

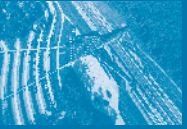
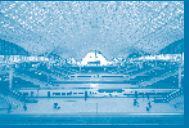
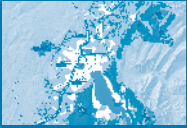
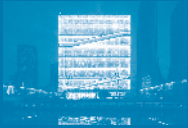
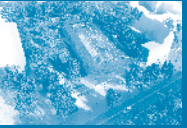
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Let's Invent!

We are at a watershed moment in history. Our era represents a tipping point for what is called the Anthropocene. Ecological emergency is part of our reality; awareness of this lies at the heart of AREP's mission. We face enormous challenges: global warming, the collapse of biodiversity, the scarcity of non-renewable resources.

For around 25 years, we have taken on the responsibility for conceiving projects and providing consulting services and helping our clients through the environmental transition. Our know-how and projects are at the interface between construction and mobility, two sectors that account for more than half of all greenhouse gas emissions. We are a multidisciplinary and international practice. A subsidiary of SNCF Gares & Connexions, AREP group is rooted in the railway industry.

We are proud of this unique legacy. Our global team comprises more than 1,000 professionals of 40 nationalities whose unique blend of specialties embodies our multidisciplinary culture: conception, urban planning, design, engineering, programming, consulting services and project management. We operate both in France and internationally, especially in Europe and Asia, in China and Vietnam where we are firmly established.

With more than 500 projects underway each year, we pride ourselves in spreading our expertise globally, by providing, at all scales and stages of projects, practical solutions designed to respond to the ecological emergency. We have joined forces to create exemplary projects, which meet the real needs of our clients, of the project's current and future end users, as well as of its surrounding environment. Public interest is one of the group AREP's founding values. People and social aspects lie at the heart of our creative process. Our teams pay close attention to uses and to ensuring that the project is perfectly integrated into its historical context and cultural and social environment.

We are actively involved in advocacy. To address climate emergency and the biodiversity crisis, we help fuel the public debate and transform practices. Curiosity is our driving force, and we relentlessly question our ways of doing things. With humility, we are learning from actors who experiment with alternative modes and who build bridges between those traditionally involved in the project production process. Here at AREP, we consider ourselves as catalysts, as an incubator for this ecosystem, a laboratory of interactions with all these actors, and particularly with small enterprises at the forefront of ecological and social issues.

We are active in (re)building a resilient and sustainable world, even if this sometimes involves radical proposals. This revolution concerns landscape as much as conception, design, engineering as well as programming, project management and consultancy for project owners.

To this end, we have developed a unique approach: “EMC2B”. We question, scrutinize and manage our operations through this prism and combine the most advanced modelling methods and common-sense approaches in order to provide simple and frugal solutions that address the following five challenges: energy, materials, carbon, climate and biodiversity.

Finally, we foster exploration: Research and innovation are at the core of our corporate DNA. We reject ready-made ideas of sustainability. We prefer the creativity brought about by each situation in order to promote elegant and sober, efficient and long-lasting solutions. We are heritage experts and as such, we prefer to enhance and transform what is already there through low-tech solutions. Our scientific and technical background enables us to conceive and operate in infrastructural and industrial projects.

Every day, more than 1,000 employees provide practical solutions tailored to the needs of our clients and aimed at meeting the challenges of the ecological emergency.

Post-carbon

The EMC2B approach

We act to bring about the ecological transition.

To achieve this goal, we have developed a unique approach, EMC2B, which guides through the design and analysis of our projects. EMC2B stands for energy, materials, carbon, climate and biodiversity.

EMC2B is the framework we use to make our post-carbon approach operational. EMC2B evaluates the ecological footprint of a project, be it a very small-scale project (for example, street furniture) or a regional scale project (when we assist local authorities with their transition strategy, as in Luxembourg or the Greater Annecy area).

EMC2B is a simple metric that allows us to assess the

five types of transition that any project must address. Using a set of values, we identify, for example, the quantity of materials used and their origin (materials), greenhouse gas emissions (carbon), energy consumption and production (energy), albedo (climate) or the number of trees preserved or planted (biodiversity). This approach is open, free to share, because we all share a common goal: to preserve the liveability of cities, regions and the planet.

Energy

- Promote sufficiency and efficiency and question comfort with regard to real needs.
- Encourage bioclimatic construction systems throughout the process, from the initial construction stages to the finest details.
- Understand and make the most of the physical constraints of the site before turning to technology.
- Use passive systems wherever possible.
- Identify and assess the low-tech solutions that could be employed and the associated costs (construction-operations-maintenance) and deadlines.
- Make the best efforts to wean off fossil fuels and energy over-consumption, promote renewable and diffuse sources of energy.

Material

- As early as the programming stage, question uses and plan spaces so that they occupy the right footprint.
- Choose the performance of the materials according to their use (e.g. the performance of glazing) and the life span of the structure.
- Favor solutions that best preserve the existing structure.
- Favor the use of less materials, easy implementation and maintenance.
- Halt the extraction of non-renewable resources, build “light” by turning mainly to reuse, bio-sourced and earth-sourced materials.
- Minimize the weight of the various elements and the quantity of materials and components by using appropriate building modules.

Carbon

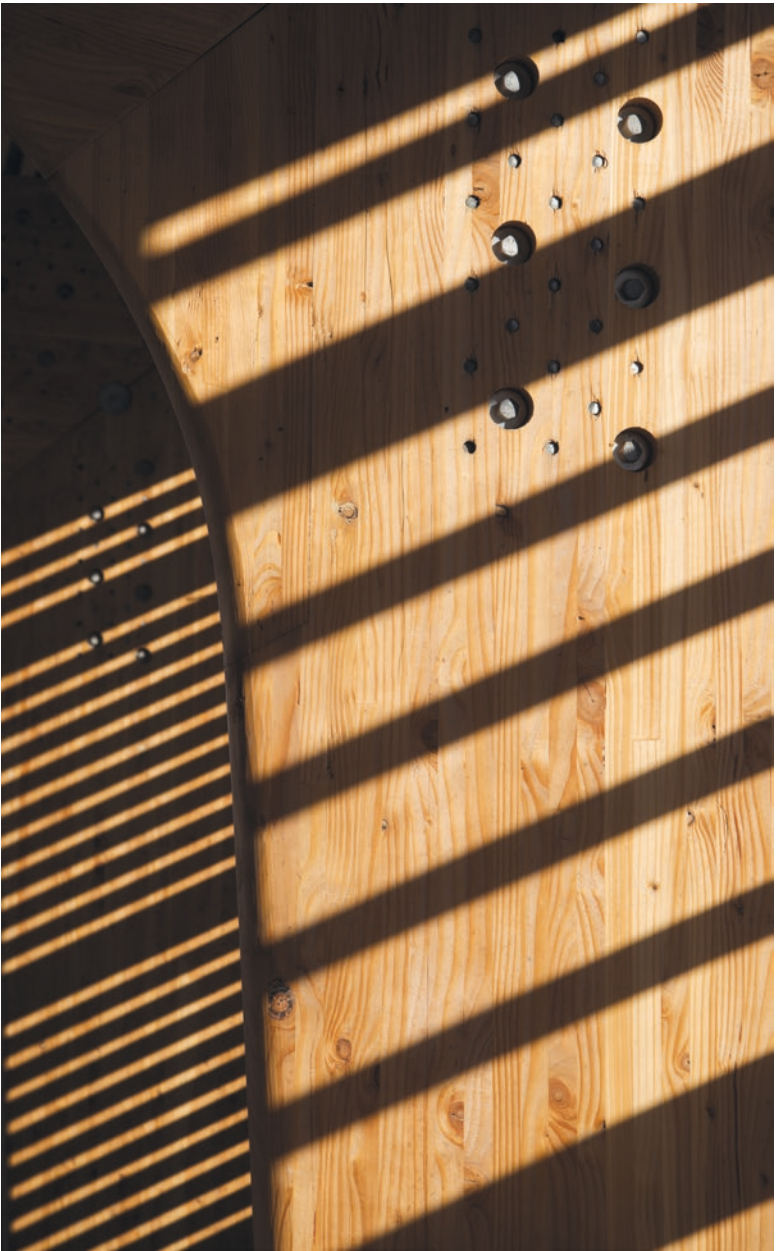
- Draw on carbon weight to guide architectural choices from the outset.
- Use whenever possible materials that reduce the carbon footprint of the project, store biogenic carbon, and limit to a minimum carbon emissions.
- Use the “carbon payback time” to adjust design choices and consider the obsolescence period as an essential parameter.

Climate

- Anticipate global warming (heat waves, increase in natural risks, etc.) by adapting spaces to preserve health and comfort: creation of cool areas, climatic shelters, study of the atmosphere of sites (aerology), natural regulation of rainwater, increase in the albedo of exposed surfaces, cooling of volumes, etc.

Biodiversity

- Ensure that living things and human constructions can coexist by working on uses, biophilic design, and the ability of the envelope and the exterior fittings to integrate with an ecosystem.
- Preserve biodiversity, work with the existing topography, conceive a landscape where vegetation has several layers, merge the urban fringes with open green spaces.







Overview

The designers and experts at AREP Group work as a collective. They apply their creativity and technical skills on projects characterised by different typologies, scales and contexts. This book provides an overview of our work by showing our approach through a selection of projects. Each of them reflects our commitment to creating designs that follow our declared principles. In applying these principles, we seek to fully appraise the specific challenges and opportunities particular to each context.

We aim to produce exemplary design responses that are finely tuned and site sensitive whilst fully meeting the needs of the client and the end user.

01

Nîmes Pont-du-Gard train station

France

Distinction
Green buildings in the South of France award, Silver category (operating station)
Client
SNCF Réseau
Architect
SNCF Gares & Connexions / AREP
AREP's mission
Design of the new passenger building and exterior spaces. Complete service from project creation and concept design through to practical completion
Cost
€22 million
Floor area
3,000 m² / Exterior
Handover
2019
Environmental principles – EMC2B
Energy 
7,700 m² of solar car ports
Materials 
- Solid wood posts - Solar shading made of bamboo canes - On-site reuse of all excavated material - Use of harvested rainwater for flushing toilets and cleaning purposes
Carbon 
Total life cycle emissions: 2,400 kg CO₂ eq / m²
Climate 
- Site-wide rainwater infiltration scheme - Exterior solar shading to minimise heat gain in the concourse - Natural ventilation and mist cooling for thermal comfort in the concourse during summer
Biodiversity 
223 trees out of 435 have been preserved 390 new trees have been planted as part of the project - Installation of insect hotels - Installation of hibernacula for the ocellated lizard





Pont de l’Alma train station

Paris

Client	SNCF Gares & Connexions – Paris Region stations department
Architect	SNCF Gares & Connexions / AREP
AREP’s mission	Concept design of the passenger building, improvement of passenger access, and redesign of the promenade Complete service from project creation and concept design through to practical completion
Cost	€8.6 million (excl. VAT)
Floor area	Building: 140 m² / Exterior spaces: 6,000 m²
Handover	2022
Environmental principles – EMC2B	
Energy 	• Optimisation of energy consumption
Materials 	• CLT walls in the passenger building
Carbon 	• The use of concrete has been limited to what is indispensable
Climate 	• Control and handling of lift overheating
Biodiversity 	• Creation of a planted promenade



03

Saint-Jean-de-Maurienne train station

France

Client
SNCF Réseau on behalf of TELT (Lyon-Turin cross-border rail line)
Project management
SNCF Réseau
Architectural concept and design studies
SNCF Gares & Connexions / AREP
AREP's mission
Concept design of the passenger building and exterior spaces Complete service from project creation and concept design through to practical completion
Cost
€4.2 million (excl. VAT) Cross-border section: 8.6 bn (excl. VAT)
Floor area
8,000 m²
Handover
2022
Environmental principles – EMC2B
Energy 
• Optimisation of energy consumption through natural ventilation • Management of modular spaces designed to help handle the snow sports peak season
Materials 
• CLT structure and timber cladding sourced from French forests located around the production site
Carbon 
• Prefabricated construction system adapted to the lifespan of the building • Broader reflection on the possibility to dismantle the building and use the materials for other purposes and on other construction sites at the end of its intended lifecycle
Climate 
• Thermal comfort during winter and summer • Largely glazed south-facing façade allowing for natural light to flood into the unheated passenger areas • Cantilevered canopy on the south-facing façade which helps control sunlight during summer





04

Auray train station

France

Client
SNCF Gares & Connexions / SNCF Réseau / AQTA
Project management
SNCF Réseau / SNCF Gares & Connexions / AREP
AREP’s mission
Concept design of the new passenger building, rehabilitation of the existing building, remodeling of the station forecourt, development of public spaces, design of the urban footbridge. Complete service from project creation and concept design through to practical completion
Cost
€28 million (excl. VAT)
Floor area
37,000 m², of which 3.7 ha of exterior surface / Building: 740 m² / Footbridge: 600 m²
Handover
2021
Environmental principles – EMC2B
Energy 
<i>Reduce consumption</i>
• 490 m² of glazed facades • LED lighting • All-purpose consumption: 216 kWh / m² of floor area
Materials 
<i>Rationality and low impact</i>
• Modular and adaptable plan • Exposed structure that helps save on materials • Bio- and earth-based materials: 270 k / m² of floor area
Carbon 
<i>A frugal project</i>
• Materials originating in Europe • Minimum use of concrete • Carbon cost: 1,757 kg CO₂eq / m² of floor area
Climate 
<i>Bioclimatic design</i>
• Solar shading tailored to each façade • Ventilation of the concourse by natural convection • Rainwater management on several scales
Biodiversity 
<i>Locally-inspired solutions</i>
• Preservation of the existing bocage network • Green roof with coastal plant species • Planted and / or pervious surfaces: 8,800 m





Saint-Michel Notre-Dame train station *Paris*

Distinction
National Engineering Grand Prix
Client
SNCF Gares & Connexions – Paris Region stations department / SNCF Réseau
Project management
SNCF Gares & Connexions / AREP
AREP’s mission
Architecture, design, heritage architecture, engineering, HVAC, acoustics, environment, pedestrian flows Complete service from project creation and concept design through to practical completion
Cost
€25.9 million (excl. VAT)
Floor area
3,072 m²
Handover
Second quarter 2023
Environmental principles – EMC2B
Energy 
• Reduction of energy consumption
Materials 
• Waterborne transport of materials
Carbon 
• Reduced use of concrete
Climate 
• Improvement of indoor air quality
Biodiversity 
• Minimal impact on the station’s exterior



Saint-Lazare train station *Paris*

Client	SNCF Gares & Connexions / Ségécé Klépierre / Spie Batignolles Immobilier
Project management	SNCF Gares & Connexions / AREP / DGLa
Partners	SCGPM / Barbanel
Project construction management	AREP / DGLa / SNCF Batimotique for the SNCF lots
AREP's mission	Remodelling and modernization of the passenger areas, redevelopment of the station forecourt. Complete service from project creation and concept design through to practical completion
Cost	€250 million (excl. VAT)
Floor area	10,000 m² Commercial spaces: 8,200 m²
Handover	2012: Core of the station 2014: Forecourt





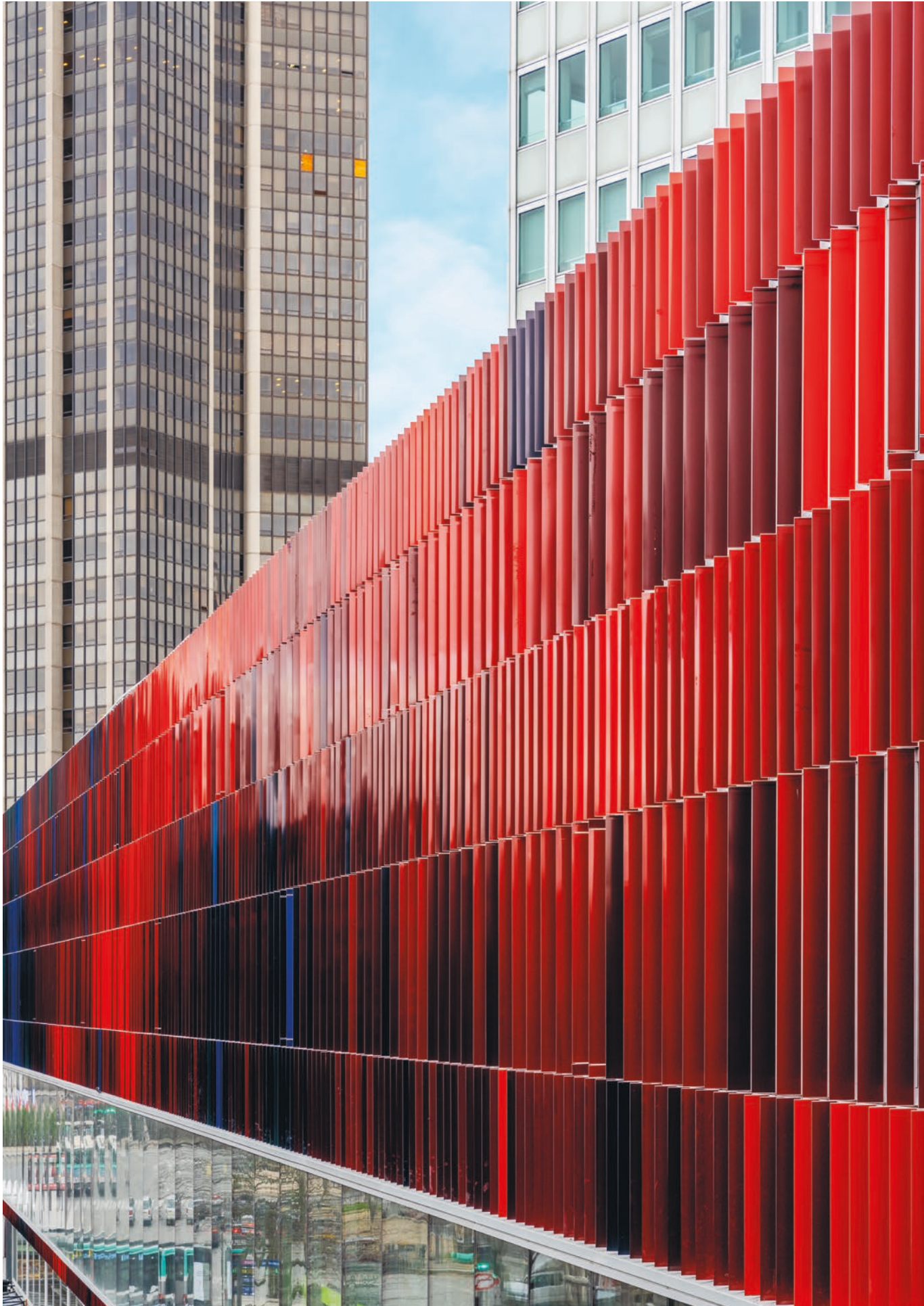
07

Montparnasse train station

Paris

Client
SNCF Gares & Connexions / ALTAREA
Project management
SNCF Gares & Connexions / AREP
Partners
Patrick Jouin-Sanjit Manku architecture practice / SLA / Builders & Partners engineering consultancy
AREP's mission
Remodelling and modernisation of the passenger areas and overhaul of the façades. Complete service from project creation and concept design through to practical completion
Cost
€85 million (excl. VAT)
Floor area
Building: 40,000 m ² / Platforms: 6,000 m ²
Handover
2021
Environmental principles – EMC2B
Energy 
- All-purpose consumption (MWh/year): 9,200 - All-purpose consumption per square metre of floor area (kWh / m² of floor area): 200
Materials 
- Bio- and earth-based materials (in tons): 1,300 - Timber (in tons): 16, stone (in tons): 1 230 - Bio- and earth-based materials (kg / m² of floor area): 28 - Timber (kg / m² of floor area): 0, stone (kg / m² of floor area): 27
Carbon 
- Construction carbon index (tCO₂eq): 18,000 Eges PCE (indicator of GHG emissions of construction materials and equipment) - GHG intensity per floor area (kg CO₂ eq / m² of floor area): 391 - GHG intensity per passenger (kg CO₂ eq / passenger): 0.35
Climate 
Albedo (%): 0.19
Biodiversity 
- Planted and / or pervious surfaces (in square metres): 21,000 - Tall fruit trees: 300 - Preservation of 300 existing tall fruit trees - Percentage of planted and / or pervious surfaces: 21% - Number of trees per hectare: 30





08

Rennes

train station

France

Distinction
“Station of the Year” award at the 2020 Regional Grand Prix
Client
SNCF Gares & Connexions
Project management
SNCF Réseau / SNCF Gares & Connexions / AREP
Partners
MaP3 / Patrick Rimoux
AREP’s mission
Transformation of the station, extension and creation of new intermodal connections. Complete service from project creation and concept design through to practical completion
Cost
€60 million for the station transformation (excl. VAT)
Floor area
Building: 7,450 m² / ETFE roof: 3,500 m² / Planted areas: 3,100 m²
Handover
2019
Environmental principles – EMC2B
Energy 
• Station spaces flooded with natural light • Centralised control of the station's technical systems
Materials 
• Preservation of the façade on the platforms and of the bridge station roof dating back to 1980. The floor of the bridge station is made of bamboo to ensure the passengers’ comfort
Carbon 
• Carbon footprint of the station: 1,500 kg eqCO₂ / m² • 50% of the CO₂ emissions result from the construction materials
Climate 
• 3,100 m² of green spaces • Screen-printed ETFE cushions
Biodiversity 
The built landscape along with the ha-ha help: • improve the microclimate and air quality for the entire city block, • develop the natural functions of the soil, • rainwater infiltration and evaporation through plants, • create and upgrade a vital space for the fauna and flora.





09

Paris-Nord train station

“Horizon 2024”

Paris

Client
SNCF Gares & Connexions
Project management
SNCF Gares & Connexions / AREP
AREP's mission
Traffic calming, improvement of pedestrian routes and intermodal connections, creation of a bicycle shed and upgrading of the bus ecostation
Floor area
80,000 m²
Handover
2024
Environmental principles – EMC2B
Energy 
• 25% reduction in energy consumption for lighting • 8% reduction in energy consumption of escalators • 5% reduction in energy consumption of lifts • Photovoltaic panels: 150 MWh / year (bicycle shed)
Materials 
• Reuse: glass from the Beaubourg caterpillar escalator, transformed SNCF reception desk, parquet flooring, etc. • Implementation of a circular management of materials (identification of resources in connection with a reuse platform) • Guidelines for a sustainable construction site
Carbon 
• More than 1,200 bicycle parking spaces (bicycle shed) • Pedestrian-dedicated areas increased by 17% (ecostation) • Urban logistics hub dedicated to last-kilometre deliveries
Climate 
• Rainwater harvesting (bicycle shed) • Improvement of the average albedo: 0.35 (+120%) • Surface of roof dedicated to water harvesting: 300 m² • Increase in pervious surfaces by 11%
Biodiversity 
• New green spaces • Green roofs on 70% of the new free standing structures, not counting photovoltaic panels





Paris-Lyon train station *Paris*

Client
SNCF Gares & Connexions
Project management
SNCF Gares & Connexions / AREP
AREP's mission
Restoration and enhancement of the heritage building and integration in the urban environment. Upgrading of the retail area
Cost
Total amount: €20 million (excl. VAT) Restoration of the frescoes: €6.9 million (excl. VAT)
Floor area
4,500 m² Fresco gallery: 110 metres long x 12 metres wide
Handover
2021



11

Bellegarde-sur-Valserine train station

France

Client
French State / Swiss State / Rhône-Alpes Region / Ain local council / SNCF / RFF / City of Bellegarde
Project management
SNCF Gares & Connexions / subcontracting engineering consultancies / AREP with the support of RFR (structure) and Sinequanon (construction works)
AREP's mission
A 1,200-square-metre passenger building, two car parks providing a total of 220 spaces, a bus station accommodating eight buses, the reconstruction of an urban thoroughfare across the site, access to the regional train (TER) platforms via a newly-created underground walkway and to the TGV platform (new line)
Start of works
February 2008
Handover
May 2010
Environmental principles – EMC2B
Energy 
- All-purpose energy consumption (MWh FE / year): 400 - All-purpose energy consumption per m² of floor area (kWh / m² of floor space): 500
Materials 
Bio- and earth-based materials (in tons): 60 - Timber (in tons): 60 Bio- and earth-based materials (kg / m² of floor area): 75 - Timber (kg / m² of floor area): 75
Carbon 
- Construction carbon index (t CO₂eq): 4,000 - Carbon intensity per floor area (kg CO₂eq / m² of floor area): 5,000
Climate 
Albedo (%): 0.22
Biodiversity 
- Green and / or pervious surfaces (m²): 6,200 - Tall fruit trees: 120 - Percentage of green and / or pervious surfaces: 27 - Number of trees per hectare of project: 53





12

Avignon High-speed train station

France

Client
Réseau Ferré de France / SNCF Gares & Connexions
Project management
SNCF Gares & Connexions / AREP
AREP's mission
Concept design of the new passenger building and exterior spaces Complete service from project creation and concept design through to practical completion
Partners
Desvigne and Dalnoky landscape architects
Cost
€24.5 million
Floor area
5,000 m² / Site: 20 ha / Green spaces: 15 ha
Handover
2001
Environmental principles – EMC2B
Energy 
- All-purpose energy consumption (MWh EF / year): 4,000 - All-purpose energy consumption per m² of floor area (kWh / m² of floor area): 211
Materials 
Bio- and earth-based materials (in tons): 300 - Timber (in tons): 50, stone (in tons): 250 Bio- and earth-based materials (kg / m² of floor area): 16 - Timber (kg / m² of floor area): 3, stone (kg / m² of floor area): 13
Carbon 
- Eges PCE (tCO₂eq): 26,000 Eges PCE (indicator of GHG emissions of construction materials and equipment) - Carbon intensity per floor area (kg CO₂eq / m² of floor area): 1,368 - Carbon intensity per passenger (kg CO₂eq / passenger): 7.22
Climate 
Albedo (%): 0.22
Biodiversity 
- Green and / or pervious surfaces (in m²): 49,000 - Tall fruit trees: 330 - Preserved tall fruit trees accounted for in the 330: 100 - Percentage of green and / or pervious surfaces: 31 - Number of trees per hectare: 21





Besançon train station *France*

Distinction
HQE® labelled station (French “High Environmental Quality” certification)
Client
SNCF Gares & Connexions
Project management
SNCF Gares & Connexions / AREP
Partner
IOSIS
AREP’s mission
Concept design of the new passenger building and exterior spaces Complete service from project creation and concept design through to practical completion
Cost
€26 million (excl. VAT)
Floor area
Covered floor area: 3,000 m² / Total floor area: 6 ha
Handover
2011





Torino Porta-Susa train station *Italy*

Distinctions

- 2013 - European Award for steel structures – Prize awarded to Agostino Magnaghi jointly with AREP
- 2013 - European Rail Station of the Year – Prize awarded to RFI jointly with AREP
- 2012 - European Solar Prize – Prize awarded to AREP jointly with Silvio d'Ascia

Client

RFI (Rete Ferroviaria Italiana)

Project management

AREP (representative) / Silvio d'Ascia and Agostino Magnaghi, architects

AREP's mission

Complete service from project creation and concept design through to practical completion

Cost

€65 million (excl. VAT)

Floor area

Station: 30,000 m² / Photovoltaic glass roof

Handover

2015

Environmental principles – EMC2B

Energy

- Reduction of energy consumption by maximising natural daylight
- 15,000-square-metre glass roof fitted with crystalline solar sensors
- Energy production: 680,000 kWh / year

Climate

- Natural ventilation





Casa Port train station Morocco

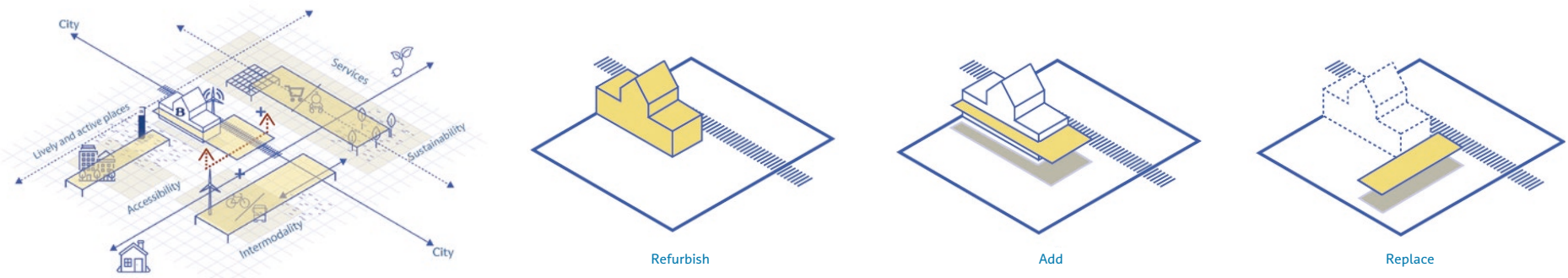
Client	Moroccan Railways (Office National des Chemins de Fer)
Project management	AREP / Groupe 3A
AREP's mission	Complete service from project creation and concept design through to practical completion
Cost	€16 million (excl. VAT)
Floor area	Station: 2,500 m² / Retail: 1,000 m² / Underground car park: 380 places
Handover	2014
Environmental principles – EMC2B	
Materials 	• Use of readily available and commonly used materials to avoid supply problems
Carbon 	• Locally-sourced materials, production of the DUCTAL® moulds for the moucharabieh, on-site shaping and assembly of the frame and structure
Climate 	• Mushrabiya on the façade to maximise the amount of natural light, while protecting against grazing light • Cantilevered roof to create shade • Creation of an “English courtyard” to bring natural lighting down to the underground retail areas and to facilitate the circulation of fresh air with the underground car parks
Biodiversity 	• Lush garden with local species between the forecourt and the lower level





Modular train station Belgium

Client	National Railway Company of Belgium (SNCB)
Project management	AREP / Bureau Bas Smets / MaP3 / Sunsoak Design
AREP's mission	Architectural concept and design studies
Handover	2021
Environmental principles – EMC2B	
Energy 	• Use of natural light in all types of stations • Photovoltaic roof panels
Materials 	• Reuse of rainwater • Complementary use of timber and steel
Carbon 	• Optimisation of intermodality • Creation of secure bike parks • Public transport: bus / tram / train • Complementary use of wood and steel to reduce by half the carbon footprint while fire resistance remains the same (60 min)
Climate 	• Not heated station areas • Optimisation of natural ventilation
Biodiversity 	• Green spaces at every station • Urban agriculture



Brussels underground northern extension *Belgium*

Client City of Brussels
Project management Multidisciplinary group BMN (Bureau Métro Nord-Nord) jointly with AREP / E. Tricaud, R. Ricote, architects, and Van Campenhout architecture practice
AREP's mission Complete service from project creation and concept design through to practical completion
Floor area Verboeckhoeven station: 7,000 m² / Tilleul station: 4,000 m² / Bordet station: 7,281 m²
Handover 2032
Environmental principles – EMC2B
Energy  • Implementation of daylight solutions to bring light down to the rail track level • Photovoltaic roof panels
Materials  • Reuse of rainwater • Recycling of the tunnel spoils from the tunnel boring machine
Carbon  • Optimisation of intermodality: up to 500 secure bike parking spaces in several stations • A minimum of 3 bus / tram / train lines
Climate  • Not heated station areas • Optimisation of natural ventilation
Biodiversity  • Green spaces at every station, open around the clock • Most exterior surfaces are pervious



Budapest Nyugati station Hungary

Client

BFK Budapest fejlesztési központ nonprofit
(Budapest development agency)

Project management

Partners: Epitesz Studio / Artélia

AREP's mission

Architecture and planning competition (ranked second)

Environmental principles – EMC2B

Energy

First energy-positive train station in Europe

- 20,000 m² of photovoltaic panels
- 1,440 kWh EP / m² / year
- 3,494 KWp (peak-power)

Materials

Reuse, locally-sourced and low-carbon materials

- A sleek and efficient train platform roof
- Mixed timber and metal structure
- 340,000 m³ of soil reused on site

Carbon

A post-carbon station

- Use of low-carbon concrete
- A project focusing on the preservation and upgrading of what is already there

Climate

An urban cool island at the heart of the city

- An urban albedo increased by 0.2 to 0.5
- Controlled and structured thermal comfort
- An XL fan to optimise thermal comfort and limit air conditioning

Biodiversity

An urban forest

- 16 ha of green spaces, 7 ha of woodlands
- 10,000 trees planted according to the Miyawaki method



Shanghai South train station *China*

Client	Chinese Ministry of Railways / City of Shanghai
Project management	AREP / ECADI Associés (East China Architectural Design and Research Institute)
Partner	MaP3
AREP's mission	Concept design of the new passenger building
Floor area	47,000 m²
Handover	2006
Environmental principles – EMC2B	
Energy 	• All-purpose energy consumption: 24,000 MWh FE / year • All-purpose energy consumption per m² of floor area: 200 kWh / m² of floor area
Carbon 	• Construction Carbon Index: 150,000 tCO₂eq • Carbon intensity per m² of floor area: 1,250kg CO₂eq • Carbon intensity per passenger: 5kg CO₂eq
Climate 	• Albedo: 0.20%





Wuhan train station China

Client	CRC China Railways Corporation (formerly MOR)
Project management	AREP in partnership with Chinese Institute of Railways n° 4
Partners	MaP3 (metal structures) / SNCF IGOA (civil engineering)
AREP's mission	Concept design of the passenger building
Cost	€400 million (excl. VAT)
Floor area	240,000 m², including 70,000 m² of enclosed public concourse
Handover	2009

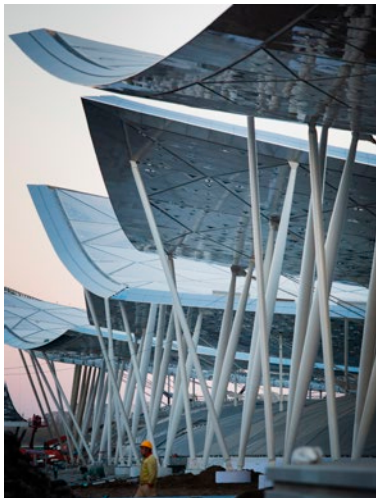


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Tongzhou train station China

Client	Beijing Jingtou Transportation Hub Investment Co., Ltd
Project management	Beijing Jingtou Transportation Hub Investment Co., Ltd
AREP's mission	Concept design of the station, roof, interior spaces and urban development around the station
Partners	Beijing General Municipal Engineering Design & Research Institute Co., Ltd / China Architecture Design and Research Institute / China Railway Design Group Co., Ltd
Cost	€12.5 million (excl. VAT)
Works cost	€3,867 million (excl. VAT)
Floor area	314,000 m² overground floor area / 1,280,000 m² underground floor area
Handover	2024
Environmental principles – EMC2B	
Energy	• Roof components allowing to save 486,000 kWh / year of electricity for artificial lighting • Regulation of heat absorption and maximisation of natural light by using a sun shading system installed on the roof to reduce the heat load by 5,200,000 kWh / year • Lower ETFE roof height allowing to save electricity consumption for heating • 21,000 m² of photovoltaic panels
Materials	• Use of ETFE for a lightweight structure
Carbon	• Optimisation of the structure to reduce the quantity of steel and thereby the carbon footprint of the project
Climate	• Improvement of thermal comfort through natural ventilation
Biodiversity	• Roof accommodating a park with local tree and plant species





Qinghe train station Beijing, China

Distinction
Grand Prix de l'AFEX 2019
Client
CRC China Railways Corporation (formerly MOR)
Project management
AREP in partnership with Zhong Tié / Chinese Institute of Railways
Partner
MaP3
AREP's mission
Concept design of the passenger building
Floor area
Train station: 109,000 m², including enclosed public concourse of 49,000 m²
Handover
2019



Capital Museum Beijing, China

Client

City of Beijing

Project management

Beijing Investment Group Co., Ltd

Partner

Architecture & Design Institute of the Ministry of Construction
(Cui Kai, architect)

AREP's mission

Architecture, signage and pedestrian flows throughout the scheme and technical design stages; consulting role throughout the construction stage; interior design, lighting, façade and acoustics throughout the scheme design and construction stages

Cost

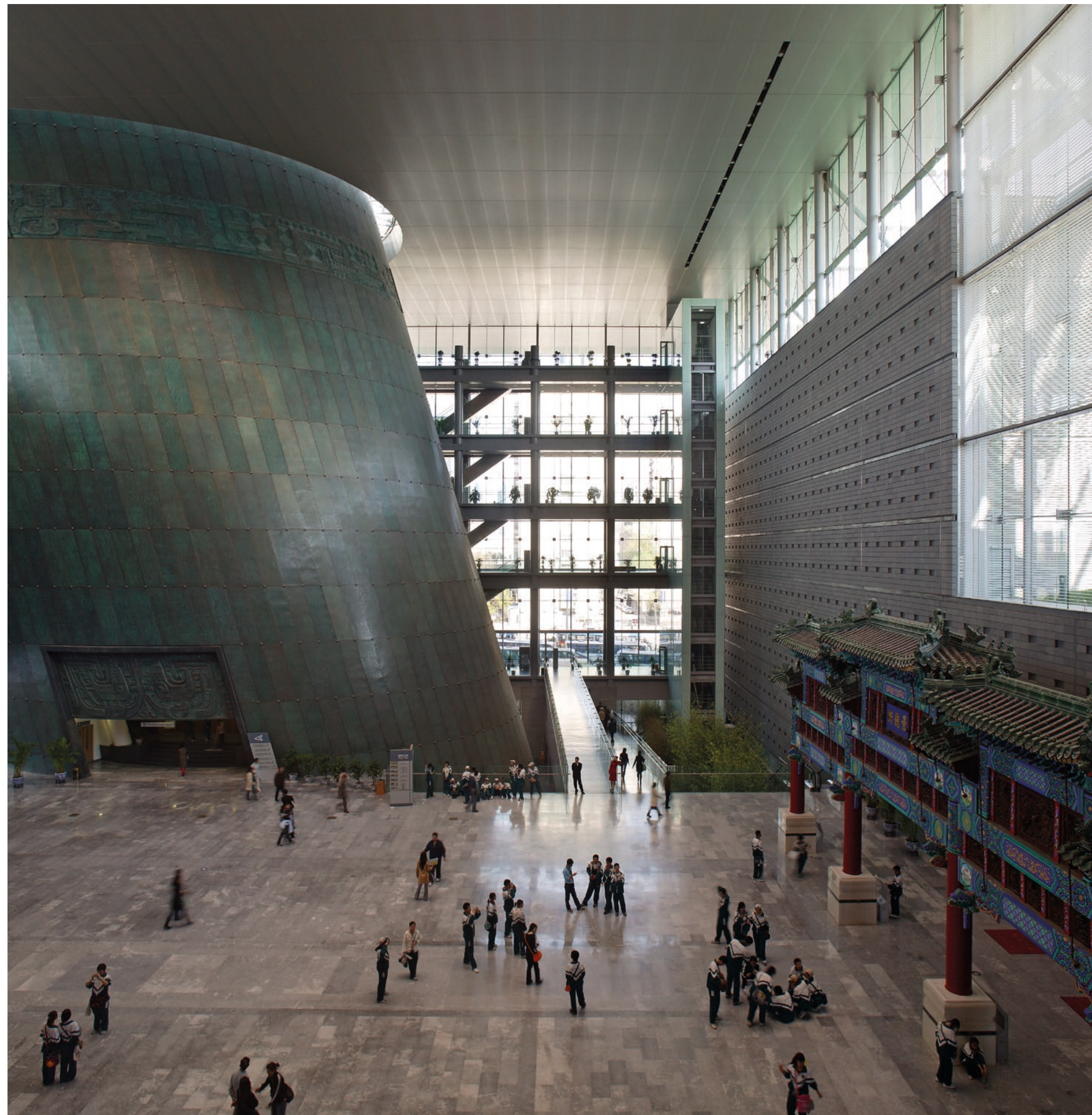
AREP's mission: €2 million (excl. VAT)
Total cost of the construction works: €4,720 million (excl. VAT)

Floor area

60,000 m²

Handover

2006





Seafrigo Headquarters *France*

Client Seafrigo
Project management Étienne Tricaud Architecture (representative) / AREP Architects / Terrell (engineering consultants) / Sero (construction management)
AREP’s mission From concept design through to tender documentation
Cost €20 million (excl. VAT)
Floor area 6,357 m²
Handover Mars 2024
Environmental principles – EMC2B
Energy  • BEPOS-labelled building (energy-positive building) • Level E3 of the E+C- French label • 600 m² of photovoltaic roof panels • Heat pump for low energy consumption • Optimised natural lighting
Materials  • Bio-based timber partially used for parquet flooring
Carbon  • Level C1 of the E+C- label • Use of low-carbon timber and concrete • Installation of a heat pump to reduce by 70% carbon emissions • Large bike park to encourage low-carbon mobility
Climate  • DTM (Dynamic Thermal Modelling) of part of the building to optimize thermal comfort • Motorised solar shading that can adapt to the levels of sunshine for better thermal comfort



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Saint-Malo ferry terminal *France*

Client
SEM Breizh, representative of the Brittany Region
Project management
AREP
Partners
EGIS / Madec Architecture / LALU (landscape architects): ATIXIS (fire protection)
AREP's mission
Concept design of the new ferry terminal and exterior spaces Complete service from project creation and concept design through to practical completion
Cost
€27.5 million (excl. VAT)
Floor area
7.5 ha / Building floor area: 7,300 m² / Green spaces: 8,100 m²
Handover
Competition won in 2021 2026
Environmental principles – EMC2B
Energy 
• All-purpose energy consumption: 190 MWh / year • Energy from renewable power sources: 190 MWh / year
Materials 
• Reclaimed materials: 460 tons • Bio-based and earth-based materials: 1,200 tons (870 tons of timber, 330 tons of stone)
Carbon 
• Construction Carbon Index: 8,900 tons CO₂eq • Bike park with a capacity exceeding regulatory requirements
Climate 
• Increase in the average albedo of the whole project from 0.07% (existing) to 0.16%
Biodiversity 
• Green and / or pervious surfaces: 15,000 m² (21% of the project floor area) • Tall fruit trees: 120





Saint-Aubin parking facility Switzerland

Client
Établissement cantonal de promotion foncière de Fribourg (Cantonal Organisation for Land Development)
Project management
AREP
AREP's mission
Parallel study contract: final stage – August 2022
Cost
CHF 28 million (excl. VAT)
Environmental principles – EMC2B
Energy 
• 7,500 m² of photovoltaic panels • Parking spaces and e-bike charging points
Materials 
• 57% of bio-based materials • Modular timber structure, number of different components kept to a minimum, supply studied within a 40-km radius
Carbon 
• Project designed to be adaptable to optimise the carbon cost of construction • Carbon footprint during construction: 913 t eqCO₂/26 kg eqCO₂/m²
Climate 
• Cool island in the heart of the building • Natural light and ventilation (thanks to the central courtyard which allows for the project to be reversible)
Biodiversity 
• Stilted structure which minimises soil sealing • Integration into the landscape • The valleys, hedgerows and stormwater basins provide shelter for the local fauna and flora



Urban logistics hub

France

Client
Caisse des Dépôts / Poste immo / Lyon Parc Auto / SERL / Quartus
Project management
AREP (architecture, planning, roads and utilities infrastructure)
Partner
EGIS (building services and equipment)
AREP's mission
New construction of an urban logistics and tertiary hub: storage for reception and dispatch, tertiary premises. Complete service from project creation and concept design through to practical completion
Cost
€28.8 million (excl. VAT)
Floor area
Buildings: 29,000 m²
Handover
2023
Environmental principles – EMC2B
Energy 
• High thermal performance • 7,300 m² of photovoltaic panels
Materials 
• Timber superstructure and cladding from reclaimed materials • Sleek and reversible building structure
Carbon 
• Construction phase designed to limit nuisance: waste management, including emissions and liquid waste
Climate 
• Green spaces designed as rain gardens • Reduction of the albedo through the greening of the north-facing façade • Rooftop plants chosen for their biofiltering properties
Biodiversity 
• 9,000 m² of green and / or pervious surfaces • Tall fruit trees: 230 • Biodiversity nests



Former headquarters of the Public Hospitals *Paris*

Client

AP-HP / Hines & Immobilière 3F (investors)

Project management

Tolila + Gilliland (architecture) / Sophie Delhay / AREP

AREP's mission

Architecture competition: 2022 (finalist)

Floor area

Office: 13,230 m² / Housing: 5,727 m² / Retail: 7,726 m²

Environmental principles – EMC2B

Energy

- Low-carbon energy by choosing the city's heat and cooling network

Materials

- Preserve the existing elements and modify only if necessary

Carbon

- Promote passive cooling systems

Climate

- Improve thermal comfort during summer in the residential units of the Saint-Martin block and in the offices of the Victoria block by using solar shading and natural ventilation through stack effect

Biodiversity

- Create a cool island by planting trees and plants in the two central courtyards of the Victoria block



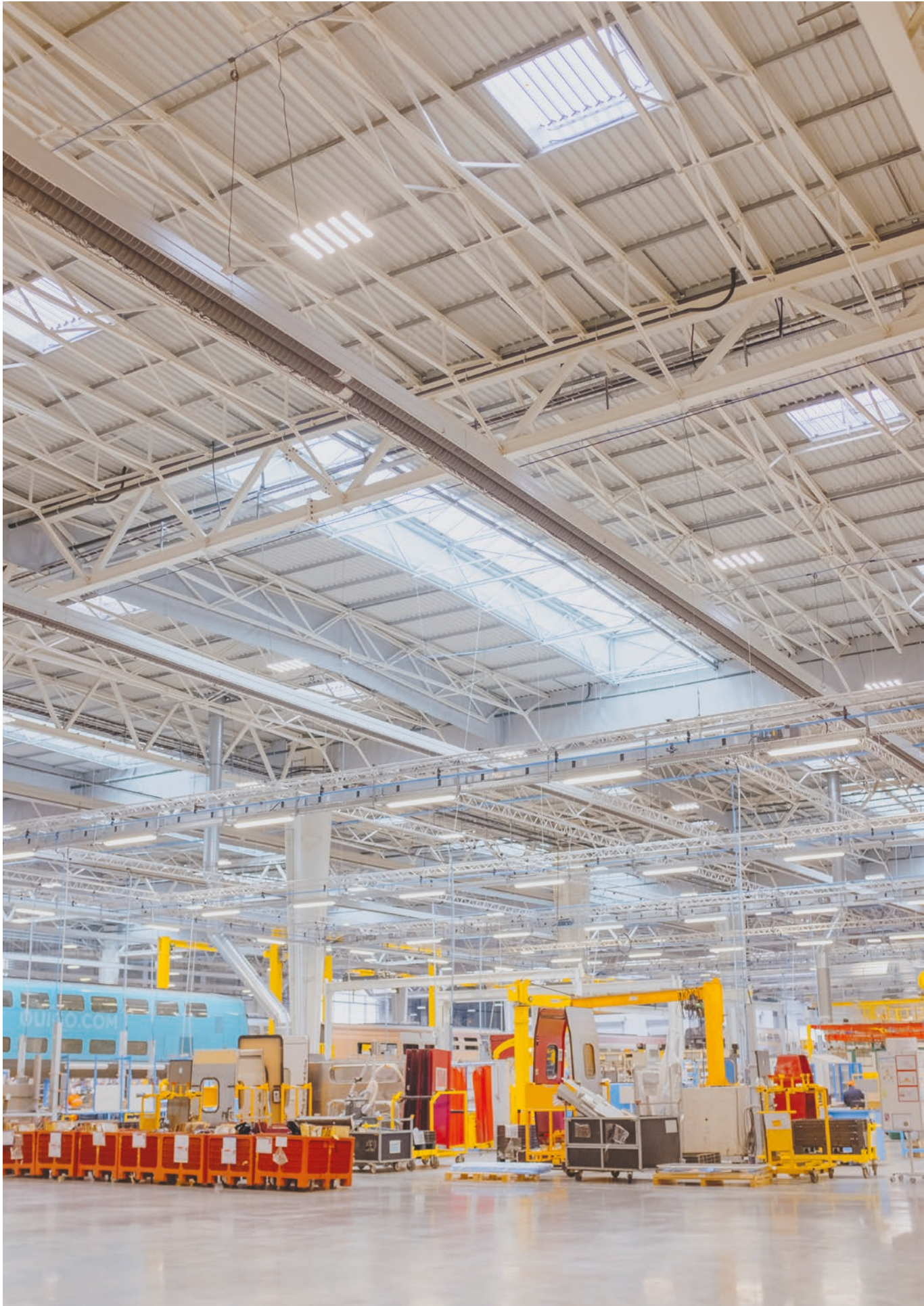
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Train maintenance facility

France

Client
SNCF
Project management and engineering consultancy
AREP
AREP's mission
Concept design for a train maintenance facility. Complete service from project creation and concept design through to practical completion
Cost
€34.8 million (incl. VAT)
Floor area
Total project floor area: 4.4 ha / Buildings: 27,000 m²
Handover
2021
Environmental principles – EMC2B
Energy 
• E+C- performance level: E3 (Label Energy-positive carbon reduction) • All-purpose energy consumption during concept design: 1,820 MWh / year • Solar energy production during concept design: 970 MWh / year
Materials 
• Demolished surface: 55,000 m² • Recycling rate: 70% • Quantity of concrete used: 11,000 m³ • Quantity of timber used: 4 m³
Carbon 
• E+C- performance level: C1 • GHG emissions throughout the life cycle of the building: 37,135 tCO₂eq over 50 years • GHG emissions of construction materials and equipment used: 24,590 tCO₂eq over 50 years • GHG emissions throughout the life cycle of the building: 1,345 kgCO₂eq/m² over 50 years • GHG emissions of construction materials and equipment used: 890 kgCO₂eq/m² over 50 years
Climate 
• Rainwater collection tank capacity: 240 m³ • Run-off coefficient: 85
Biodiversity 
• Created green spaces: 3,300 m² • Number of trees according to the project: 161





Eco-designed platform shelters

France

Client	SNCF Gares & Connexions
Project management	AREP
AREP's mission	Design of the range of platform shelters, technical development, assistance with the monitoring of the roll-out
Cost	€21 million (excl. VAT) over 7 years
Duration of the mission	2018 - 2025
Roll-out capacity	Installation of 100 shelters per year
Environmental principles – EMC2B	
Energy 	- LED strips on the underside of the roof - Optional solar roof
Materials 	100% recyclable materials (steel, aluminium, glass, timber) - Furniture and screens in FSC-certified class 4 timber - Optimisation of the thickness of materials and of the width of foundations - Parts designed to minimise the percentage of scrap
Carbon 	100% French production



Signage France

Client
SNCF Gares & Connexions
Project management
AREP
AREP's mission
Design and roll-out of the signage guidelines





REAP furniture France

Client
Société du Grand Paris / Île-de-France Mobilités / Association des maires d'Île-de-France
Project management
AREP / Marbre d'Ici / Cronos conseil
Partners
Bellastock / Ecocem
AREP's mission
Design, manufacturing and experimental use of street furniture
Handover
2019

Environmental principles – EMC2B
Energy 
Less energy consumption for the manufacturing of materials due to reuse and recycling
Materials 
- Reclaimed materials: timber seats and backrests, timber parasols, steel parasol poles - Recycled material: concrete module (concrete powder and crushed concrete, stones, bricks, tiles) - Re-use of local materials: 100% of the timber comes from reclaimed exotic wood (exterior joinery reused for seats and backrests, timber flooring boards for sun shading) - Repainted reclaimed metal: use of sprinkler pipes to make poles; sun shading devices, and directional signage - Concrete aggregates from demolition rubble 50% of Ecocem low-carbon concrete binder
Carbon 
Reduction by 25% of GHG emissions through reuse and low-carbon cement
Climate 
Thermal comfort thanks to sun shading devices



Luxembourg Railways administration building *Luxembourg*

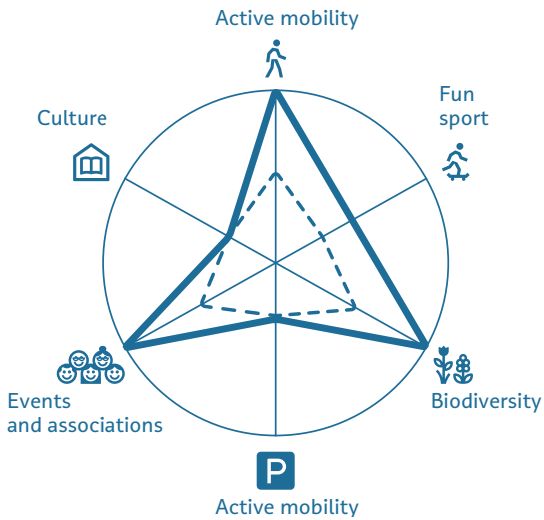
Client
Luxembourg Railways
Project management
Ballinipitt, AREP, TPF, Idès
AREP's mission
Architecture, spatial planning concept design, landscape design, acoustics, and lighting
Floor area
15,000 m²
Handover
2027
Environmental principles – EMC2B
Energy 
• 25% of the energy needed is solar-powered • 15% of parking places are fitted with recharging stations
Materials 
• Prefabricated bio-based materials: gabion, Cross Laminated Timber • Water consumption: 3.4 m³ / pers / year
Carbon 
• Priority given to local energy sources (geothermal energy, air source heat pump, etc.) • GHG emissions linked to energy consumption during operation: 21.8 kgCO₂eq / m² / year
Climate 
• Double skin providing acoustic and thermal insulation • Opening windows to customise indoor comfort • Atrium providing natural ventilation
Biodiversity 
• Created green spaces: 1,070 m² • 11% of the soil surface is to be unsealed



School Streets

Paris

Client
City of Paris
Project management
AREP
Partners
Bfluid (co-contractor) / Playgones (subcontractor)
AREP's mission
Design and implementation of the School Streets Initiative scheme aimed at creating a new typology of urban space
Cost
€79,070 (excl. VAT)
Floor area
Rue Vauvenargues: 2,420 m² / Place des Messageries: 1,300 m² / Rue Le Vau: 5,560 m²
Handover
Design studies: February 2021 – September 2021
Environmental principles – EMC2B
Materials 
• Porous paving materials • Use of reclaimed paving stones
Carbon 
• Priority to active modes of transportation
Climate 
• Encourage the emergence of cool islands
Biodiversity 
• Soil unsealing and greening



Oasis Schoolyards

Paris

Client
SLA City of Paris
Project management
AREP
AREP's mission
Design and implementation of green oasis schoolyards
Cost
Design studies: €50,000 (excl. VAT) Construction works: €500,000 (excl. VAT)
Handover
February 2022 – September 2022
Environmental principles – EMC2B
Energy 
Transition towards capable, reversible and traffic-calmed public spaces
Materials 
Promote porous surface materials to help soils act like sponge: • Reclaimed natural stone paving • Soft cork floor • Wood chips for playground surfacing • Low-tech and sustainable modules made from bio-based materials • Use of wood chips for playground surfacing • Wooden playground equipment
Carbon 
Priority to active games and modes
Climate 
Encourage the emergence of urban cool islands by: • Unsealing the soils • Preserving a shaded canopy • Using light-coloured surfaces with high albedo • Harvesting rainwater from the roofs
Biodiversity 
Soil unsealing and greening: • 310m² + 172 m² of pervious and / or planted surfaces • Nests and shelters for small fauna



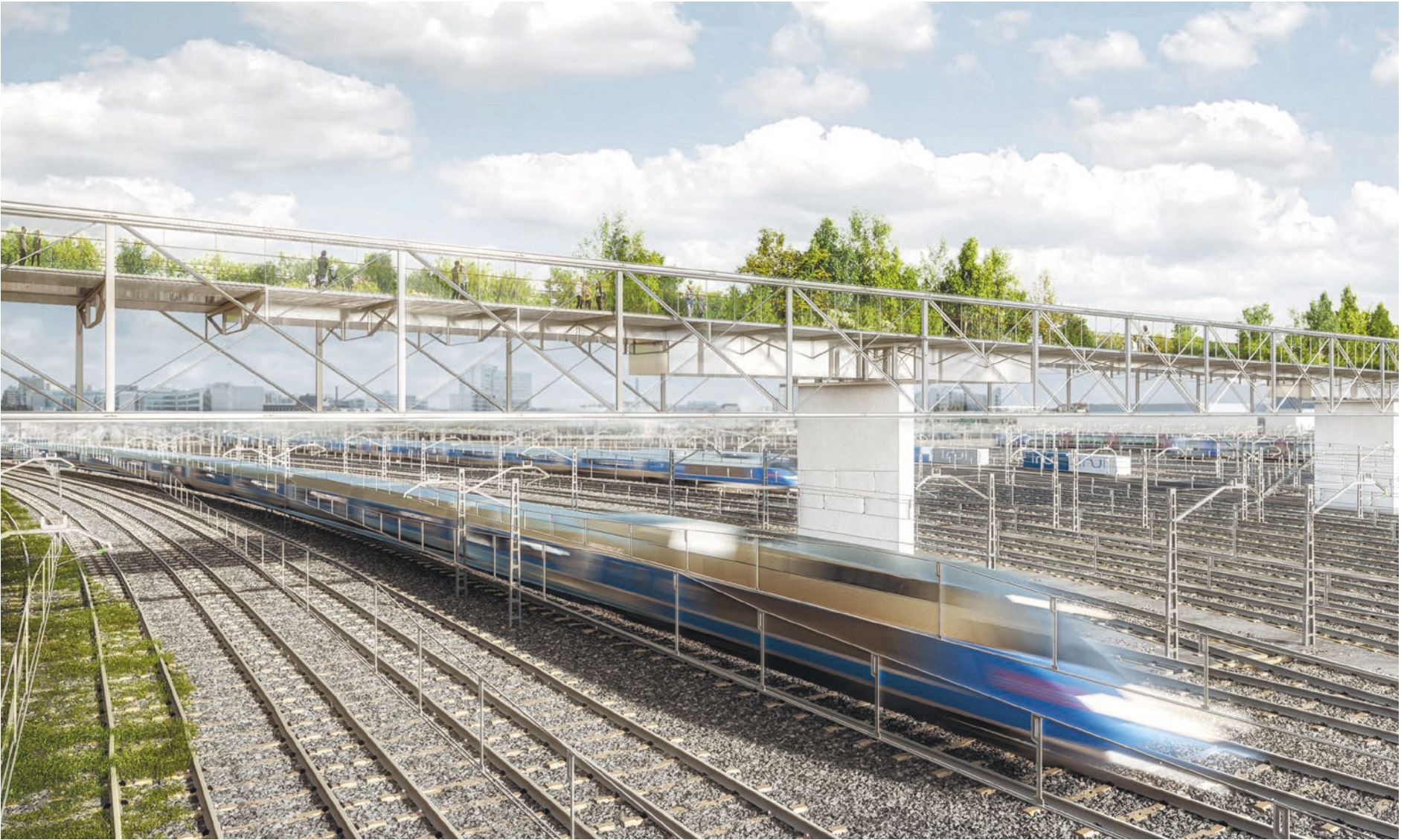
Charenton-Bercy footbridge

France

Client
City of Charenton / Grand Paris Aménagement (Paris urban development agency)
Project management
AREP
AREP's mission
Design of the footbridge
Floor area
Width: 12 metres / Length: 250 metres
Handover
Design studies: 2021

Environmental principles – EMC2B

Energy 
• A low-tech project in terms of energy consumption • “Dark skies” corridor to minimise energy consumption • Presence sensors • Direct, low-energy lighting
Materials 
• A structure designed with use in mind • Over-sized lattice trusses enabling 70-metre spans and the use of less materials
Carbon 
• 40% reduction in the carbon footprint of the structure compared with a standard long-span structure • Planting boxes positioned in line with the piers to smooth out the static loads of the footbridge
Climate 
• Wide green strip to mitigate the heat island effect • Circulations laid out on either side of the green strip to provide shade • Myawaki planting method to achieve dense vegetation rapidly
Biodiversity 
A unique planted footbridge that extends the environmental corridors • The planted spaces are connected to the Bois de Vincennes • Well thought-out management of water run-off • Continuity of the plant substrate



Banks of Hoan Kiem lake

Hanoi, Vietnam

Client

Public Works Management Unit of the Hoan Kiem district

Primary contractor

Vietnam Infrastructure JSC

AREP's mission

Renovation and beautification of public spaces around Hoan Kiem Lake

Cost

€152,628 (excl. VAT)

Floor area

15 ha

Handover

October 2020



Luxembourg in Transition

Luxembourg cross-border region

Distinction
Project selected for the 10th Rotterdam Architecture Biennale

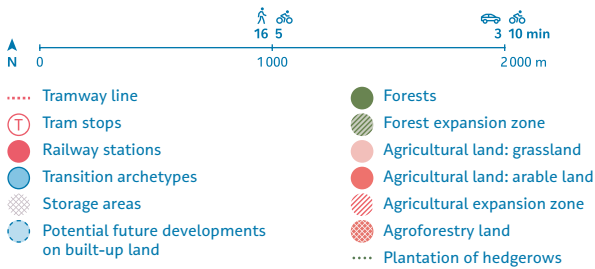
Client
Ministry of Energy and Spatial Planning of the Grand Duchy of Luxembourg

Project management
AREP (representative) / Taktyk / Quattrolibri / Institute for Environmental Transition of Sorbonne University Alliance / Mobil’Homme

AREP’s mission
Foresight study on Luxembourg and its cross-border functional region

Floor area
Study perimeter: 10,000 km² (Luxembourg Functional Region)

Handover
Competition won in 2020
Study delivered in 2022



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Greater Annecy, the archipelago conurbation France

Client

Committee for Architecture, Planning and Environment (CAUE) of Haute-Savoie / Greater Annecy conurbation

Project management

AREP

Partners

Taktyk (landscape architecture, planning) / Repérage Urbain (sociology) / Kaleido'Scop / Benjamin Pradel (Ph.D in sociology) / Martin Étienne (illustrator)

AREP's mission

Prospective study for the environmental transition of the region

Cost

€100,000 (excl. VAT)

Floor area

540 m²

Duration of the mission

2021 – 2023

Environmental principles – EMC2B

Energy

Final energy consumption (MWh / pers / year): 27.2 MWh / pers / year

- Scenario 1 > 15.4 MWh / pers / year • Scenario 1 > 15.4 MWh / pers / year
- Scenario 2 > 11.8 MWh / pers / year • Scenario 3 > 11.5 MWh / pers / year

Share of renewable energies in gross final energy consumption: 15%.

- Scenario 1 > 88% • Scenario 2 > 87% • Scenario 3 > 93%

Carbon

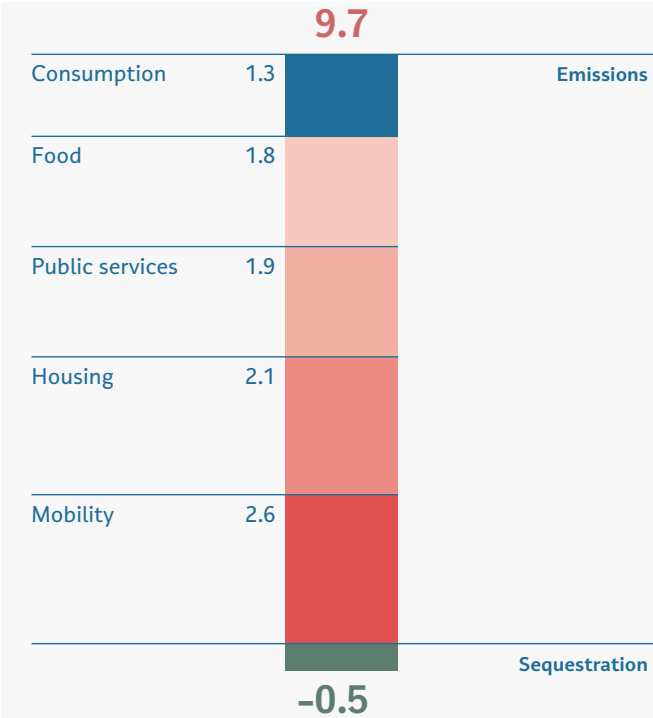
Carbon footprint (tCO₂e / pers / year): 9.7 tCO₂e / pers / year

- Scenario 1 > 4.2 tCO₂e / pers / year • Scenario 2 > 2.4 tCO₂e / pers / year
- Scenario 3 > 2.7 tCO₂e / per / year

Biodiversity

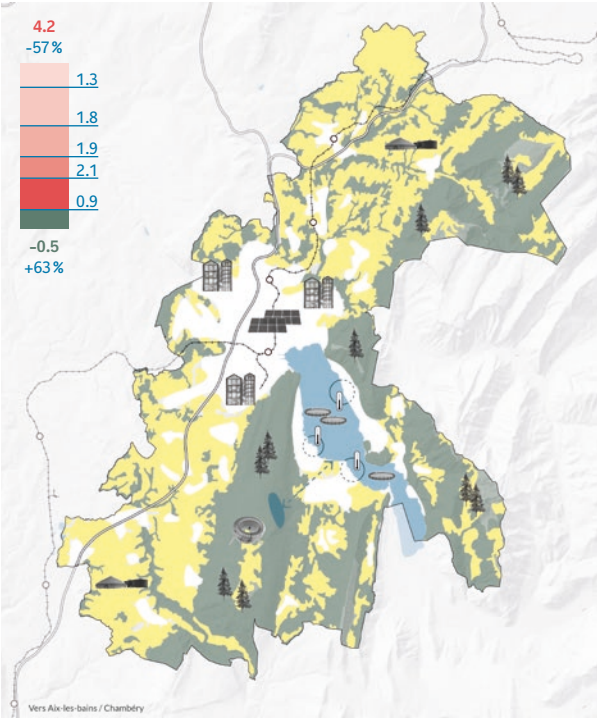
- Farmland (in km²): 184 km²
- Woodlands and semi-natural areas (in km²): 248 km²
- Average rate of soil sealing in the Greater Annecy conurbation between 2008 and 2021 (ha / year): 43.7 ha / year
- Scenario 1 > 15.4 ha / year • Scenario 2 > 10.2 ha / year
- Scenario 3 > 5.5 ha / year

Current situation



Carbon footprint of the Grand Annecy in tCO₂e/pers.

The diffuse archipelago – 2050



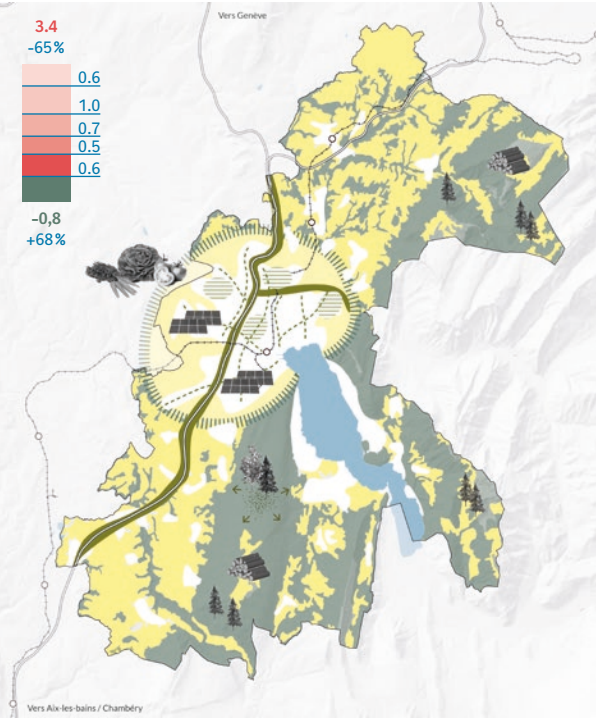
Energy

- Methanisation units.
- Solarisation of rooftops.
- Lake source heating and cooling district.
- Flying wind turbines.
- High altitude fish farming.
- Pumped energy transfer station between Semnoz and the lake.

Agriculture & forestry

- Vertical urban farms.
- Fish farming.
- Combating bark beetle infestation.

The negotiated archipelago – 2050

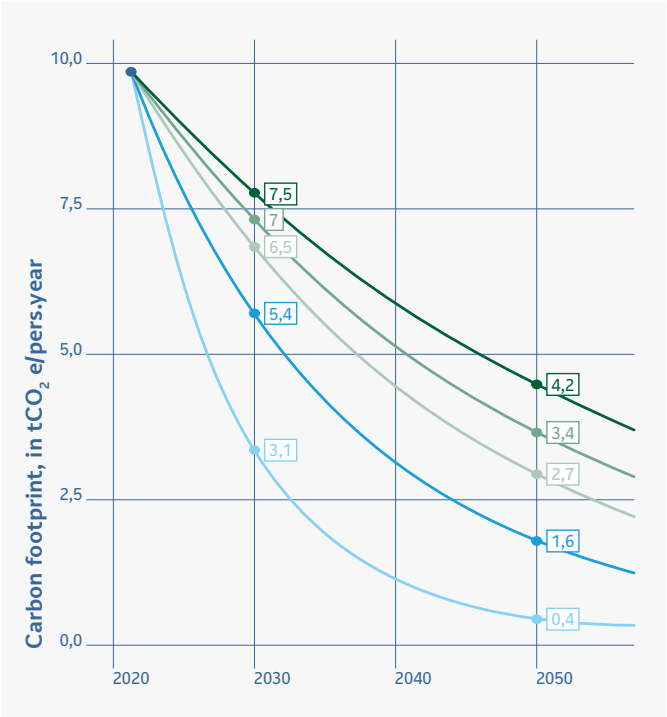


Energy

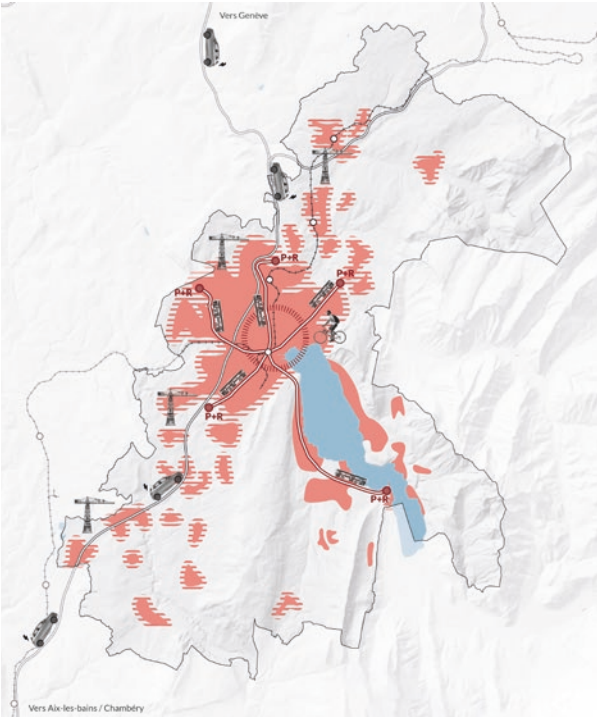
- Solarisation of rooftops.
- Developing the local wood energy sector.

Agriculture & forestry

- Developing the market gardening belt in peri-urban areas to strengthen Greater Annecy's food self-sufficiency.
- Reinforcement of green corridors in the town centre.
- Reinforcing green corridors along infrastructures.
- Renaturation of soils in artificial areas (ZAN).
- Setting up of agriculture & forestry demonstrators.
- Combating bark beetle infestation.



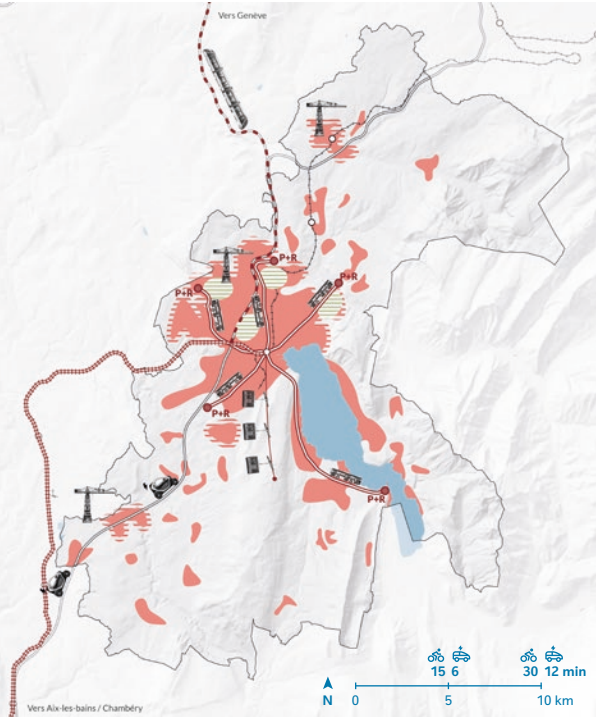
Carbon footprint trajectories at constant effort rates, based on the 2021 and 2050 footprints in the scenarios.



Artificialisation and mobility

Artificialisation

- Urban extension
- Intensification
- Renaturation



Artificialization and mobility

Mobility

- BRT lines
- Vehicle electrification
- Tram/Train on highways
- Doubling of the railway line
- BRT on highways
- Urban boulevard

Low-carbon district of Petersen Dakar, Senegal

Client	CETUD World Bank
AREP's mission	Master plan of the BRT terminus district in Dakar
Partners	Pascale Trompette (CNRS, PACTE) / Redman Sénégal / Hugh Mulcahey / Myluckypixel, VUF Bikes / Sylfen / Sunna Design / Backacia / SAS minimum
Cost	€650,000 (excl. VAT)
Floor area	100 ha
Handover	March 2022
Environmental principles – EMC2B	
Energy 	• Optimising the solar orientation of buildings • Photovoltaic panels • Hydrogen energy storage
Materials 	• Reuse and recycling of site materials during the construction phases • Street furniture made from recycled waste from the construction site • Best practices for the construction of buildings and public spaces
Carbon 	• Assessment of the project's carbon emissions (GHG emissions throughout the lifecycle of the project): 3,200 kgCO₂eq / m²
Climate 	• Wind comfort in public spaces and natural ventilation of buildings • Pedestrianisation of the area • Shared cargo bikes for logistics
Biodiversity 	• 23% of green or pervious soils and spaces • Planting of 438 trees



Urban insertion of the Phuket tramline Thailand

Client

Transport and Traffic Planning Office / Ministry of Transportation of Thailand

Funding

French Development Agency (AFD)

AREP's mission

Comprehensive study on planning, transportation and heritage architecture on Thailand's Phuket island
Participation of AREP Vietnam, AREP Regional Planning (Territoires), AREP Flow and Mobility, Heritage Architecture department

Partners

DVDH (Des Villes et des Hommes) representative / EGIS Rail

Cost

AREP's share: €198,090 excl. VAT (Consortium: €749,621 excl. VAT)

Handover

Mai 2021

Environmental principles – EMC2B

Carbon

- The implementation of light rail and cable car projects, complemented by an upgraded bus network linking the island's main residential and holiday districts, will lead to a significant reduction in car traffic traffic (on average, a 3% decrease of vehicles per km in 2030 and a 6% decrease in 2040 on the island, compared with a business-as-usual scenario). As a result, emissions are estimated to fall by 20% in 2040 compared with a business-as-usual scenario



Sino-French Ecocity of Caidian China

Client	French Development Agency (AFD) / Municipality of Wuhan
Project management	AREP / Burgeap / Terao / Iris Consulting / EY
AREP's mission	Planning competition
Floor area	Study perimeter: 62 km² Operational perimeter: 30 km²
Handover	2017
Environmental principles – EMC2B	
Energy 	• Systematic use of photovoltaic roof panels
Materials 	• Launch of construction projects by means of architecture competitions with high environmental standards regarding materials
Carbon 	• Public transportation network covering the entire urban grid • Walkability of the city blocks • Mixed uses, allowing people to work, receive healthcare and enjoy leisure activities within short distances
Climate 	• Reforestation programme • Mitigation of the heat island effect in built-up and agricultural areas
Biodiversity 	• Contribution of the urban metabolism to the regeneration and protection of the very rich and fragile hydrographic system





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Nancy Grand Cœur
Ecodistrict
France

Client
Société Lorraine d'Économie Mixte d'Aménagement Urbain (local development agency) on behalf of the Greater Nancy Conurbation
Project management
AREP (architecture, planning, landscape architecture) / Atelier Michel Desvigne (landscape architecture) / SEFIBA (Engineering consultancy -roads and utilities infrastructure)
AREP's mission
Master plan, design of public spaces (complete service from project creation and concept design through to practical completion), consulting services in urban planning, architecture, landscape architecture and environmental solutions, consulting services in public consultation, monitoring of the project
Cost
Nancy Grand Coeur urban development zone: €30 million (excl. VAT) Simone Veil Square and renovation of the Thiers car park: €16 million (excl. VAT)
Floor area
6.9 ha of public spaces
Handover
Studies: 2007 - 2013 Construction works: 2014 - 2020
Environmental principles – EMC2B
Energy 
• Use of LED lighting devices to optimize energy consumption
Materials 
• Pervious stone flooring tiles and wooden walkways
Carbon 
• Zéro Artificialisation Nette (net zero soil sealing) • Waste management
Climate 
• Encourage the creation of cool islands
Biodiversity 
• Soil unsealing • Planting of more than 1,000 trees • Creation of natural water ponds





Adiabatic cooling prototype Vietnam

Client

Seoul Biennale of Architecture and Urban Planning

Project management

AREP

Partner

Mi-Sook Jung, coordinating architect in Korea

AREP's mission

Design and supervision of the manufacturing of the prototype as part of an international call for projects

Handover

2021

Environmental principles – EMC2B

Materials

- Total mass: 1,000 kg
- Bio-based and earth-based materials: 1,000 kg





Hangzhou Sports Tower China

Distinction Grand Prix de l'AFEX - Top 10 project
Client Hangzhou Olympic and International Expo Center Construction Investment Co. LTD
Project management AREP
Partners HZDI / MaP3
AREP's mission Design of the building comprising sports amenities, a hotel, a clinic and pedestrian routes
Cost €180 million (excl. VAT) not including interior fittings
Floor area Tower: 82,000 m² / Velodrome: 6,400 m² / Clinic: 5,600 m² / Press conference area: 2,000 m² / Retail: 9,000 m² / Hotel: 24,000 m² / Car park: 51,000 m²
Handover 2022
Environmental principles – EMC2B
Energy  • Energy from renewable power sources (MWh / year): 2,000 m² of solar thermal panels
Climate  • Albedo: 0.30%
Biodiversity  • Planted and / or pervious surfaces: 13,600 m² • Ratio of planted and / or pervious surfaces: 23%







01

P. 14

Nîmes Pont-du-Gard train station
France

Thermal comfort, water management, use of local materials, biodiversity preservation, solar car ports. The Nîmes-Pont-du-Gard train station brings together all of our commitments.

The building appears behind the trees in a Mediterranean garden. Around the station, local tree and plant species lead the way to the entrance of the station. Inside the building, a large canopy takes over from the trees to protect the travelers. The building is composed of three layers of thermal protection and light filters. On top, inclined sunshades protect from excessive light. On the underside, a bamboo cane ceiling provides subdued lighting that evokes the shady atmosphere of the South.

The transparent glass skin enhances the legibility of the station’s organization: vertical circulations, services and facilities, connections between the different modes of transport, including bicycles and electric cars, and between the existing regional train line and the new high-speed line.

Soft light, generous spaces, bio-sourced and earth-sourced materials, such as the local stone of Brouzet, natural ventilation and light-weight structures such as the connecting walkway built like a suspension bridge. Most of the car parking spaces provide a solar canopy with 8,000 m² of solar panels. The linking platform overlooks the landscape and offers both a view of the Nîmes hillsides to the north and an unimpeded view of the Costières. The arrival at the station allows to quickly grasp the particularities of the site.

The combination of all these elements makes passengers movements easier and more fluid and provides a enhanced passenger experience.



02

P. 18

Pont de l’Alma train station
Paris

For the renovation of the Pont de l’Alma station, located near the Eiffel Tower, AREP has sought to integrate the building seamlessly into the landscape, to highlight its architectural features and to create new landscaped surroundings.

The challenge of the project was to create consistency between the passenger building and the elevated walkway to encourage soft mobility, but also to give the building a place and function within the public space. Both open and understated, the station blends seamlessly into the landscape of the Seine banks. By revealing the stone walls and paying special attention to lighting, the project highlights the interior features of the station.

To preserve the perspective created by the banks of the Seine, two pavilions have been built. They fulfil a dual purpose: to bring together the various passenger services in a coherent manner and to increase the legibility of the access points to the riverbanks which extend under the promenade along the Seine. The first pavilion accommodates the ticket office as well as the adjoining premises; the second houses a commercial space opening onto the Seine. We have used our knowledge of the Parisian landscape to ensure that the renovation blends seamlessly with the surroundings while adding trees and plants.



03

P. 20

Saint-Jean-de-Maurienne train station
France

The station has been designed in anticipation of the future high-speed train station on the Lyon-Turin line and can be demounted and reused to minimize its carbon footprint.

Designed to adapt to the peak season and a fixed time frame (10 years), the project is the result of a broad reflection on the adaptability of buildings over time and the construction choices in relation to their lifespan, in keeping with our research revolving around the theme of “temporary” constructions. The prefabricated construction system contributes to maintaining a clean building site, reducing waste on site, while limiting heavy machinery. The light-weight construction of this “gallery-like” station features raw materials and is aimed at reducing energy consumption through a conception process that has focused on building volumes, compactness and sun shading as well as on the size and orientation of the bay windows.

The building features a pleated, double-pitched roof supported by a grey strip, that takes its cue from the traditional villages of the Alps while echoing the slopes of the Vanoise mountain range. The roof is the element that gives the building its characteristic form. The canopy, which extends on both sides of the main building, makes it look like an elegant “gallery-like station”, enhancing its dialogue with its environment. The facade cladding consists of vertical timber boards, sourced from French suppliers. The north-facing openings provide generous natural light while limiting overheating. The entirely glazed south-facing façade allows for natural light and sun to flood into the passenger and visitor areas.



04

P. 24

Auray train station
France

The Auray station, a station for both daily commuting and long-distance travel, was entirely designed by the AREP teams to open the building up to the city and recreate the links between two municipalities.

Modern, resource-efficient, and functional, the new Auray station displays simple and sleek building volumes and planted areas while featuring a limited number of colours and materials (steel, timber, glass, yellow granite, etc.), in keeping with the landscape and heritage of the area. The creation of a new 100-metre-long footbridge connects two municipalities (Auray and Brech) providing people from both sides with a direct access to the station. This new connection has transformed a previously unused area into a car park and a secure bicycle shelter.

The station has been sized to handle the seasonal flow of passengers travelling to the Quiberon peninsula and is expected to accommodate 1.4 million passengers per year by 2030. Auray station is also the first station in Brittany to have a BIM digital twin thanks to the expertise of the AREP teams.



05

P. 28

Saint-Michel Notre-Dame train station
Paris

AREP has been awarded the National Engineering Grand Prix for the redevelopment and modernization project of Saint-Michel Notre-Dame train station. Our multi-disciplinary practice put forward frugal and sustainable solutions for this Parisian station located along the Seine.

It is the eighth busiest station in France (32 million passengers) and is served by the RER (suburban) lines B and C and the metro line 4, providing an interconnection area for them. Many constraints had to be overcome to turn this underground station and its invisible passenger building into a brighter, more accessible, more fluid and more noteworthy terminal. How could the building be bathed in natural light when openings to the outside could expose it to flooding from the Seine or cause noise pollution? And how, without these openings, can the quality of the indoor air be improved?

AREP’s multidisciplinary teams put forward a simple idea: 28 porous and transparent bay windows, six of which are located in the upper part, thus affording views of the banks of the Seine. These flood resistant windows provide robust flood protection, reduce noise, let natural light in and allow for air renewal. Vertical lighting and rebalanced light intensity will improve the legibility of space and make the pedestrian routes to the platforms more visible. By highlighting the heritage elements of the historic station, built in 1878, and adding two escalators and a lift, we are transforming the station into a bright, user-friendly, and remarkable place.



06

[P. 30]

Saint-Lazare train station *Paris*

Opened in 1837, Paris Saint-Lazare is the oldest train station in France. The needs of pedestrians have been at the heart of the project: organise space between the different modes of transport to facilitate movement, make the station more comfortable, welcome travellers in a quality urban atmosphere, offer them efficient services and attractive shops. The link between the station and the surrounding neighbourhoods and the city has been reinstated while the architectural heritage features of the station have preserved and restored.

The project required particularly strong attention to the management of pedestrian flows both throughout the construction phase to keep the station running and afterwards in its day-to-day operation. The original architectural features of the building have been highlighted and the three main levels of the station (metro, street, trains) have been linked via an atrium which brings natural light all the way down to the metro area below street level. Lighting, materials (stone, timber, glass, metal), signage and furniture have been thoughtfully combined to ensure that all areas of the station are welcoming, functional and comfortable both for travellers and people simply passing through. The floor from the end of the platforms to the metro and RER entrances features a hard-wearing, light-coloured granite which adds to the cohesion and brightness of the spaces. The memory of the place, designed by architects Alfred Armand in 1853 and Juste Lisch in 1889, is kept alive by using the same materials as the original building: glass, for transparency and protection; steel, as a historical expression of lightweight structures and a contemporary expression of modernity; and stone on the restored façades, expressing continuity with the city's 19th and 20th-century buildings. The restructuring of the main concourse, listed as a historic monument, made possible the creation of a 10,000 m² retail space on three levels.



07

[P. 34]

Montparnasse train station *Paris*

AREP has created a well-lit, accessible, and legible station that highlights the historical and artistic heritage of the late 20th century.

The latest transformation of the Paris-Montparnasse station gives prominence to natural light, with two new glazed roofs and the footbridge that enhances the central hall. The exterior façades feature large bay windows allowing views of the city from the station and vice versa. The colours on all the façades pay tribute to the artistic past of the district and to the colourful and renovated frescoes by Victor Vasarely.

The frescoes, which have been decorating the walls of the station for 47 years, have been given a new lease of life in this new setting.

The rehabilitation of the station addresses a critical issue: the need to handle an increasing number of travellers and commuters. Pedestrian routes from the metro to the platforms have been simplified, signage has been rethought and the different flows have been reorganised to minimize potential conflicts during peak hours. For an enhanced passenger experience waiting and meeting spaces with 600 seats have been created in the public areas. The modernisation of the station has created harmony between the flow of light and the flow of passengers and a welcoming environment for the increasing passenger numbers while preserving natural resources.



08

[P. 38]

Rennes train station *France*

A gateway to Brittany, Rennes station epitomises the architectural transformation that seals the connection between the two riverbanks of the city and facilitates transport links.

AREP has redesigned the station to improve the management of pedestrian flows associated with the arrival of the Bretagne-Pays de la Loire line (30 million passengers expected by 2040). This transformation of a 19th century “bridge-station” has been a real technical and architectural achievement and part of a broader urban reflection.

The cloud floating over the built landscape acts both as a roof to the extension of the station and a façade while providing a sense of place identity. It consists of four seven-metre-wide sheets of ETFE cushions, a light-weight material used as an alternative to glass. The sheets are transparent and partially overlap each other, thereby letting natural and artificial light flood in. They are supported by a tree-like structure made up of metal posts and timber chords.

Each of these posts is rooted at level -1 of the station and stretches up to 17 metres to reach the roof. Under the cloud an origami-like complex structure with 320 facets tops the interchange area. On the outside, a new footbridge spanning the rail tracks, the Anita Conti footbridge with its landscaped ha-ha, extends the interchange area and gradually rises to 11 metres before reaching down to the South forecourt.



09

[P. 42]

Paris-Nord train station *Paris*

For the renovation of the Paris Nord station, AREP has imagined a new form of architecture which redefines the archetypal train shed.

With the Horizon 2024 project, AREP has imagined and designed a more legible and uncluttered station, one that is open to the city and meets real needs with simplicity. The new station's contemporary and environmentally engaged architecture reflects the layout of the grand train sheds and encourages different types of mobility. The rehabilitation by AREP's multidisciplinary project teams invented a new archetype of trains sheds: one that is simple and frugal, produces solar-powered energy and dialogues with the contemporary glass roof while being in keeping with the vocabulary of the historic grand trains sheds. Opening up onto a new forecourt and bathed in natural light, it accommodates more than 1,000 secure bicycle spaces. Its timber-latticed façade allows to see through it while at its upper, partly coloured, part one can see the climatic chronology of Paris from 1850 to 2024, an allusion to the climate stripes. The new forecourt has been rethought to act as a new urban focal point and an eco-friendly passenger area, with green spaces and a light-coloured, high-albedo floor using reclaimed materials. In the extension of this new intermodal space, the transport operators' premises have been integrated into the timber façade that runs along the entire forecourt . An urban logistics hub dedicated to last kilometre deliveries, complements the scheme to give back to the station its function of public space in the heart of the city.



10

[P. 46]

Paris-Lyon train station *Paris*

Frescoes Gallery (Salle des Fresques)

The restoration of the Frescoes Gallery, an outstanding heritage site listed as a historic monument, began in 2014 with the Fresco 1 works and has been broken down into several phases overlapping one another in order to meet operational constraints and the need to keep this large Parisian station running: restoration of the frescoes, restoration of the glass roofs, installation of water mist fire protection devices, egg chairs in the Frequent Travellers lounge, Fresco 3 works. The aim of the project was to improve the functional and spatial legibility of the public space and create a new retail offer and new services.

Cour Chalon

The Chalon project, undertaken after the restoration of the clock tower in 2015, constitutes the first large-scale restoration of the station's façades. The aim was to ensure the longevity of the facades and roofs of the historic monument and to enhance the station's heritage features by creating retail units under the frescoes.



11

[P. 48]

Bellegarde-sur-Valserine train station *France*

Bellegarde station is the expression of an exemplary and innovative environmental approach.

The circular building is structured around two concentric rings. The first one comprises the central concourse, which is topped by a timber dome with an opening at the upper end. It is surrounded by a second ring accommodating services, premises under concession and entrances on the ground floor and operating premises on the first floor. These two rings are topped by a second translucent dome. In order to optimise thermal efficiency and minimise energy costs, the space between the domes is used as a heat exchanger to heat the public areas in winter and ventilate the interior vault in summer. Heat pumps, photovoltaic panels, ground-coupled heat exchangers and high-performance insulation complete the system. The building makes extensive use of wood, which is present in both the interior and exterior dome and in the overall cladding. The Bellegarde multimodal transport hub is located on the banks of the Valserine Gorge, in a steep-sided site at the intersection of the rail lines serving Culoz, Bourg-en-Bresse and Geneva. An urban thoroughfare connecting the upper and lower town runs through the multimodal hub, which accommodates drop-off areas for cars and taxis as well as two car parks with 90 and 135 places respectively. The TER platforms are connected via an underground walkway and the TGV line platform is accessible via a ramp.

Nearly 40,000 m³ of rock were extracted to give the site its shape and make movement routes between the car parks, the building, and the platforms accessible for people with mobility or other impairments. An 80% of the retaining walls were made from gabion baskets using the extracted rock. This rocky site is home to specific plant species while its steep sloping nature required the implementation of a very careful run-off water management system.



12

P. 52

Avignon High-speed train station France

The Avignon TGV station protects users from climate hazards while maintaining a visual connection with the surroundings.

Built in 2001 on the Courtine peninsula, less than three kilometres from Avignon, this high-speed station is the centrepiece of a new business hub that stretches over 200 hectares at the area where the Rhône and Durance rivers meet. The site is subject to very strong climatic constraints, as the Mistral wind blows from the north and the sun shines through from the south. AREP designed two 400-metre-long structures along the open-air platforms to protect passengers. The two buildings are set on the rail track embankment.

The geometry reflects the heat of the South. The outer curve features stone, while the interior is made of white stained wood. On the opposite side, the transparent façade protects from the wind and allows views of the sky and the city. The mezzanine level accommodates the waiting area and has been designed as a pre-positioning system: passengers can stand or sit along the platform, in front of their carriage, while being sheltered. The station, designed as a “garden station”, features various species, such as plane trees, cypresses, tulip trees, almond trees, and umbrella pines to restore local biodiversity and set the stage for the renewal of the city.



13

P. 56

Besançon train station France

Echoing the citadel of Besançon, the stone walls of the station spread out in the heart of a natural undulating landscape, through which runs the high-speed rail line (TGV). Combining Land Art and functional design to connect one means of transport to another, the project introduces an elegant composition of walls and footbridges into the landscape. The station stretches from the car parks through to the concourse and the platforms under a large green roof which natural extends the south side of the site. The concourse, which houses the passenger services, is directly linked to the circulation routes leading to the platforms, which are accessed by gently sloping ramps. The station reflects the synergy between nature and technology and is one of the first in France to have been awarded the “High Environmental Quality” standard.



14

P. 60

Torino Porta-Susa train station Italy

Both an intermodal terminal and an urban locus, Torino Porta Susa station is a highly innovative project in the world of rail transport. It integrates all the requirements of an interchange hub in a new and resolutely contemporary city space: the city enters the station and the station becomes a piece of the city. Drawing on the tradition of 19th century arcades of the Italian cities, the station has the form of a 385-metre-long and 30-metre-wide glazed gallery, which is joined perpendicularly at 100-metre intervals by walkways positioned in line with existing streets. Inside the gallery is a series of volumes in steel and glass, house services and shops. They rest on a two-level concrete base occupied by car parks and technical areas. From the interior, one can appreciate the geometry of the glass canopy, whose form follows the variations in ground level between north and south and the two main thoroughfares to the west and the east. The north-facing side of the station ends in a gently sloping forecourt overlooking the historic town and the old station. A system of multiple vertical walkways (gently sloping ramps, escalators, staircases and lifts) ensures simple, easy connections between the station's five levels and smoothes out the uneven ground between south and north, and between Corso Bolzano and the Spina. The glass roof (15,000 square metres) is entirely covered in single-crystal photovoltaic sensors fitted between the two layers of glass. They also act as shading devices, optimising the thermal comfort of this public space in summer and winter alike, while producing 680,000 kWh per year. The entire building is ventilated naturally – from the platforms, which have high inertia, to the concourse, which opens onto the exterior. This system is complemented by occasional boosts of heat (winter) or cold (summer).



15

P. 64

Casa Port train station Morocco

The organisation of the station and adjacent public spaces is part of an overall urban redevelopment of the neighbourhoods bordering the port of Casablanca.

The interchange hub has been designed to meet the increase in traffic expected by the Moroccan national rail operator (ONCF) and houses, under its large roof, waiting areas, circulations, services as well as retail outlets and a two-tier underground car park facility. The station's potential for development was taken into account at the design stage, thus making it possible to create a connection with a future underground RER station.

Through its materials and lighting the station carries on the heritage of Moroccan classic (geometric space, use of light, simple and noble materials, use of traditional technical skills) while paying tribute to the modernity of Casablanca. The concourse features a large timber and steel roof obeying a rigorous geometry and supported by thin columns which end up in eight branches framing an opening in the roof that allows for a more subdued ambient light. The floor-to-ceiling glass facades ensure continuity between indoor and outdoor public spaces while allowing passengers to grasp the general layout of the station and, thereby, anticipate their movements. On the west-facing façade of the building, a mashrabiyya acts like a screen rises to help reduce direct sunlight in the afternoon. On the south-facing façade, the roof covers the vast outdoor public spaces.

The underground car park extends under the forecourt and the passenger building, allowing direct vertical links between the car park and train access points. It has only two levels to facilitate its operation and management in terms of safety and it can be accessed by ramps surrounding the taxi drop-off and pick-up areas.



16

P. 68

Modular train stations Belgium

AREP and its partners have developed for the Belgian National Railway Company (SNCB) a new typology of small and medium-sized stations designed to handle up to 20,000 passengers per week. A special toolkit has been developed to help architects design the future stations according to this new typology. Some 3,800 trains operate on the Belgian network every day, serving 554 stations. Although until recently people used to commute by car, traffic congestion has prompted the shift to rail transportation.

Today, we need to focus on small and medium-sized stations by proposing a an iconic, sleek and adjustable design concept that can be easily reproduced as well as adapt and evolve over both the short and long term. This new typology of stations is designed to adapt to the changing functional needs and constraints of the different sites. Its development is in line with the standardisation of platform equipment and the trend towards uniform design, which can already be observed in some ongoing station projects launched by the SNCB. This new typology is the result of an ongoing reflection within the SNCB Innovation & Station Environment Division along four lines of research and development:

- the station in its built environment
- the multimodal station
- the station in a context of digitalisation;
- the station in a context of sustainable development.



17

P. 70

Brussels underground northern extension Belgium

A study has been launched by the public consortium Beliris and Stib for the extension of the public transport network to the north of Brussels.

This extension, which will link the North station to Bordet station over a distance of around four kilometres will be running through the municipalities of Schaerbeek and Evere. To meet future needs, the metro will be automatic and be operating services every 90 seconds. The new line comprises seven stations located some 30 m below ground and emerging in very diverse and constrained urban contexts, thereby requiring solutions tailored to each location. AREP, which is part of the BMN (Brussels Metro North) multidisciplinary consortium specially set up for this project, is working on the Verboeckhoeven (7,000 m²), Tilleul (4,000 m²) and Bordet (7,281 m²) stations from the project creation to the practical completion in coordination with the Belgian practice Van Campenhout.



18

P. 72

Budapest Nyugati station Hungary

The in-depth restructuring of Nyugati station has required taking into account the environmental aspects that make up AREP's EMC2B approach and questioning the act of building.

AREP's finalist project for the restructuring of the Nyugati station in Budapest, Hungary, takes into consideration the living world, the architectural heritage and what is already there to support the shift towards a traffic-calmed urban metabolism. The station acts as an “ecological locomotive” and has been designed as a resource-efficient and resilient mobility hub open to the city. Surrounded by an urban forest, this post-carbon station, frugal in terms of materials and built-up areas, has been designed to be one of the first large energy-positive stations in Europe. Our project preserves the existing Eiffel building, with the restoration of the railway hall built by the Eiffel Ateliers in 1877, and allows for evolving uses (commercial, artistic, sports and cultural activities).



19

P. 74

Shanghai South train station China

Shanghai South train station reinvents the connection between train and road transport modes while the round shape of the building ensures operating fluidity. A flagship project by AREP.

The round shape of the building connects trains and road transport modes smoothly and provides passengers with the shortest possible walking distance to the waiting areas and platforms. When one stands inside the building, the entire space is visible: the different functions and circulations are readily legible, from the parking areas to the trains. The translucent, light-weight roof stretches over 60,000 m². It is composed of three layers: solar shades on the outside, transparent polycarbonate sheeting and perforated metal on the inside, which all combine to filter and diffuse the natural light. All the areas are lit by lamp posts laid out according to a precise and well-thought pattern. AREP took into account the symbolic aspect of this specific architecture by incorporating the concepts of Chinese cosmology: the round shape symbolizes the sky and the square – the waiting area – represents the earth.



20

P. 78

Wuhan train station China

In Wuhan, AREP has designed a contemporary, multimodal and user-friendly station for the world's fastest line.

The construction of Wuhan's new station marks a major stage in the city's exponential development. In the midst of a demographic boom, the station accommodates 11 platforms and 20 tracks over 370,000 m². With its broad roof made up of a central structure stretching from east to west, complemented by four successive wings spreading to the south and north, the station boasts a strong identity within the urban landscape. Its organic shape, supported by lightweight structures, produces the effect of a bird taking flight, evoking the local legend of a crane bringing wealth and prosperity to the city's inhabitants. It also illustrates the movement and fluid design that characterise the project. The station accommodates all types of mobility and encourages soft modes of transport (walking and cycling). Its central, symmetrical, three-dimensional composition forms a balcony overlooking the city. It is located in the heart of the area undergoing urban development. In order to accommodate the different flows effectively both in time and space, the station functions like an airport, with separate departure and arrival platforms. The materials used are extremely simple, and the natural light is carefully controlled to optimise user comfort while reducing electricity consumption.



21

P. 80

Tongzhou train station China

The Tongzhou transport hub is located in the Yangtuo region in the Tongzhou district (Beijing), within a triangle formed by the Sixth East Ring Road, the North Canal and the existing Beijing-Harbin railway line. The design not only expresses the essence of Beijing's traditional architectural elements, but also incorporates the “urban forest” concept by connecting to and integrating the surrounding urban green space to carve out a new ecological identity for this secondary hub. The design of the station's main roof evokes a combination of “sails”. Seven small sails are laid out on the south-facing side of the main roof combined with the public realm and the retail outlets below. The space under the roof features “light bubbles” that illuminate the underground space. The plan aims to reclaim the land for the city by creating a traffic-calmed corridor throughout the area and by providing connections throughout the city to maximise the site's accessibility. The intelligent building concept revolves around lightweight structures embedded with green technologies, such as wind corridors, water systems and photovoltaic panels, to provide the best climate conditions for the buildings and create a new model of eco-friendly station.

The garden-like station is flanked by the central green space to the west and the Sixth Ring Park to the east, on the ecological thoroughfare of the central zone. The seven floating sails run through and protect the green thoroughfare from sunlight, thereby forming an urban park that extends both inside and outside the station and creating a vibrant, multi-dimensional space.



22

P. 84

Qinghe train station Beijing, China

Combining horizontal and vertical lines, AREP has delivered a new station set in a dense urban fabric that opens up the city to the natural landscape.

Qinghe train station constitutes a major interchange hub on the high-speed rail line connecting Beijing to Zhangjiakou. Designed as a window on the history of the city, it addresses the needs for accessibility, intermodal connections, uncluttered spaces, safety, brand image and urban development. Commuter cross flows are clearly separated, as it is always the case in Chinese stations of similar scale. The 220-metre long and 130-metre wide curved roof made of copper-coloured metal sheeting opens up the façades to the city. The west-facing floor-to-ceiling glass façade opens up onto a large pedestrian plaza which extends beneath the viaducts and commands sweeping views of Xishan mountain. The east-facing façade sits on a stone podium which faces the residential district. The geometry

of the structure is simple and applies easy to implement and cost-effective structural principles. The structure is composed of eight transversal ribs with a 25-metre space between them. They are supported by angled bents that are held firmly together on top and mark out the side halls at the foot of the building. The project makes careful use of natural resources with emphasis on natural light and water harvesting systems.



23

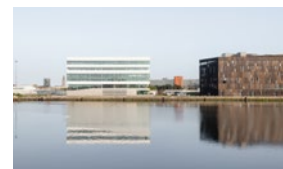
P. 86

Capital Museum Beijing, China

Beijing Museum of History is located on Fu Xing Men Avenue, a major east-west thoroughfare extending Xi Chang An Jie Avenue, which runs alongside the Forbidden City and Tien An Men Square. Fu Xing Men Avenue is flanked by a series of high-profile cultural amenities including an opera house and a library.

The museum was planned as one of the city's flagship public buildings and reflects the image of Beijing as one of the leading global cities. With a total floor area of 60,000 m², the museum is topped by a horizontal rectangular roof and is set back from the avenue to leave room for a public square open to the city, which highlights the building and provides space for cultural events and festivals. Beneath this large roof, which cantilevers over the square, the museum's layout reminds one of a Chinese palace: three pavilions surround a central courtyard on three sides, while the entrance is part of a movement structure where the visitor steps under a stone wall which alludes to the zigzag path one has to go through to enter a palace. The volume, interior spaces and materials of each of the pavilions reflect the functional symbolism of these spaces. The base on which the three volumes are built accommodates ancillary museum facilities (retail, restaurants, auditorium) and spaces for temporary exhibitions, as well as technical premises and a car park in the underground level.

The acoustics and temperature control within the vast indoor spaces are managed in a way to ensure maximum comfort for visitors. Natural light floods in from the south and east façades and the roof. Filtered to minimize glare, it highlights the various volumes and is reflected on the different materials.



24

P. 90

Seafrigo Headquarters France

The Seafrigo headquarters are located in a rapidly changing area, on the interface between the port and the historic city of Le Havre, and express the new urban vitality of the Citadelle district. The building sits on an open site affording unimpeded views of the docks, the River Seine and the city. Extending

the sea metaphor initiated by the ENSM (French Maritime Academy) building, the Seafrigo headquarters are moored alongside the Eure Basin. The east and west blocks of the building accommodate all the workstations in a total floor area of around 700 m² ensuring equal comfort for a 400-strong staff. The width and structural continuity of the floors along with the footbridges linking them to one another on either side of the atrium on levels 1 and 2 provide a flexible distribution of the staff. Dynamic thermal simulations and calculations based on the RT 2012 regulations led to the following choices:

- Improved envelope performance due to the size and performance of glazing and the installation of motorised solar protection;
- heat and cold generated by a heat pump;
- photovoltaic panels on the roof.

The building qualifies for Bepos/E3C1 certification.



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P. 92

Saint-Malo ferry terminal France

In Saint-Malo, AREP is inventing a new architectural archetype for the ferry terminal of the tomorrow, which embodies the future of post-carbon travel while preserving the natural, built and intangible heritage of the site.

At a time of climate emergency, ferry terminals must change. They are still considered as places associated with fossil fuel combustion and combustion-engine vehicles, whether the latter operate on land or at sea. The new Saint-Malo ferry terminal project has been thought as a low-impact architectural and landscape ensemble that can change over time to adapt to the shifting mobility patterns. Through this project AREP has imagined and designed a new architectural archetype. The seven-hectare site is open to the elements, the sun, the wind, the rain, and the sea spray. It sits on the edge of the sea and dialogues with the city ramparts. The sun can provide almost twenty times the energy needed, including the energy consumed by ships, buildings, and vehicles, thereby revealing the productive potential of this new archetype: the ferry terminal is a hub of mobility and low-carbon energy. The terminal must adapt to global warming and its spaces have been designed accordingly: albedo and colorimetry of the exposed surfaces, green spaces, and natural ventilation combine to achieve bioclimatic comfort, thermal delight, and lighting. The Saint-Malo ferry terminal has been designed according to four principles, brought together in an innovative way: enhancement of what is already there and adaptability, soil unsealing and biodiversity, simple and low-impact materials, post-carbon approach and integration into the landscape of renewable energy sources.



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[P. 96]

Saint-Aubin parking facility Switzerland

AREP submitted a proposal for the parallel study mandate regarding the development of the Agrico site in Saint-Aubin, Switzerland, launched by the Cantonal Land Development Agency (ECPF) of Fribourg. The project proposes a reversible and adaptable mobility platform designed to meet shifting needs and to accommodate decarbonised transportation means (1,400 places). Designed by the architect Jacob Zweifel in 1967, the Agrico campus, a genuine agricultural utopia, is now home to research centres in the agri-food sector. The programme comprises a mobility platform which combines public transportation, parking spaces for bicycles, and motorised two-wheelers, as well as a silo car park (equipped with electric vehicle charging points).

The project aims to optimise current needs and provides the possibility of tailoring these spaces to future needs by designing a platform that can adapt to the unpredictable effects of climate change and the shifting patterns of mobility, thus extending the research already carried out on the car park in the Saint Julien-en-Genevois station area, developed by AREP.

Is the idea of a post-carbon parking an oxymoron?

The modular structure of the silo car park has been designed to be reversible and to enable the transformation of spaces so that they accommodate new uses (commercial units, offices, services, etc.) Every second level features slabs that can be demounted to create flexible double heights for new programmes. The number of different components (posts, beams, panels, etc.) is kept to a minimum to enhance the structure's reparability and expansion. Several sawmills within a 40-km radius propose species compatible with the project and 57% of the site's materials could thus be bio-based, which is a major contribution to the EMC2B approach in terms of materials. Regarding climate and biodiversity the building is divided into two symmetrical platforms on either side of a central courtyard planted with trees. This cool island in the heart of the building brings natural light and ventilation. Photovoltaic panels stretch over a 7,500-sqm surface on the roof and provide enough energy to recharge part of the electric vehicles. AREP has designed this parking facility not as a car shelf system but as a genuine energy infrastructure which can shift over time as it lies at the crossroads between post-carbon architecture and shared mobility.



27

[P. 98]

Urban logistics hub France

Lyon's Urban Logistics Hub (ULH) project aims to meet the challenge of moving goods around the city in a carbon-free manner, thus addressing the issues of congestion and pollution caused by last-mile deliveries.

Located in the heart of the city, the Edouard Herriot port is a major strategic site. As a transit and distribution hub, the port is the terminal of departure for goods that arrive by rail, river and road. The goods are first sorted and grouped together and then dispatched across the entire metropolitan area via environmentally friendly and carbon-free distribution methods. The Urban Logistics Hub project, led by the AREP teams, comprises the construction of a logistics hub which, due to its flexible space organisation, will have the capacity to accommodate all projects, from those of small businesses to those of large operators. The infrastructure has been designed to blend in seamlessly with the environment and be consistent with the ongoing urban transformation of the Gerland district. It is composed of two buildings, the North and South blocks, rising in the centre of a plot of land on the port. The north building marks the entrance to the site. The south building, on the other hand, features a sleek architectural design with graduations of rhythms and volumes. The distinctive feature of this logistics hub in a dense urban environment is that it extends over several levels comprising logistics spaces, truck manoeuvring areas, ramps and offices stacked upon one another, intertwined. More than 26,000 m² will be dedicated to all the functions the city needs: reception, sorting, last-mile distribution, order and delivery routes preparation, remote storage for retailers and artisans, integrated solutions for e-commerce trade flows, etc. Design flexibility allows the modular buildings to evolve with changing needs: warehouses can be converted into workshops which can then be used as office space and vice versa.



28

[P. 100]

Former Headquarters of Public Hospitals of Paris Paris

This project is part of the call for innovative urban projects (APUI) "Reinventing Paris 3" but epitomises the symbolic legacies of the previous "Reinventing Paris" versions. "Reinventing Paris" illustrates the city's ambitions in terms of transition in the way projects are carried out: setting objectives rather than programmes, embracing the new needs of civil society through innovative uses, incorporating them in the guidelines for responsible construction processes and in the goals of the future bioclimatic Paris zoning plan (BioPLU).

The former headquarters of Public Hospitals of Paris is a major focal point on the City Hall square and the Gesvres quay. The aim of the redevelopment project is to propose a diverse mixed-use programme (housing, office, retail, and services) to better cater for the everyday needs of local residents and foster a vibrant neighbourhood life. The locally focused, environmentally responsible programme aims to restore the attractiveness of the neighbourhood, whose sense of place identity has fallen. The project is designed to set an example and demonstrate the ambitions of the City of Paris. It's a socially-aware project, where the emphasis is placed on renovating, repairing, reusing, recycling and recovering in order to restore meaning, history, values, vibrancy and attractiveness. The heritage value of the St-Martin and Victoria blocks is the guiding theme of the project on an urban and architectural scale, informing all the other aspects at all stage. Our approach is based on five themes:

- Urban form: keeping to the basics of the Haussmannian urban composition,
- Envelope and layout: restoring the qualities of the architectural composition and envelope to revitalise the building blocks,
- Relationship between fullness and emptiness: transforming the heart of the building blocks into commons to be shared and crossed,
- Programme and construction principles: drawing on the resilience of the Haussmannian architecture, proposing a programme that can adapt to change over time,
- Roofs: anticipating the transformation of Haussmannian roofs in 2030.



29

[P. 102]

Train maintenance facility France

AREP is reinventing solar-powered industrial buildings through solar panel-equipped 6,000-square-metre roof.

AREP is one of the French leaders in railway maintenance facilities with more than twenty years of experience in the field. Now we are taking this type of buildings to a new level by implementing a post-carbon approach to their design.

With a surface area of 24,000 m² and a height of 18 metres, the Hellemmes maintenance facility handles all operations on "mid-life" high-speed Duplex trains in one place. For this purpose, high-speed train carriages are taken apart and completely refurbished. The building concentrates the railway maintenance process in one facility and features innovative technologies while achieving energy performance and a reduced carbon footprint.

The metallic structure of the facility frees the main volume from any posts thanks to a 60-metre span and a 13.50-metre free height, giving a lace-like effect to the lightweight, elaborate framework. The goal of the project was to design a modular space, allowing the building to change over time and to integrate new technologies. A series of skylights, combined with a 30-metre glass roof, let natural lighting in, reducing the need for electric lighting and ensuring a comfortable temperature.



30

[P. 106]

Eco-designed platform shelters France

Designed to fit various platform layouts at nearly 3,000 SNCF train stations, our range of shelters reflects our commitment to providing the highest standards of service and comfort for all passengers. They are available in several types: an entry-level model, standard models with basic features (seating, lighting, USB ports) that can be completed with different options (photovoltaic roof, display frame, louvred screens, perforated metal sheets, etc.), a monopod model and a large number of customisable models (door, heated bench, camera, real-time information, etc.). All the seats are made from FSC-certified timber harvested from eco-managed forests. This material provides maximum comfort all year round and contributes to the inviting aesthetics of the shelters. Beyond the trains stations, some of the models can be easily adapted to into a variety of urban contexts and to accommodate a wide range of uses in the public realm: bus shelters, tramway shelters, taxi stands, roofs canopies, etc.



31

[P. 108]

Signage France

Concevoir un système d'information dans l'espace fiable et clair.

Station signage is one of the major priorities in mass transit. Managing passenger flows, particularly in busy stations with sometimes complex internal movement structures, requires an approach that relies on five pillars: harmonise, simplify, structure passenger routes, schematise and establish hierarchies. Signage needs to address a certain number of issues: flow management (people entering and exiting a station or looking for intermodal connections), interplay between the signage and other passenger information elements, station-train interplay in order to optimise management, understanding of the global scope of intermodality to ensure a "seamless" station operation. To this end, the signage guidelines designed by AREP Design provides a clear, legible, effective and consistent system throughout the rail network. Signage is also a fast-moving field, which must constantly adjust to new uses and new contexts and make a complex transport system legible to as many people as possible. Recent developments in the design principles of the signage that has been rolled out since 2012 helped us to address the new challenges facing mass transit stations. By focusing on simplifying and establishing hierarchies, a new system of "augmented" (or monumental) signage, used wherever possible, can highlight passenger routes. The use of graphic signs on architectural elements improves flow management, by helping anticipate passenger movements.



32

P. 112

REAP furniture France

Winner of the call for projects launched by the Greater Paris authority and Paris Region Mobility to design street furniture for squares across the Greater Paris region, the Modulo REAP project meets security and environmental challenges by using demolition waste from nearby sites, thereby rooting the project in its local context.

The project team, assisted by RÉAP (for Réemploi Applicable), AREP's in-house expertise, identified three environmental drivers: favour reclaimed materials for the plugs fixed to the seats, recycle rubble from locally available sources (bricks, earth, concrete) to manufacture the furniture bases, and use low-carbon cement in the concrete mix. The bollards, made from recycled concrete covered with wood, can also be used as waiting furniture. Designed to be modular, the range of furniture can serve a variety of purposes: signage, games, sports equipment, bike parks, parasols, etc. This experimental system of street furniture has been installed on the forecourt of the Seine-Saint-Denis Prefecture, next to the metro exit.



33

P. 114

Luxembourg Railways administration building Luxembourg

Our group submitted a proposal for a sleek, flexible, and comfortable office building to the international competition organised by Luxembourg Railways. The site was very complex and constrained by the rail tracks running 500 metres from the Central Station.

Our proposal features a building that is both linear and fragmented: the elements are organised on either side of a central hall that reflects the idea of a train station as a lively, shared space, accommodating flexible programmes. It creates a meeting place bathed in light and providing thermal comfort. Footbridges on all floors connect the different parts of the building.

Plants and trees are prominent in the design of the building: They are present not only in the outdoor spaces but also in the patios and the central hall as well as on the flat roofs that are accessible to users. The landscape layers framed by rails embedded in the ground create a seamless transition between the public realm and the interior street. The plinth walls made from gabion baskets will support climbing vegetation. The tertiary buildings of the future must feel like home. This is why we have paid special attention to uses. The large concourse provides semi-outdoor, thermally

comfortable spaces for digital nomads and remote workers. The vertical and horizontal circulations become places where people can spend time, socialise, and work in a relaxed and casual atmosphere. Acoustic comfort is one of the major priorities of the project. We have reduced noise from the outside by implementing high-performance façades incorporating a double-skin complex to meet the desired acoustic requirements (BREEAM Excellent rating + WELL Platinum rating).

Coffered ceilings with an absorbing material on the roof underside and occasional reinforcements on the vertical walls in the interior street provide acoustic comfort in the interior spaces.



34

P. 116

School streets Paris

AREP assists the City of Paris in implementing schemes aimed at pedestrianizing and restricting motorised traffic in the streets around the capital's nursery and elementary schools. The goal is to create child-friendly public spaces.

In parallel with the design and creation of street prototypes around schools for the City of Paris, AREP explored the place of children, and generally the place of the different age groups in public space. The goal is to imagine how people can reclaim public space so that the city becomes a highly walkable place. The idea is to create an ecosystem where school streets provide favourable conditions for various uses and can accommodate different profiles at different moments of the day.

The school streets project in Paris consists in:

- Proposing new codes, new rules of the game (learning outside the class, urban gardening, sports practice in public space...)
- Playing with context and blurring boundaries
- Reclaiming space through greening and reintroducing biodiversity in the city
- Amplifying uses and fostering social ties at different moments of the day
- Blending in the Parisian identity and what is already there.



35

P. 118

Oasis schoolyards Paris

The programme of this initiative is part of the resilience strategy of the City of Paris, which comprises the transformation of schoolyards into “oases”, true urban “cool islands”.

Within this context, AREP is working with the City of Paris to transform the schoolyards of the 11th arrondissement through the following actions:

- Unseal the soil of and massively planting the schoolyards to mitigate the heat island effect
- Reconnecting children living in the city with nature through the senses (touch, taste, smell, etc.)
- Diversify uses and age groups through active games, relaxing games, vegetable gardens, reading, outdoor classes, etc.
- Foster gender-neutral uses: make room for both girls and boys in the schoolyards
- Consider schoolyards as a learning resource for awakening, experimenting and developing learning.



36

P. 120

Charenton-Bercy footbridge France

Un urban footbridge designed according to the EMC2B principles

Located in the Charenton-le-Pont area, at the gates of Paris, the Charenton-Bercy site is a major development zone. Surrounded by the ring road, the A4 motorway and the rail tracks, the new footbridge designed by AREP will unlock the potential of this 12-hectare area bordered by the River Seine. The 275-metre-long Charenton-Bercy footbridge, an outcome of close collaboration between architects and engineers, recreates the link between the Bois de Vincennes and the Seine. Its 12-metre-wide structure is the expression of a new structural archetype, based on the thoughtful use of materials to optimise their performance and the search for “sophisticated lightness” in terms of the quantity of materials used and the amount of construction-related CO2 emissions. This sleek, elegant structure is a leading example of low-carbon infrastructure.

Traduction de la démarche EMC2B à l'échelle de l'ouvrage d'art, AREP conçoit ce franchissement comme régénératif: vis-à-vis de la biodiversité, en intégrant une riche promenade arborée, en installant des zones de pleine terre à proximité des points d'appui; dans l'intégration aussi du solaire photovoltaïque pour les parties protégées. Ce franchissement léger, survolant les voies ferrées, proposera des vues inédites sur Paris et sur le territoire de Charenton-Bercy. La générosité de cette passerelle dédiée au modes actifs offrira donc un nouvel espace public au cœur de la métropole parisienne.



37

P. 122

Banks of Hoanm Kiem Lake Hanoi, Vietnam

In the centre of Hanoi, Lake Hoan Kiem - meaning Lake of the Returned Sword - is a major historical and heritage site in the Vietnamese capital. Over time the site had deteriorated, thereby needing extensive restoration. In 2015, as a result of an international competition, AREP was selected to design an ambitious project for the renovation and embellishment of the public spaces around the lake.

The lake is the symbolic heart of the Vietnamese capital and carries great spiritual value. It also fulfils multiple functions: it is a major heritage area with historical, cultural, urban and landscape significance; it offers the largest open-air public space in the capital, open exclusively to pedestrians at weekends; and, finally, with its lush vegetation, it forms a green lung and a familiar park for the city dwellers, who enjoy their daily activities there.

AREP was present at every stage, from design to completion, to ensure the quality and coherence of the project. The team coordinated the design studies, which brought together decision-makers, partners and residents throughout the studies and works. The approach was multidisciplinary and participatory, and several public exhibitions were organised for the local population. The project was inaugurated on October 10, 2020 to coincide with Hanoi's 1010th anniversary celebrations.

By improving the pedestrian walkways, street furniture and lighting, by preserving the city's heritage buildings, by highlighting the lake's natural landscape and connecting the lake to the surrounding areas, AREP has created a vibrant, accessible public space that showcases the city's exceptional heritage.



38

P. 124

Luxembourg in Transition Luxembourg Functional Region

AREP and its partners won an international and multidisciplinary consultation led by the Grand Duchy of Luxembourg and conducted a vast prospective study between 2020 and 2022 in Luxembourg and its functional region. The goal was to map out a pathway to ecological transition by 2050 for Luxembourg and its cross-border metropolitan area.

What kind of spatial planning strategies can help achieve carbon neutrality by 2050? Spatial planning constitutes a fundamental matrix, likely to slow down or, on the contrary, to accelerate the shift in our lifestyles. The prospective study carried out by AREP and its partners (TAKTYK, Quattrolibri,

Bureau Mobil”Homme BMH and the Institute for Environmental Transition of the Sorbonne University) aimed to map out a pathway to building a resilient and carbon-free future by 2050 for Luxembourg and its functional region. The challenge is enormous, both in terms of soil preservation and reduction of greenhouse gas emissions, as we are dealing with one of the highest carbon footprints in Europe.

In the face of the pressing environmental challenges, we have had the opportunity to develop a digital model, Flux, which has supported our reflection at a regional scale. By encouraging iteration between project and carbon metrics, f(lux) made connections between proposals and “ecological value”, through our project methodology.

To carry out this prospective study, the team proceeded in three stages. The first one consisted in understanding the context of the Luxembourg functional region and in preparing the ground for the methodology to apply. During the second stage we unfolded our strategic vision. The third stage led to a manifesto which summarises our vision in 16 key actions, details three lines of research and provides an overview of demonstration projects on five pilot sites.



Greater Annecy, the archipelago conurbation France

AREP has been carrying out a prospective study for the ecological transition of the Greater Annecy area by 2050.

With its lake, its mountains, its economic activity zones and its natural and agricultural areas, the Greater Annecy area is attractive. Over the past 50 years, its population has doubled. The region needs to reinvent its path forward to meet the current and future environmental and demographic challenges that put it under strain. How can the region adapt to the challenges of tomorrow? How can it become a shining example in terms of sustainable development?

These were the questions asked by the Committee for Architecture, Planning and Environment (CAUE) of Haute-Savoie and by the Greater Annecy conurbation. They tasked AREP with carrying out a prospective study aimed at analyzing the specific features of the Greater Annecy area and exploring its potential resilience. We have imagined three possible futures, three scenarios for the ecological transition of the Greater Annecy area by 2050 revolving around the idea of the archipelago, an idea which is very present in the imagination of local authorities and residents.

The three paths are deliberately distinctive and are supported by narratives that invite people to get involved:

- The “scattered archipelago”, a scenario that does not fundamentally question the current model but seeks to limit its effects through technologic innovation.
- The “negotiated archipelago” scenario, where development relies on the strong cooperation with the neighboring areas mediate scenario, thus questioning the notion of archipelago on a larger scale.

- The “archipelago of the commons” scenario, which explores how land-use planning could support a profound shift in lifestyles.

At the end of this project, the local authorities should have a wider vision of the Greater Annecy model and its potential for development and change in the future. The prospective elements we provide and the transition metrics we use to compare the three scenarios will help local authorities to make informed decisions regarding the strategic orientations of the conurbation and define an operational framework for the projects to come.

This prospective study sits between collective imaginary and metrics and ushers in a new era of regional planning. After a first period focusing on functional specialization and a second age that saw cities pitting against one another in a race for attractiveness, the time has now come to converge towards common climatic targets while taking into account the economic issues.



Low-carbon district of Petersen Dakar, Senegal

Petersen station is the terminus of Dakar’s BRT (Bus Rapid Transit) line, which is due to open in 2024. Located 800 metres from the port of Dakar and the TER station, the project area spans 100 hectares including strategic sites: the Iba Mar Diop stadium, which is to host the 2026 Youth Olympic Games (YOG), and a rapidly changing urban fabric.

The consortium led by AREP has designed a master plan for the entire district using iterative work methods harnessing 14 areas of expertise from AREP and its partners (urban planning, architecture, landscape, urban programming, pedestrian flows and soft modes of transport, roads and utilities infrastructure, environmental engineering, dynamic modelling of climatic comfort, governance, project set-up, land value capture, property markets, sociology and local informal markets, GIS) and the expertise of five start-ups specialising in sustainable city development. The master plan identifies 22 hectares of mutable land for mixed-use developments, public spaces, parks and gardens, and public amenities. The future Petersen transport hub will form the nexus of an intermodal system. Road traffic and parking have been rethought to leave more space for pedestrians, bicycles (particularly cargo bikes), public transportation and spaces dedicated to the site’s informal economy.

The master plan sets out the key principles for the development of the district in the short term, in anticipation of the YOG and the opening of the BRT, then introduces a series of pilot projects that will lead to a coherent transformation of the district by 2050.

The master plan has been produced using CIM (City Information Modelling) tools: a 3D model that brings together all the elements of the project throughout its development.



Urban insertion of the Phuket tramline Thailand

Phuket is Thailand’s second most popular tourist destination, and the number of visitors and residents increases every year. As a result, basic infrastructures such as water supply, waste management and, above all, transport networks are under strain.

To address the challenges posed by urban growth, pollution and congestion, the authorities of the province of Phuket and the Thai government are seeking to develop a more sustainable transportation system. To support them in their efforts, we have carried out a comprehensive study focusing on planning, transportation and the natural and architectural heritage of the island and provided recommendations for the development of sustainable urban mobility systems in Phuket.

The project comprises the implementation of new transportation corridors and the reorganization of the existing transportation network. The development of sustainable urban projects along these corridors is also being considered. Over the ten years to come, the network is expected to include a north-south tramline connecting the airport to Phuket Town, an east-west cable car between Phuket Town and Patong, and improvements to the bus network.

The project aims to enhance the quality of life of the local community by providing a better public transportation service, reducing traffic congestion, improving public spaces and air quality. The project will also contribute to the economic revitalisation of the area, in particular by encouraging the development of innovative projects in the vicinity of the main stations. It will boost urban density, reducing urban sprawl and the consumption of natural resources and will be beneficial to the tourism industry by promoting the architectural and landscape heritage of Phuket Town.

AREP’s multidisciplinary team is involved in the parts of the project relating to urban development, mobility and architectural and landscape heritage.



Sino-French ecocity of Caidian China

Since the first Sino-French agreement promoting cooperation in the field of sustainable development, China has made environmental protection one of its priorities. Promoting sustainable urban development has become crucial in order to limit the increasing stress that urban growth places on the environment and the quality of life of local residents. AREP has joined forces with Burgeap, EY, Biotope, Terao and Iris Conseil to support the French Development Agency, the municipality of Wuhan and the Caidian district in defining a city project that meets the urban and environmental challenges of a fast growing country. As French experts in the design and transformation of cities based on mobility and services, we have put forward a project that demonstrates a comprehensive approach combining spatial planning with a programme in line with the local economy and uses, while creating a new environmental balance.

The integrated design approach and implementation strategy relied on a vast array of areas of expertise: governance, urban development strategy, definition of a regional project, economic modelling, programming (housing, services and organisation of the transport system for people and goods) and impact studies.

The ecocity development plan meets seven objectives:

- improve the attractiveness of the area by highlighting its assets and history
- identify the benefits provided by biodiversity and enhance remarkable sites
- define agricultural areas as a tool for urban development
- rethink the city on a human scale
- finely connect the area
- improve everyday life through functional social and inclusive diversity
- propose technical objectives for sustainable development as part of an overall cost strategy.



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P. 136

Nancy Grand Cœur Ecodistrict France

Like many other neighbourhoods around train stations that have been left behind for a long time, this formerly derelict sector had the potential to become attractive, thanks to its good connections to rapid transport networks and the possibility of transforming this land at the heart of Nancy.

The area's exceptional location as a gateway to the historic city centre, in the immediate vicinity of a TGV station, makes the Nancy Grand Cœur project an opportunity to simultaneously develop an area which is exemplary in terms of sustainable development -low energy and water consumption and sustainable organisation of the transportation system- but also a district featuring an intelligent approach to the urban context, respectful of the existing heritage, consistent with the architecture of the city and connected to the adjacent neighbourhoods. This responsibility is reflected in the project by four fundamental guidelines that have been part of the project since the creation of the planning zone (ZAC) in 2007:

- **Mutability of the city:** redevelopment of railway brownfield, restoration and preservation of the existing architectural heritage;
- **Mobility:** reduction of road traffic, public transportation system using dedicated lanes (TCSP), redesign of the bus station, reorganisation of the car park
- **Mixed-use programming:** 800 housing units, 45,000 m² of amenities, 38,000 m² of office space, 12,600 m² of retail and services
- **Nature in the city:** putting water at the heart of the city at the heart of the city and the creation of a green quay on the west bank of the river.

The Nancy Grand Cœur project heralds a regional sustainable development strategy. In order to create a sustainable district, a comprehensive approach has been developed, comprising a method, tools and a system of shared governance throughout the process and ten themes have been identified covering the three areas of sustainable development (environmental, social and economic).



44

P. 140

Adiabatic cooling prototype Vietnam

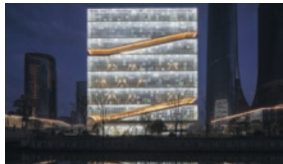
Designed by the AREP teams in Vietnam and France, this prototype provides a low-tech solution to hygrothermal comfort issues

This prototype designed by AREP proposes a natural alternative to air conditioning. It was shortlisted in an international call for projects and presented at the 2021 Seoul Biennale

of Architecture and Urban Planning, whose theme was "CROSSROADS, Building the Resilient City".

It addresses an issue that is global in scope but resonates strongly in Vietnam, one of the most vulnerable countries to the effects of climate change. Extreme heat waves have already been occurring with increasing frequency during summer. However, modern air-conditioning solutions, commonly used to deal with extreme heat, require a considerable amount of energy, which has a high environmental cost as it comes from coal-fired power stations generating atmospheric pollution and affecting human health. Could there be a solution for cooling cities and public spaces without using energy or refrigerant gas? Our project in Vietnam addressed this challenging question by drawing inspiration from a natural process used for centuries by ancient civilisations: the adiabatic principle.

Adiabatic cooling only requires hot air and water. It relies on a simple premise: when water evaporates, it uses energy. This energy is "absorbed" by the heat of the ambient air, a process which automatically generates a natural cooling by 6 degrees when one is nearby. All that was left to do was to imagine a functional and inexpensive system using a minimum of resources for a maximum of freshness. To achieve this, AREP combined cutting-edge digital tools with local craftsmanship in an innovative way.



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P. 144

Hangzhou sports tower China

AREP designed for the city of Hangzhou a large public sports facility intended to host the 2022 Asian Games.

The "sports tower" sits on 84x84-metre square base. The tower accommodates sports facilities on eight levels and a striped ramp leads pedestrians up to the rooftop belvedere. The Sports Tower stacks sports facilities on eight levels while the planted ground level accommodates other facilities (hotel, clinic, etc.) among sunken gardens and terraces stretching out in the continuity of the metro station.

A public, pedestrian-only ramp connects all levels, leading visitors from the park to the roof. This ramp, which is independent from the lifts and interior stairs, has a dual function: it acts both as a walkway offering sweeping views of the old town of Hangzhou and as a symbol. The building marks the entrance to the new urban center and, from a technical point of view, addresses several specific constraints related to sports practice: Floor to floor height is 12.60 metres, which allows for the nine-metre ceiling height, necessary for ball games.

Thermal comfort is ensured through carefully studied stratified air-conditioning systems, as temperature in the sports areas must not exceed 17°C. The transparency of the building allows for natural light, thus reducing energy consumption.

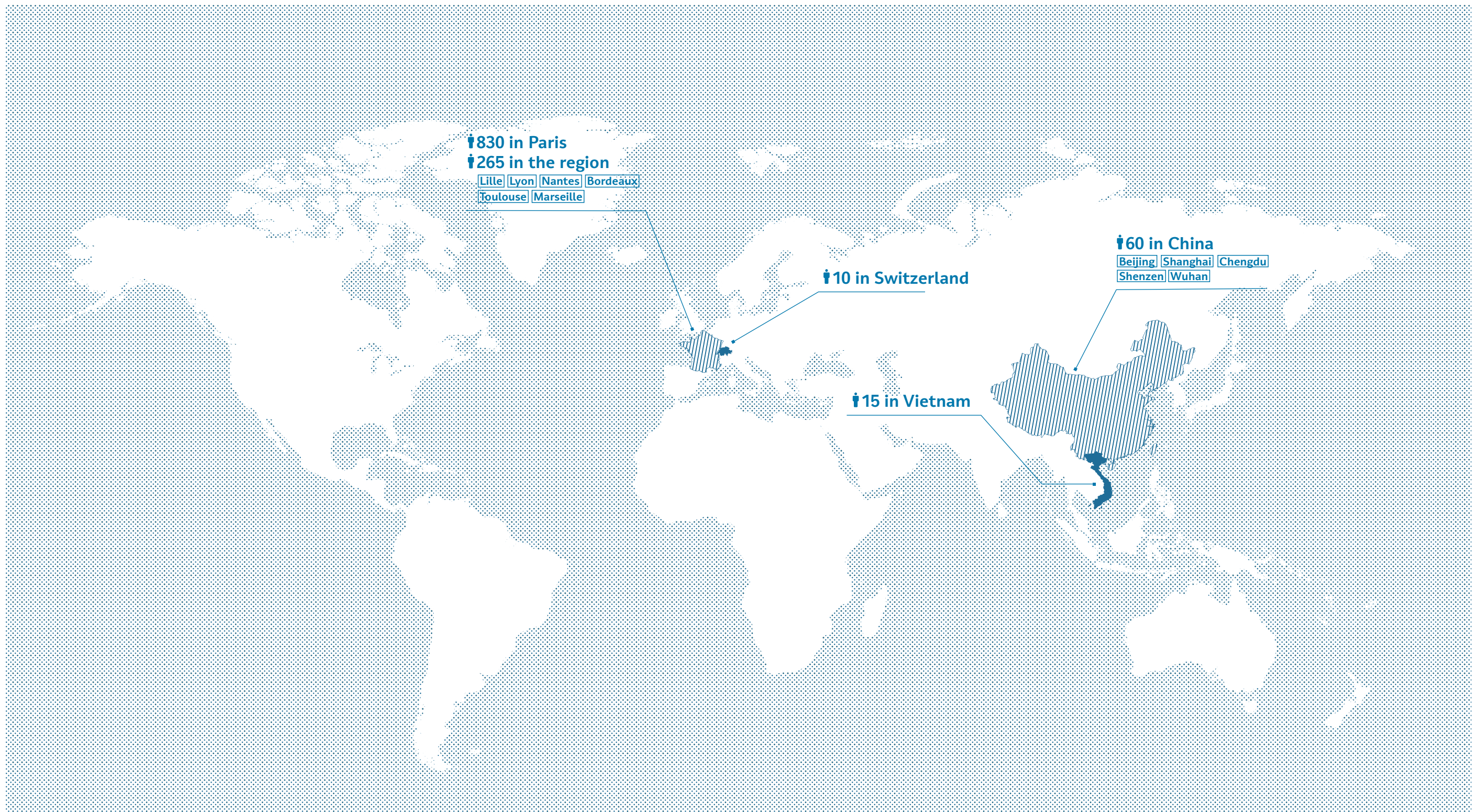




Who we are

Founded in 1997, AREP Group is a multidisciplinary practice. AREP brings together the specialities and areas of expertise that are essential to the renewal of architecture, cities, and regions. AREP Group stands for conception, research, engagement, and post-carbon.

The company provides practical solutions to the ecological emergency through its EMC2B approach. AREP Group contributes to research, public dialogue and shifting practices through its publications. AREP Group employs more than 1,000 people of 40 different nationalities and is present both in France and abroad.



Key figures

1 unique multidisciplinary offer Project management and design Strategy, consulting and project management assistance Expertise & simulation	1, 000 + employees between France, Switzerland, China, and Vietnam	53% women 47% men 1% of employees recognized as disabled	39 years old on average 40 nationalities	500 + projects every year	140 M euros turnover 2024
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The management team

Raphaël Ménard
Chairman of the Board

Raphaël Ménard studied at the Ecole Polytechnique, the Ecole des Ponts ParisTech and the Paris-Belleville School of Architecture. He began his career at RFR (design of the Simone de Beauvoir footbridge in Paris and the glass shell of the Strasbourg train station). In 2003, he founded Elioth, a company made up of designers specializing in low-carbon innovation (acquired by the Egis group in 2011). In 2014, he created 169-architecture. He is also a lecturer on the postgraduate program in Post-Carbon Architecture at the Marne-la-Vallée School of Architecture. He theorized his practice in numerous publications, including his Ph.D thesis Energy, Matter, Architecture. In 2018, he joined AREP Group as Chairman of the Board.

Technical Departments

- Émilie Hergott, *Building Design & Production*
- Hiba Debouk, *Urban Studies & Regional Planning*
- Céline David, *Design*
- Donatien Frobert, *Engineering*
- Élise Dageons, *Consulting & Programming and Project Management & Ownership Services*
- Luc Néouze, *International*

Philippe Bihouix
Managing director

Philippe Bihouix studied at the Ecole Centrale de Paris. He began his career as a construction manager in a general contracting firm before switching to consulting. In 2009, he joined the SNCF group to manage the European rail freight activities. As a consultant engineer, Philippe Bihouix gained experience in many industrial sectors (energy, chemistry, transport, building engineering, aeronautics) before becoming a leading expert on non-renewable resources and low-tech solutions. He has been appointed to the AREP Group Board of directors as Managing director in order to implement the company's new strategy and contribute to the sector's ecological transformation.

Business Departments
Céline Portaz, *France & International*

- Support Departments**
- Matthieu Lerondeau, *Communications & Impact*
 - Bérengère Jaillon, *Finance, Legal & Compliance and Information Systems*
 - Philippe Bihouix, *Strategic Leadership & Performance*
 - Alexandre Bouvresse, *HR, CSR & Workplace Experience*

We are client-oriented

Flexible and with open-ended roles, AREP Group's organisation is first and foremost client-oriented. We tailor our teams and expertise to the expectations of our clients and to the specific nature of each project and assignment. At every scale of operation, our teams question practices and challenge conventional thinking to help our clients work towards a Post-Carbon Future. Responsive and agile, our employees demonstrate multidisciplinary know-how which sits at the crossroads of architecture, mobility, and regional planning, blurring the boundaries between fields.

Each project, each mission becomes an opportunity for interaction and exchange. With humility, we learn from actors who experiment with alternative ways of doing things and who break down the boundaries associated with the traditional typologies of production. AREP Group considers itself as a catalyst, an incubator of this ecosystem, a laboratory fostering interaction, particularly with the small structures at the forefront of ecological and social issues.

To build a Post-Carbon Future, we need every source of inspiration! We have joined forces to create exemplary projects, which meet the actual needs of users. This commitment is reflected in five key principles that are at the heart of our design method:

- Collaborative enthusiasm
- Focus on uses and people
- Time and cultures
- Space and forms
- A Post-Carbon Future driven by economic frugality





A unique multidisciplinary offer

Project management and design

- Architecture* (Transport, Industrial facilities, Infrastructure, Building retrofit and Heritage building expertise)
- interior design
- Signage
- Urban studies, landscape
- Public space design
- Industrial Design
- Engineering

Strategy, consulting and project management assistance

- Forecasting & Regional strategy
- Programming & Real asset advisory
- Architecture and Heritage buildings: Strategy & Project management assistance
- AMO (Execution - Operation and Maintenance, Environment)
- Project management consulting & coordination
- Training
- Consultation and co-design
- Service design

Expertise & simulation

- Flows and mobility analysis
- Data, geometry & digital tools
- Graphical representations & renderings

Practice

Architecture*

- Railway and metro station, transit-oriented architecture
- Rehabilitation and transformation of existing buildings
- Expertise in heritage buildings
- Industrial, railway and logistic facilities
- Crossing facilities and structures
- Modular and experimental architecture
- Works supervision

Regional planning

- Forecasting and regional strategy
- Urban planning
- Landscape architecture
- Public space, roads, and utilities infrastructure

Design

- Spatial and interior design
- Industrial design
- Graphic design & signage
- Service design

Engineering

- Building structure and envelope
- HVAC
- Thermal comfort and air quality analysis, forecasts
- Electricity
- Construction economics
- CFD expertise (Hypercube)
- Acoustics and sound engineering
- Fire safety
- Accessibility

Environment and Digital

- Environmental simulations (EMC2B)
- Data, geometry, and digital tools
- BIM Management

Flows and Mobility

- Flows and mobility expertise
- Crowd movement and flow simulations

Consulting and programme management

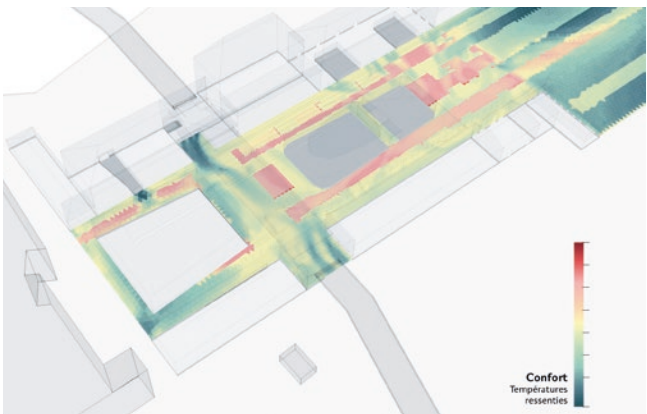
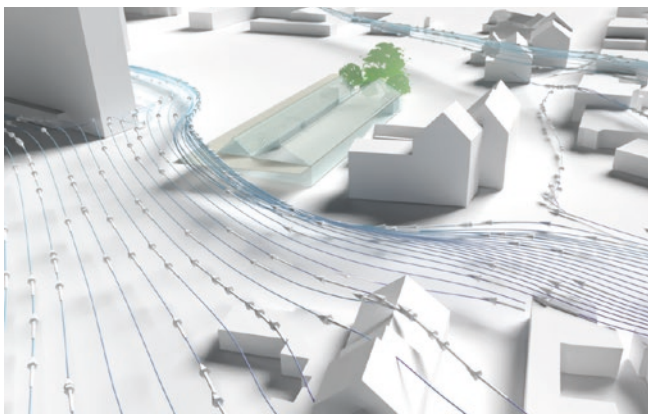
- Industrial and technical programming
- Facility programming
- Optimisation and development of existing buildings
- Transport facilities and public space programming
- Foresight of future needs for facilities

Project management and consulting

- Project management
- Delegated Project Management for the Client
- Environmental consulting
- Detailed overview of the project's scope
- Asset management
- BIM consulting services

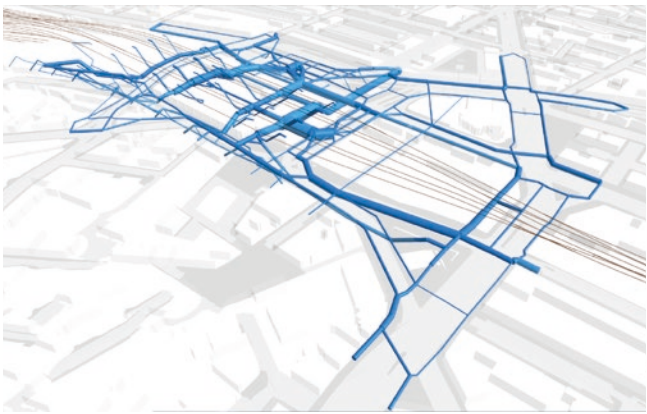
* Via AREP Architectes

Our areas of expertise



The Hypercube

It is our research unit for engineering, energy and fluids. The Hypercube provides cutting-edge expertise in modelling physical phenomena related to climate comfort and air quality, based on digital simulations and data analysis.



Flows and mobility

We help clients to define and implement sustainable mobility strategies, and we work with architects and planners to optimise projects by taking into account pedestrian flows.



Photovoltaic strategy

AREP is involved in the entire solar engineering value chain, from the initial phase consisting in defining a company strategy and identifying a project through to its technical and administrative development.



REAP

A multi-disciplinary team dedicated to the reuse of materials. Its role consists in raising awareness and help AREP experts to incorporate reclaimed materials into their projects. They also provide consulting services in the field of reuse.

Research

Here at AREP, we pride ourselves on the exploratory approach of projects. To invent a Post-Carbon Future, we question our certainties, update our knowledge and open up new practical and conceptual perspectives. Independent and critical, our research takes part in the discussions that shape the future of urban areas in transition.

AREP is actively involved in numerous partnerships and research programmes. We have also strong ties with the world of academic research and teaching.

AREP édition's publications

	<i>Recherche</i> <i>Rapport d'activité</i> AREP – 2025
	<i>Réparer le futur</i> Hiba Debouk AREP éditions – 2024
	<i>Grand Annecy - Prospective pour 2050</i> AREP – 2024
	<i>Atlas bioclimatique des grandes gares parisiennes</i> <i>Stratégie et plan d'action d'aujourd'hui à 2050</i> AREP éditions – 2023
	<i>POST, la revue post-carbone d'AREP n° 2,</i> <i>Aux (re)sources de l'urbain</i> AREP éditions – 2023
	<i>Labondance invisible</i> Simon Bergounioux AREP éditions – 2023
	<i>Luxembourg in Transition,</i> <i>Paysage capital</i> AREP éditions – 2022
	<i>POST, la revue post-carbone d'AREP n° 1,</i> <i>L'échelle en question.</i> AREP éditions – 2022
	<i>Creating a Post-Carbon Station</i> Raphaël Ménard AREP éditions – 2021

To structure our approach, we have built our programme around 6 themes:

- Resources and Materials
- Land Use & Biodiversity
- Energy & Sense of place
- Representations & collective imaginary
- Design & Adaptation
- Architectures & Mobility

Collective works

<i>La Ville Low tech, vers un urbanisme de discernement</i> ADEME – 2020
<i>Projet de recherche Frugacité: FoRmes Urbaines des quartiers de Gare ou à fortes Contraintes et biodiversITÉ</i> PUCA / OFB / AREP / Université Paris 1 – 2020

Scientific papers and communications

<i>Auway Alexandre, “Prise en compte de l’hétérogénéité des morphologies urbaines pour modéliser la connectivité paysagère en ville”, colloque Demain, Nature et ville?, 2022</i>
<i>Bogdan Mateusz et al., “Calcul des facteurs de forme entre polygones. Application à la thermique urbaine et aux études de confort”, conférence IBPSA France, 2022</i>
<i>Delarc Morgane, “Réinventer le mobilier urbain à Paris”. In Les espaces publics urbains: penser, enquêter, fabriquer, par Fleury et Guérin-Pace, Perspectives Villes et territoires, 2022</i>
<i>Franz Hannah, et al., “Inventory Tools and Strengthening Measures for Historical French Metallic Train Sheds (1850 – 1931)”, Railway Heritage Preservation Conference, 2022</i>
<i>Le Bot Nils, et al., “Renewing Urban Models: Does the City Need Low-Tech?” Conference of the International Forum of Urbanism (IFoU), 2022</i>
<i>Striffling-Marcu et al. Veston. 2022. “Patrimoine ferroviaire du XX^e siècle: quelle reconnaissance et quelles adaptations pour sa conservation?” In Situ, no 47</i>

Credits

Engagement and post-carbon ^[P. 02]

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Nîmes Pont-du-Gard train station

France – 2019 ^[P. 14]
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Pont de l’Alma train station

Paris – 2022 ^[P. 18]
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Saint-Jean-de-Maurienne train station

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Auray train station

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Saint-Michel Notre-Dame train station

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Saint-Lazare train station

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Montparnasse train station

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Paris-Nord train station

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Bellegarde-sur-Valserine train station

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Avignon High-speed train station

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Torino Porta-Susa train station

Italy – 2015 ^[P. 60]
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Casa Port train station

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Modular train station

Belgium – 2021 ^[P. 68]
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Axonometry AREP

Brussels underground

northern extension
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Budapest Nyugati station

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Shanghai South train station

China – 2006 ^[P. 74]
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Tongzhou train station

China – 2024 ^[P. 80]
AREP / illustrations K2visual-com

Qinghe train station

Beijing, China – 2019 ^[P. 84]
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Capital Museum

Beijing, China – 2006 ^[P. 86]
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Seafrigo Headquarters

France – 2024 ^[P. 90]
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Saint-Malo ferry terminal

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Saint-Aubin parking facility

Switzerland – 2026 ^[P. 96]
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Former headquarters

of the Public Hospitals
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T+G, Sophie Delhay - AREP /
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Train maintenance facility

France – 2021 ^[P. 102]
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Eco-designed platform shelters

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REAP furniture

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administration building
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Oasis Schoolyards

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Banks of Hoan Kiem lake

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Greater Annecy,

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China – 2017 ^[P. 132]
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France – 2020 ^[P. 136]
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Adiabatic cooling prototype

Vietnam – 2022 ^[P. 140]
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Hangzhou Sports Tower

China – 2022 ^[P. 144]
AREP / photos Rudyku

Who we are

AREP / photo D. Boy de la Tour
AREP / photos Y. Audic

Our areas of expertise

AREP (L'hypercube, Flux et mobilités)
SNCF – AREP / photos M. Lee Vigneau
SNCF Gares & Connexions / photo D. Pelofi
Photos AREP (RéAP)

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