


# Nianing's church, Senegal

by Nicolas Vernoux-Thélot / 2019-06-07 17:00:50 / France / 7673 / FR



New Construction

**Primary energy need :**

3 kWhep/m<sup>2</sup>.an

(Calculation method : )

**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** : Other building  
**Construction Year** : 2016  
**Delivery year** : 2019  
**Address 1 - street** : Nianing, Sénégal Sénégal NIANING, Autres pays  
**Climate zone** : [As] Tropical dry

---

**Net Floor Area** : 457 m<sup>2</sup>  
**Construction/refurbishment cost** : 1 059 799 €  
**Number of none** : 3 none  
**Cost/m2** : 2319.04 €/m<sup>2</sup>

General information

Located on the shells' coast, south of Dakar, the project is imbued with this regional particularity taking as a starting point the spiral shape of a cymbium.

Oriented towards the east and sloping towards the sky, the building closes to the north and the south to protect itself from the sun and the harmattan.

The building opens to the west to capture the freshness of the trade winds by a set of volumes broken down into seven vaults with a bell tower that rises to 45 meters and plays the role of both signal and ventilation chimney.

In order to put in place a natural passive ventilation, the project is inspired by the functioning of the African termite mound which is an extremely efficient model of thermal regulation. It is also inspired by the operation of wind towers in East Africa, which have also been known for centuries for their effectiveness.

## Sustainable development approach of the project owner

Promote the hiring of a local workforce for the construction of the building.

The Eiffage company honored this request and hired more than 50% of the construction team in the Mbour region

## Architectural description

The woods all come from Cameroon forest labeled "respect for the environment and sustainable development". All non-reusable formwork timber for other sites was recovered to build the church choir chairs.

## Building users opinion

Without knowing the work on the passive natural ventilation, the abbot told us when the final reception of the works in April 2019: What a freshness in this church!

## Photo credit

King Lenemy

## Stakeholders

### Contractor

Name : Archidiocèse de Dakar

Contact : Benjamin Ndiaye, archevêque de Dakar

### Construction Manager

Name : IN SITU ARCHITECTURE

Contact : contact@insitu-architecture.net

<http://www.insitu-architecture.net>

### Stakeholders

Function : Construction company

Eiffage Sénégal

Dominique Job / Sandra Villepontoux / Gérard Sénac

<http://senegal.eiffage.sn/>

General Enterprise

---

Function : Structures calculist

ETECS

Lucien Santolini

<https://www.etecsafrique.com/>

Office of study structure

---

Function : Construction Manager

GA2D

Eric Mulot

executing project management relays

## Energy

### Energy consumption

Primary energy need : 3,00 kWh<sub>ef</sub>/m<sup>2</sup>.an

Breakdown for energy consumption : Nave: emergency block \* 5 / Baffles \* 10 / Projectors \* 28 Sacristy and sanitary block and technical: 5 ceiling lights / 1 amp

### Real final energy consumption

Final Energy : 1,00 kWh<sub>ef</sub>/m<sup>2</sup>.an

Real final energy consumption/m<sup>2</sup> : 1,20 kWh<sub>ef</sub>/m<sup>2</sup>.an

Year of the real energy consumption : 2 019

### More information

LED bulb (total consumption: 496 kWh / year)

## Renewables & systems

### Systems

#### Heating system :

- No heating system

#### Hot water system :

- No domestic hot water system

#### Cooling system :

- No cooling system

#### Ventilation system :

- Natural ventilation

#### Renewable systems :

- No renewable energy systems

#### Solutions enhancing nature free gains :

rafraîchissement par tirage thermique qui permet de économiser 112 % de la consommation énergétique de l'édifice

## Environment

### Urban environment

Land plot area : 5 691,00 m<sup>2</sup>

Built-up area : 725,00 %

Green space : 4 311,00

## Products

### Product

#### Concrete

cimenterie locale (à Kirene, environ 50km)

Cimenterie du Sahel

**Product category :** Gros œuvre / Structure, maçonnerie, façade

Reinforced concrete vault, optimization of the material (15cm thick)

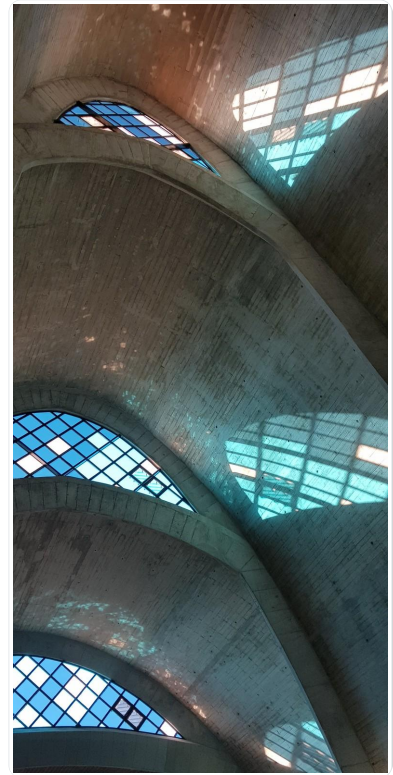
The product was enthusiastically accepted by all stakeholders.



#### steel canopy

**Product category :** Second œuvre / Menuiseries extérieures

The product was enthusiastically accepted by all stakeholders.



Coated coating

**Product category :** Second œuvre / Revêtements de sol

Local shell used as aggregates

The product was enthusiastically accepted by all stakeholders.

Large cunettes and retention basins

**Product category :** Aménagement extérieurs / Gestion des eaux pluviales

At the foot of the vaults were drawn large cunettes that are gravitarily connected to landscaped retention basins located below the site. The retention ponds compensate for the waterproofing created by the building and allow the infiltration of progressive water into the soil during the rainy season.

The product was enthusiastically accepted by all stakeholders.



more than 50% of the workforce was hired in the region

**Product category :** Management / Implication des parties prenantes

The product was enthusiastically accepted by all stakeholders.

Cooling by thermal print of the bell tower

**Product category :** Génie climatique, électricité / Ventilation, rafraîchissement

The verticality of the building has been exploited to the maximum to create natural ventilation day by "chimney effect" and at night the system turns by natural convection.

The product was enthusiastically accepted by all stakeholders.

## Costs

### Construction and exploitation costs

**Global cost :** 1 059 800,00 €

**Reference global cost :** 1 059 800,00 €

**Global cost/none :** 353266.67

**Reference global cost/none :** 1059800

**Cost of studies :** 113 032 €

**Total cost of the building :** 1 059 799 €

## Energy bill

Forecasted energy bill/year : 99,00 €

Real energy cost/m2 : 0.22

Real energy cost/none : 33

## Health and comfort

### Comfort

Acoustic comfort :

PRO BET Impedance acoustic study

## Carbon

### GHG emissions

GHG in use : 0,30 KgCO<sub>2</sub>/m<sup>2</sup>/an

Building lifetime : 167,00 année(s)

## Contest

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

Creation of passive natural ventilation by the bell tower to ensure the freshness of the building and avoid the use of electric fans and air conditioners.

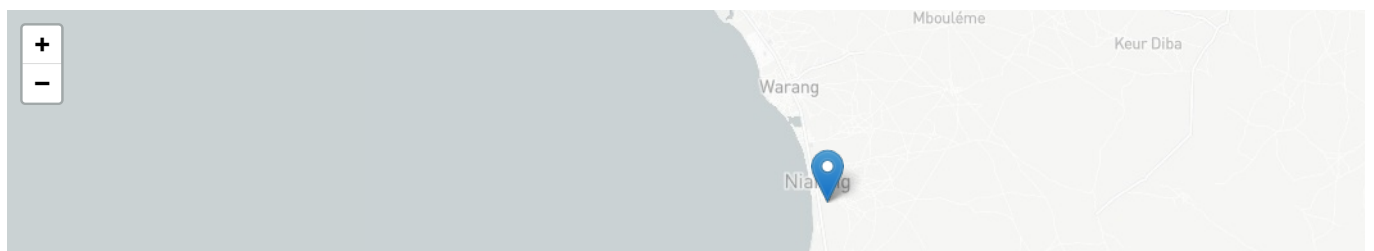
### Building candidate in the category



Energie & Climats Chauds



Prix du public





Date Export : 20230526183114