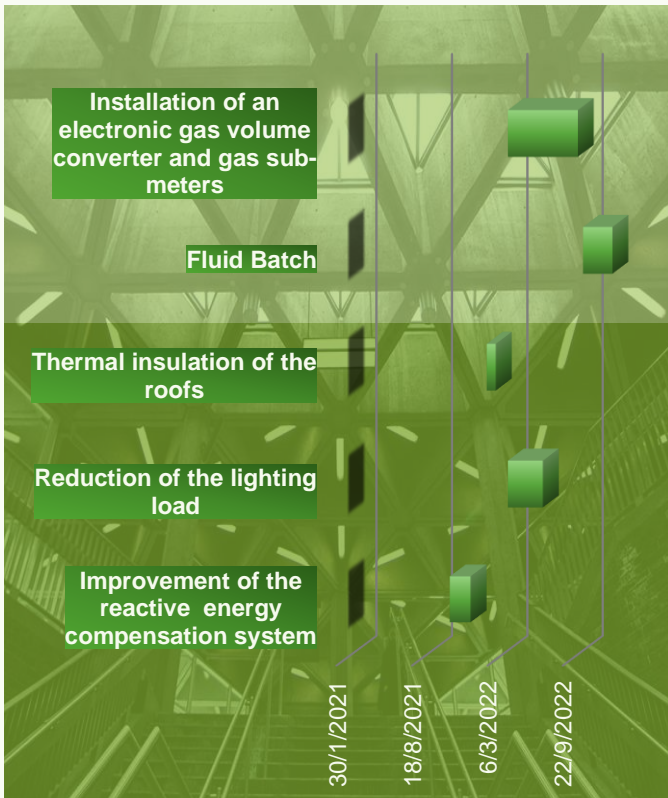
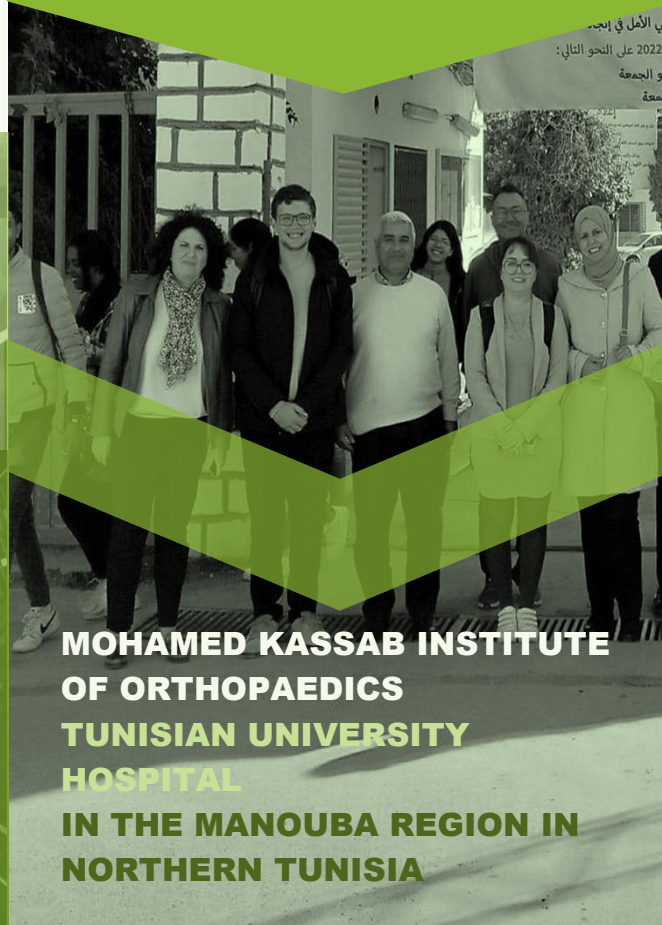


ENERGY RENOVATION PROJECT IN TUNISIA

Mohamed Kassab Institute of Orthopaedics is a Tunisian university hospital located in the Manouba region in northern Tunisia and covers an area of approximately 10 hectares, of which 14151 m² is built. The actions in Mohamed Kassab Institute of Orthopaedics is one of the 3 cost-effective public buildings energy refurbishment based on renewable energy sources and energy efficiency which were implemented through the GreenBuilding project.



“This is where
the energy
renovation
took place in
Tunisia”



ACTION LIST

- *Optimization of the emergency service subscribed power*

The request of the subscribed power reduction was officially sent to the Tunisian Company of Electricity and Gas (STEG) on December 23, 2021. This action consists on reducing the subscribed power to 315 KVA instead of the actual power of 630 KVA!

- *Improvement of the reactive energy compensation system*

The reactive energy is an unproductive but necessary energy that must be carefully controlled. With an investment cost of about 4500 euros, this action will improve the power factor $\cos(\phi)$ to reach 0.99 and will avoid reactive energy penalties of about 3000 euros per year. The capacitor bank was successfully installed on December 19, 2021.



THE BUILDING IS LESS ENERGY-CONSUMING AND OF COURSE MORE GREEN!

- *Reduction of the lighting load*

2411 tubes and spotlights were installed, achieving an efficiency of 120 lm/w.

LAMPS	NUMBER
Tube LED 18 Watts	1299
Tube LED 9 Watts	1061
Spot LED 6 Watts	13
Lampe LED 30 Watts	55
Lampe LED 80 Watts	15

- *Thermal insulation of the roofs*

On 3/2/22, the Management Company of Borj Cedria Techno Park signed the contract of thermal insulation of the roofs for a total insulated area of about 1230 m².



LAST ACTIONS

- *Installation of an electronic gas volume converter and gas sub-meters*

The provisional acceptance of the work was completed on September 30, 2022. In total, six sub-meters for gas division were installed in different place in the building.



- *Fluid Batch*

Installation and commissioning of 8 solar water heaters, management of hot water distribution, enhancing boiler energy efficiency, prevention through water treatment and reduction of thermal losses in pipes”

- *Implementation of an energy management system*

The tasks mainly included: Supply and installation of 34 smart electric meters; Supply and installation of a set of input converters, centralizers, a server, installation of a set of WiFi sensors, software.