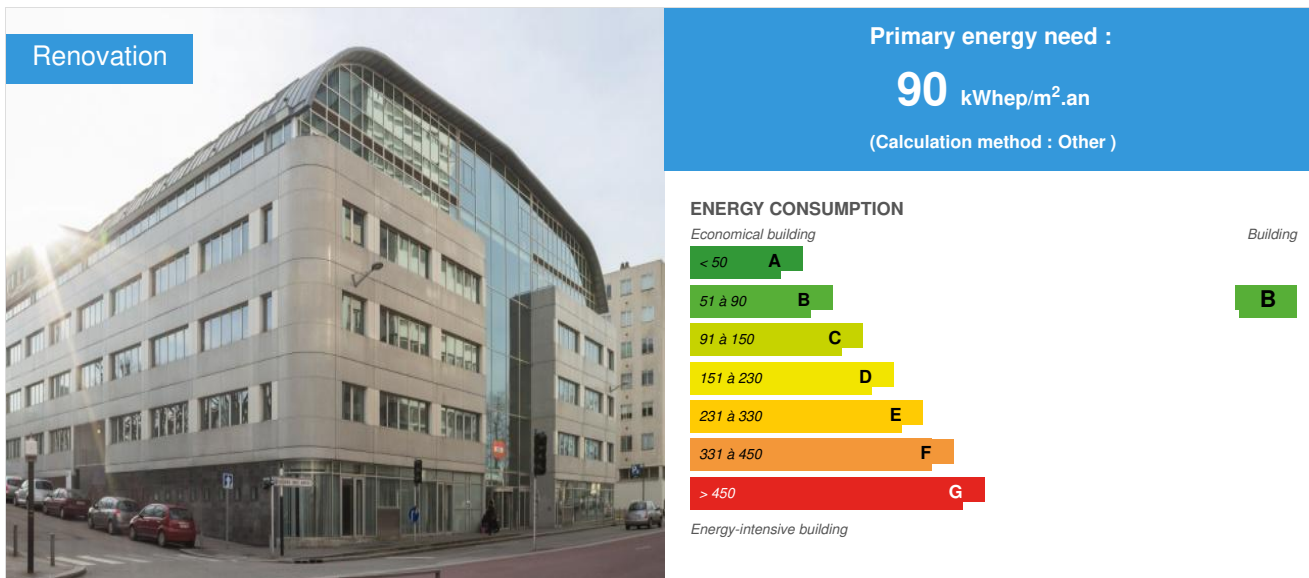


## MARCO POLO

by Cédric Nicard / 2015-06-29 09:00:35 / France / 13452 / FR



**Building Type** : Office building < 28m  
**Construction Year** : 2001  
**Delivery year** : 2003  
**Address 1 - street** : 4 rue Saint Eloi 76000 ROUEN, France  
**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

**Net Floor Area** : 8 972 m<sup>2</sup>  
**Construction/refurbishment cost** : 840 000 €  
**Number of Work station** : 350 Work station  
**Cost/m2** : 93.62 €/m<sup>2</sup>

**Certifications :**



### General information

Implementation of iconic BOUYGUES BATIMENT GRAND OUEST (ex Quille Construction).  
 The building has undergone an energetic and environmental renovation in 2012 and 2013. He is now certified HQE RENOVATION and BBC RENOVATION.  
 The conventional energy consumption was reduced by 40%. The overall energy bill was reduced by more than € 25,000 / year.  
 Historically, the building was developed by CIRMAD PROSPECTIVES and built between 2001 and 2003, according to HQE standards.  
 Building delivered in 2003, very functional, including modular spaces:

- 7220m<sup>2</sup> of offices (some spaces that can be transformed into shops)
- 450m<sup>2</sup> of technical rooms
- An inter-company restaurant
- A gym space, equipped with toilets, showers, infirmary
- 440 underground parking spaces

- Each floor has two toilet blocks, two tea rooms and several meeting rooms.
- The top floor offers a "Club" and VIP space.
- The central patio is vegetated.

## Sustainable development approach of the project owner

Project certified HQE Renovation by Certivéa. The particular strengths of Environmental Quality are:

Adaptability of the building (offices / shops / Restaurant / sport and high divisibility of the building)

Improvement of biodiversity and of the initial sealing rate

user comfort (olfactory, thermal, visual)

Energy efficiency, energy management

Space management, integration of the site

Bouygues Bâtiment Grand Ouest has worked with the engineering office HQE «ELAN» to define an environmental profile adapted to the owner's commitment and to the context of the operation.

## Architectural description

The building is used as offices, is composed of 5 stories and 2 basement levels with a total area of 7906 m<sup>2</sup> useful, including 7393 m<sup>2</sup> of offices and 513 m<sup>2</sup> of technical rooms and sports hall on the ground floor. It also has 440 parking spaces in the basement. Floors, covering an area of about 1500 m<sup>2</sup>, are bright and very functional and allow a very good horizontal divisibility. These floors have a high ceiling of 2.60 m and are laid out around a monumental hall on 3 floors and a vegetated patio. With a depth of 14 meters, they can both operate as open-space partitioned into individual offices. They are served by 2 lifts. The building has a polished concrete facade and a zinc roof. The building also has a Restaurant Inter Company located on the ground floor.

## Stakeholders

### Stakeholders

Function : Contractor

CIRMAD PROSPECTIVES

M. Jean-François BROUILLIEZ

<http://www.cirmad.com>

Function : Construction Manager

ARTEFACT Architectes

Function : Company

BOUYGUES BATIMENT GRAND OUEST

M. Eric PEREGO

<http://www.bouygues-batiment-grand-ouest.fr/>

Function : Environmental consultancy

SCPI PFO2 - Investisseur

M. Cédric NICARD

<http://www.perial.com/nos-produits/pfo2>

## Contracting method

General Contractor

## Type of market

Table 'c21\_belgium.rex\_market\_type' doesn't exist

## Energy

### Energy consumption

Primary energy need : 90,00 kWh/m<sup>2</sup>.an

Primary energy need for standard building : 157,69 kWh/m<sup>2</sup>.an

Calculation method : Other

CEEB : 0.0001

Breakdown for energy consumption : Heating: 25 kWh /m<sup>2</sup> SHONRT.year lighting: 21 kWh /m<sup>2</sup> SHONRT.year Sockets: 20 kWh /m<sup>2</sup> SHONRT.year Ventilation: 15 kWh /m<sup>2</sup> SHONRT.year Air Conditioning: 5 kWh /m<sup>2</sup> SHONRT.year Hot Water: 2 kWh /m<sup>2</sup> SHONRT.year (excluding shower and RIE) Lifts: 1 kWh /m<sup>2</sup> SHONRT.year

Initial consumption : 150,00 kWh/m<sup>2</sup>.an

## Real final energy consumption

Final Energy : 89,00 kWh/m<sup>2</sup>.an

Real final energy consumption/m<sup>2</sup> : 87,00 kWh/m<sup>2</sup>.an

Year of the real energy consumption : 2 014

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Real final energy consumption/m<sup>2</sup> : 96,00 kWh/m<sup>2</sup>.an

Year of the real energy consumption : 2 013

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Real final energy consumption/m<sup>2</sup> : 150,00 kWh/m<sup>2</sup>.an

Year of the real energy consumption : 2 012

## Envelope performance

Envelope U-Value : 0,89 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

The renovation project has not touched the building envelope. Envelope performance remains the same.

Indicator : EN 13829 - q50 » (en m<sup>3</sup>/h.m<sup>3</sup>)

Air Tightness Value : 1,70

## Renewables & systems

### Systems

Heating system :

- Heat pump
- Tape
- VAV System

Hot water system :

- Individual electric boiler
- Solar Thermal

Cooling system :

- Reversible heat pump
- Tape
- VAV Syst. (Variable Air Volume system)

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Solar Thermal
- Other, specify

Renewable energy production : 3,00 %

Solar Sensor Solutions autovidangeables plans. Annual production of announced renewable energy (3%) is in fact the solar hot water, which covers 61% of the building's hot water needs

### Smart Building

BMS :

Implementation of the Counting Plan : Exhaustive (heating, water, electricity, air conditioning, lighting, sockets), counting by area and information stored locally (more than 65 counters).

Smartgrid :

A supervision for monitoring energy consumption and development of awareness among building occupants.

**Users' opinion on the Smart Building functions :** Special attention was paid to the building management system which covers the comfort parameters of heating/air conditioning and of lighting. For lighting, a 1st and 2nd day regulation has been set up (regulation according to the natural light). The user is left free to relight if necessary. In the evening, after the departure of the last collaborator, building switches to «vacancy» mode, which is the complete extinction of lights. This mode is set up for the lowest energy consumption possible without compromising the rebooting the next day. Combining the real needs of the building and automatization of key systems, Building Management System allows now a flexible and easy control because it was modeled on the daily conditions of occupation. It provides therefore a better comfort, improved quality workspaces and allows precise monitoring of consumption. It is now managed by a recognized specialist in its sector [Control Systems Management Board of BOUYGUES BATIMENT GRAND OUEST] and so is the guarantee of the continuity of different actions.

## Environment

### Urban environment

The building is located in the city center of Rouen, near the St Eloi church, in classified area. The implementation of the Marco Polo was done in accordance with the environment

in terms of views, sunlight and noise pollution. The building offers nice views on the Seine and on the «law» vegetated roofs. The U-shaped configuration of the building helps to protect some facades from the wind. Terraces and walkways are accessible to users at any time of the year.

The public transport (buses, metro) are all available within 200m.

Parking is marked on the ground to secure access for pedestrians and bicycles.

## Products

### Product

Air Handling Central Motor low consumption

Ziehl-abegg

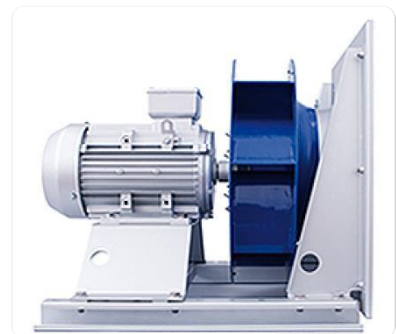
+33 474 460 620

<http://www.ziehl-abegg.com/fr/>

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

Blower motor and low energy extraction

Integrated into the project, this technical choice allowed to bring a good control of the HVAC system performance.



VMC DFE + with high efficiency heat recovery system

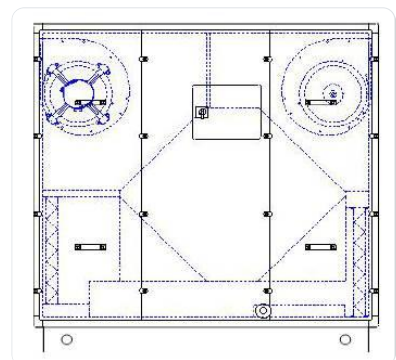
ALDES

<http://pro.aldes.fr/contact/>

<http://pro.aldes.fr/>

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

Series DFE + is a range of controlled mechanical ventilation units (up to 6000 m<sup>3</sup> / h) with high efficiency heat recovery system (90% and more) composed of a counterflow plate exchanger in aluminum, of a condensate drain pan in stainless steel, filters(class G4 / F7) and centrifugal fans with electronic high-efficiency motor (series «micro-watt»). The exchanger is high efficiency counterflow of the air / air type, and is executed in aluminum resistant to sea water, to a temperature up to 80 ° C. The sealing tests according to DIN1946 show a leakage rate of 0.017% at 400 Pa of difference between the 2 air streams. The exchanger meets the EN 308 standards. The exchanger is certified EUROVENT (air / air exchanger program).



Integrated into the project, this technical choice allowed to bring a good control of the HVAC system performance.

SINGLE COIL SENSOR CSOL 423

EKLOR

<http://www.eklor.fr/contact-34.html>

<http://www.eklor.fr/>

**Product category :** Génie climatique, électricité / Chauffage, eau chaude

KBB absorber with aluminum sheet on copper pipe fittings, absorber with 1 tube coil ø 9 mm. Transmission 88%.

The establishment of a solar hot water production helped to feed, amongst others, the gym hall of the building.



DHW solar cylinder B.SOL

EKLOR

<http://www.eklor.fr/contact-34.html>

<http://www.eklor.fr/>

Product category : Génie climatique, électricité / Chauffage, eau chaude

Domestic water from solar collectors storage

The establishment of a solar hot water production helped to feed, amongst others, the gym hall of the building.



LUMIANCE - INSAVER HE 16W 150 LED 4

LUMIANCE

<http://www.havells-sylvania.com/en-gb/contact-us/local-offices/>

<http://www.havells-sylvania.com/fr-fr/>

Product category : Génie climatique, électricité / Eclairage

Recessed LED high efficiency for high power of 4000K with aluminized polycarbonate reflector treated scratch-resistant / low Recessed height 100mm for UGR <23



The choice of LED technology has brought both energy efficiency and visual comfort.

## Costs

### Construction and exploitation costs

Total cost of the building : 840 000 €

### Energy bill

Forecasted energy bill/year : 84 700,00 €

Real energy cost/m<sup>2</sup> : 9.44

Real energy cost/Work station : 242

## Health and comfort

### Water management

Consumption from water network : 3 410,00 m<sup>3</sup>

Water Consumption/m<sup>2</sup> : 0.38

Water Consumption/Work station : 9.74

## GHG emissions

GHG in use : 8,00 KgCO<sub>2</sub>/m<sup>2</sup>/an

Methodology used :

Energy consumption 2014 (conversion factor Base Carbone)

GHG before use : 11,00 KgCO<sub>2</sub>/m<sup>2</sup>

, ie xx in use years : 1.38

## Contest

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

Owner and occupant of Marco Polo building, the company Bouygues BATIMENT GRAND OUEST wanted to thrive in the long term its presence in the building while enhancing its expertise in the energy performance professions to control its environmental impact.

Looking for a third party investor to finance the restructuring and acquire the building, BOUYGUES BATIMENT GRAND OUEST relied on PFO2, SCPI from the PERIAL Group. The mobilization of funds required for the work was based on an operation of "sale and lease-back". This operation has led BOUYGUES BATIMENT GRAND OUEST to sell to PFO2 his building and remain tenant.

### Building candidate in the category



Rénovation énergétique

