

DecarbEurope – Ibiscos Garden Hotel

The road to becoming a Nearly Zero Energy Hotel

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Ibiscos Garden Hotel:



- Where?
 - Company: Ibiscos Garden Hotel
 - Location: Rethymno
 - Region: Crete
 - Country: Greece
- What?
 - Since 2015, the Renewable and Sustainable Energy Systems Lab of the Technical University of Crete (ReSEL-TUC), through various European projects, has supported the Ibiscos Garden Hotel in assessing its energy profile and the impact of applying energy efficiency and renewable energy measures through Energy Performance Contracting. Many of the measures analysed were implemented, and the Hotel's long-term goal is to become a nearly Zero Energy building.
- Benefits?
 - = Energy savings adding up to 195 MWh/ year
 - 170 tCO₂eq/ year emissions reduction
 - Annual monetary savings of EUR 21,200.

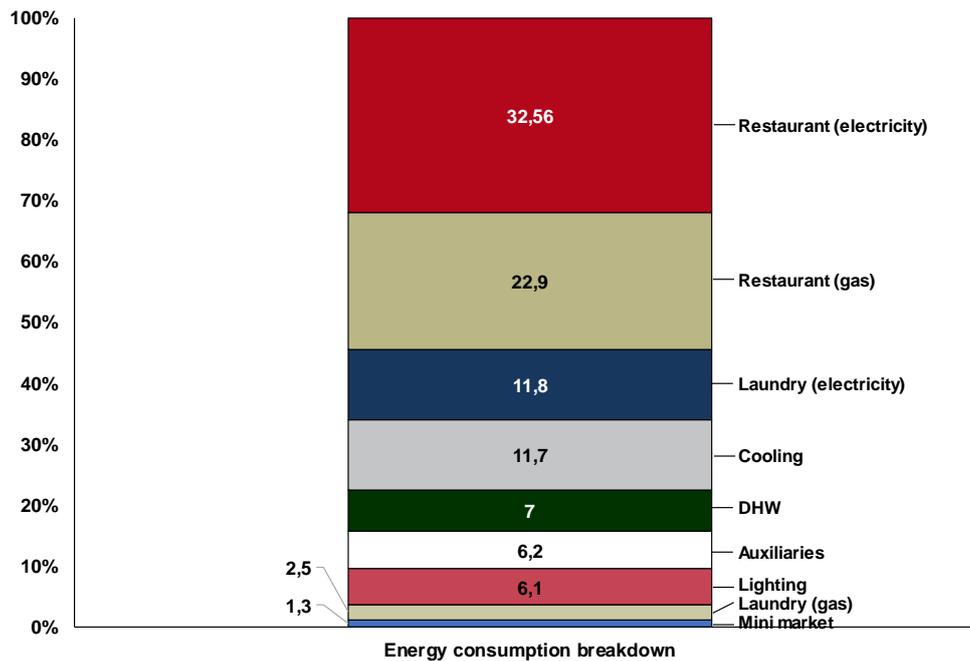
What makes this site special?

The Ibiscos Garden Hotel is a family business that opened in 1991. The hotel is located in the highly touristic town of Rethymno in the Greek island of Crete, barely 200m from the town's main sandy beach. It also holds a privileged spot in the centre of Rethymno, with easy access to the town's most important historical sites.

With 4,500 m², this medium-sized hotel operates seasonally from May to October, with an accommodation capacity of over 300 beds. Annually, it receives around 6,500 visitors, who are able to enjoy the many services offered, which include a restaurant and bar, three swimming pools, a mini market, and a playground.

Because of the high transit experienced throughout the summer months, annual final energy consumption amounted to 517 MWh before new measures were implemented. The main energy sources used are LPG and electricity, with an average distribution of 32% and 68% respectively. The illustration below depicts the Hotel's energy balance breakdown:

Illustration 1: Ibiscos Garden Hotel energy balance breakdown



Source: ReSEL-TUC analysis

“Becoming a nearly Zero Energy Hotel is a strong step towards sustainability; to be able to grow with nearly zero, or even zero emissions, is necessary for us and for our guests” Tassos Papadourakis, Hotel Owner

The many amenities offered by hotels make annual energy costs and consumption rank among the top five in energy consumption in the tertiary building sector. Because of this, the sector presents a large potential for savings, which has made energy management and the implementation of energy efficiency measures an essential part of the industry.

At Ibiscos Garden Hotel, the potential for energy savings was identified and with the help of ReSEL-TUC (the Renewable and Sustainable Energy Systems Laboratory of the Technical University of Crete) an assessment was carried out, through which different measures were proposed to drastically reduce the hotel’s energy consumption. The efforts focused not only on reducing electricity use, but also on increasing the share of renewable energy in the facilities, by installing a 50-kW photovoltaic plant through net-metering, which saves energy costs by almost 20%.

Ceiling fans were installed to reduce cooling loads, resulting in yearly cost savings of 7%. High consumption in kitchen and laundry was tackled with the substitution of energy-inefficient appliances such as ovens, stoves, chillers and freezers, which led to an energy consumption reduction of almost 80 MWh/year. Additional measures included the substitution of conventional lamps with LED lights, leading to savings of 7.2 MWh/year, as well as building automation in the form of occupancy sensors in corridors and bathrooms.

Regarding cooling loads, the installation of over 320 exhale ceiling fans generated energy savings of 32MWh/ year. The use of ceiling fans minimizes the operation of A/C units, given also the microclimate surrounding the hotel buildings (gardens, pool, water fountains, plantations in balconies, etc.) and its favourable orientation for natural ventilation. The fans can also operate in conjunction

with the air conditioning units, achieving the same thermal comfort with less energy consumption. The fans reduce cooling loads by reducing indoor ambient air temperature by 1 °C. Practically, the ceiling fans can completely replace A/C during nights and mornings and limit the use of A/C to midday, resulting in high energy savings.

The total investment of EUR 104,000, results in 195 MWh/ year energy savings for the Ibiscos Garden Hotel. This translated into annual monetary savings of EUR 21,200 with an expected payback period of five years. Most importantly, the measures implemented have led to an emissions reduction of 170 tCO₂eq/year.

The breakdown of the investment and energy and emissions savings for each of the measures are reflected on the table below:

Table 1: Investment and savings breakdown by measure

	Investment (EUR)	Cost savings (EUR/ year)	Energy savings (MWh/ year)
Ceiling fans	25,000	4,480	32
PV plant	57,500	10,500	75
Kitchen	9,883	2,859	63.5
Laundry	9,249	2,255	16.2
Lighting	863	1,009	7.2
Building automation	1,100	115	0.819

The measures were financed via local EPC providers many of which are SMEs operating the fields of energy efficiency and renewable energy. Some of the “low-cost” measures, such as the LED replacements, were paid directly by the hotel, as payback time was short. The hotel has also applied for a public grant; hence it is expected that part of the investment will be recovered through that, in the long-term.

Aiming to set precedent in the sector, ReSEL-TUC established a strong working relationship with the hotel owner, which was helpful in overcoming the challenges faced

For ReSEL-TUC, whose main objective is to turn research and scientific knowledge to mature energy solutions and practices that are economically and technically sound, the main driver of the project was to shed a light on the benefits of nearly Zero Energy Hotels in Greece, specifically in islands. As they are major tourism destinations, hotels in the area are put under heavy environmental strain during the summer season. The energy renovation of hotels offers a viable path to the sustainable development of Mediterranean islands, by reducing the carbon footprint of the tourism sector and upgrading the accommodation services offered. This not only falls in line with the EU energy efficiency goals but also gives a solution for the new business challenges that come hand-in-hand with the trend towards sustainable tourism.

This is a typical hotel in its category and climate zone, therefore the solutions applied are highly replicable by other similar hotels in the area. As reflected by the results obtained at the Ibiscos Garden Hotel, the strong engagement of the hotel owner and staff in environmental sustainability, in combination with technical assistance provided by ReSEL-TUC, formed the best conditions for a successful project, that can inspire and trigger replications by other Mediterranean hotels.

Overcoming the challenges faced

The first challenge the project faced arose when the lack of sub-metering in different hotel buildings (and/or areas) was noticed, which created uncertainties in the energy balance (during the energy audit) and subsequently in the savings that could be achieved by the measures proposed. This was addressed by ReSEL-TUC, using detailed inventory of mechanical equipment and calculations of their energy consumption, measurements with specialized instruments (e.g. thermal camera) and simulations. In addition, it was recommended to install sub-meters in the hotel, to optimize the monitoring of energy consumption and savings in the future.

Lastly, finding appropriate financing was a challenge, as it was a large investment for an SME, however, this was addressed by seeking financing through EPC as well as applying for public grants.

Successes

The main success of the project came from being able to demonstrate a case of feasible hotel renovation towards nearly Zero Energy standards in Greece. The case was disseminated widely at national, EU and international levels, including COP21, Fitur and the European Parliament. The hotel also received a Silver Award in Tourism Awards 2016 for Environmental protection.