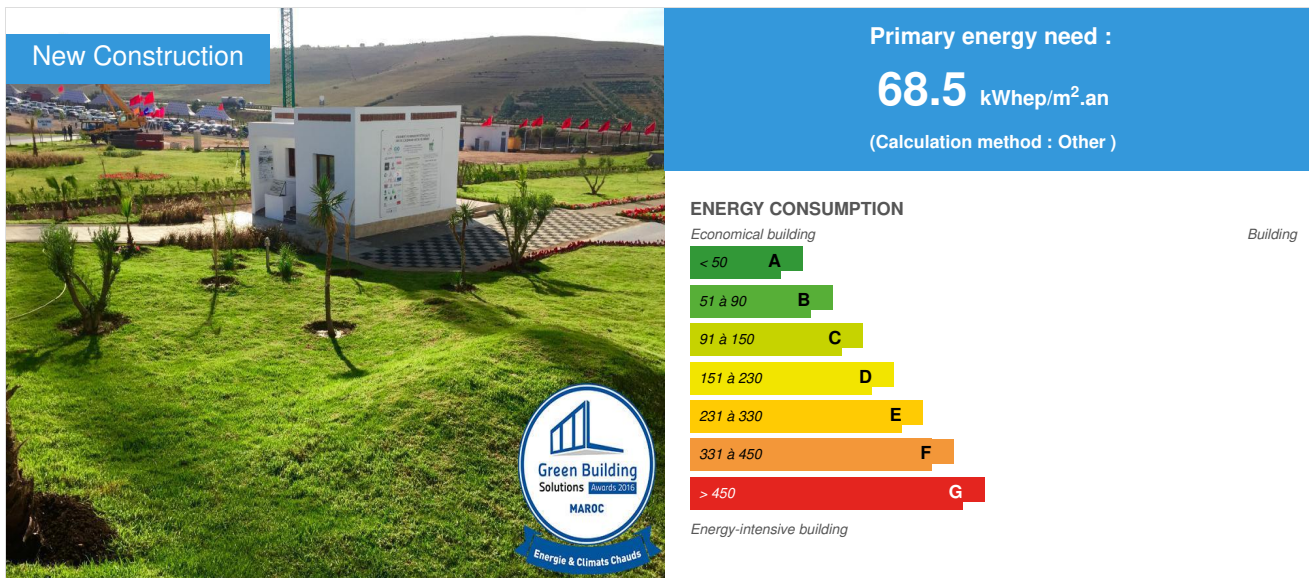


## LEP - Social Housing for Positive Energy

by [Ahmed Belamine](#) / 2016-05-22 14:27:02 / Maroc / 21614 / FR



**Building Type** : Isolated or semi-detached house

**Construction Year** : 2015

**Delivery year** : 2015

**Address 1 - street** : Ecole Mohammed VI de Formation aux Métiers du Bâtiment et des Travaux Publics de l'OFPPT 26000 SETTAT, Maroc

**Climate zone** : [BSh] Subtropical Dry Semi-arid (Steppe)

**Net Floor Area** : 55 m<sup>2</sup> Other

**Construction/refurbishment cost** : 22 000 €

**Number of Dwelling** : 1 Dwelling

**Cost/m<sup>2</sup>** : 400 €/m<sup>2</sup>

### General information

As part of the framework of the commitment of the Kingdom in the fight against climate change, the "LEP" is social housing pilot project to Positive Energy. This construction model is part of a list of collaborative projects to make the assets of Cluster EMC. It is part of the construction process complies with Energy Efficiency in the Construction Code (CEEB) and according to the new Thermal Building Regulations in Morocco (RTCM). Located in the heart of the School of Education Mohammed VI in Building and Trades of Public Works OFPPT in the Settât region, the "LEP" (Social Housing for Positive Energy) is a pilot project initiated by the Cluster EMC (Energy efficiency of Building Materials), and in partnership with the Office of Vocational Training for Employment Promotion (OFPPT), EIS (Energy Investment Company), GIZ DKTI (German Initiative for technology climate friendly) and all members and partners of the Cluster. The "LEP" was part of the inaugural tour by His Majesty King Mohammed VI of the largest training school in the building trades and public works in Africa.

### See more details about this project

<http://www.construction21.org/france/articles/fr/le-cluster-emc-realise-le-1er-logement-social-a-energie-positive-au-maroc.html>

<http://www.leconomiste.com/article/983812-logement-energie-positive-et-c-est-du-social>

<http://lnt.ma/inauguration-royale-du-premier-logement-social-a-energie-positive/>

<http://www.medias24.com/ECONOMIE/161354-Des-logements-sociaux-alimentes-au-solaire-bientot-au-Maroc.html>

<http://www.challenge.ma/lep-un-premier-logement-social-a-energie-positive-au-maroc-63498/>

## Data reliability

Self-declared

## Stakeholders

### Stakeholders

**Function :** Contractor

Cluster EMC - Cluster Efficacité Energetique des Matériaux de Construction

Tel : +212 5 22 40 26 32 / Email : [contact@clusteremc.org](mailto:contact@clusteremc.org)

<http://www.clusteremc.org>

Owner / Supported by the Ministry of Industry, Trade, Investment and the Digital Economy

**Function :** Designer

ABG Studio - Ahmed Belamine, Architecte

Tel : +212 5 22 20 87 27 / Email : [contact@abgstudio.ma](mailto:contact@abgstudio.ma)

<http://www.abgstudio.ma>

Master of Work / Assistant to the Owner / President of the Commission Sustainable Building Cluster EMC

**Function :** Contractor representative

Ministère de l'Industrie, du Commerce, de l'Investissement et de l'Economie Numérique

Te : +212 5 37 66 96 00

<http://www.mcinet.gov.ma>

Governmental Partner - Moroccan policy of support to clusters

**Function :** Contractor representative

OFPPT - Office de la Formation Professionnelle et de la Promotion du Travail

Tel : +212 5 22 63 44 44

<http://www.ofppt.ma>

institutional partner - Mohammed VI School of Education in the Building Trades and Construction

**Function :** Contractor representative

SIE - Société d'Investissement Energétique

Tel : +212 5 37 57 23 89 / Email : [contact@siem.ma](mailto:contact@siem.ma)

<http://www.siem.ma>

institutional partner / Investor

**Function :** Investor

GIZ DKTI - Initiative Allemande pour les technologies favorables au climat

Tel : +212 5 37 68 19 39 / Email : [dkti1-maroc@giz.de](mailto:dkti1-maroc@giz.de)

<http://www.giz.de/marokko> - <http://www.dkti-maroc.org>

Partenaire Privé / Investisseur - German Society for International Cooperation (GIZ) GmbH

**Function :** Certification company

Bureau Veritas Maroc

Tel : +212 5 22 54 35 40 / Email : [contact.ma@bureauveritas.com](mailto:contact.ma@bureauveritas.com)

<http://www.bureauveritas.ma>

Control Bureau Technique: Structure / Fluid / Thermal

## Contracting method

Public Private Partnership

## Owner approach of sustainability

Located in the heart of The School of Education Mohammed VI in the Building Trades and Construction OFPPT in the Settat region, the "SARA" (Social Housing for Positive Energy) is a pilot project initiated by the Cluster EMC (Energy efficiency of Building Materials), and in partnership with the Office of Vocational Training for Employment Promotion (OFPPT), EIS (Energy Investment Company), GIZ DKTl (German Initiative for technology climate friendly) and all members and partners of the Cluster. The "SARA" was part of the inaugural tour by His Majesty King Mohammed VI of the largest training school in the building trades and public works in Africa. The Cluster EMC, Owner of this project, brings together companies, industrial and service providers, consultants, architects, developers, and universities, working for the promotion of sustainable building in Morocco. The cluster remains the first African chapter of the international network dedicated to the environmental transition of the building. To emphasize that the Cluster EMC is supported by the Ministry of Industry, Trade, Investment and the Digital Economy. EMC cluster has set a task, improving the competitiveness of the construction materials industry by providing innovative solutions in terms of energy efficiency. Among the treaties strategic areas within the cluster commissions, include: - Optimization of energy consumption - the development of innovative energy efficiency solutions - Promoting the use of energy-efficient solutions - the mobilization and training of skills in the field of energy efficiency "EMC cluster aims to establish a synergy between, on one side the research and training institutions and other industrialists and professionals creation chain will them in the act of building. This collaborative project is the result of this desire, "said Rachid Naanani, President of Cluster EMC. The objective of this project was to succeed the challenge to provide comfort for all. Social housing positive energy "LEP" is a building whose central principle result of the positive balance between the energy produced and energy consumed. The goal is to reduce energy requirements, maintain comfortable temperatures, humidity control and promote natural lighting. This is the "first social housing positive energy in Morocco." It is part of the construction process complies with Energy Efficiency in the Construction Code (CEEB) and according to the new Thermal Building Regulations in Morocco (RTCM). The project aims to be a bridge between training and Moroccan industry. The project launched by His Majesty King Mohammed VI January 27, 2016 is certainly a unifying tool in the field of sustainable construction in the Kingdom. This implementation is intended in the short term a case study to real and replicable scale, but also in the long term, a bridge between OFPPT the training school and local industry, both in terms of training and in terms practice.

## Architectural description

Bioclimatic architecture. This first Moroccan experience in the social housing segment highlights a simple and ambitious architecture. "Through this achievement, we wanted to ensure that the thermal and acoustic comfort in housing within the reach of all Moroccan citizens," said Ahmed Belamine, Project Architect of the first social housing positive energy in Morocco "LEP" and President of the Commission Sustainable Building Cluster EMC. Furthermore, this achievement showcases the Moroccan industrial noting the challenge of achieving a rate of integration of local materials exceeding 95%. The project meets the requirements of the specifications Moroccan loads for social housing. It extends over a covered area of 64 m<sup>2</sup> and a net area of 55 m<sup>2</sup>, in accordance with the specifications of social housing in Morocco sold 250 000 - DHS; It is a construction with optimized orientation for both the thermal comfort the photovoltaic efficiency. Its position provides thermal inertia ensuring occupant comfort both during winter and summer. The openings have been studied for a renewal of air in the home and providing hygienic conditions and optimal health to the people.

## If you had to do it again?

Experience is certainly over again, on a large scale. This achievement is a replicable case study, but also a bridge between training institutes in the business of construction and local industry, both in terms of training and in terms of practice.

## Energy

### Energy consumption

Primary energy need : 68,50 kWhep/m<sup>2</sup>.an

Primary energy need for standard building : 120,00 kWhep/m<sup>2</sup>.an

Calculation method : Other

CEEB : 0.0023

Breakdown for energy consumption :

lighting heating 16.17 53.86 1.86 Cooling DHW 11.94 16.17 equipment

### Envelope performance

Envelope U-Value : 0,86 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

Crawl Space Walls U = 0.75 U = 0.70 Facade Glazing Menuiserie + U = 2.05 U = 0.35 Roofing

Building Compactness Coefficient : 0,73

## Renewables & systems

### Systems

Heating system :

- No heating system

Hot water system :

- Individual electric boiler

#### Cooling system :

- No cooling system

#### Ventilation system :

- Natural ventilation

#### Renewable systems :

- Solar photovoltaic

Renewable energy production : 100,00 %

## Environment

### GHG emissions

GHG in use : 355,00 KgCO<sub>2</sub>/m<sup>2</sup>/an

### Comfort

Calculated thermal comfort : T / chauff. / moyenne : 19° C --- T / refroid. / moyenne : 26° C

Acoustic comfort : DnT, A, tr: 39 DbA (standardized acoustic insulation adapted to noise road DnT, A, tr)

## Products

### Product

Kasbah System

Orobrique - Solutions terre cuite

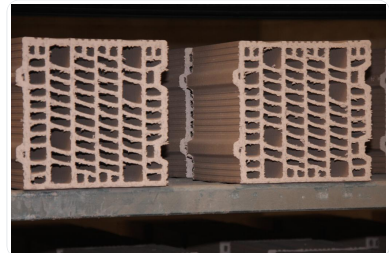
Tel : +212 5 22 95 02 01 / [contact@orobrique.ma](mailto:contact@orobrique.ma)

<http://www.orobrique.ma>

**Product category :** Table 'c21\_italy.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 = '6'

Kasbah System is a new process that has its origins in the architectural heritage of technical kasbates old medinas of North Africa (mythical comfort symbol). > Technical System Attributes: • Thermal inertia • Insulation: the porosity of the material constitutes a barrier to thermal bridges (thermal transmission coefficient  $U < 0.70 \text{ W / m}^2\text{K}$ ) • Sound insulation: cellular structure inducing acoustic comfort > 54 dba • resistance to crushing • reaction and fire resistance • Durability • technical assistance: a team dedicated to the support and monitoring of the design phase (internal BET) to that of a construction project • Low risk • condensation • sanitary quality poses Speed

excellent performance



Photovoltaics: Solar panels / inverters and batteries

Jet Energy International (AR Corporation)

Tel : +212 5 37 74 92 92 / Email : [contact@jetenergyinternational.com](mailto:contact@jetenergyinternational.com)

<http://www.jetenergyinternational.com>

**Product category :** Table 'c21\_italy.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 = '29'

The photovoltaic power plant is composed of 12 solar PV unit power 250Wc. Solar panels are high-performance crystalline silicon CubEnergy 250Wc designed by PV Industry, a leader in providing products of famous brands and high quality in solar technologies and certified TUV, CE. Two panels electrically connected in series form a chain. Six channels are connected in parallel with an inverter to generate a photovoltaic field. The inverter SMA Sunny Island 3.0M brand is connected to the grid "local" low voltage, the electricity produced is thus directly consumed by electrical equipment (consumption).

excellent performance



IsolPro TIP-10 - Mortar thermal insulation for floors and roofs

Comarev

Tel : +212 5 22 23 30 60 / Email : comarev.sa@menara.ma

<http://comarev.ma>

**Product category :** Table 'c21\_italy.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 = '7'

ISOLPRO TIP-10 is a premixed mortar to power high thermal insulation, consisting of hydraulic binders, virgin polystyrene beads and specific additives. ISOLPRO TIP-10 is designed to insulate and heat treating floors and roofs of all types of new or old buildings, with a coefficient of thermal conductivity  $\lambda$  0.074 class T1; resistance to diffusion of water vapor  $\mu$  10; compressive strength of 1.48 N / mm<sup>2</sup>

excellent performance



GreenMat painting

Atlas Peintures

Tel : +212 5 22 35 07 27 / Email : contact@atlaspeintures.ma

<http://www.atlaspeintures.ma>

**Product category :** Table 'c21\_italy.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 = '12'

GREENMAT is an environmentally friendly paint water-based matt, odorless and without volatile organic compounds (VOCs). GREENMAT is used for protection and decoration of new or maintenance, indoor or outdoor. GREENMAT the lacquer is based on a pure acrylic binder in aqueous dispersion neat wall surfaces, wood or metal joinery new or maintenance work.

excellent performance



Double Glazing Saint Gobain

MedGlass Industry (AR Corporation)

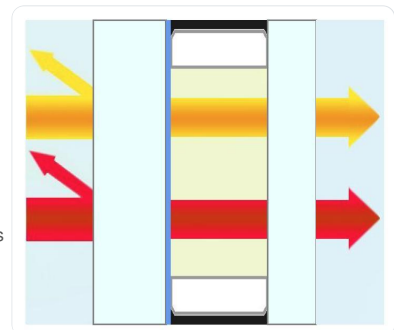
Tel : +212 5 37 74 98 00 / Email : contact@medglassindustry.com

<http://www.medglassindustry.com>

**Product category :** Table 'c21\_italy.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'

Double glazing factory sealed and consists of sheets of glass separated by an air space and / or dehydrated gas through a space. First glass Planiclear 6.00mm / 4.00mm Planiclear Second glass with a heat transfer (- 0 ° relative to the vertical) Ug: 2.0 W / (m<sup>2</sup>K).

excellent performance



Cype Software (Distributor: Cype Morocco)

Cype Ingenieros S.A

Cype Maroc / Tel : +212 6 62 14 10 50 / Email : cypemaroc@gmail.com

<http://www.cypemaroc.com> / <http://www.cype.fr>

**Product category :** Table 'c21\_italy.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 = '29'

Software for structural calculation (carriers Kasbah walls System) / Fluid Calculations / Simulation Thermodynamic (STD)

excellent performance



Optical fiber

Méditel

Tel : +212 5 20 20 02 66 / Email : contact@mditel.ma

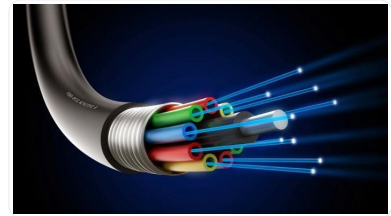
<http://www.meditel.ma>

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AS oneINNER JOIN innov\_category AS two ON one.parent\_id = two.idWHERE one.state=1AND one.id = '29'

Equip this accommodation fiber can launch a wave of democratization of access to high speed all the different classes of Moroccan society and its commitment to modernization of the housing sector by supporting the development of homes connected to all Moroccans and in the cities of the Kingdom.

excellent performance



## Costs

### Construction and exploitation costs

Global cost : 16 500,00 €

Renewable energy systems cost : 5 500,00 €

Global cost/Dwelling : 16500

## Urban environment

The "SARA" project (Social Housing for Positive Energy) is a demonstrator model, it is located at the School of Education Mohammed VI in the Building Trades and Construction OFPPT in the Settat region of Morocco .

## Building Environmental Quality

### Building Environmental Quality

- indoor air quality and health
- consultation - cooperation
- acoustics
- comfort (visual, olfactive, thermal)
- energy efficiency
- renewable energies
- building process
- products and materials

## Contest

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

### Building candidate in the category



Energie & Climats Chauds

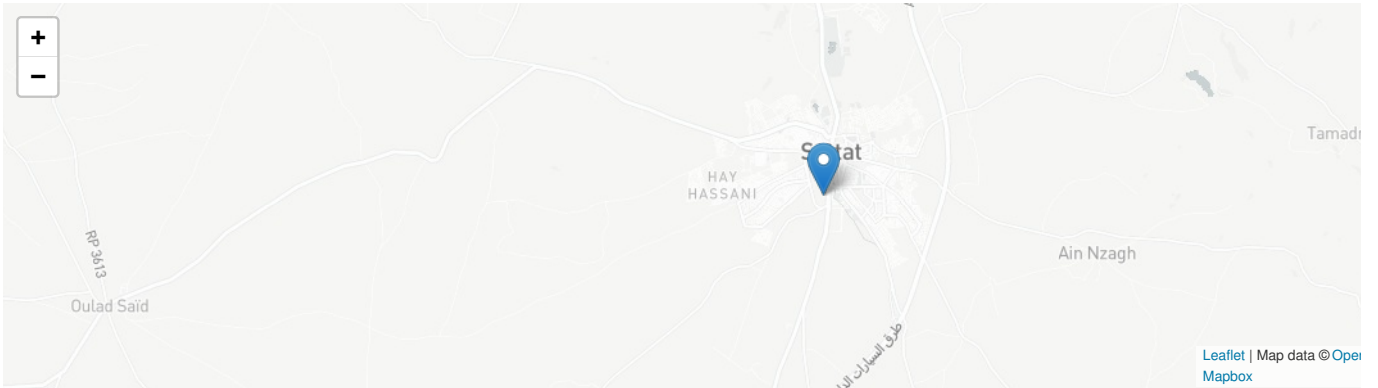




Bâtiment Intelligent



Coup de Coeur des Internautes



Date Export : 20230613165617