URMA de Bruay / Saint-Saulve

by Jean Luc Collet / 2018-06-18 08:30:23 / Francia / 14004 / FR

Primary energy need :

13.1 kWhep/m².an

(Calculation method : RT 2012)

ENERGY CONSUMPTION

Economical building

Building

A

< 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 : School, college, university
Construction Year : 2018
Delivery year : 2018
Address 1 - street : 59880 SAINT-SAULVE, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 9 395 m²
Construction/refurbishment cost : 21 830 000 €
Cost/m2 : 2323.58 €/m²

General information

The building is home to 1300 students in food and bodycare professions. The floors develop a useful surface around 9,000 m² distributed in two wings flanking a central courtyard:

- On the street side, the reception wing, of general and scientific education: The construction integrates the soft natural environmental technologies of the site with the will to be applied pedagogical support and lived of the sobriety for the energy transition. A permanent display of performance achieved will boost communication. The processes used use simple technologies at very low pressures and temperatures, the first maintenance of which can be ensured within the establishment.
- On the courtyard side, the wing of laboratories and technical vocational training workshops.

The architectural philosophy developed is to demonstrate the perfect synergy between the indoor air quality of the premises and high energy performance.

Sustainable development approach of the project owner

Since late 2013, the Regional Council of Nord Pas de Calais, now Hauts de France, has engaged with the Chamber of Commerce and Industry (CCI) in a voluntarist approach called REV3, which aims to support the regional transition to a Sustainable Development, with the aim of positioning the Haut-de-France region as the French locomotive of the "Third Industrial Revolution". URMA de Bruay / Saint-Saulve is one of the buildings labeled "REV3" as a demonstrator of this approach.

Architectural description

The program is divided into two building blocks connected by a covered walkway: A tertiary building with street (mark A) and a rear building with workshops (mark B).

The project, located on the edge of a wetland, uses all the natural resources of the site. Firstly to reduce thermal needs, an over-insulation of the architectural envelope integrates parieto-dynamic glazing preheating new air (mainly for building A). Two thermal wells participate in the renewal of summer air and winter fresh air temperate premises of building A, provided by activated natural ventilation and its calorie recuperator on stale air. Aero-voltaic sensors and a south-west oriented aeronautical elevation enhance the efficiency of this calorie recuperator by supplementing the inputs.

The deep foundations on piles, made necessary by the nature of the ground, act as sensors by ensuring the first frigories of the cold production line of the workshops of the building B and the cooling of the collective premises of the set A + B. The recovery of calories on greywater contributes to the reduction of general needs. Finally the recovery of rainwater roofing reduces consumption of drinking water.

Building users opinion

Building just delivered, not yet occupants

See more details about this project

http://www.hautsdefrance.fr/valenciennois-vers-pole-dexcellence-de-lartisanat/

Stakehol

Contractor

Name : Conseil Regional des Hauts-de-France
Contact : M. LEGROS Jerôme - Tél. +33374277049 - Standard. +33374270000 - jerome.legros@hautsdefrance.fr

Construction Manager

Name : Graph Architectes - José OCA mandataire
Contact : M. COLLET Jean-Luc - Tél. +33327381020 - jlcollet@nordnet.fr

Stakeholders

Function : Manufacturer

Function :

Nord France Constructions

M.Cabiddu Bruno - b.cabiddu@nfc.fayat.com

http://www.fayat.com
Large Large Work

Function :

SDI - CRI

M.Petit Jérôme - direction.travaux@sdi-cri.fr

http://www.groupe-scarna.fr
Second Work

Function :

EGEPP

M.Dolle Christophe - egepp02@egepp-peinture.com

http://www.egepp-peinture.com
finishes

Function :

Delannoy - Dewailly

M.Baccari Vincent - vbaccari@delannoy-dewailly.fr

http://www.delannoy-dewailly.fr
Heating ventilation

Function : Manufacturer

Function : Manufacturer

Function :

Satelec

M.Rodriguez Antony - a.rodriguez@satelec.fayat.com

http://www.fayat.com
electricity

Function : Manufacturer

Function : Manufacturer

Contracting method

Separate batches

Type of market

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Energy

Energy consumption

Primary energy need : 13,10 kWhep/m^2.an

Primary energy need for standard building : 71,20 kWhep/m^2.an

Calculation method : RT 2012

Breakdown for energy consumption : 12.3 KWHEP / M².AN Heating
3.7 KWEP / M².AN ECS
13.3 KWHEP / M².AN Lighting
1.6 KWHEP / M².AN Auxiliary

Real final energy consumption

Final Energy : 8,50 kWhef/m^2.an

Envelope performance

Envelope U-Value : 0,30 $W.m^{-2}.K^{-1}$

More information :
Oversized envelope in ITE with parietodynamic chassis

Building Compactness Coefficient : 0,36

Indicator : n50

Air Tightness Value : 0,45

Users' control system opinion :

no users yet

More information

The figures communicated do not concern the workshops (building B), which are not included in the RT 2012 calculation, as they are part of processing.
The difference between total consumption items and overall consumption is explained by the building's renewable energy contributions.

Renewables & systems

Systems

Heating system :

- Gas boiler
- Low temperature gas boiler
- Geothermal heat pump
- Solar thermal
- Canadian well

Hot water system :

- Condensing gas boiler
- Heat pump
- Solar Thermal

Cooling system :

- Reversible heat pump
- Geothermal heat pump
- Floor cooling
- Canadian well

Ventilation system :

- Natural ventilation
- Canadian well

Renewable systems :

- Solar photovoltaic
- Solar Thermal
- Heat pump on geothermal pile
- Heat pump

Renewable energy production : 58,00 %

Solutions enhancing nature free gains :
Orientation et compacité optimisées,brise-soleil limitant les surchauffes estivales, étanchéité à l'air et isolation renforcées, rafraîchissement par ventilation naturelle activée sans groupe froid.

Environment

Urban environment

Land plot area : 20 549,00 m^2

Built-up area : 28,80 %

Green space : 8 600,00

The project is set up in a rapidly changing area, on the edge of a protected natural area and currently on the fringe of a business park, on the edge of a high traffic road lined with industrial buildings used for commercial purposes. (car dealerships) or small industry. With a structuring project of urban bypass in progress, the establishment of the URMA takes on an increased importance with a role of urban "bridgehead" in size as in alignment for the road which, freed from a part of its traffic by the bypass, will take on a more urban character than it does today. In anticipation of this new function, bike paths and public bus stops have been developed, which are echoed in our project with dedicated bus platforms and equipment for cyclists, serving the smooth travels of this new entrance. These facilities are in line with the philosophy of the project that has rejected the place of the car in the basement to focus on alternative travel and preserve the adjacent wetland.

Products

Product

R-Volt - aerovoltaic sensor

SYSTOVI

M.Mimaud Laurent - l.mimaud@systovi.com

http://www.systovi.fr

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'

sensors that seal and generate both electricity and hot air with a higher yield than other products on the market by keeping the PV cells at optimum temperature.

good acceptance, need to use a service provider in the exercise, between coverage, electricity and ventilation.

FTA thermo-active foundations

Géothermie Professionnelle

M.Jean-Baptiste Bernard - jean-baptiste.bernard@geothermie-professionnelle.fr

http://www.geothermie-professionnelle.fr

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'

thermo-active foundation system

difficulty of integration with conventional heating / cooling systems - technical implementation.

Static extractors Ventilation Natural Activated VNA

Astato

M.Lucet Alexandre - ing2@astato.com

http://www.astato.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 = '19'

Static extractors ensuring a natural draft on the Natural Ventilation ducts Activated

good acceptance - needed debugging on batch interfaces.

Parieto-dynamic ENR windows

Roche France - Ridoret

M.Jean-Baptiste Ridoret - jb.ridoret@groupe-ridoret.com

http://www.groupe-ridoret.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'

Parieto-dynamic breathable triple glazing chassis

good acceptance
- arises like a classic chassis
- pay attention to the dust on site, sealing of the necessary air inlets and dedusting of the internal air space during the site delivery phase.

ERS - wasteful calories recovery on wastewater

Biofluides

M.Poupel Gregory - g.poupel@biofluides.com

http://www.biofluides.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 = '18'

heat recovery system on gray unloaded wastewater through an insulated buffer tank and by means of a heat pump.

good acceptance
- take care of the clutter of the system and the heating / plumber interface

Costs

Construction and exploitation costs

Renewable energy systems cost : 2 486 600,00 €

Cost of studies : 2 440 000 €

Total cost of the building : 21 830 000 €

Subsidies : 500 000 €

Health and comfort

Water management

The project integrates a rainwater collection tank of 250 m3 supplying all the toilets of the operation by a separate network and covering the total water needs of sanitary facilities for the 1300 students and site staff.

Indoor Air quality

The exhaust air extraction uses the same process, by induced air, as the activation of the thermal wells described below. Each extraction duct, in flat duct to optimize congestion, is deployed in the central position of the building, to have a very low pressure drop, in order to operate by natural and / or activated thermal engine, depending on the climatic conditions. The low pressures involved ensure a hygienic renewal of the premises, even in case of malfunction or breakage of equipment, to ensure air quality of the premises.

In the upper part of the extraction regulator, an air / ice water exchanger makes it possible to recover the calories from the stale air.

It operates in a laminar and turbulent mixed flow in vertical chambers in conductive fins and a peripheral tubular coil, in order to present the optimum of the head losses necessary for the two functions. A final extraction induction, on a variator of uses and resources, makes it possible to overcome the turbulences and to ensure the output flows on the roof. The organization with a vertical tendency of the extraction of stale air, leads to regrouping these conduits in 10 vertical sensors, resulting in 10 collectors expansion. To meet the periods of unoccupancy and energy saving, a stale airflow regulator (in butterfly system or guillotine) regulates the extracutatural to zero flow, excluding specific premises with constant ventilation.

Comfort

Health & comfort :

Thermal activated wells (PTA) in room temperature, building A and B.

The levels of the water table, close and fluctuating, favorable to the heat exchange with the earth offer an optimum return of the exchanges in bored thermal wells.

Essentially in building A service, two tracks generate two peripheral circuits. Pumps are cascaded, with a primary heat sink, tempera- ture, in the form of a conventional sewage pipe on the outside and at the bottom of buildings A and B. This brings air into a secondary pipe. , reserved under the building and in line with the elevations of building A.

Central blowing .

The outer area is blown into the primary heat sink, (diameter 1600), to overcome the pressure loss, exchange with the earth, and enter the secondary puitsthermic (which we also call thermal gallery, since it is under the building), at atmospheric pressure.

Activation by airinduit.

The temperate exterior is blown into the flat ducts by the induced air effect, a nozzle calibrated according to the required flow rate, and fed by a centralized fan, on a dimmer, regulated according to the indoor and outdoor temperatures.

Introduction byconvection.

The heated air of renewal complementary to the pariéto dynamic glazingsarrive in plinth of the veil BA, under the radiators, to finalize the temperature of comfort.

The renewal air that arrives in the premises is thus always of optimal quality, at constant temperature and hygrometry, without the use of exchangers or filters subject to fouling and through easily cleanable and visitable ducts.

Calculated thermal comfort : TIC entre 28.0 et 29.3 pour TICref entre 30.4 et 32.3 sans production mécanique de froid

Acoustic comfort :

As the pitch is located less than 50m from two noisy streets, the constructive choice in terms of exterior joinery has been the implementation of dynamic parietal windows. Dynamic parietal glazing ensures, among other things, optimum acoustic protection, thanks to the vibratory independence of the 3 glazed walls that compose them.

In terms of interior acoustics, the comfort of the occupants is sought by the implementation of a wood / concrete ceiling in large volumes, associated with acoustic absorbers and the use of soft Flotex-type absorbent floors.

In smaller volumes, the Flotex is associated with false ceilings whose island configuration maximizes sound absorption.

Finally, the use of a very low pressure natural assisted ventilation avoids any risk of parasitic noise blowing or air intake that are often deplored in the case of a VMC installation.

Carbon

GHG emissions

GHG in use : 2,00 $KgCO_2/m^2/an$

Methodology used :
RT2012 calculation

Building lifetime : 60,00 année(s)

Life Cycle Analysis

Eco-design material :

The project incorporates 730m² of wood-concrete floors, leaving the wood soffit and the wooden beams supporting the concrete slab visible in the large volumes of the operation: refectory, multipurpose room, meeting rooms and resource center. This presence of a natural material, visible on a daily basis for apprentices, has a strong educational value beyond its ecological value.

The technical galleries supporting aerovoltaic solar collectors on the R + 1 and R + 3 roofs are made of wood framing, a technique that consumes less energy than conventional wet construction methods.

Contest

Reasons for participating in the competition(s)

- Control of the interior comfort by a natural ventilation activated very low pressures.
- Insertion of low temperature solar collectors by windows and solar cladding, then high temperature aerovoltaic roof.
- Recovery optimization of sensible and latent calories.
- Climatic well activated in temperate tertiary premises.
- Piles in thermoactive foundations for heating and direct cooling.
- Enhanced recovery of fatal calories from greywater.

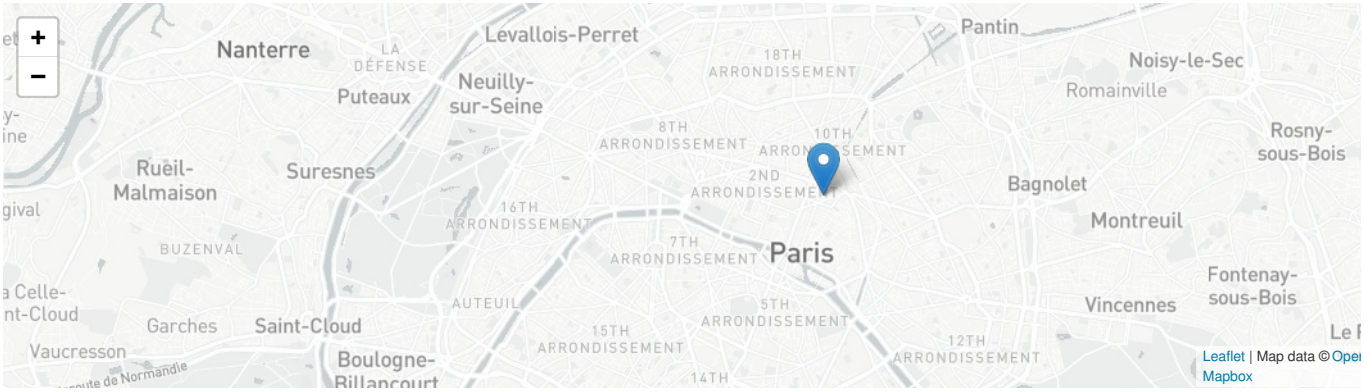
Building candidate in the category

Green Solutions AWARDS
powered by Construction21.org

Santé & Confort

Coup de Cœur des Internautes

Prix des Etudiants



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