Simone Veil Primary School, Rosny-sous-Bois

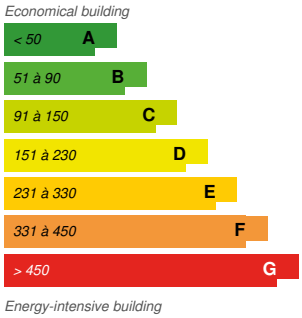
by Charlotte Picard / 2022-06-14 00:00:00 / France / 1859 / FR

Primary energy need :

42 kWhep/m².an

(Calculation method : Other)

ENERGY CONSUMPTION



Building: A

Building Type : School, college, university
Construction Year : 2019
Delivery year : 2021
Address 1 - street : 44 rue Hussenet 93110 ROSNY-SOUS-BOIS, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 3 369 m²
Construction/refurbishment cost : 11 406 536 €
Cost/m2 : 3385.73 €/m²

Certifications :

Proposed by :

General information

The increase in population generalized throughout the city, led to the design of a school with 11 classes of 3383 m² SDP. The design began in September 2018 for delivery in September 2021. This schedule imposed prefabrication, with however the ambition to develop insulated wall boxes in organic straw from the Ile-de-France region (77) coated on both sides int./ext. . Despite the time constraint, the team organized participatory wood-burnt workshops and supervised the collection and transformation of a small part of the wood from the school to the Villarceaux estate (95).

The creation of the Simone Veil school group is part of a process of serving the common good. For this, the team ensures that its actions are positive or neutral on the ecosystems. This ethical research is built around the following principles:

- **Local resources** : identify available unprocessed resources, as well as the origin and environmental impact of each architectural element;
- **Social intensity** : Citizen architecture that reintegrates the act of building by promoting professional integration companies and participatory construction sites;
- **Alternative pedagogies** : Architecture, support for a pedagogy advocating the collective development of the eco-citizens of tomorrow.

A market with an adapted procedure: procedures with negotiations.

Building users opinion

Children, teachers and staff quite satisfied with the building.

If you had to do it again?

If it were to be redone, the best would be not to build... Or smaller, change scale to tend downwards...

See more details about this project

https://www.ekopolis.fr/operation-batiment/groupe-scolaire-simone-veil

Photo credit

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Stakeholders

Contractor

Name : Commune de Rosny-sous-Bois
Contact : 01 49 35 37 00
https://www.rosnysousbois.fr/

Construction Manager

Name : Commune de Rosny-sous-Bois, direction recherche et innovation territoriale
Contact : moerosny93[at]rosnysousbois.fr
https://www.linkedin.com/in/architecture-r%C3%A9g%C3%A9n%C3%A9rative-3a40b3205/?originalSubdomain=fr

Stakeholders

Function : Other consultancy agency

SEMOFI

https://www.linkedin.com/company/semofi/?originalSubdomain=fr
Geotechnical study office

Function : Environmental consultancy

APAVE SUD EUROPE

https://www.apave.com/fr-FR/?utm_source=annuaire_site_web&utm_medium=website&utm_campaign=Annuaire
Control office

Function : Company

UTB

https://www.utb.fr/
Charpentier

Function : Company

Menuiserie David et Fils

https://www.menuiseriedavid.com/
Carpenter

Function : Company

APIJ BAT

https://www.apijbat.com/
Wood and straw construction, plaster on straw

Function : Manufacturer

Lenoir Bois

http://www.lenoir-sarl.com/
Sawmill

Contracting method

Separate batches

Type of market

Global performance contract

Energy

Energy consumption

Primary energy need : 42,00 kWhep/m^2.an

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

Calculation method : Other

Breakdown for energy consumption : Heating: 24.1 kWhpe/m².year DHW: 7.4 kWhpe/m².year Auxiligo: 0.8 kWhpe/m².year Lighting: 8.9 kWhpe/m².year

Envelope performance

More information :
Straw insulated walls, 47cm thick. Mestizo insulated roofs. Ground floor insulated with foamglass.

R of the walls = 9

Indicator : n50

Air Tightness Value : 0,60

Renewables & systems

Systems

Heating system :
- Urban network
- Water radiator
- Radiant ceiling
- Solar thermal

Hot water system :
- Urban network
- Solar Thermal

Cooling system :
- No cooling system

Ventilation system :
- Natural ventilation
- Free-cooling
- Double flow heat exchanger

Renewable systems :
- Solar Thermal
- Other, specify

Other information on HVAC :
Natural ventilation with heat recovery.

Solutions enhancing nature free gains :
Ventilation naturelle.
Cloisonnement en plaques d'argiles.
Murs paille, enduits 2 faces.

Végétalisation des toitures.
Cour végétalisée, favorisant l'apport de fraîcheur.

Environment

Risks

Hazards to which the building is exposed :

- Urban heat island

Risks measures put in place :

- **Building of passive design** : this makes it possible to limit heating needs by minimizing losses as well as avoiding overheating in summer while benefiting from free solar contributions in mid-season.
- **Straw insulation with an R of 9** : the use of this material limits heating needs in winter and keeps you cool in summer.
- **Natural ventilation with heat recovery** : no electricity consumption to ventilate the building, maintenance is simple and it is a solution that lasts over time.
- **Overventilation at night, ceiling fans** : low-tech cooling.
- **Kindergarten playground without bitumen and partially green roofs** : avoids the heat island effect.
- **Massive stove as comfort and emergency heating** in the event of a power cut.

Urban environment

Land plot area : 3 436,00 m^2

Built-up area : 48,00 %

Green space : 1 137,00

The Simone Veil primary school is part of a neighborhood in the making. Located in the north of the town of Rosny-sous-Bois, it is on the edge of a suburban district which extends between the Rosny 2 shopping center to the north, the railway lines to the east (RER E), the boulevard Gabriel Péri to the south and the avenue du Charles de Gaulle to the west. This district is currently the subject of a town planning consultation.

Products

Product

Natural ventilation with heat recovery

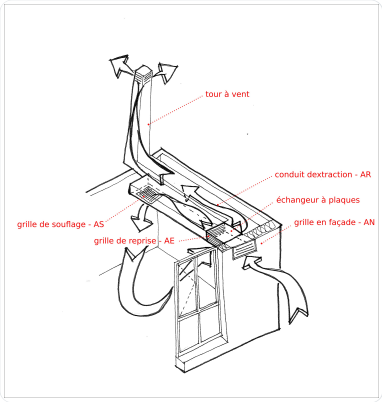
La solution a été conçue par la direction recherche et innovation, Rosny-Sous-Bois et diffusée en partenariat avec le BET Switch.

Ville de Rosny-sous-Bois, BET Switch

https://www.rosnysousbois.fr/; http://www.switch.coop/introtest/

Product category : HVAC, électricité / ventilation, cooling

We are proposing a project that implements an innovative ventilation system which seems to us to be an appropriate response to the current challenges of controlling energy performance at a controlled technological cost: natural ventilation with heat recovery (VNRC).



The system is based on the use of plate heat exchangers in a natural ventilation network. Properly sized, the exchangers recover approximately 50% of the heat from the extracted air and generate acceptable pressure drops.

The originality of the solution lies in the fact that, unlike most natural ventilation strategies which are based on sweeping between an air intake in the lower part and an outlet in the upper part, we implement ventilation paths supply and extraction so that these flows intersect, thus allowing the implementation of heat recovery.

This diagram works if the network is sized sufficiently generously so that the pressure drops induced by the plate heat exchanger remain acceptable; in this case, the pressure differences due to the temperature differences and the action of the wind make it possible, on average, to achieve the expected air renewal.

The implementation of this system supposes the reversal of several solidly established practices concerning the ventilation of tertiary buildings:
• Consider ventilation as a stakeholder in the architecture, integrated into the building, rather than as an independent technical installation, constituting an added layer of distribution ducts.
• Giving users a hand in simple management of air renewal rather than automating the management of a complex installation.
• Aim for overall energy performance of the system rather than just thermal efficiency – in fact, mechanical ventilation installations with heat recovery have thermal efficiency close to 90% but generate significant electricity consumption. The VNRC developed here shows lower thermal efficiency (~50) but has no power consumption for air movement.
• Design a system on a statistical air quality target, based on CO2 concentration, rather than a flow rate target. Current regulations concerning mechanical ventilation are based on achieving air change rates. Natural ventilation is by nature unstable because it constantly balances itself according to internal and

external climatic conditions; the air renewal flow is therefore not guaranteed continuously, it must therefore be resonated statistically and in terms of air quality (on the criterion of CO2 concentration) rather than on flow control.

This system was developed, probably for the first time in France, at the Boutours kindergarten in the municipality of Rosny-sous-Bois, by the City's internal project management unit. The Simone Veil school is the 3rd school project on which the VNRC system has been implemented; the design and implementation have reached a certain maturity. Furthermore, the instrumentation and monitoring of previous projects demonstrated the satisfactory operation of the system.
The Simone Veil school is developing this system on a large scale – it is a school of 11 classes – illustrating the replicability of the system.

Users of school facilities equipped with natural ventilation in Rosny-sous-Bois have integrated this new low-tech technology well, appreciating the thermal comfort of these new buildings compared to the existing aging stock. Simple indicators allow them to know the concentration of CO2 in the classrooms and activity rooms, and the teams are supported by the research and innovation department in handling these buildings.

Costs

Construction and exploitation costs

Renewable energy systems cost : 78 000,00 €

Total cost of the building : 11 700 000 €

Subsidies : 1 246 700 €

Additional information on costs :
€50,000 geothermal substation.
28,000€ mass stove.

Circular Economy

Social economy

Social economy and professional integration :

1 ESS structure was mobilized on this project: APIJBAT

Health and comfort

Water management

A storage tank is set up to recover rainwater. This water is then made drinkable for use in water games for children

Indoor Air quality

Analysis of the CO2 concentration in the building: each classroom is equipped with a sensor that simply displays the CO2 concentration. The probe both controls the activation of natural ventilation and collects information all year round. The first results for the Simone Veil school are good: the concentrations are generally lower than 1000ppm.

Comfort

Health & comfort :

Choice of VOC-free materials.

Acoustic comfort :

Acoustic tests of the facade have been carried out, the results are pending. This will make it possible to know more precisely the acoustic performance of straw facades and the impact of air intakes for natural ventilation.

Carbon

GHG emissions

Building lifetime : 80,00 année(s)

Life Cycle Analysis

Eco-design material :

By choosing to use local biosourced materials (hardwood from the Ile-de-France region, straw) for the construction of our buildings, we are effectively minimizing the GHG emissions associated with their construction.

Contest

Reasons for participating in the competition(s)

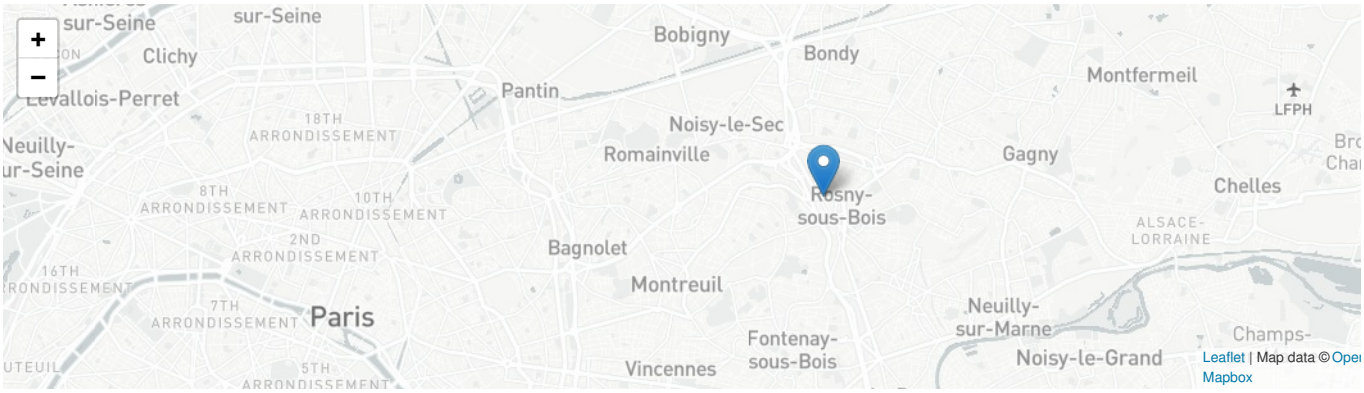
Le projet présenté repond à notre souci permanent de construire des bâtiments **impactant le moins possible l'environnement**, répondant aux **prévisions les plus pessimistes quant à l'évolution du climat** et à l'entretien le plus low-tech possible. C'est donc un projet par nature très résilient.

Les aléas identifiés à Rosny-sous-Bois sont principalement ceux des communautés urbaines denses : **périodes de canicules** de plus en plus présentes, flux d'approvisionnement en énergie de plus en plus tendus et couteux, gestion de l'eau potable.

Pour ce trophée, nous mettons en avant particulièrement un système de ventilation innovant qui nous paraît être une réponse adaptée aux enjeux actuels de maîtrise de la performance énergétique à coût technologique maîtrisé : la ventilation naturelle avec récupération de chaleur (VNRC).

Building candidate in the category

Prix du public



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