ECO-HOTEL IN BUDAPEST

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SITE PLAN
ROOMS
Hotel Rooms:

Standard hotel guests room of 21 m², we modify this arrangement to end in two type of hotel rooms that benefits us in this project.

We have one room more elongated (~ 25 m²) and other more squared (~ 27 m²), this provide us to make a 'lego' with this two type of rooms and finalise in a good program that allow us put between 30-35 rooms in the hotel.
STRUCTURE
Structure with a squared grid in which we place the pillars in the principal partition walls that conform the main disposition of the floors with the rooms.
PROGRAM LAYOUT
Placement of the rooms:
Placement of the rooms:

- Vehicles Elevator: 35 m²
- Luggage Storage: 25 m²
- Documents Storage: 25 m²
- Lobby + Reception: 65 m²
- Office: 8.5 m²
- Toilets: 22 m²
- Restaurant: 55 m²
- Kitchen: 24 m²
- Staircase with elevator: 20 m²
GARAGE
Our hotel has around 30 rooms (maybe 35), we try to put inside one underground floor these amount of car-spaces, but we don't have that space because they need free space for the movements of the drivers, we reach till a 28 car-spaces, more or less the amount of rooms we have.

We reach this underground level through a car elevator.

The car parks are 2.5 x 5 meters (the normalised measures of the cars).
CIRCULATION
Travel with central point on the access floor

Linear travel on the floors between the hotel rooms
SECTIONS
FACADES
PASSIVE ENERGY SOURCES
- The building has a protective skin of reused wood shutters, which protects the sun from the afternoon and at the same time allows views to the outside and to penetrate the natural light.

- By means of an automatic system programmed and controlled by solar panels according to the seasons, the shutters remain completely open when the solar incidence is not direct and they close only when it is in the west.

- The automatic opening and closing system has a very detailed programming so that even the closing speed of the shutters is modified.

Reference: Council House 2
Shutters

- In summer, the shutters close quickly as well as the height of the sun changes rapidly and in winter, their closure adapts to the speed of the sun, so that they move more slowly and thus maximizing the entrance of natural light avoiding the incidence direct unwanted.

OBJETIVE: Protect from the direct impact of the sun and maintain stable temperature in the building
Ventilation

- Admission of air: dining room, living area, bedrooms
- Air passage: Hallways
- Extraction of air: Kitchen, bathrooms
Ventilation

Natural admission opening to facade

WINDOWS

Carpentry opening

Opening on site
Ventilation

Passage of air

**DOORS**

They can be used as pass opening an aerator or the gap between the doors and floor sheets.
Ventilation

Extraction of air

EXTRACTION OPENINGS

The toilets, the kitchens and the bathrooms must have extraction openings.
Ventilation

Admission of air: dining room, living area, bedrooms.

Air passage: Hallways

Extraction of air: Kitchen, bathrooms.
Materials:

We use materials of the area to make the construction cheaper and friendly with the surroundings. This also make the Hotel more ecologic because the rocks that we use are the ones that have fallen and we can take from the Szent Gellert Mountain. That is a very discreet and clear rock.

Also we are taking wood for the shutters, that are a very good passive energy source for the ventilation and shading of the building that we are talking about it in a moment. This shutters are made of national wood reused in some way, from antique structures from Budapest buildings or in other ways, we don’t like to cut down more trees and use `new wood`. 
ACTIVE ENERGY SOURCES
Geothermal Heat Pump:

Characteristics:

- Use electricity

- When it's cold outside a heat pump extracts this outside heat and transfers it inside. When it's warm outside, it reverses directions and acts like an air conditioner, removing heat from your home. It moves heat instead of generating heat, giving you more energy efficiency

  - Two to three times more energy efficiency

  - How they work: Pulls heat from the surrounding air and dumps it at a higher temperature into a tank to heat water.

  - Fully sustainable with solar panels

Energy Produce:

In general, a 3-ton residential geothermal heat pump system produces an average of about one poundless carbon dioxide per hour compared to a conventional system.

Geothermal installer has estimated your home is consuming 150kwh per square meter, per year.
Photovoltaic Solar Panels

We choose:
SolarWorld
Sunmodule Plus
SW 260 Poly

Why?
- Higher performance
- Production of 10% more than annual average
Photovoltaic Solar Panels

How many solar panels we use in our building?

800 solar panels
ENERGY DEMAND OF THE HOTEL
Geothermal installer has estimated that buildings are consuming 150 kwh per square meter, per year. We have 1,550 m² so we need 232,500 kwh per year.

Geothermal Heating Energy:

Geothermal heat pumps are 400% efficient, this means we only need 58,125 kwh of electricity to extract that heat, in difference with a electric baseboard heating (100% efficient) we will need every 232,500 kwh, so we will use four times amount of energy to the heat that we need on the hotel. But this will be if we are only using the Geothermal Heating, but we are combining this with Photovoltaic Solar Panels.