Category: Sustainable Hotel

Case Study: Regina Dell' Acqua Resort

Project cofinanced by
European Regional Development Fund

Lead Partner
Provincia di Savona

SOORE
Sustainable Construction in Rural and Fragile Areas for Energy efficiency

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The village of Skala in the map of Kefalonia

The hotel "Regina Dell' Acqua Resort" in Skala

General Information

Situated in Skala ,in the south-east side of Kefalonia, Regina Dell' Acqua Resort is a five star hotel constructed according to the rules of sustainable building. The reconstruction process was completed in 2009 in a plot of 8 acres and its total area is 1,800 square meters. The main goal of Mr. Stavros P. Travlos, the civil Engineer of the building, was to create a resort where luxury would meet the techniques of bioclimatic building, without reducing the quality of the service offered.

Presentation

The orientation of the building is south-east. As a result, it benefits from natural sunlight during morning hours and has shade in the evening, when the sun sets. This fact decreases the need for lighting during the day and the energy consumption, reducing operating costs and environmental impact. The large number and size of the windows allow even more sunlight in the interior of the hotel.

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Large windows allow sunlight enter the hotel facilities during the day

Due to the high temperatures occurring in the summer, the constructor has used energy friendly panes and frames that do not allow the temperature to rise in the interior of the hotel when the sunlight enters during the day. Moreover, thanks to the above mentioned eco-friendly products, they achieve a significant reduction in the losses of cool air when the air-conditioning systems operate. As a result, the temperature is more or less stable in the building offering a pleasant environment to the tourists and the employees.

Apart from the panes and the frames that protect the indoor temperature, the walls are insulated by using appropriate materials that improve the energy efficiency of the building and decrease the rate of heat transfer from the interior towards the exterior and vice versa. Additional advantages of this technique is money saving, seismic protection and soundproofing thanks to the strengthening of the building's envelop.

During the design and the construction of the building, one of the priorities was to use local materials, wherever it was possible, in order to stimulate the local market and preserve the insular characteristics. For this reason, on the front side of the building there is a large surface covered with local rocks, stone walls, trees and plants, which improve the image of the building and reduce the ambient temperature by 2° C.

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The front planted side of the hotel

The planting in the exterior area of the hotel is highly protective in the summer because the plants absorb and consume solar energy for the process of photosynthesis, decreasing the ambient temperature. In addition, trees and plants offer a really effective natural insulation from heat in summer and cold in winter.

An important factor that was taken into consideration when designing this hotel was adequate ventilation. For this reason, openings were designed in the roof of the building. More specifically, an essential condition to keep the interior of a building cool in summer is the ventilation during the night that conveys the warm air of the day to the exterior and allows the cool air of the night to enter the building and decrease the temperature of the walls and the ambient in general. For this reason, there are openings and windows in the higher part of the hotel which help air circulate in a more efficient way. Moreover, these openings remove warmer air from the building and raise and distribute cooler air from the lower floors to the ones that are higher and contribute to the cooling of the walls. Better air circulation is also easier thanks to the position of the hotel that enables the air to enter the building.

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The large windows and sun shades of the hotel

The main energy source of the hotel is natural gas, a conventional fuel, which has an increased rate of efficiency that in well-maintained plants can reach 94%. As a result, savings are achieved during the production of thermal energy and fewer emissions in the environment as for the same amount of heat produced, natural gas emits 30% less carbon dioxide than burning oil and 45% less carbon dioxide than burning coal. This source of energy is used for cooking and heating, achieving significant scale economies and maximum functionality. Apart from the environmental protection, natural gas is also cheaper than oil, thus the final operational cost is reduced.

Regarding water heating, solar water heating systems were installed on the roof of the building that collect the free and inexhaustible power from the sun in order to warm a liquid that moves through pipes connected to the panels. The major advantage of this application is the use of a renewable energy source, which does not affect the environment and reduce dramatically the cost. Although the installation of a solar water heating system is more expensive than that of a conventional one, those using solar power can achieve savings on their electric bill by 50 to 80%.

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The hotel is situated near the sea but in a higher level, allowing better air circulation

Evaluation

Regarding the energy efficient hotel in Skala, it constitutes a paradigm of a well-behaving building as far as energy consumption is concerned. It is a new-built luxurious hotel that has turned into action some of the basic requirements of sustainable building.

Since the hotel trade has gone through a serious evolution and expansion over the recent decades and tourism could be considered as the most important industry for Greece, it is crucial to present good practices like this one, with the hope that it will encourage other entrepreneurs to make some steps towards more ecological hotels.

Due to its large spaces there is a great need for air conditioning, especially during summer when the weather in Greece is rather hot, fact that the constructors tried to confront by creating large windows and roof openings. An additional use of this technique is the exploitation of natural light, in order to avoid energy consumption for this reason. Moreover, the constructors have taken into consideration the advantages of south-east orientation, so as to enjoy sunlight as much as possible.

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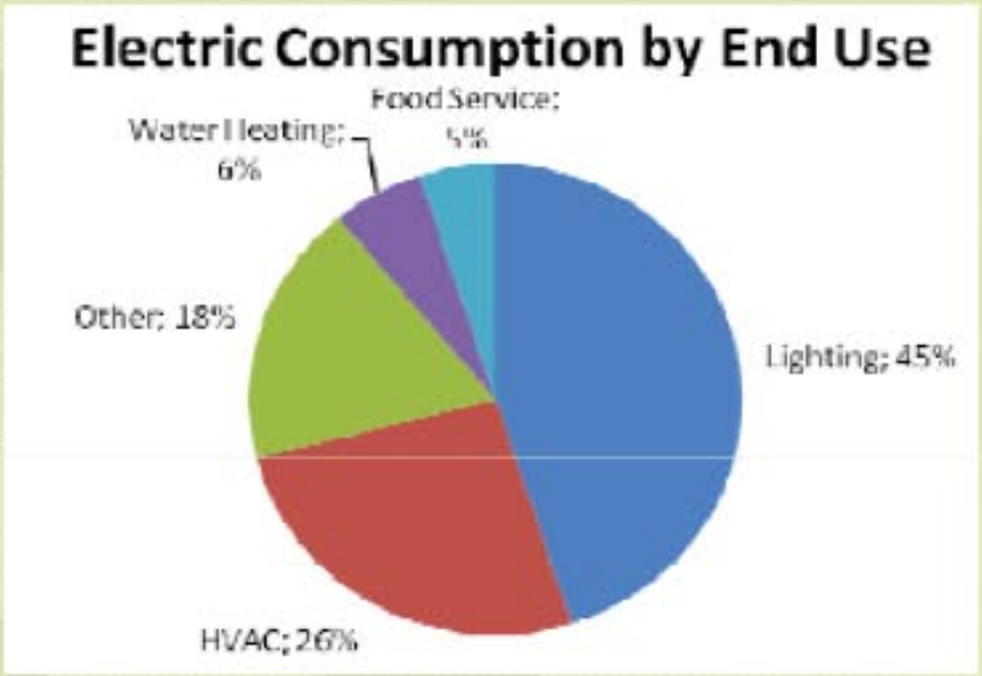

Electric Consumption by End Use in Hotels

Source: National Action Plan for energy efficiency – US EPA)

Wall insulation and energy friendly panes and frames enhance the energy efficiency of the building and reduce energy consumption for cooling and heating drastically.

Undoubtedly, rational use of energy for air conditioning and lighting plays a very important role in saving energy, because these measures alone are insufficient to make a difference. Continuous and adequate training of the hotel's personnel is a way of raising their awareness and informing them regarding energy saving measures, which are not only protecting the environment but also reduce the operating cost.

The use of natural gas and the installation of solar water heater released to a large extent the hotel from the conventional electricity. The continuing increases of energy costs have forced a great number of hotels to take energy efficiency into account, without reducing the comfort level and aesthetics that are vital for the hotel business and especially for luxury hotels.

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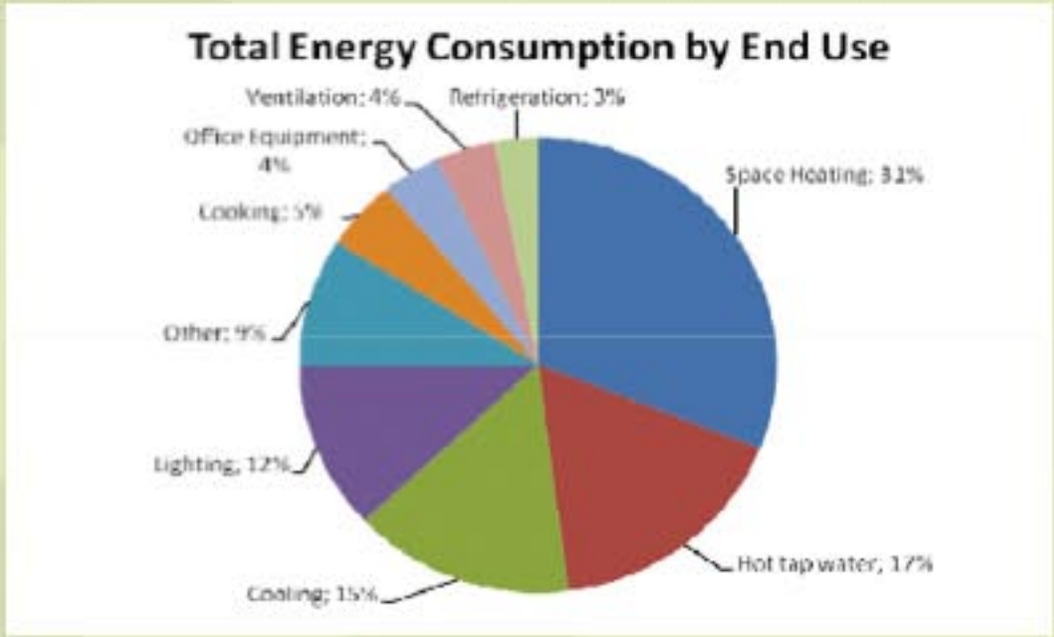

Typical Total Energy Consumption by End Use in Hotels

Source: National Action Plan for energy efficiency – US EPA)

Finally, the construction of artificial rocks using local materials and the planting contribute to the beautification of the surroundings and the slight decrease in temperature. As a result, the accommodation during the period of summer when the temperatures are high in Greece becomes more pleasant, fact that is also reinforced by the sea that is close to the hotel.

In general, it is evident that the designers and the constructors of Regina dell' Acqua Resort Hotel have respected the location, the climate changes and the environment as a whole while constructing the building. They tried to apply several requirements of sustainable architecture and building in order to achieve energy efficiency and in the same time money saving.

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The artificial rocks on the front side of the hotel

Potential for transferability

The sector of hotel business constitutes one of the major representatives of the tourism industry. Therefore, it has to adapt to new market conditions and to the requirements of sustainable growth. In Kefalonia there are several hotels and rooms for accommodation, which could be inspired by these efforts. The demonstration of the good examples could be a solution, as well as the creation of networks for exchanging experiences regarding energy efficient building and operation.

To improve the energy efficiency of a building, there are three categories of interventions:

- Extended reconstruction that can be done in case of total renovation, like the replacement of windows and frames, adding insulation materials, installation of exterior passive systems or conversion of conventional building materials in passive components (e.g. transforming a simple wall in solar wall), external shading systems (stable or mobile), etc.

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The vegetation on the surroundings of the building

- Small low-cost interventions such as limitation of cracks, indoor shading systems, ceiling fans, planting for shading, replacing incandescent light bulbs with low energy consumption bulbs, etc.
- Non-technique interventions, such as proper operation of building systems, including proper use of windows (natural heating in winter, shading and night ventilation in summer), rational use of electric devices in order to avoid thermal charge of the building (e.g. avoid cooking during the hours that the temperature is high).

A key factor that can easily be taken into consideration when constructing a new building is its orientation. As explained in previous chapters, orientation plays a rather important role in bioclimatic architecture and in the building's protection from weather conditions.

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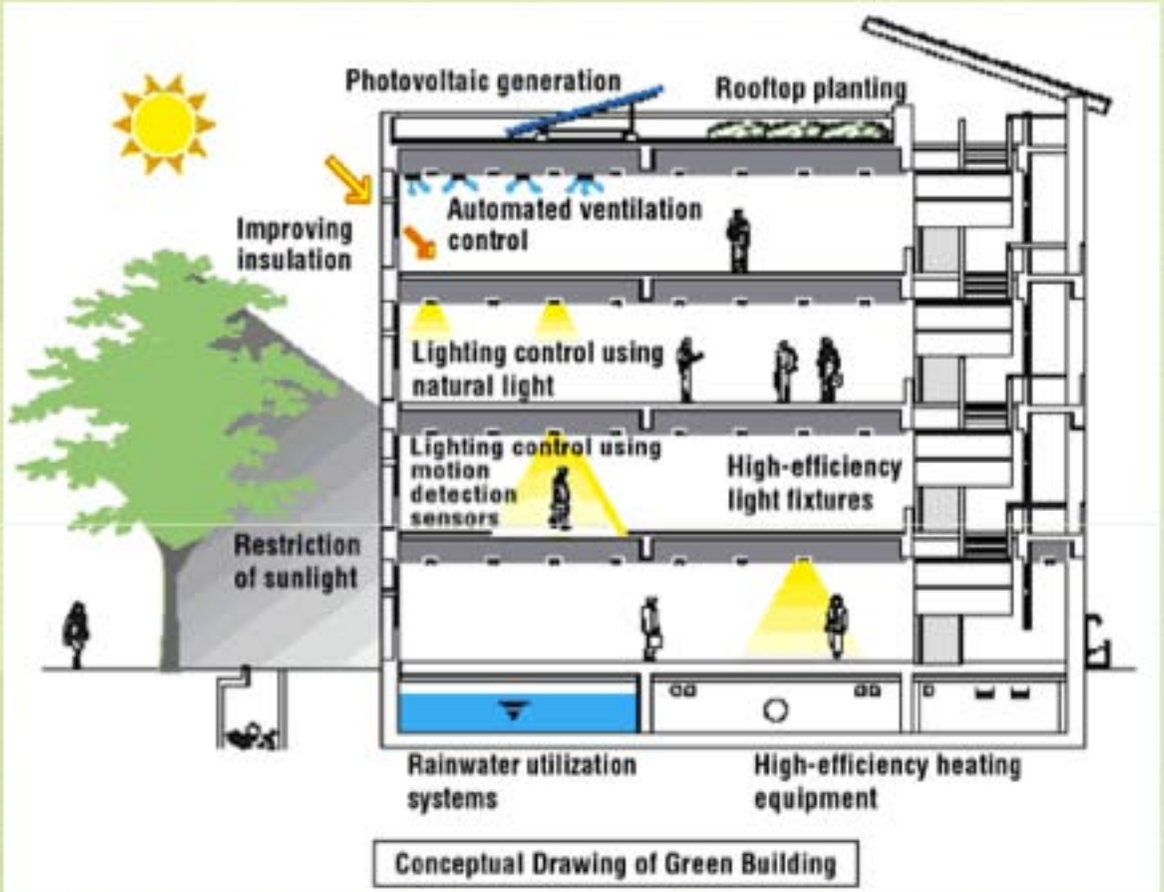

Conceptual Drawing of Green Building

Green Building applications

The designers-constructors that aim at building energy efficient buildings apart from low energy consumption and environmental protection should also consider the end-users and install non-complicated systems, because, in some cases, the contribution of the users is necessary for the effective operation of the building. This fact should constitute a key criterion when selecting the appropriate techniques, as it has been proved that complexity can lead to reduced input from the user's side and result in inferior energy efficiency.

At this point, it should be emphasized that in Kefalonia, as in most Greek regions, public sector fails to comply with the imperatives of sustainable development, although it should set an example for the entire society. The majority of public sector's buildings are extremely energy consuming due to their age and their operation. The main problem is the irrational use of heating and cooling methods, for which the employees are mostly responsible, due to the lack of information and awareness regarding environmental issues. Moreover, the maintenance of the installations is also very important and has to be a vital part of the building's operation.

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The exterior facilities of the hotel

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Photos by Mrs Kotsovou Marianna and the the web site of Regina Dell' Acqua Resort

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