Category: Sustainable Hotel

Case Study: Hotel Monte Malaga

Project cofinanced by
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Provincia di savona

Sustainable Construction in Rural and Fragile Areas for Energy efficiency

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Client: Hoteles Monte
Project : Architects “Hombre de Piedra” and “Montoya Molina”
Calculations of structures and facilities: H.P. Ingenieros, Ineco-98, S.L., Salvador Muñoz and Samuel Domínguez
Developer: Gabriel Rojas, S.L.
Contractor: Dragados, S.A.
Oppening Year: 2005

Context

The hotel chain Hoteles Monte opened its flagship, Hotel Monte Malaga, in 2005. Located in the center of Malaga, capital of the Costa del Sol, Monte Malaga is a modern and emblematic building due not only to its innovative design but also because it is an example of sustainable construction.

Designed by the architects Juan Manuel Rojas and Juan Ramon Montoya, the building occupies the site of a former industrial plant in front of the Malaga port and the hotel, though urban, responds to this location with industrial logic. Adaptation to the surroundings is a sustainable principle.

Description

In this building takes place the integration of clean energy generation within the normal installations of a building, valuing its advantages but also taking into account its drawbacks.

This project is proposing a new, non-predatory relationship of the building with its environment, the Costa del Sol. The project doesn´t distinguish between architecture and installations. The architects project spaces taking into account their behavior as installations (patios as wells of air and light, towers as chimneys, etc.) and they project installations as elements of architecture (photovoltaic sunshades, solar thermal collectors, etc.).

The integrating concept is found in various building elements.

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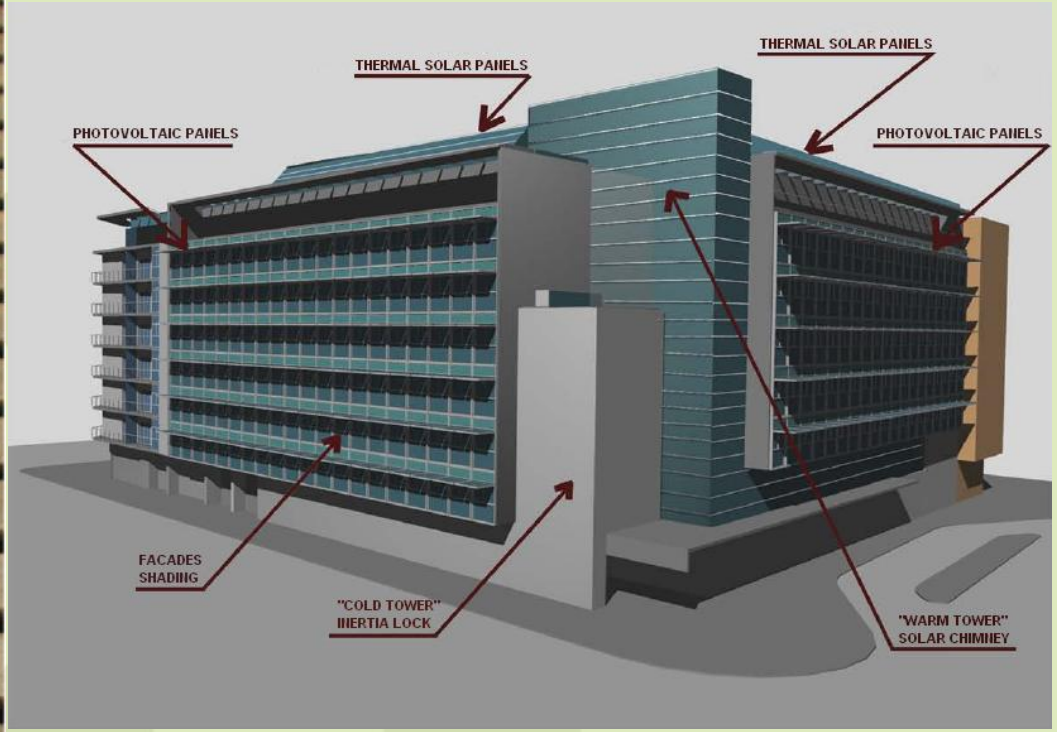

"Patio"

Ventilation

The first is the courtyard (patio) that leads to the basement to 6 meters deep. The functions rooms and the restaurant are at this depth and the courtyard is the element that articulates these spaces and provides natural lighting and ventilation. Using this element also takes advantage of the thermal inertia of the ground. The courtyard becomes a well where it is stored, because of their greater density, the cool night air. This air is introduced into adjacent plants with the ability to create cross ventilation. In addition, a technical mezzanine is located next to the patio, two meters deep, and takes air from the courtyard air conditioning.

In the south corner stand the " Cold Tower" and the "Warm Tower".

The first is a volume of stone that consists of an area of 9 meters high with an enclosure of 45 cm thick and a ventilated chamber. Thanks to the thermal inertia of the enclosure this space is configured as an air conditioned warehouse that found in the entrance area serves as a buffer between the exterior and interior environment. This space has a skylight with automatic opening. The opening allows for ventilation of the space as well as the generation of cross ventilation, as this space is connected to the ground floor and basement and the main courtyard.

The so-called "Warm Tower" is nothing more than a solar chimney. This bioclimatic mechanism consists of a vertical glass element that makes the warm indoor air to rise creating a suction and ventilation effect. In the case of this building, the solar chimney is made to coincide with the main lifts. Therefore, this element has a triple function: volumetric configuration of the South corner of the building, bioclimatic element ventilation, and vertical communications hub.

On the facade, given the privileged position of the building along the Mediterranean is intended that the rooms are open as possible. A mixed system is proposed: substructure of curtain wall and prefabricated modules and exterior finishing works. These exterior finishing works allow the building to "breathe."

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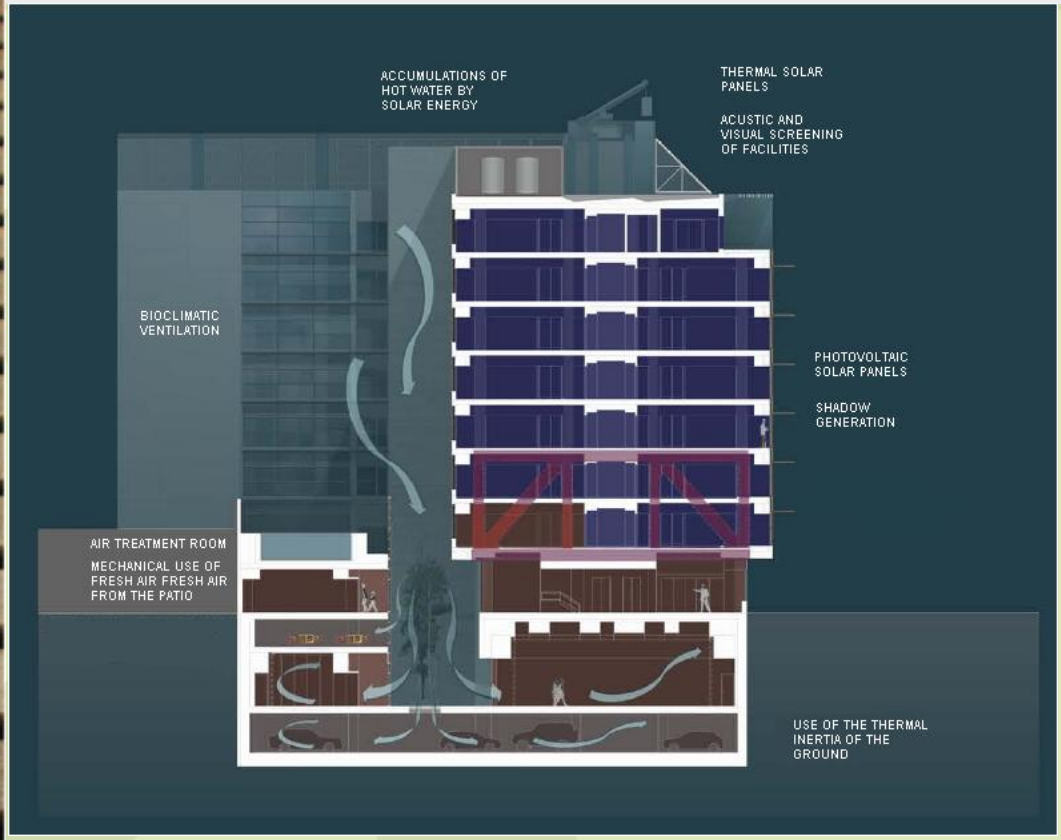

Above: Rooms Ventilation
Left: Solar Photovoltaic Panels

Since hotel rooms have a single front and it´s not possible cross ventilation are used pivoting windows 2 meters wide, so that when these windows are opened, the meter of window that is out, placed perpendicular to the current of air, induces it to let into the room ventilating it. The fan coil for air conditioning is also integrated into the facade, and uses the air filtered by the exterior finishing works to ventilate and air-conditioning the room.

The aspect that most makes special this facade is the integration therein of a photovoltaic installation grid-connected for electricity production.

This facility produces several benefits:
•Production of electrical energy that is discharged to the grid and also brings economic benefit from its sale.
•Dazzle by the entry of direct radiation in the rooms is avoided.
•Reduction of heat load on the facade through the shadowing produced by the modules, which means significant savings in air conditioning. In winter, however, affect the sun with a slight angle, the modules do not produce shading and therefore does not increase heating costs.
•Enables transparent glass leading to a better vision of the landscape and saving money.
•It avoids the emission of CO_2 into the atmosphere.

The building also has a solar thermal installation for hot water. The ideal orientation for these facilities would require completely fill the cover with diagonal of solar batteries. The architects of the building had to find a compromise between the space requirements for all facilities and a layout for proper functioning. It was decided to group the solar collectors into two "screens" aligned with the cornices on the facades Southeast and Southwest, with an orientation deviated 45 degrees to the south, but with an optimal tilt (40 º). This arrangement of the sensors allows to use the vital deck space for multiple facilities and in addition, sensors behave as acoustic-and visual screens that protect the street from the impact of this machinery.

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SCORE Sustainable Construction in Rural and Fragile Areas for Energy efficiency

SUSTAINABILITY STRATEGIES

Passive Measures

BIOCLIMATISM

- Sunlight Exposure
- Ventilation
- Isolation

Active Measures

CLEAN ENERGY GENERATION

- Solar Thermal
- Solar Photovoltaic

CLIMATIZATION

LIGHTING

AUTOMATION

Space Ecology

ECOLOGY OF THE URBAN LANDSCAPE

ECOLOGY OF ARCHITECTURAL SPACE

BIOCLIMATIC STRATEGIES

Sunlight Exposure

NATURAL LIGHT

- Lighting studio
- Automation of artificial light

SOLAR RADIATION

- Air-conditioning in summer by shading
- Heating in winter by sun exposure

Ventilation

MANUAL NATURAL VENTILATION

AUTOMATIC NATURAL VENTILATION

Isolation

THERMAL INERTIA

- Ventilated facade
- Cool Tower

BURIED BUILDING

- Thermal gradient

Evaluation

The Spanish hotel sector comprises more than 14.000 premises spread throughout the country with an energy consumption over 5.000 GWh, which forces them to seek new services and measures to increase savings and energy efficiency. According to the Andalusian Energy Agency, the big hotels, which consume more than 400.000 Euros in energy, with a proper use of energy saving measures can save up to 30% of primary energy, that supposes not emitting to the atmosphere nearly 5.000 tons of CO2 (in the case of small hotels, the savings could be 15% in energy and up to 30% on their bill without reducing the comfort of the hotel). This would be the result of making some investments, amortized over the medium term, the installation of measures such as solar panels, light sensors, biomass boilers and replace mercury lamps. Given that energy is the second in the overall costs of hotels, after the staff, presumably this is one of the factors where awareness must prevail and where to start using renewable energy.

In Andalusia, the Federation of Hotels, aware of the importance of fostering a culture of saving and energy efficiency, in late 2007 signed a cooperation agreement with the Department of Innovation, Science and Enterprise of the regional government, to maximize efforts in the dissemination and implementation of saving measures, energy efficiency and renewable energy development in the hospitality industry and it is heavily promoting these values and opportunities.

One of the most positive experiences in Andalusia is the Hotel Monte Málaga, the first hotel in Spain that in its architecture integrates a cogeneration power center and bioclimatic principles consistent with the medium in which it is situated. It is a huge generator of clean energy using renewable energies such as solar thermal and solar photovoltaic, integrated into its architecture. Hotel Monte Málaga pays special attention to the environment.

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On the other hand, the applications of current technologies for saving and clean energy generation are combined with traditional Mediterranean strategies as shade and natural ventilation.

These facts demonstrate the strong commitment of sustainability which has been created this hotel. Bioclimatic criteria of sunlight, insulation and ventilation (energy saving), along with cleaner production of energy (photovoltaic and thermal), represent a real bet for a new and more respectful relationship between the hotel building with its environment.

Potential for transferability

The principles applied in the Monte Malaga Hotel are mostly common sense and many of them applied in the Mediterranean area for a long time.

It is true that the application of any technology used in the hotel may require a major investment at the time of its construction, but it is also true that these technologies will save in energy costs and savings for the environment will be very significant.

Furthermore, the technologies applied in this building are pretty much new, but are proven and used before and available for everyone.

The principles that inspire the construction of this hotel are perfectly transferable to other coastal areas of the Mediterranean, where exist more or less the same climatic conditions of the city of Malaga and the Costa del Sol. The sun, that this building takes advantage of, is the common denominator in many Mediterranean countries.

References and bibliography

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Juan Manuel Rojas Fernández. *"Integración de las energías renovables en edificación"*

Monte Hotels – www.hotelesmonte.com

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- Agência Regional de Energia do Centro e Baixo - Alentejo (PORTUGAL)
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