverter, measurement, battery and control modules.
- PV/fuel cell/electrolyser unit for measuring characteristics and system efficiency.
- PV module with solar simulator and PV panels of different types

Available Infrastructure and laboratory facilities and additional needs and requirements

- Heat transfer bench for measurement of conduction, convection and thermal radiation on flat plates and cylindrical shells.
- Meteorological stations for solar and wind resources assessment.
- Biodiesel fuel production unit from used vegetable oils.
- Parabolic Trough Concentrator Prototype Loop.
- Evacuated Tube Solar Water Heater with Heat Pipe
- Heat Exchanger Laboratory


Windy


Parabolic
Trough
Collector
Model

Industrial Training


Chevron
Chevron Egypt Lubricants S.A.E
شيفرون مصر للزيوت ش.م.م


2022
2022

Imagine a world where energy is completely free. This is the promise that green technology brings. The world is in a state of flux, and the need to transition to sustainable and green technologies is becoming more and more pressing. For our world to sustain and reduce its dependency on fossil fuels, we must harness green technologies and sustainable energy.

For More Information about SEE Program

Contact me:

Dr. Ahmed Abouzaid

Building # 19 - 2nd floor

Email: a_abouzaid2007@yahoo.com

Best Wishes