

PV Energy Community Case Study:

Iveron Monastery

Halkidiki, Greece

The Iveron Monastery is located by the sea, on the northeast side of the third peninsula of Halkidiki, Greece.

The Iveron Monastery was built at the end of the 10th century with the largest part of the isles having been rebuilt during the 19th century.

Iveron has around 100 people living within the main building structure and nearby shelters at any one time. It features wood, stone and marble processing facilities, various farming activities, a restaurant and a museum so is considered as a typical example of a small autonomous energy community.

The Monastery does not have a connection to a central electric transmission/distribution grid therefore lightning and electrical appliances are powered by stand alone diesel generators. The average daily electrical consumption of the Monastery is around 1000 kWh, serviced by one diesel generator of 250kW.

Heat is provided by biomass burners via the central heating system in the main building structure and with biomass stoves, fan coils and electric heaters in other shelters. The evening electrical consumption is approximately 500 kWh and it is served by a second smaller diesel generator of 100kW. A ground mounted PV system of 83kWp was integrated into the existing diesel system, forming an Autonomous Hybrid PV E.CO.

Due to the historic and archaeological importance of Iveron Monastery, the installation of PV modules was not allowed either on the roof or in places visible from the Monastery. Therefore, the PV system was installed in a clearing near the Monastery and the energy generated is transferred via a Medium Voltage (MV) line.



Google earth view of Iveron PV E.CO

A PV system controller ensures that the maximum PV yield is generated during any given time. It also monitors the diesel generator to ensure that it is always operating at an optimum level to prolong its service life and ensure a responsive adjustment over the PV output.

As a result, load fluctuations are compensated immediately, and the oil consumption of the diesel generator has been considerably reduced. In cases where there may be an excess of PV energy produced, the controller adjusts the MPPT operation of each inverter reducing the produced PV energy. In order to minimize the initial cost of the PV system, energy storage systems and battery inverters have not been installed.

Iveron PV E.CO constitutes a real-world example of the kind of electrical service that is currently provided in non-interconnected areas and, more generally, in weak electrical grid areas.