


## RTE Transfo Campus (69)

by laure nugier / 2023-03-09 00:00:00 / France / 1103 / FR

**Extension**



Primary energy need :

**28.9** kWhep/m<sup>2</sup>.an

(Calculation method : RT 2012 )

**ENERGY CONSUMPTION**

*Economical building* *Building*

|           |          |          |
|-----------|----------|----------|
| < 50      | <b>A</b> | <b>A</b> |
| 51 à 90   | <b>B</b> |          |
| 91 à 150  | <b>C</b> |          |
| 151 à 230 | <b>D</b> |          |
| 231 à 330 | <b>E</b> |          |
| 331 à 450 | <b>F</b> |          |
| > 450     | <b>G</b> |          |

*Energy-intensive building*

**Building Type** : Office building < 28m  
**Construction Year** : 2019  
**Delivery year** : 2021  
**Address 1 - street** : 2119 Avenue Henri Schneider 69330 JONAGE , France  
**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

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**Net Floor Area** : 20 250 m<sup>2</sup>  
**Construction/refurbishment cost** : 51 000 000 €  
**Number of Work station** : 350 Work station  
**Cost/m2** : 2518.52 €/m<sup>2</sup>

Certifications :



### General information

“ Transmitting, transforming and passing on the current... for the general interest. ”

— RTE

RTE, a committed and exemplary contracting authority

The RTE Campus brings together training and research and development activities for transport and electricity networks on the single Jonage site. More than 30,000 m<sup>2</sup> of buildings for a synergy network with the Lyon innovation pool (start-ups, clusters, fablabs, etc.) established to experiment and develop the digital tools essential to the management of the electricity network of tomorrow (control- control, power electronics, information systems, etc.). In a context of energy transition and the necessary evolution of the network, RTE initiated this project in **an overall operating cost approach** including the costs incurred by the operation and maintenance of the site.

## RTE transformer campus: an efficient ecosystem

The design teams have seized on this ambition to create an efficient and innovative ecosystem, to design the project and design **a welcoming workplace and education, promoting creativity, well-being, and exemplary in terms of sustainable development.**

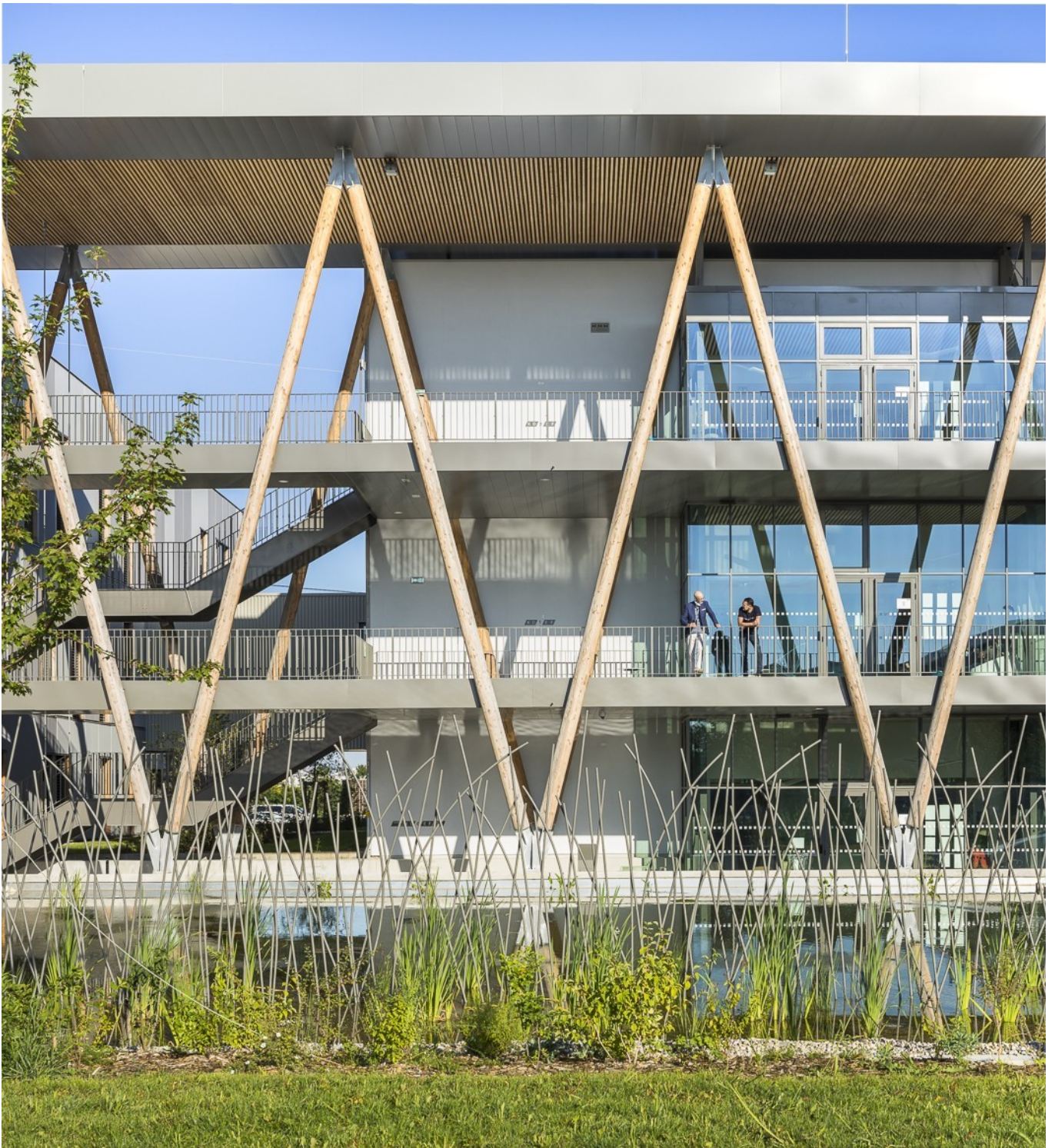


As an extension of the interior street that crosses the existing building, two covered exterior streets have been created, connecting the various buildings in a comb. The volumes follow one another like pavilions around this spine, revealing the bias of an **evolving and extensible constructive framework, adaptable to future projects.**

To preserve this flexibility and these evolutionary choices, the tertiary sets and the technical platforms are separated. Each of these programs has its own constraints of building thickness, slab-to-slab heights, raised floor thicknesses, acoustic constraints, lighting, etc.

This arrangement also makes it possible to protect the tertiary areas from the noisiest technical areas.





## Innovative facades in a wood / concrete mix

The design in V and against V of the Douglas posts of the wooden framework of the streets, gives the rhythm and makes, in passing, a skilful nod to the sinusoidal signal of the alternating electric current.

The cladding consists of an **FMB facade combining a wooden frame with a reinforced concrete facing**, an innovative process developed by AIA Ingénierie with a patent filed with the INPI. It responds to a challenge of **constructive frugality, the right material in the right place**.





The interior spaces offer a **comfortable working environment** and quality to the 370 permanent staff and 7,000 trainees over the year, while allowing **great flexibility in terms of layout**, as is customary in the age of telecommuting and diversified working methods. The assumed visibility of the wooden frame gives a view of the architecture and contributes to a warm atmosphere.





## Users at the heart of the project

**Biodiversity is placed at the heart of the project** through careful definition of the landscape program. Users can enjoy large terraces refreshed by long aquatic basins, an orchard that brings flowers to insects and fruits to employees in all seasons, a rustic meadow and a picnic area.





## A project with high environmental value

The programmatic requirements of the MOA "HQE BD – BIOSOURCE – BEPOS – BIODIVERCITY" laid the foundations for the environmental design approach. For our team, its application to the act of building opens up new perspectives and new potential. **The interest is indeed to go beyond the purely energetic or constructive passive ambition, to combine the approaches: a real strategy at the scale of the site, an anticipated resilience on the future, as well as a performance and an assumed desirability.**

The cross-analysis of the nearby territory, the existing site, the functional program and the environmental ambitions enabled us to work in a transversal design approach to propose a project that meets the specific challenges of the operation. **All of the architectural and technical choices are the result of reasoned work on the environmental quality of the construction, examined under the filter of the quality of use and the comfort of the various users.** At the same time aesthetic, ergonomic and durable, the project covers all areas of reflection.

## Building users opinion

Users are very satisfied with the site and appreciate the facilities, the natural and artificial lighting and the summer comfort. Winter comfort could be improved by more precise knowledge of equipment settings (blowing speed, remote control operation and BSO). They are sensitive to the fact that their workplace is very ecological and find the bodies of water, vegetation, outdoor equipment and biodiversity on the site very pleasant.

## If you had to do it again?

The project could have been designed with an integration of reuse of materials.

## BIM approach

The project carried out in total cost was the subject of a BIM approach which was essential for the success of this operation.

## Photo credit

Sergio Grazia

## Stakeholders

### Contractor

Name : RTE (Réseau de Transport d'électricité)

Contact : Yann MONTABROUD - yann.montabroud[a]rte-france.com

<https://www.rte-france.com/campus-transfo>

### Construction Manager

Name : AIA life Designers

Contact : Laure NUGIER - l.nugier[a]a-i-a.fr

<https://www.aialifedesigners.fr/>

### Type of market

Not applicable

### Allocation of works contracts

Build and sell construction

## Energy

### Energy consumption

Primary energy need : 28,90 kWh/m<sup>2</sup>.an

Calculation method : RT 2012

### More information

The project was monitored over 2 years: real energy performance (energy recovery) – monitoring of maintenance operation – monitoring of comfort in the premises – support for commissioning, etc.

## Renewables & systems

### Systems

Heating system :

- Radiant ceiling
- No heating system

Hot water system :

- Individual electric boiler

Cooling system :

- Radiant ceiling

#### Ventilation system :

- Double flow heat exchanger

#### Renewable systems :

- Solar photovoltaic
- Other, specify

Renewable energy production : 46,00 %

#### Other information on HVAC :

##### Heating :

- Heating by renewable energy: all new buildings are heated by recovering heat from cooling systems dedicated to the activity of the technical platforms;
- More than 1000 m<sup>2</sup> of photovoltaic solar panels: 200 kWp.

##### DHW:

- Hot water tank ;
- Recovery of EP for toilet flushing;
- Hydro-saving taps to control water consumption.

##### Refreshment:

- cooling by radiant panels in the offices;
- Temperature control by users for adaptive comfort and to make users involved in the energy sobriety process.

##### Ventilation :

- Double flux ventilation ;
- Automatic adaptation of ventilation by continuously measuring the quantity of CO<sub>2</sub> in meeting rooms.

ENR production: 650 Sunpower Maxeon 2 – 360W photovoltaic panels are installed on the two sites (210 on site 1 and 400 on site 2). Production site 1 = 17 kWhpe/m<sup>2</sup>.year and site 2 = 29 kWhpe/m<sup>2</sup>.year.

## Smart Building

#### BMS :

GTC, allowing real-time monitoring: of temperatures, ventilation and cooling of each room; cold/DHW/PV production monitoring, technical alarm feedback, electrical energy consumption monitoring.

Global security supervision: GTC coupling for raising rebate contacts of openings, emergency exits, access controls, cameras, anti-intrusion alarm.

#### Users' opinion on the Smart Building functions :

The uses were explained to the employees present and this practical information is mentioned in the life book provided on the arrival of new employees.

## Environment

### Biodiversity approach

The plant palette: 40 species of trees + 48 species of shrubs + 61 species of perennials + 29 species of grasses & perennials + 13 species of aquatic plants. **The palette consists of 76% native species.**

#### The biodiversity :

- Partnership with the LPO: LPO refuge site;
- 1000m<sup>2</sup> of pools;
- 15,000m<sup>2</sup> of meadow, garden, orchard, valleys, etc. ;
- Nesting boxes built into facades and in trees: gray wagtail, chickadee, black redstart, tree sparrow, kestrel and bat.

#### Mitigation actions on soil and biodiversity :

##### The project presents a strong landscape party whose challenges were as follows:

- Limiting the sealing of plots and maximize the spaces in the ground;
- Managing rainwater on each plot;
- Promoting ecological continuity and biodiversity;
- Creating large wet areas;
- Offering outdoor uses that promote well-being and health.

##### Water management at the plot:

- Impermeable roads and paths: valleys made up of filtering and purifying plants;
- Roof water: infiltration wells or trenches (positioned between the plots);
- Recovery of rainwater to supply **the sanitary facilities and the filling of the basins** .



## Urban environment

### Biodiversity in the neighborhood

The project is located in an urban area in the east of Lyon, in Jonage, within the perimeter of the ZAC des Gaulnes, where a first RTE building was built in 2012. The surrounding buildings are essentially tertiary and industrial in a area which was very mineral and little landscaped. The two project sites, on either side of Avenue Henri Schneider, are linked by a garden square and offer a high-quality outdoor environment with biodiversity at its heart, contributing to the quality of life in the neighborhood.

### Easy travel

Several users are present on the site: permanent RTE staff, RTE trainers, trainees and people external to the structure.

The location of the site was chosen for its multimodal service, in order to offer the various users varied means of transport and to move towards a reduced impact of the modes of transport.

The site is connected to:

- Tramway T3 serving the Part-Dieu station and Vaulx en Velin;
- Several bus lines;
- The Rhonexpress leading to Saint Exupéry airport.

## Products

### Product

Constructive frugality and innovative facade – The mixed wood/concrete facade

Eiffage Construction

**Product category :** Structural work / Structure - Masonry - Facade

The wooden structure:

The skeleton of the office structures is organized around a single post-beam frame of 5.40m x 7.00m. The frame is projected in height on 3 levels G+2 and in thickness on 2 or 3 frames. Mixed floors, combining a wooden joist with an SBB reinforced concrete pre-slab, make their thermal inertia accessible by leaving the underside visible. The cladding is made up of an innovative FMB facade combining a wooden frame with a reinforced concrete facing that has undergone ATEX certification. The offices are connected to the street by exterior floors resting on full-height V-shaped Douglas fir posts. The architectural design is guided by the possibilities of adaptability and scalability of the buildings thanks to the work on the grid

The FMB facade:

The facades of the tertiary and technical bars are made of FMB facade panels, a process developed by AIA Ingénierie. The system is made up of a wood frame panel to which an exterior concrete facing is connected. This arrangement makes it possible to obtain a concrete exterior face, guaranteeing the durability of the structures, while ensuring good thermal insulation but also clean implementation in the context of a low- nuisance site.

The concrete facing is in two slightly different shades, thus allowing continuity of appearance in the event of future extensions.

This facade has been the subject of a site ATEX that we have pre-studied in the study phase with the CSTB to ensure its constructability, its cost and the overall schedule of the operation.

The Covered Street

The post structure in glued laminated wood in V and against V, inspired by the sinusoid of the alternating current. Each strip connects to this common thread through a glazed, bright space, a convivial space and fitted out with suitable furniture in order to offer a working environment oriented towards new uses which lights up in the evening like lanterns. The load-bearing structure in class IV glue-laminated posts fixed on metal plates in raw steel at the foot and head + metal structure and concrete slab on collaborating floor - underside in wooden strip.



## Costs

### Construction and exploitation costs

Renewable energy systems cost : 337 100,00 €

Cost of studies : 4 300 000 €

Total cost of the building : 55 400 000 €

Additional information on costs :

Landscapes, green spaces and landscaping: €1,151,900

### Indoor Air quality

- Materials with low pollutant emissions;
- Automatic adaptation of ventilation by continuously measuring the amount of CO2 in meeting rooms.

### Comfort

#### Temperature level :

- Radiant panels;
- Insulation and high-performance exterior joinery;
- Solar protections controlled by hourly programming;
- Controls of comfort conditions by users (light – solar protection – ventilation).

#### Acoustic comfort :

- Acoustic radiant ceilings;
- Absorbent wall panels;
- Partition performance;
- Acoustic furniture.

#### Visual comfort :

- Quality natural lighting;
- 100% of spaces on the first day;
- Landscape views;
- Blinds with adjustable slats to maintain visual comfort.

### Quality of life and services

- Bowling green;
- Orchard;
- Vegetable garden.

## Carbon

### General infos

#### The project reduces its environmental impacts through technical and energy sobriety:

- Use of ENR: more than 1000m<sup>2</sup> of photovoltaic panels – heat recovery on cooling systems dedicated to the activity of technical platforms
- Integration of wood: Main structure of the project in wood - Facade with a mixed wood/concrete wood frame – false ceilings and cladding in wooden strips – wood from sustainably managed forests
- Control of water consumption: recovery of Ep for flushing, watering and basins 62% of non-drinking water needs covered by Ep – hydro-efficient taps – permanent monitoring of consumption
- Adaptability: Post/slab construction system that allows re-partitioning without work, including for the technique
- Control of operations: centralized management of the building – Energy monitoring – Monitoring of faults and alarms – management and monitoring of technical equipment

### Carbon sink

#### A strong ambition: Level 3 of the Biosourced Label (upstream of RE2020 – project design in 2018)

- Mixed wood/concrete floor
- BMF facade
- External structure covering
- Site 1: 46.2 kg/m<sup>2</sup>
- Site 2: 45.4 kg/m<sup>2</sup>

## Contest

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

Nous candidotons afin de promouvoir les innovations architecturales, techniques, environnementales et les expertises permettant de construire autrement : en



réduisant les impacts environnementaux et carbone et en tenant compte des ressources.

Points forts du projet :

- **L'opération s'inscrit dans une démarche environnementale ambitieuse matérialisée par des certifications et labellisations** : Certification HQE Bâtiment Durable – profil Excellent, Certification Biodiversity, Labellisation Biosourcé : Niveau 3, Labellisation BEPOS 2017 : Niveau E3C1.
- **Une ambition forte : Niveau 3 du Label Biosourcé (en amont de la RE2020 – conception du projet en 2018)**
- **Le projet réduit ses impacts environnementaux par une sobriété technique et énergétique** : utilisation d'ENR, intégration du bois, maîtrise des consommations d'eau, adaptabilité du bâtiment et maîtrise de l'exploitation.
- **Le projet présente un fort parti paysager** limitant l'imperméabilisation des parcelles et favorisant la continuité écologique et la biodiversité.



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