



## Energy-Efficient Renovation and Building – Sekem Medical Center



Sekem Medical Center has a clear policy to ensure that all new buildings and renovation projects comply with international energy efficiency and sustainability standards. The center's design integrates a Concentrated Solar Power (CSP) system based on Linear Fresnel Reflector (LFR) technology, which provides both electrical and thermal energy for hospital operations.



The CSP plant includes a solar field with an aperture area of 296 m<sup>2</sup> and a peak thermal power output of 120 kW. A heat transfer fluid (Therminol-66) circulates through the collectors, reaching outlet temperatures of approximately 160 °C. This thermal energy drives an Organic Rankine Cycle (ORC) unit that produces 4–8 kW of electrical output while simultaneously generating 83–95 kW of thermal energy. The thermal output feeds an absorption chiller (35 kW cooling capacity) to provide air conditioning for the hospital at an outlet temperature of 12.5 °C, efficiently converting solar heat into cooling energy without the need for conventional electrically driven compressors.

In addition, a 5-kW rooftop photovoltaic (PV) array coupled with a 28-kWh battery storage system supports the facility's electrical loads during the night, enhancing energy resilience and minimizing dependence on external energy sources. All lighting across the facility uses high-efficiency LED technology, significantly reducing electricity consumption and contributing to overall building efficiency.



### **Applicable Standards and Frameworks**

- ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings (energy performance and lighting efficiency).
- ASHRAE 170 – Ventilation of Health Care Facilities (indoor air quality and ventilation).
- ISO 50001 – Energy Management System (monitoring and continuous improvement of energy performance).
- Egyptian Energy Efficiency Building Code (EEBC) – National standard for sustainable building design.
- Alignment with LEED for Healthcare v4.1 sustainability framework (renewable integration, optimized energy use, and indoor environmental quality).

Through these integrated technologies and adherence to international and national standards, Sekem Medical Center demonstrates a strong institutional policy and commitment to energy-efficient, renewable-based building design and sustainable hospital operation.