Maison Notre Dame du Mont

by Sandra Aoun / 2015-06-30 13:33:47 / International / 9979 / EN

Primary energy need :

258.69 kWhpe/m².year

(Calculation method : Primary energy needs)

ENERGY CONSUMPTION

Economical building *Building*

< 50	A
51 à 90	B
91 à 150	C
151 à 230	D
231 à 330	E
331 à 450	F
> 450	G

Energy-intensive building

Building Type : Hotel, boarding house
Construction Year : 1991
Delivery year : 2015
Address 1 - street : 01 Fatka main street 1401 FATKA, BYBLOS, Libanon
Climate zone : [BSh] Subtropical Dry Semiarid (Steppe)

Net Floor Area : 4 300 m² Useful area (es)
Construction/refurbishment cost : 159 999 €
Cost/m2 : 37.21 €/m²

Proposed by :

dawtec
WHEN GREEN TECHNOLOGY MATTERS

General informations

Maison Notre Dame du Mont in Fatqais one of the reference hostels in the area.

Maison Notre Dame du Mont premises consists of a two main parts:

§ A four stories nursing home comprising 61 rooms with individualbathrooms

§ A four stories hotel comprising 120 rooms with individual bathrooms,1 central kitchen, 1 laundry, and 1 reception area with dedicated toilets.

This facility is a convent which can accommodate up to 181 residents. Thenursing home is inhabited by 61 people all year long. Whereas for the occupancyof the hotel, we assume that on average, the hotel is inhabited by 90 people onaverage all year long. Throughout the period of occupancy, the facility iscontinuously operational, since it is considered as a domestic living space.

A central domestic hot water system is installed for the entireproject. It is consisting of 4 boilers (used also for heating) located in atechnical room in Hotel's basement and the following hot water storage tanks:

1. One hot water storage tank having 1500L of capacity serving NursingHome, with circulating pump, located in the same technical room.
2. A hot water storage tank having 1500L of capacity for Hotel first andsecond floors, with circulating pump, located in the same technical room.
3. A hot water storage tank having 750L of capacity for Kitchen andLaundry, with circulating pump, located in the same technical room.
4. A hot water storage tank having 1500L of capacity for Hotel third andfourth floors, with circulating pump, located in the a technical room atHotel's roof.

See more details about this project

http://www.saintefamille.org/

Stakeholders

Stakeholders

Function : Company

DAWTEC

address: Dawtec, Lemec center, Furn El Chebbak, Baabda - LEBANON Tel/fax - LEBANON:+961-1-288688 Mobile - LEBANON:+961-70-288688 Tel - GERMANY:+49-15229046069 Email: dawtec@dawtec.com

http://www.dawtec.com/
Consultancy design and contracting for Renewable Energy solutions

Contracting method

Maximum Guaranteed Price

https://www.construction21.org/data/sources/users/15194/management.docx

If you had to do it again?

We execute the same system

Energy

Energy consumption

Primary energy need : 258,69 kWhpe/m^2.year

Primary energy need for standard building : 250,00 kWhpe/m^2.year

Calculation method : Primary energy needs

CEEB : -0.0001

Breakdown for energy consumption : This project has studied the energy consumption for hot water only

Initial consumption : 258 693,00 kWhpe/m^2.year

Envelope performance

Envelope U-Value : 0,42 $W.m^{-2}.K^{-1}$

More information

As previously noted, the yearly thermal energy required for domestic hot water usage of the facility is around 258,693.23 kWh. This energy is currently provided by a Diesel boiler system composed of 4 boilers heating 4 water tanks of total capacity 5,250 Liters. The boiler system is assumed to have constant Diesel consumption and constant energy production for thermal energy for water heating all around the year because of the regular occupancy of the facility.

The proposed solar water heating system consists of 255 square meters of Solar Pergola area that are expected to generate around 256,019.09 kWh of thermal energy yearly.

The energy coverage of the solar water heating system covers approximately 83% of the yearly energy demand for hot water consumption.

Real final energy consumption

Final Energy : 258,69 kWhfe/m^2.year

Real final energy consumption/m2 : 256 019,00 kWhfe/m^2.year

Real final energy consumption/functional unit : 256 019,00 kWhfe/m^2.year

Year of the real energy consumption : 2 015

Renewables & systems

Systems

Heating system :

- Solar thermal

Hot water system :

- Solar Thermal

Renewable systems :

- Solar Thermal

Renewable energy production : 83,00 %

Products

Product

Solar Pergola

Product category :

The Pergola Solar System is an innovative product offering an architectural solution to a mechanical system without affecting its performance.
This system transforms solar energy into thermal energy for use in various applications such as Pool Heating, Water Heating, Space Heating, Process Heat and Solar Air Conditioning while preserving an aesthetic image. The Pergola Solar System being the only solar system with absorbers installed at 0 degree of inclination and having a system structure that can be constructed from a wide variety of materials makes the Pergola Solar System a unique design for Solar Water Heaters.
The diversity of materials and colors present an added value to the system, as the structure could be made from wood, aluminum, colored steel, stainless steel… to suit different architectural needs.
The Pergola Solar System was patented in 2009 (Patent No. 8589 - Ministry of Economy and Trade – 2009). This keeps the Pergola Solar System away from the competition whirlpool.
The Pergola Solar System is a pioneering product outweighing all standard type solar systems available in the market. Its uniqueness increases its commercial value.
The Pergola solar system can be easily expanded or upgraded on demand

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Costs

Construction and exploitation costs

Global cost : 35 000 000,00 €

Reference global cost : 50 000 000,00 €

Renewable energy systems cost : 159 999,00 €

Global cost/Bedroom : 193370.17

Reference global cost/Bedroom : 50000000

Cost of studies : 1 000 €

Total cost of the building : 25 000 000 €

Subsidies : 24 000 €

Energy bill

Forecasted energy bill/year : 9 000,00 €

Real energy cost/m2 : 2.09

Real energy cost/Bedroom : 49.72

Contest

Reasons for participating in the competition(s)

Maison Notre Dame Du Mont in Fatqa is inhabited by 151 people on average all year long. For domestic hot water consumption, a central hot water system is currently used, consisting of 5,250 Liters storage heated by 4 Diesel boilers, serving domestic hot water use for both the Nursing Home and the Hotel.
This project is the integration of 255 Square Meters Open Type Vacuum Tubes Solar Pergola.

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The *Pergola solar system* can be easily expanded or upgraded on demand.

This system was implemented in parallel with the existing boiler system and to be connected to new and existing storage tanks.
The total cost of the project is **159,999.00 USD.**
The expected yearly savings of the system are around **32,402.42 USD** and the payback period is **5 years**.
The current yearly expenses on Diesel for thermal energy generation are approximately **32,740.86 USD**, equivalent to a yearly consumption of **36,378.74 Liters** of Diesel. Hence, the current thermal energy required is **258,693.23 kWh**.
The installed solar water heating system is expected to generate yearly **256,019.09 kWh**of thermal energy, hence covering **83%** of the yearly energy demand for hot water consumption, and reducing CO_2 emissions by **94,687.06 kg** yearly.
The roof of the facility is suitable for such an installation and the construction can accommodate all required items for implementation.
During its lifetime of **28 years**, the system will cost the user **182,399.00 USD** (including maintenance and consumables) and will generate **6,279,654.59kWh** of thermal energy. The cost of thermal energy from the installed system is **0.03 USD/kWh**.

Over the years, the system would have cost **182,399.00 USD** and would have saved**794,768.78 USD** (taking into consideration the degradation factor). Hence, according to the current Diesel price, the system would benefit the user with **612,369.18USD** during its lifetime.
Presentation of the Installed Project
The installed system for installation is 255 Square Meters Open Type Vacuum Tubes Solar Pergola that is to be implemented in parallel with existing boilers and connected to both existing and new hot water storage tanks.
Our objective was to separate the two main parts of the project (Hotel and Nursing) by the mean of hot water production and to reduce fuel consumption by introducing solar energy.
Existing Status: 4 boilers around 230 KW are serving both nursing and hotel facility with common heating supply system.
Modification on Existing system: additional boiler with a capacity of 400 Kw should be installed, and one the exiting boilers shall be connected to the newly installed boiler and separated from the exiting 3 other boilers. This new configuration shall allow independent heating production for nursing home from the hotel.
Concerning Nursing Home, separate boilers shall be installed in the technical room as discussed above, and a common solar system made up of 255 square meters were installed on roof. These panels are currently heating a new hot water storage tank of 1500L capacity in order to preheat the cold water entering the main solar and boiler heated hot water storage tank of 1500L capacity also.
The existing boilers shall be dedicated to the hotel and the same common solar system was installed on roof. These panels are currently heating an existing hot water storage tank of 1500L capacity in basement technical room in order to preheat the cold water entering the double coil new hot water storage tank of 1500L capacity serving Hotel's first and second floors. As for the kitchen and laundry, a new double coil hot water storage tank of 1000L capacity was installed. These solar panels are heating
also the existing hot water storage tank of 1500L capacity in hotel's roof technical room in order to preheat the cold water entering a new added double coil hot water storage tank of 1500L serving Hotels third and fourth floors.
During sunny periods of year, the installed system is expected to cover all the hot water consumption of the facility, hence skipping the use of the boilers for water heating during this season (April to September). In mid-seasons between summer and winter, the system is expected to cover around 50% of the hot water consumption, hence reducing considerably the current fuel consumption for heating water in these seasons. During winter, the system is expected to cover around 40% of the hot water consumption, therefore, a reduction on the fuel expenses will also come about in this season.
This system was implemented to make use of natural resources to reduce fuel consumption for water heating. Moreover, energy meters were installed in order to measure the energy (in kWh) and the flow (in Liters per Second) of the hot water in order to keep track of the hot water consumption. Data will then be available for further study whenever more actions are needed to analyze the energy consumption for domestic hot water provision.
The main components of this system are the following:

- 255 m² Open Type Vacuum Tubes Solar Pergola
- 4 Differential Temperature Controllers
- 2 sets of Circulating Pumps
- 1 Open Type Expansion Tank
- 4 Three-Way Valve
- Make-Up Water System
- 7 Energy Meters
- 4 Flow Meters (water meters and fuel meters)
- 4 New Hot Water Storage Tanks
- Galvanized Steel Pipes
- UPS Battery System
- Boiler 400Kw

The system was implemented according to highest standards of quality and safety.

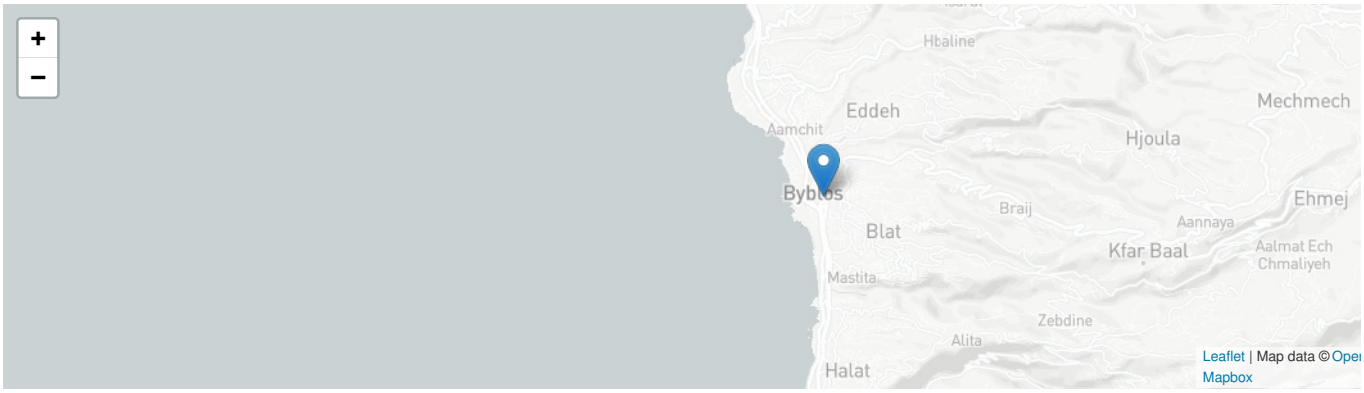
A detailed summary of the proposed project is provided in this section on the table here below:

SWH System Supplier	DAWTEC
Gross Area Of Solar Collectors	255 m²
Installed Cost Of SWH System	159,999.00 $
Estimated Hot Water Consumption On Site	9,050 Liters/day
Estimated Annual Energy Savings	256,019.09 kWh/y
Estimated Annual Cost Savings	32,402.42 $
Payback Period	5 years
Total Avoided CO2/y Due To SWH	94,687.06 kg
System Working Days Per Year	365 days
Storage Tank Size	10,750 Liters
Estimated Delivery Temperature	60°C

Building candidate in the category

Renewable energies

Green Building Solutions Awards 2015
powered by Construction21



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