UNOPS

Sustainable design for the United Nations Regional Hub in Panama

High levels of sustainability, design based on principles of bioclimatic architecture, energy efficiency and high share of locally produced energy were the features sought by the United Nations Office for Project Services (UNOPS) for the design of the United Nations Regional Hub building in Panama. The building was required to be carbon neutral and produce 100% of the energy used. Besides, the building was required to have a high standard of autonomy in water use and to treat used water on-site.

Context of the Project

Those were the ingredients required by UNOPS in the tender presented. The design of the Preliminary Plan of the building, presented by the winning consortium, an international group composed of Terradas Arquitectes (architecture), Trama TecnoAmbiental (engineering), from Barcelona and Régis Coté Associées Architectes from Quebec (architecture) met all the expectatios and the design was rated Leed Platinum.

The United Nations Office for Project Services (UNOPS) published a tender for the design of the Preliminary Plans for the United Nations Regional Hub in Panama, that will host regional United Nations agencies for Latin-America and the Caribbean. The building will be constructed on land given by the Government of Panama in an area dedicated to host international organizations.

Among 13 participating consortia, the winner was the one composed of Terradas Arquitectes (architecture), Trama TecnoAmbiental (engineering), from Barcelona and Régis Coté Associées Architectes from Quebec (architecture).

The building will host more than 12 United Nations regional agencies and will be a regional hub for the Latin American and Caribbean region. Among the services that will be provided at the building are: an auditorium for 250 people, a library, a kindergarten, a restaurant, a cafeteria, a travel agency, a bank office etc.

Design Requirements

High levels of sustainability, design based on principles of bioclimatic architecture, energy efficiency and high share of locally produced energy were the features sought by UNOPS. More specifically, the building was required to be carbon neutral and produce 100% of the energy used. As far as water use is concerned, the building was required to have a high standard of autonomy (using rainwater and re-use of water) and to treat used water on-site.

Design Solution

The design presented by the winning consortium had bioclimatic design patterns, applied to the local climate, a light and modular constructive system, high efficiency mechanical installations and an on-site electricity generation with a photovoltaic pergola, that not only generates electricity for the building, but also serves as a solar protection –in Panama, the highest irradiation levels hit the roof- and also collects rainwater.

Such sustainable design measures decrease the thermal demand of the building as much as 60% compared to a conventional building.

Trama Tecnoambiental, engineering and consulting firm specialized in sustainable building and renewable energies, coordinated the project and has been responsible for the bioclimatic aspects, energy concept, mechanical installations and environmental aspects. Terradas Arquitectos and Régis Coté Associées Architectes have been responsible for the architecture and urban projects.

Some features of the project are summarized in the following table:

Name of the project	Preliminary Plans for the United Nations Regional Hub in Panama
Client	United Nations (through United Nations Office for Project Services - UNOPS)
Location	Panama, Panama city, Clayton
Function	Offices
Site area	6,4 Ha
Protected surface (forest)	2,7 Ha
Garden surface	2,5 Ha
Occupied surface (buildings and roads)	0,93 Ha
Built surface (not considering parking lots)	12.832 m2
Offices	10.643 m2
Other services	2.189 m2
Number of UN agencies	12
Constructive systems	
Foundation, parking lots and lower floor	Reinforced concrete
Offices	Steel structure and light cladding
Solar protection	On all facades and on the roof
Facades and roof	Ventilated and thermally-insulated
Photovoltaic system installed power	520 kWp
Renewable electricity production	721.657 kWh/year
Share of demand met with renewable energy	100%
Share of water demand met with rainwater collection	40%
Cooling service	Groundwater exchange Heat Pumps
Cooling distribution	Radiant system
Hot water generation	Heat recovery from heat removed by heat pumps
Ventilation	Heat recovery of ventilation exhaust air
Treatment of used water	Phytodepuration system
Waste	Separation in origin
LEED Rating	Platinum

For more information you may contact:

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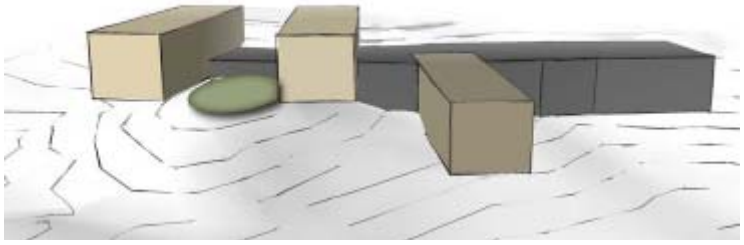
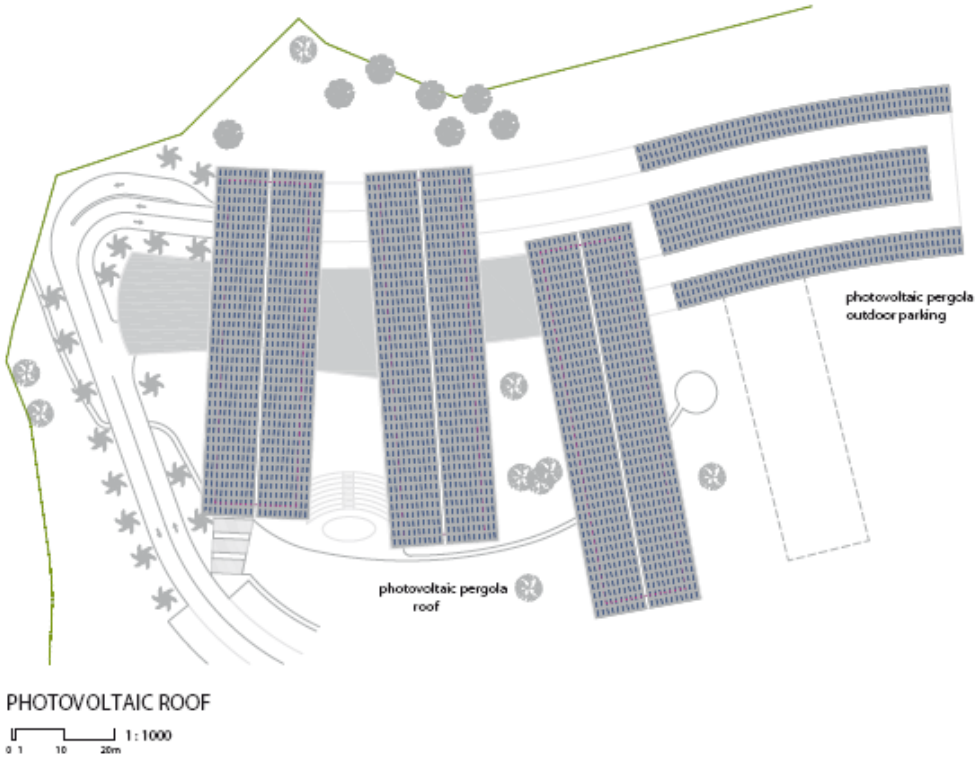
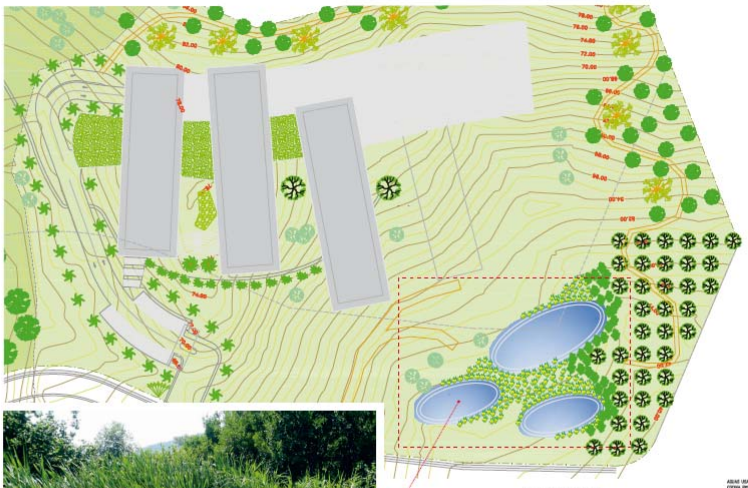
Lessons learnt:

Applying bioclimatic architecture strategies is crucial in order to obtain a balanced solution for a building that must meet the requirement of covering all its energy needs with local renewable sources of energy.
Energy demand avoided due to good design means savings in terms of money, both because it requires simpler equipment and lower operation costs.
Beyond energy use, the autonomy of the building must be assessed in other aspects, such as local water treatment.

To sum up, this building is designed in order to be responsible for its impacts in the environment and its users, not only minimizing the negative impact but also maximizing the positive.







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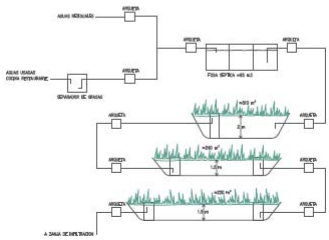
WASTE WATER TREATMENT

Although the basic infrastructures, among them the sanitation circuit, are expected to be built during construction of Avenida de la Foresta, for various reasons the building project should include equipment for the eco treatment of used waters.
Among these reasons are:
-the present infrastructure in the area is insufficient and too small (both sewer system and waste water treatment facilities)
–there is no guarantee that the waste waters generated in the building can be treated properly
–treatment in situ gives a treated water supply for use in irrigation in the dry period
-any excess treated water drains into the ground, raising the local phreatic level

The system proposed is based on treatment in phases:
-pre-treatment: fat separator, septic tank
-green filtering (with fixed and floating aquatic plants): facultative tank (500 m2), aerobic tank (240 m2) and gravel filter (223 m2) – infiltration and pumping for re-use in irrigation.



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