Project: Modernisation and Upgrade of the buildings of Goulandri Museum of Natural History

Country: Greece

Location: Kifissia, Athens

Duration: 08/04/2021 – ongoing

The **overall goal** of the project is the **energy renovation** of the Goulandris Natural History Museum, which includes two connected buildings:

- the Natural History Museum (~1,940 sq. m) and
- the Centre for Environmental Research and Education "GAIA" (~5,050 sq. m),

through energy efficiency and RES interventions, as presented below:

- roof/shell insulation
- replacement of heating, cooling and air conditioning system
- replacement of lighting systems
- Installation of a new Building energy Management System (BEMS)
- Installation of electric vehicle chargers
- Installation of RES systems (PV, solar and geothermal system)

The project is funded by the Operational Program **"Transport Infrastructure, Environment and Sustainable Development"**, under the Greece-EU programme for development **"National Strategic Reference Framework (NSRF) 2014-2020"**, with a total budget of 1.885.574,00 €.
In this context, the main objective of this assignment is to provide Technical Assistance (TA) to the Goulandris Natural History Museum for the above interventions, through the implementation of specific services.

The project will improve the sustainability and thermal conditions (heating and cooling) of buildings, where daily visits of citizens take place. Over time, there will also be significant cost savings and significant environmental benefits, such as reducing CO_2 emissions.

Photovoltaic panels in the southeast view of "GAIA" building (Photorealistic picture)

Photovoltaic panels in the southwest view of "GAIA" building (Photorealistic picture)

The following table presents key benchmarks in energy consumption and CO_2 reduction after energy renovation of the two buildings according to the Energy Performance Certificate (EPC), in line with the Greek Buildings' Energy-Efficiency Regulation requirements (KENAK):

EPC Results	Unit	Natural History Museum	Building "GAIA"
Total area	m^2	1940	5050
Total primary energy consumption - BEFORE renovation	kWh/m^2	316.8	285.7
Energy Category - Class (EPC) – BEFORE renovation	-	D	C
Annual CO_2 emissions (calculated)	kg/m^2	107.6	96.4
Annual primary energy savings - AFTER renovation	kWh/m^2	205	253.1
Energy savings	%	64.7	88.6
Energy Category (EPC) - AFTER renovation		B+	A+
Annual reduction of CO_2 emissions	kg/m^2	70	87.9

As part of this project, LDK provides the following consulting services:

- Issue of the **Energy Performance Certificate** for the two buildings in the current condition (before the energy renovation)
- Presentation of **general requirements** to be taken into account during the implementation phase of the project (presentation of the legislative framework, CE certification issues, ISO etc.)
- Analysis of the **technical parameters and characteristics** which represent each energy intervention in order to achieve the optimal performance of energy indicators.
- Preparation and analysis of **key energy performance indicators (EnPIs)** for the monitoring of energy consumption, as well as thermal comfort conditions. Indicators will be based on the new BMS system measurements.
- Progress reporting and communications with the program's committee / Subprojects modifications/progress checking requests / Monitoring and overall technical consulting for the effective implementation of the investment project
- Project supervision for verifying the proper implementation of subprojects by the subcontractors; compliance with required licenses and security protocols
- Technical supervision and quality control of the EE & RES subprojects' implementation