[01]

ARCHIPENTE

Samuel-Paty secondary school,
Construction of a secondary school in Valenton - France

Images HD et PDF du projet

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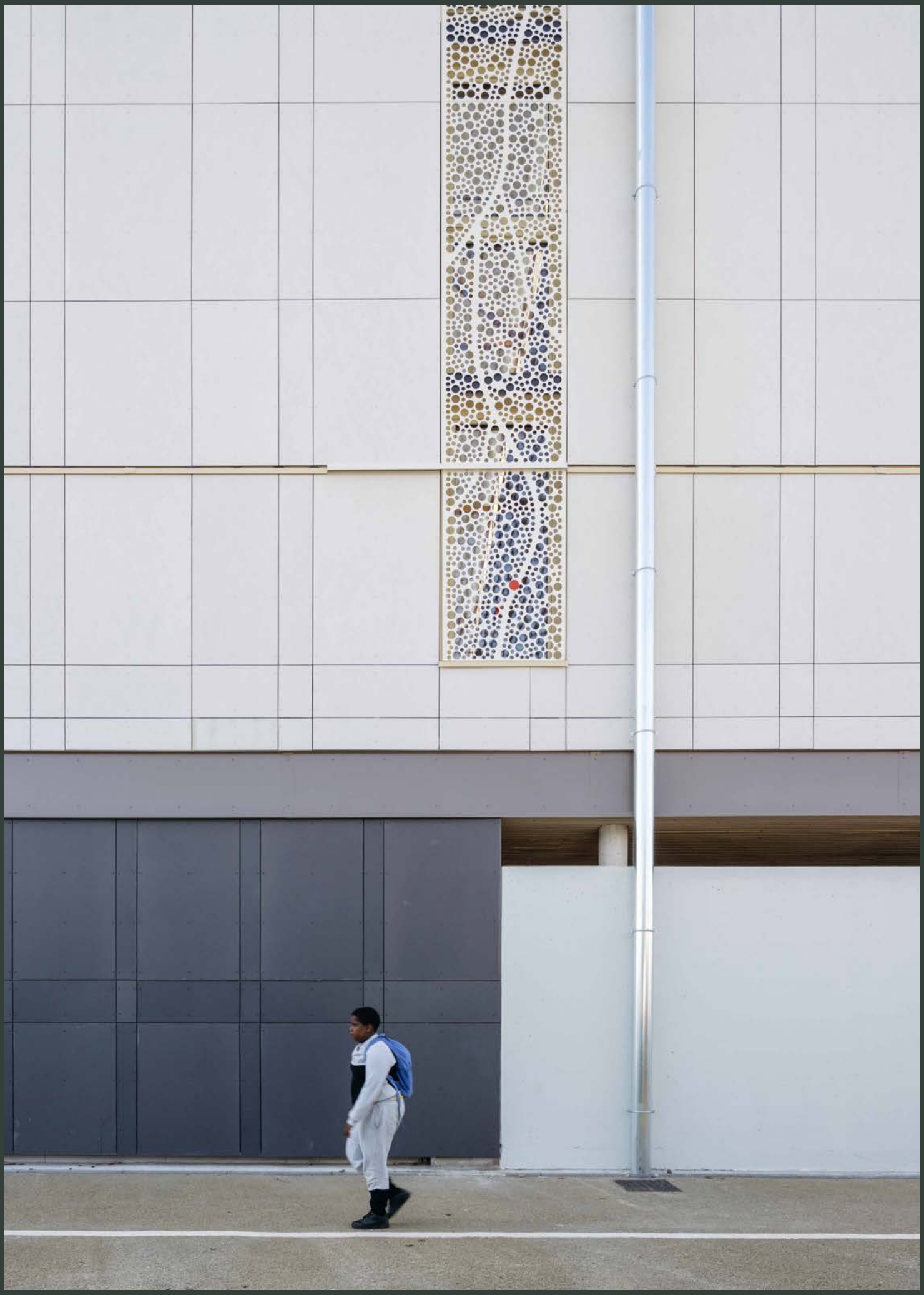
view of Samuel Paty secondary school from the road [01]

Archipente, Samuel Paty secondary school in Valenton

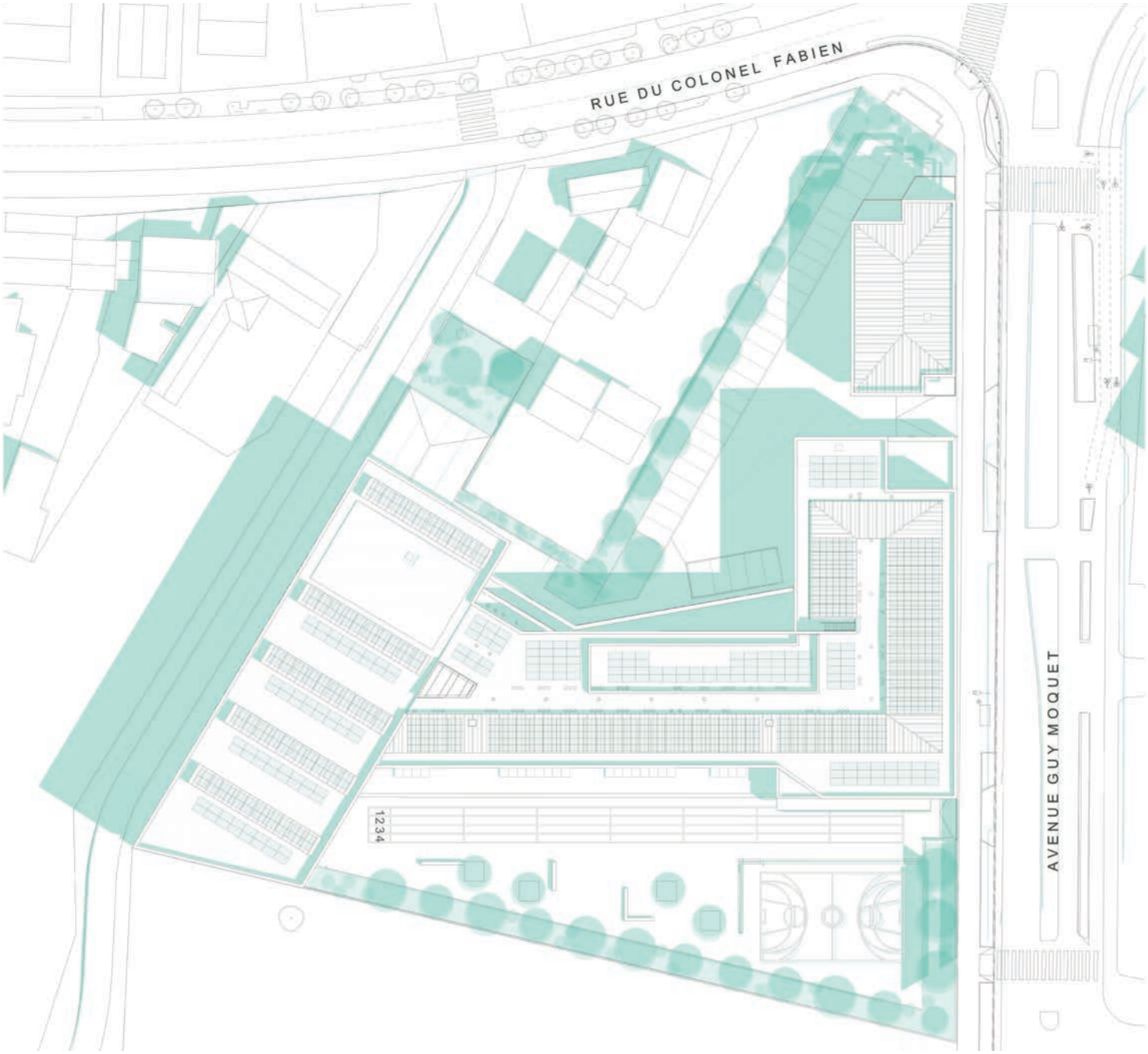


view of the window perforations. [02]

The current crisis serves as a reminder: resource-efficient and energy-efficient architecture is not a secondary consideration. Associated with Maître Cube, within a design-construction-operation-maintenance consortium, ARCHIPENTE has envisioned the Samuel Paty School in Valenton, as it has always approached its projects since 1978: as a fervent advocate of bioclimatic building design. This is the first "Passive Building" certified college in France and the first college in the Île-de-France region with a wooden structure.

The school building, covering 8,500 square meters (750 students), consists of a concrete plinth and two levels of wood post-and-beam construction. It is certified as an HQE "Sustainable Building." A meticulous optimization process during the studies allowed it to be constructed at a lower cost compared to a traditional concrete building. Seventeen massing scenarios were tested using heliodons before finalizing the project's definitive composition, aiming for a balance between contextual integration, usability, and environmental imperatives.

view of the exterior facade of the college [03]



site plan [04]

A consortium of committed actors

Launched in late 2017, the competition was judged in September 2018. The consortium led by Maître Cube, a general wood construction company and the leading wood construction operator in France, was unanimously selected as the winner. In addition to ARCHIPENTE, this consortium primarily brought together actors committed to ecological transition: Enertech (an energy management expert for the past twenty years), Betrec IG (specialized in building engineering, wood structure, infrastructure, and environment), Tribu (a pioneer in eco-responsible building and territorial design), and Omnibus (a landscape architect focused on frugality).

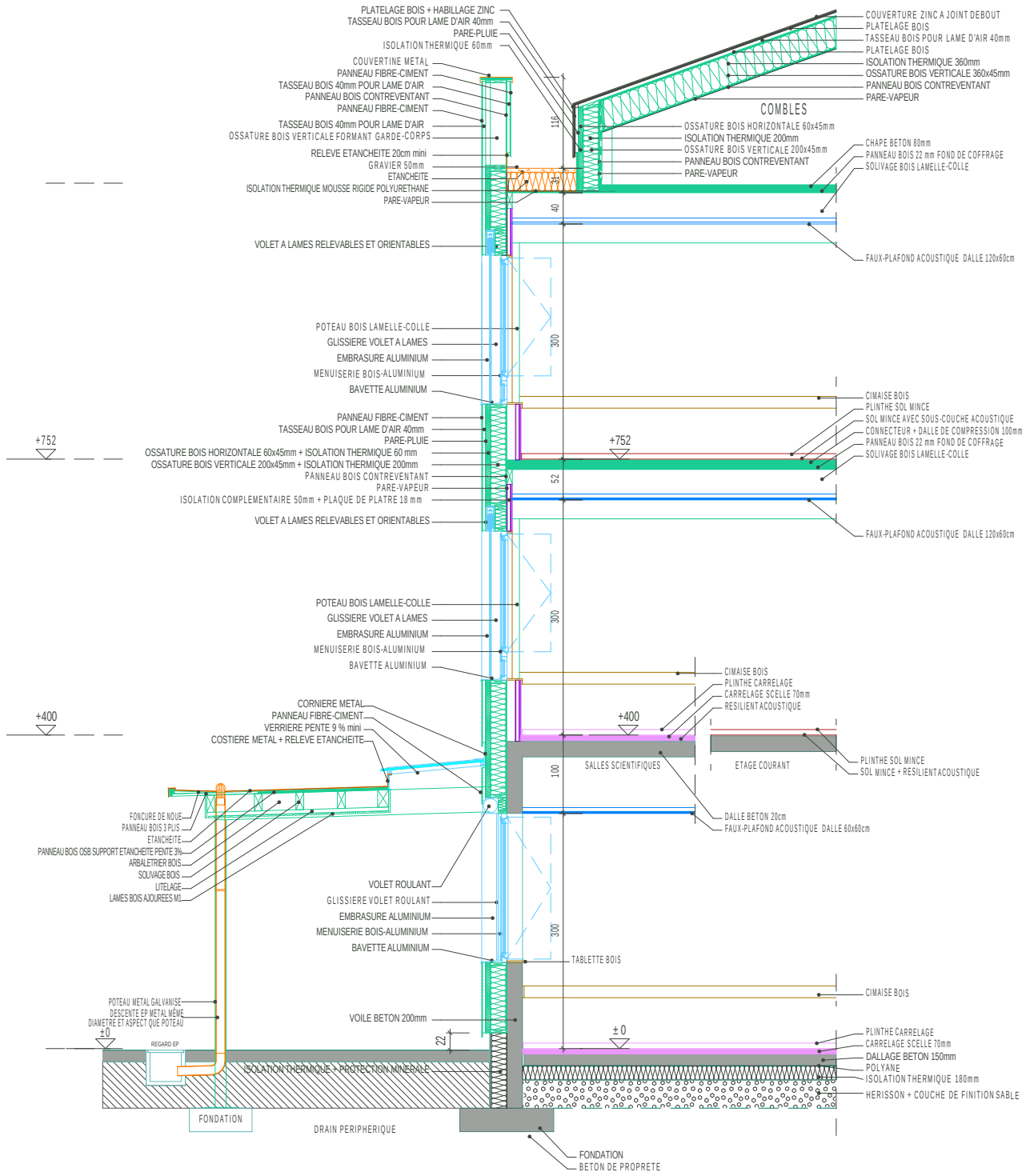
With the exception of the delayed delivery of the gymnasium due to the COVID-19 pandemic (construction began in March 2020), the construction of the school was completed in eighteen months. Engie Axima is responsible for its operation and maintenance until 2024, after which it will be transferred to the Val-de-Marne department. The consortium has two years to address any issues with the building, and they commit to ensuring that the projected energy consumption is not exceeded (15 kWh/m2/year for heating, etc.) and to controlling summer overheating (no day with an indoor temperature exceeding 25°C).

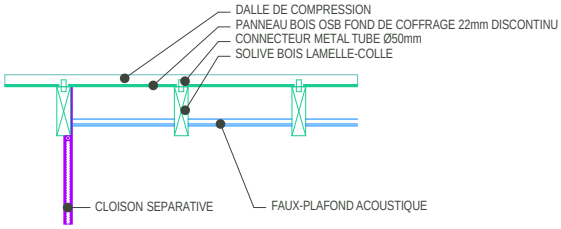
Three buildings, three functions

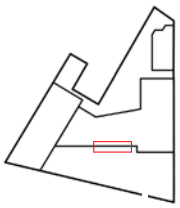
Located at the corner of Avenue Guy-Môquet and Rue du Colonel-Fabien, the project consists of three separate buildings that can function independently. The main entrances to the educational building and the gymnasium are located on Mail Yvonne-Hagnauer, a recently opened pedestrian area by the municipality of Valenton between Rue du 8-Mai-1945 and Rue du Colonel-Fabien. This space is protected from car traffic, providing a calm and secure environment for students and families. The six staff accommodations (double or triple-oriented T5 apartments) are located to the north of the plot, connected to the residential fabric of the neighborhood. They face Avenue Guy-Môquet, allowing occupants to disconnect from their professional environment.

The gymnasium features a collective sports field (for handball, basketball, etc.), a dance studio, and a 14-meter-high climbing wall. It offers various modes of operation depending on the day, time, and users. Outside of school hours, it is made available to associations and sports clubs. The ground floor, which students can access directly from the school grounds, houses the multipurpose hall, changing rooms, and toilets. The first floor is exclusively dedicated to sports activities. It is composed of wooden frames with underlying beams and is punctuated by tall openings on the northwest façade, extended by five rectangular roof lights oriented towards the northeastern light.

The secondary school students have a bicycle and scooter parking area, sheltered by the canopy that borders the entrance gate. They access the classrooms from the playground (a program requirement) by crossing the covered walkway located beneath the educational building. The south-facing orientation of the building allows for maximum winter solar gains and protects the classrooms from summer heat with motorized blinds (adjustable and tiltable slats). Most of the time, the playground is only shaded by vegetation







COUPE DE PRINCIPE SUR PLANCHER BOIS-BETON COLLABORANT

Three buildings, one architecture

Inside, the predominant colors are white, wood, and raw concrete. The light tones harmonize with the brightness of the spaces. Abundant natural light is achieved through continuous strips of triple glazing set within wood-aluminum hybrid frames. Over a hundred light ducts (stainless steel tubes, curved or straight) provide natural lighting to the central corridors and the back of practical workrooms (for artistic and scientific education).

All facades share the same design language, whether it's the educational building, the gymnasium, or the staff accommodations. The spandrels, windows, and blinds have a cream color that echoes the wood interiors. The MOB (wooden frame) fillings are clad with light gray fiber cement panels (Equitone). Steel sunshades, acting as sunbreakers, are installed in front of the staircases and unique spaces (such as the library and gymnasium) to create varied lighting atmospheres, their kinetics guided by the time of day and sunlight.

As is customary, ARCHIPENTE has anticipated the possibility of installing photovoltaic panels on the "fifth façade" of the buildings. The south-facing roof slopes, technical provisions, and structural dimensions are designed to accommodate the weight of the panels and their frameworks. Considering the significant rise in energy prices, the department has embraced the idea of producing its own electricity. A study has been approved to implement a photovoltaic power plant on the college's rooftops. The project will then meet the criteria for "Passive Plus Building" certification.

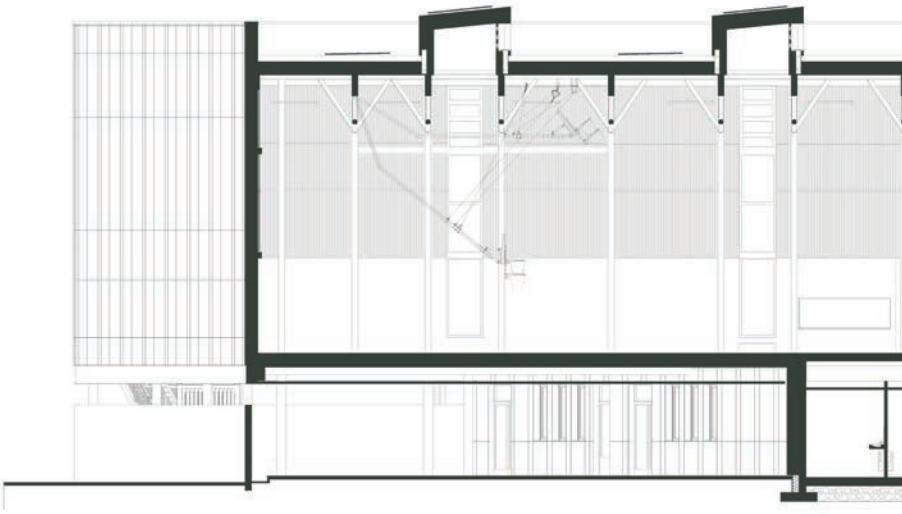
The 550 Bildau & Bussmann wood-aluminum windows contribute to the energy-efficient envelope of the building. The combination of triple glazing and spruce wood allows for meeting both technical requirements (thermal, acoustic, and security performance) and aesthetic considerations. On the exterior, the aluminum finish of the windows perfectly matches the cladding, providing a harmonious appearance to the facades. On the interior, the naturally stained spruce wood of the window frames blends with the unconventional elements of the timber structure, while on the ground floor, it engages in a dialogue with the raw concrete.

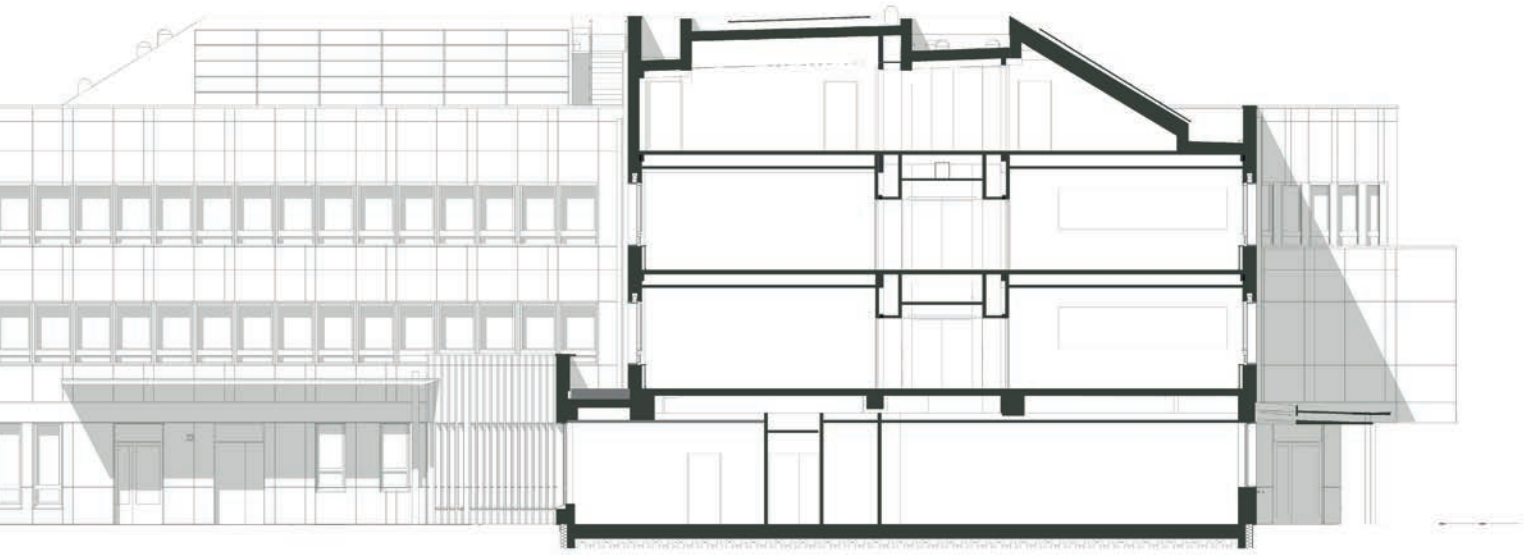
Open plan, active framework

There are essentially two ways to construct energy-efficient buildings. The first involves relying on thick insulation and the efficiency of machines. The second approach involves optimizing the design phase, considering that what is not spent on technology can be invested in material choices and spaces. In Valenton, the second approach is clearly favored. Wood is an excellent ally in this regard. Instead of a concrete structure, a timber frame can accommodate the majority of insulation within its framework.

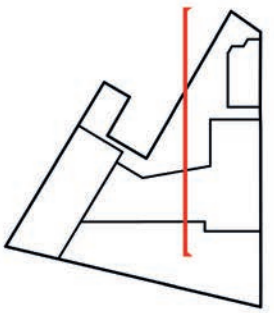
In total, approximately 1,000 m3 of wood, 85% of which is sourced from France, is used in the project. Constructing the floors using dry construction methods requires precise structural planning. All the glulam frames are installed on a 120 cm grid, a measurement that corresponds to the standard width of a wood panel (or wood derivative). As a result, all dimensions in the project are multiples of 30 cm (60 cm, 1.20 m, 2.40 m, 3.60 m, etc.). No partition walls hinder the principle of open plan buildings, which allows for flexibility in modifying partitions according to evolving needs. Concrete cores for staircases and a few diagonal bracing elements are sufficient to stabilize the wooden structure.

The concept of an "active framework" is another valuable tool for the project's flexibility, envisioned by ARCHIPENTE. It involves reserving a long series of service ducts on either side of the central corridors for distributing electricity and utilities. This strategy simplifies the management of space for the double-flow ventilation system, reduces the plenum height of false ceilings, and allows access to technical elements without disrupting the classrooms. This approach will be particularly beneficial when implementing the photovoltaic electricity generation system for the school. As the illustrious Alvaro Siza highlighted, "Architecture begins when all constraints have been integrated."





[06]



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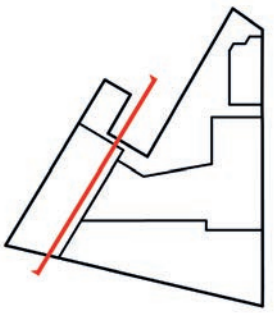
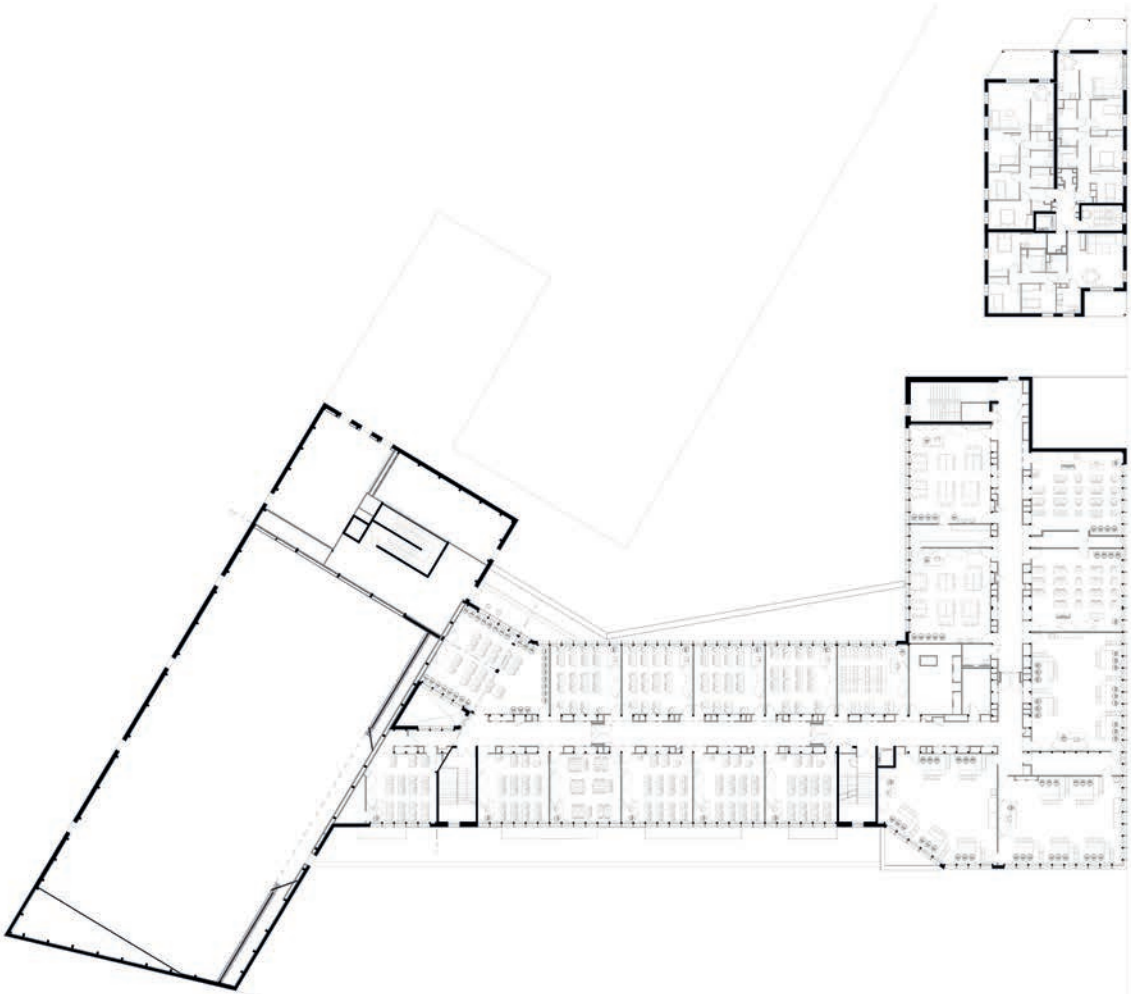
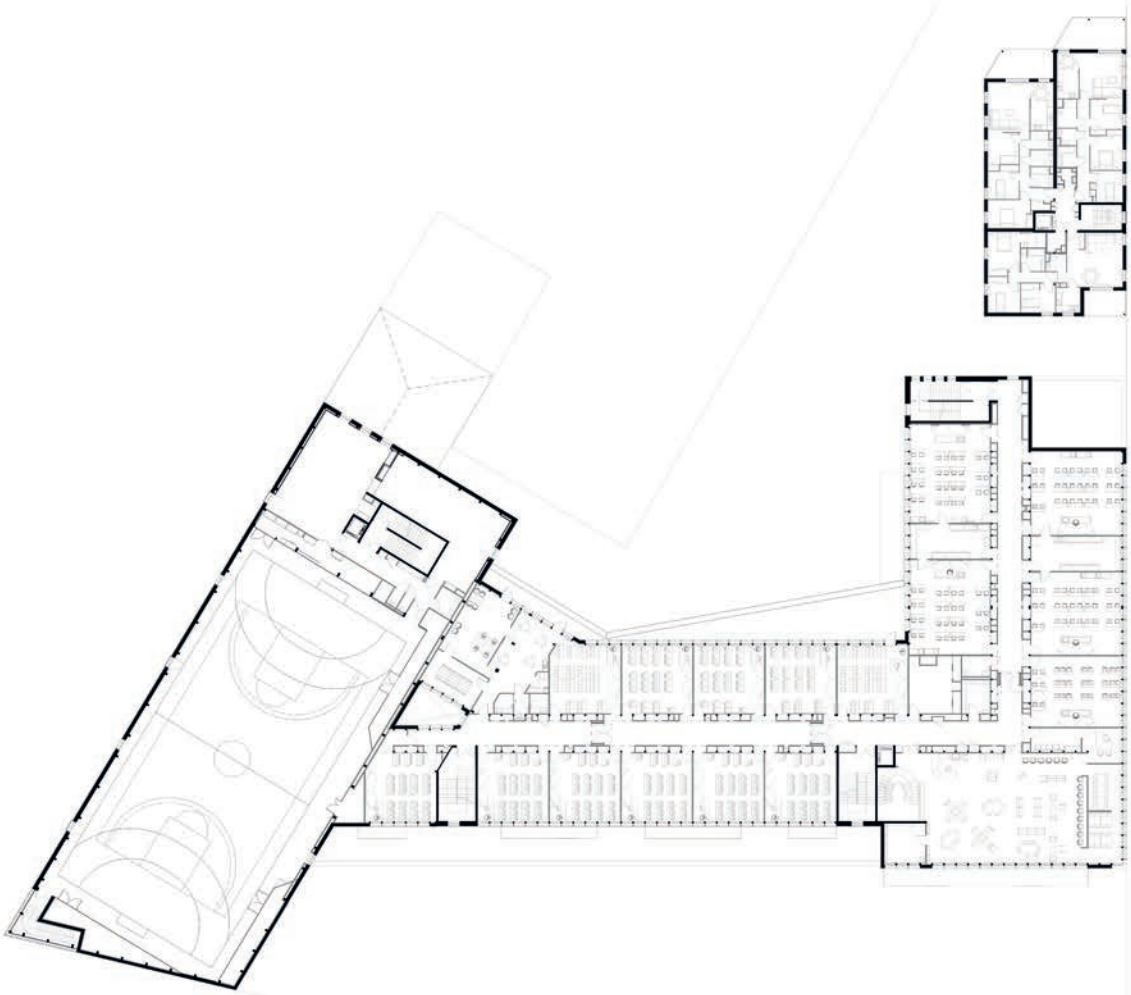


cross section of the secondary school [06]
longitudinal section of the gymnasium [07]

ground floor plan [08]





plan du 2e étage [09]
1st floor plan [10]

aerial view [11]

view of the college from the inner courtyard [12]

«In their art of craftsmanship, carpenters have always been concerned with material conservation for centuries. During the Middle Ages, wood leaving Paris was subject to taxation, and reusing materials was already a necessity. The reuse of materials, the adaptability of buildings, and the storage of CO_2 through wooden construction are more relevant topics than ever.

The Valenton college is an eco-friendly and energy efficient building. It anticipates the climate of tomorrow and allows for changes in use due to its modularity. Maître Cube, bringing together local carpenters, is proud to have realized this project as a general contractor, contributing to a more regional and environmentally conscious economy. I would like to extend my special thanks to Édouard Molard and his firm Archipente for this wonderful collaboration, which has allowed us to grow and nurture our ideas. Wood is making progress!»

Sébastien Méha, Maître Cube Île-de-France

Technical Specifications

Location
Mail Yvonne-Hagnauer, Valenton (94)

Project Owner
Département du Val-de-Marne

Group's representative builder
Maître Cube Île-de-France

Architect
Archipente
Edouard Molard, Christophe Lauer, Victor Caballero, Christian Pupier

Landscape Architect
Omnibus

Engineering Consultants
Betrec IG (economics, fire safety, infrastructure), Betrec lignalithe (structure), Enertech (fluids), Rez'On (acoustics), Tribu (High Environmental Quality), GBA Energie (collective catering), Preventech Consulting (ergonomics), Bureau Veritas Construction (safety and public security)

Operation and Maintenance
Engie Axima

Group Coordinator
Aequo Construction

Mission
Global Performance Public Procurement

Environmental Approach
Certified Passive House, High Environmental Quality BD Excellent 9* certified, E4C1 design approach
Validated bio-based building approach
Renewable energy production: 70.3 kWh/(m²a)
Frequency of overheating > 25°C: 0.0%

Usable Area
8 500 m²

Total Project Cost
19 million euros excluding taxes

Timeline
September 2022 (delivery of the gymnasium), August 2021 (delivery of the college and housing), March 2020 (start of construction), June 2018 (submission of the bid)

view of the college from the inner courtyard [13]

interior view of the secondary school, entrance hall [14]

interior view of the college, hallway [15]

interior view of the college, stairs [16]

interior view of the college, restaurant [17]


ROMANS
N → P

interior view of the college, school library [18]

interior view of the college, climbing wall [19]

interior view of the college, gymnasium [20]

Who are we?

ARCHIPENTE, specialises in off-site timber construction and High Environmental Quality (HEQ).

ARCHIPENTE is an agency founded in 1982 in Montbrison (Loire department) by Dominique Molard, an architect committed to the environment since 1978. Its Paris branch was established in 2012 by Édouard Molard, following seven years of experience in renowned agencies such as Ateliers Lion Associés and Beckmann N'Thépé Architects. The location of this Parisian branch for eight years in the heart of Fablab WoMa, an architectural prototyping workshop equipped with machining and 3D printing machines, reflects ARCHIPENTE's commitment to research and development.

Today, the agency's workforce is divided between the workshop in Montbrison (Rue du Repos) and the workshop in Paris (Rue de Naples, 8th arrondissement). As a specialist in bioclimatic timber architecture, ARCHIPENTE has attracted numerous clients who share its primary goal: achieving carbon neutrality in buildings. Its projects consume little or no non-renewable energy and require minimal maintenance. Nonetheless, they are delivered within very short timeframes, thanks to expertise in off-site construction techniques. Local timber supply chains, bio-based materials, and short supply chains are systematically favored. At ARCHIPENTE, the environmental approach is not a passing trend but rather its raison d'être since its early projects under the leadership of Dominique Molard:

- In 1982, the energy-efficient H2E85 residence in Montbrison consumed only 33 kWh/m²/year for heating, a value validated by two years of measurement by the CETE de L'Isle-d'Abeau. The project was thirty years ahead of the RT2012 regulations.
- In 1994, the Albanais High School in Rumilly (Haute-Savoie) became the largest wooden structure building constructed in France at that time (with a wood volume of 1,400 m3 for 10,000 m2 of usable area).
- In 1998, the Villard-Bonnot High School (Isère) became the first "HEQ" high school in the Rhône-Alpes region. Natural light and summer comfort were its primary targets.

Between 2010 and 2012, two more projects were recognized (through conferences and press) for their innovative approach:

- The Veauche College (Loire) for its energy consumption of 40 kWh/m²/year, pellet heating (25 kWh/m²/year), low soil sealing, rainwater recovery, summer comfort, and natural lighting in its circulation areas.
- The Maison des Ainés in Montbrison, a positive energy housing facility for the elderly, became the first "passive" certified building in the Loire department, and it was awarded the "Habitat solaire Habitat d'aujourd'hui," "Observ'ER," and "Habitat durable" prizes.

ARCHIPENTE, the partners

Dominique Molard (architect DENSAIS): Graduate of the National School of Arts and Industries (Strasbourg), European Master's in Timber Construction from EPFL (Lausanne, Switzerland).

Édouard Molard (architect DENSAIS): Graduate of the National School of Arts and Industries (Strasbourg), certified European Passive Building Designer CEPH+ (Passive House), B.I.M. reference person (Level 2 certification).

Dominique Molard
Édouard Molard
Christian Pupier
Hwanhee Park
Christophe Lauer
Aurélie Granger Rezeau
Amélie Marchiset
Victor Caballero
Lucie Thamas
Marie Bouyssonie
Jacqueline Molard
Laetitia Cesarini

The ARCHIPENTE team [21]

Archipente, Samuel Paty secondary school in Valenton

100 Passive Timber Bio-based Housing Units in Coupvray

- **Client:** MDH
- **Location:** Coupvray (77)
- **Area:** 7700m²
- **Completion:** 1st quarter of 2024
- **Environmental Approach:** Passive Certification - Timber Structure, Bio-based Insulation

Lycée Philibert Delorme Boarding School in L'Isle d'Abeau

- **Client:** Région Auvergne Rhône-Alpes
- **Location:** Isle d'Abeau (69)
- **Area:** 2336m²
- **Completion:** 3rd quarter of 2023
- **Environmental Approach:** Bepos effinergie (Positive Energy Building), renewable energy production of 50.7kWh/m²/year, E4C1, pilot project for "Bois des Territoires du Massif Central" (Wood from the Massif Central Territories).

34 Passive Social Housing Units E3C1 in Montbrison

- **Client:** Loire Habitat
- **Location:** Montbrison (42)
- **Area:** 2615m2 (gross floor area)
- **Completion:** 2021
- **Démarche environnementale:** Certified passive construction, Label E+C-: E3C1 NF Habitat HQE, pre-configuration for positive energy buildings (bepos), Zero Carbon Emissions, Passive House Certification, High-Quality Construction Site, Wood from the Massif Central Territories, Quality of Use, Cost Control
- **Award:** Low Carbon Architectural Innovation, USH 2020

Stent – Wooden Highway Prototype

- **Funders:** European Union - European Regional Development Fund (ERDF), National Fund for Territorial Cohesion (FNADT), Auvergne-Rhône-Alpes Region, Loire Department, Credit Agricole Loire Haute-Loire Foundation for Innovation
- **Completion:** Prototype 2nd quarter of 2023
- **Environmental Approach:** Xylofutur Certification, Valorization of "Large Wood" Resources

ENERTECH SCOP

Enertech is a fluid engineering consultancy that has been committed to the energy transition of buildings for 40 years. Our expertise lies in our measurement campaigns, innovation, a "low-tech" approach, and hands-on experience. We design, renovate, and optimize buildings with low operating costs and minimal environmental impact. As specialists in energy efficiency and comprehensive approaches, Enertech provides services such as thermal and fluid engineering, energy-focused HQE (High Environmental Quality), dynamic thermal simulations, and predictive energy consumption analysis. We are also experts in passive buildings and those classified as "positive energy."

Betrec INGÉNIERIE

BETREC develops all the disciplines of general engineering through areas of expertise: structures (wood/concrete/metal), cost estimation, building systems, road and utility design, demolition/asbestos removal, environmental services, construction management, and project coordination. Since its establishment in 1965, BETREC has adapted and stayed at the forefront of innovation to provide expertise in new technical processes. With a team of 120 employees, BETREC has offices in the Southeast, the West, and the Paris region, enabling close proximity and a good understanding of local stakeholders.

Rez'On
INGÉNIERIE ACOUSTIQUE

Rez'On Engineering has been operating for over 20 years in the fields of environment, industry, and specifically building sector, through the design and construction monitoring of public and private infrastructure (educational, healthcare, hospitality, commercial, residential, cultural, and sports facilities).

TRIBU

Tribu is an eco-responsible engineering consultancy for buildings and urban projects, with offices in Paris, Lyon, and Nantes.

We support both public and private stakeholders in their environmental, bioclimatic, and energy-related approaches at various scales and across a range of expertise, bridging the gap between research and practical application. Our approach is rooted in collective intelligence, constant re-evaluation of practices, and making informed decisions in support of sustainable projects. We provide a holistic and comprehensive vision with the aim of creating buildings, neighborhoods, and territories that are tailored to social and environmental challenges.

omnibus

Omnibus is a landscape and urban design studio founded in 2010, advocating for an engaged approach to design projects that draw their richness and uniqueness from the specificities of each site.

Omnibus develops a landscape and ecological approach that fully integrates nature into developments, promotes the growth of living elements, and enhances on-site resources. A meticulous process of stitching together is undertaken, considering the existing elements, the dynamics of the environment, and the dreams and needs of different users.

This project approach was recognized with the Young Architects and Landscape Architects Award in 2016, presented by the Ministry of Culture.

GBA Énergies

GBA Energies is a thermal, fluid, and kitchen engineering consultancy comprising of 10 engineers and technicians. Based in Auvergne Rhône-Alpes, it operates throughout France. Its strengths lie in the complementarity of its disciplines, experience, close client relationships, and passive design expertise. GBA Energies is qualified by OPQIBI, an organization for professional qualifications in engineering and consulting.

Bildau & Bussmann
Fenêtres et portes en bois

Bildau & Bussmann specializes in the custom manufacturing of wooden and wood/aluminium windows and doors that are integrated into high-performance projects.

Originally a traditional joinery company, Bildau & Bussmann has remained loyal to wood and the roots of craftsmanship, accumulating extensive expertise through various projects. They have adapted to the most specific and sophisticated demands, fitting into architectural styles ranging from the most traditional to the most modern designs.

EQUITONE
Fibre cement facade materials

EQUITONE is a brand of the Etex Group, specializing in fiber cement for over 100 years. EQUITONE collaborates with architects to design durable, innovative, resistant, and environmentally-friendly façade materials. From natural or mineral appearances to the raw character of fiber cement, as well as a wide range of finishes and colors, the EQUITONE product line offers ample inspiration and creative possibilities, allowing for experimentation with shapes and nuances.

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