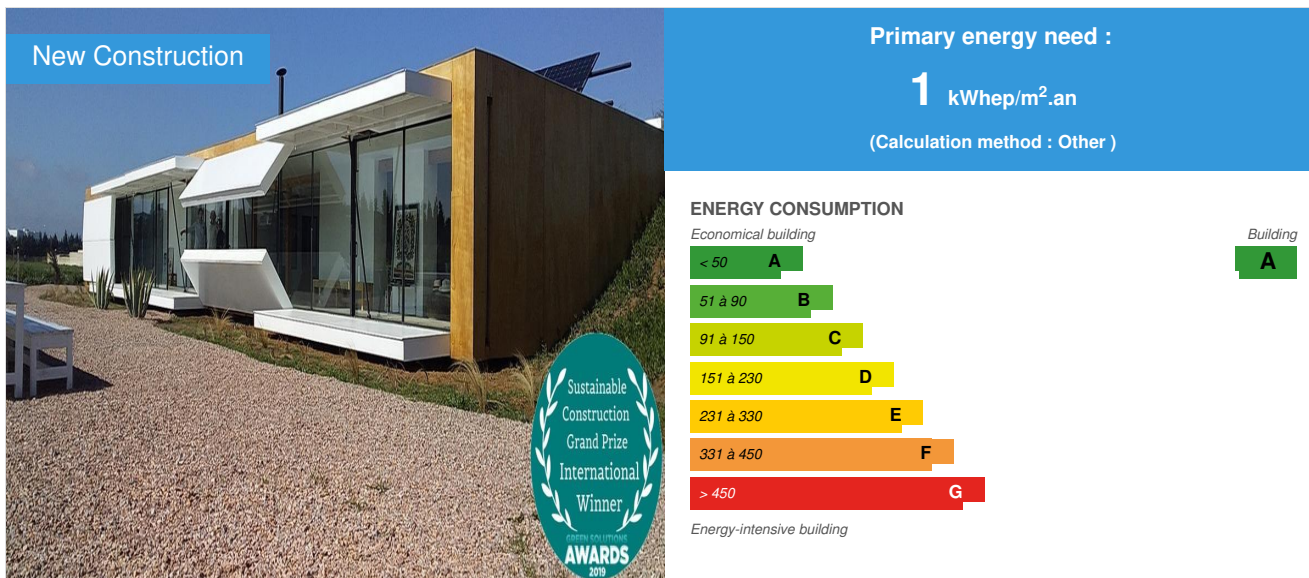


## House B autonomous

by Myriam Soussan / 2019-05-28 15:26:51 / Maroc / 17493 / FR



**Building Type** : Isolated or semi-detached house  
**Construction Year** : 2018  
**Delivery year** : 2018  
**Address 1 - street** : Douar Cheraqui 27182 BOUSKOURA, Maroc  
**Climate zone** : [Csa] Interior Mediterranean - Mild with dry, hot summer.

**Net Floor Area** : 220 m<sup>2</sup>  
**Construction/refurbishment cost** : 230 000 €  
**Cost/m2** : 1045.45 €/m<sup>2</sup>

### General information

House B autonomous won the Sustainable Construction Grand Prize of the 2019 Green Solutions Awards at the Morocco level + the international Sustainable Construction Grand Prize.

This house has been conceived as a true **bioclimatic greenhouse**, offering a south facade in **double glazing**, free to hide thanks to a system of shutters whose positions are managed by jacks. The **north facade is completely buried in a mound planted**. The house was built with a **wooden** structure and filled with **mud bricks**. All in **total autonomy**: photovoltaic electricity, recovery of rainwater in a **buried tank** and filtration for domestic and drinking water, treatment in phytopurification for all dirty water. The modular layout of spaces and furniture in the entire house, allows many combinations and adapts to the seasons and the number of occupants. Thus, the living space during the winter is reduced to maintain **thermal comfort**; during the summer the house opens and frees up space. All the components of the house have been designed and manufactured on site (windows, kitchen, handles, furniture ... etc.) The different living areas of the house are not assigned to a single function, it is the user who will define it, according to his desires of the moment, by moving the furniture on wheels, by sliding walls, leaving appearing "hidden" furniture ...

## See more details about this project

<http://www.archibionic.com/#/maison-b/2504589321>

## Data reliability

Self-declared

## Photo credit

Archibionic

## Stakeholders

### Contractor

Name : Oualid Belakbil

Contact : Oualid Belakbil - Tel :+212 6 00 65 60 46

### Construction Manager

Name : Archibionic-Myriam Soussan et Laurent Moulin architectes

Contact : +212 6 61 22 20 85 / archibionik@gmail.com

<http://www.archibionic.com>

### Stakeholders

Function :

Orientalier Menuiseries bois

Mohamed Marjane - Tel : +212 6 68 45 71 59

All the realization of woodwork and wood furniture

Function :

Menuiserie acier El Amri

Mohamed El Amri - Tel : +212 6 51 33 45 04

All the realization of steel joinery and opening systems

Function :

Argilex

Oussama Mounkir - Tel : +212 6 20 00 00 61

The realization of the structural work and coated finishes

### Owner approach of sustainability

We have always been particularly aware of the overconsumption in which we were evolving, and in which we ultimately participated. But, taken by our urban daily life away from these considerations, we were totally inactive. When we decided to build this house, our primary concern was not ecological. It was mainly about creating an exceptional place, a bubble of serenity that would allow us to escape the chaos of our daily Casablancais. It seemed obvious then that this house would finally be the opportunity for us to assume our environmental responsibility and to reduce, on our scale, our footprint on the environment.

The idea was then to prove to ourselves but also to serve as proof that aesthetics, design and quality of life were not exclusive of environmental responsibility.

It was after our meeting with Myriam and Laurent, at home in Felfla, that we understood that we could push this idea even further. They made us taste energy autonomy, we were seduced.

### Architectural description

The house wants to be stealthy and integrated into its environment. The entry of the house is located north facade, a breakthrough in a mound planted ... At first we do not guess the house, we must cross to see it appear south facade as a discreet object that came to ask gently without impact on the ground. We discover a multifunctional removable facade constantly changing over the days and seasons. These large shutters, according to their deployment, serve at the same time insulators and sun breeze, they extend the terrace and offer integrated seats and blinds. **Site Implementation Strategy and Materials:**

-House oriented North / South, talute on its facades North, East and West, to increase the global inertia.-Bearing walls in adobe, the ground being taken on the ground.-Structure and chaining in fir tree: balance compensated by the trees planted on the site.-Wood exterior cladding, to protect the raw earth.-Finishing lime

plastered fine, without adding paint.-Large greenhouse on south facing wall accumulator contiguous to living spaces.-Removable facade multifunctional.-Reduction / expansion of spaces during extreme weather events (extreme cold or heatwave).

## If you had to do it again?

Since the first autonomous housing in Medina Rabat, inaugurated in 2013, we do not offer more than that to our customers, the results are beyond our expectations and we are convinced that these systems are viable and should be generalized to any construction.

## Building users opinion

Today, more than a year after our installation, we are still very (pleasantly) surprised to find that we live quite "normally" and our daily needs are fully covered by the energy that the house produces.

From a thermal point of view, at no time, we felt the need to install an air conditioning, the rooms are at all times of the year very pleasant (cool in summer and temperate in winter) and the fireplace is very efficient in winter. The temperature difference with houses in conventional construction at the same time is noticeable.

## Energy

### Energy consumption

Primary energy need : 1,00 kWhep/m<sup>2</sup>.an

Primary energy need for standard building : 50,00 kWhep/m<sup>2</sup>.an

Calculation method : Other

CEEB : 0.0002

Breakdown for energy consumption :

lighting, appliances, pumps and electric cylinders

### Envelope performance

More information :

The house is semi buried, butte planted to the north, and entirely built of mud bricks.

The roof is isolated with cork from Morocco.

Indicator : EN 13829 - n50 » (en 1/h-1)

### Real final energy consumption

Year of the real energy consumption : 2 018

## Renewables & systems

### Systems

Heating system :

- Others
- No heating system

Hot water system :

- Solar Thermal

Cooling system :

- No cooling system

Ventilation system :

- Natural ventilation

Renewable systems :

- Solar photovoltaic
- Solar Thermal

Renewable energy production : 100,00 %

-Polar generators, 220v regulator, 8 batteries

Solutions enhancing nature free gains :

Houses oriented North / South and talute, greenhouse south facade, double glazing, appliances very energy-efficient

## Environment

### GHG emissions

Methodology used :

Clean site, use of local materials without GHG

### Life Cycle Analysis

Eco-design material :

Wood structure / Adobe walls Earth / Lime coatings Morocco cork insulation

### Water management

Consumption of grey water : 60,00 m<sup>3</sup>

Consumption of harvested rainwater : 60,00 m<sup>3</sup>

It is raining 401mm / m<sup>2</sup> / year in Bouskoura.

The 230 m<sup>2</sup> of roof can recover 100m<sup>3</sup> of rainwater, the buried tank located under the kitchen is 50m<sup>3</sup> with coating for a coating of raw cement for the mineralization of rainwater.

Ultra filtration and UV lamp are installed for water purification.

Wastewater is treated by phyto-purification and is used for watering the vegetable garden.

### Indoor Air quality

-Natural Ventilation-Indoor Garden-Natural Materials.-Natural Coatings

### Comfort

Health & comfort :

All spaces benefit from natural light, through sliding glass panels, glass roofs, skylights ... All these openings include concealable panels or baffles, to be oriented according to the entry of light desired according to the day and seasons, thus ensuring circulation and renewal of the air.

Acoustic comfort :

Buried house and earthen walls allow a good absorption of the sounds and a very good acoustic comfort.

## Products

### Product

Photovoltaic panels

SolarWorld

<http://www.solarworld.com>

Product category : Table 'c21\_spain.innov\_category' doesn't exist SELECT one.innov\_category AS current,two.innov\_category AS parentFROM innov\_category AS oneINNER JOIN innov\_category AS two ON one.parent\_id = two.idWHERE one.state=1AND one.id = '3'

Accepted without hesitation



Converter / regulator / battery assembly

Victron

<http://www.victronenergy.com>

Product category : Table 'c21\_spain.innov\_category' doesn't exist SELECT one.innov\_category AS current,two.innov\_category AS parentFROM innov\_category AS oneINNER JOIN innov\_category AS two ON one.parent\_id = two.idWHERE one.state=1AND one.id = '3'

Accepted without hesitation



Multifunctional shutters

Archibionic

Archibionic - archibionik@gmail.com

<https://www.archibionic.com>

**Product category :** Table 'c21\_spain.innov\_category' doesn't exist SELECT one.innov\_category AS current,two.innov\_category AS parentFROM innov\_category AS oneINNER JOIN innov\_category AS two ON one.parent\_id = two.idWHERE one.state=1AND one.id = '10'

This principle makes it possible to manage the light inputs as it sees fit, and thus to control the interior temperatures of the house. not only is it a facade element but it also extends the veranda, serves as a sunshade, insulation, cushion range ... when they are inclined, they also serve as seating in chaise lounge mode.

More than just a part, this innovation is an integral part of the overall concept of the house and was immediately accepted. The execution by the various carpenters was carried out without problems. The only difficulty was rather electric in the choice of cylinders and their installation ...



Glass opening system / baffle

Archibionic

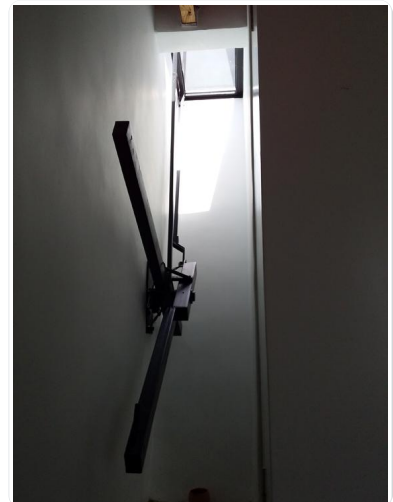
Archibionic - archibionik@gmail.com

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This principle has been entirely manufactured locally, a disk brake can manage and the canopy and the deflector.

The steel carpenter discovered the detail with curiosity, immediately understood and executed it perfectly.



Double combustion high efficiency suspended stove

Menuiserie El Amri et Pil'Poêle

<https://www.pilpoele.ma>

**Product category :** Table 'c21\_spain.innov\_category' doesn't exist SELECT one.innov\_category AS current,two.innov\_category AS parentFROM innov\_category AS oneINNER JOIN innov\_category AS two ON one.parent\_id = two.idWHERE one.state=1AND one.id = '18'

The idea was to integrate a stove machined in a box and also to cover its duct, in order to suspend it and allow a double combustion and a high efficiency.

Installed without difficulty



## Costs

### Construction and exploitation costs

Renewable energy systems cost : 9 000,00 €

Cost of studies : 28 000 €

Total cost of the building : 230 000 €

## Urban environment

This house is located in a rural area.

## Land plot area

Land plot area : 40 000,00 m<sup>2</sup>

## Built-up area

Built-up area : 2,00 %

## Green space

Green space : 3 900,00

## Building Environmental Quality

### Building Environmental Quality

- Building flexibility
- indoor air quality and health
- biodiversity
- works (including waste management)
- acoustics
- comfort (visual, olfactive, thermal)
- waste management (related to activity)
- water management
- energy efficiency
- renewable energies
- building end of life management
- integration in the land
- mobility
- building process
- products and materials

## Contest

### Reasons for participating in the competition(s)

This house has been conceived as a true bioclimatic greenhouse, offering a south facade in double glazing, free to hide thanks to a system of shutters whose positions are managed by jacks. The north facade is completely buried in a mound planted. Skylights with deflector are present in the rooms. The roof is insulated with cork and ventilation is done naturally ensuring thermal comfort.

This house consists of a wooden structure and walls of mud brick made on the spot, the coatings are in lime / sand and all the elements were manufactured in Morocco (windows, shutters, systems of openings, kitchen), the goal is to use a minimum of machined and imported objects, giving priority to the local.

### Building candidate in the category



Energie & Climats Chauds





Bas Carbone



Prix du public



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