

CONFLUENCE

ENERGY EFFICIENCY ,
BUILDING SIMPLICITY

Lisa, Sofia, David, Johanna, Niklas, Celine



If the source is not mentioned, it means the picture is ours

How does simplifying existing infrastructure contribute to energy efficiency in the redevelopment of the Confluence district?

SUMMARY

1

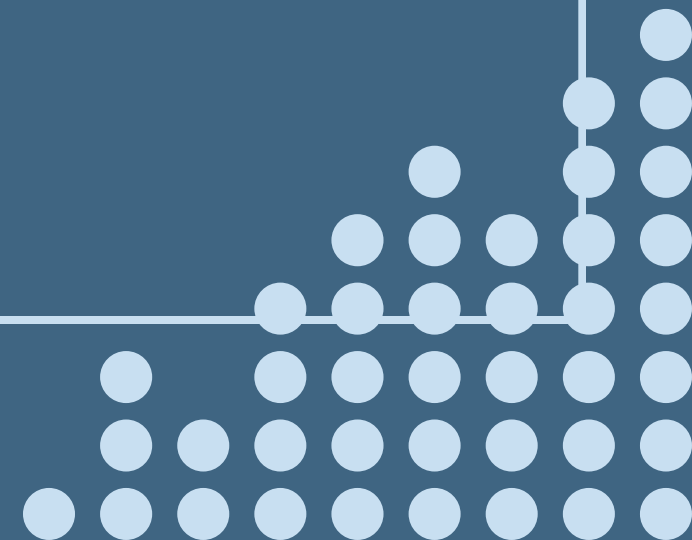
History of Confluence district, and its environmental transformation

2

Focus on the HIKARI project

3

Focus on Ouvrons Perrache project



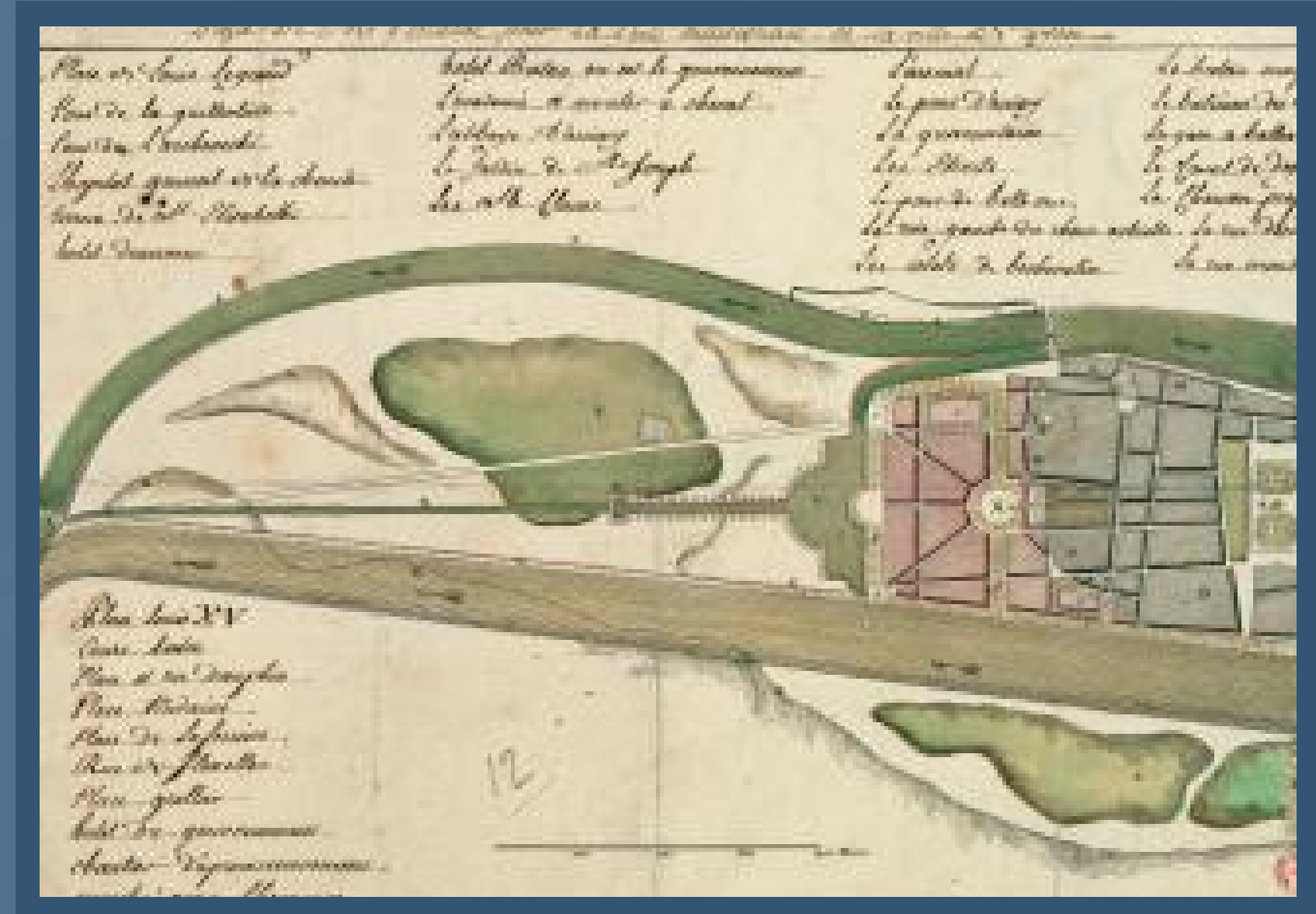
I. The history of Confluence

Before 18th Century_

- Flooded lands
- Islands

Begining of 1800's

- Solidify the land
- Industrial area : docks, industries, logistics
- 1855 : construction of the Perrache train station



Lyon confluence website

End of the 20th century.

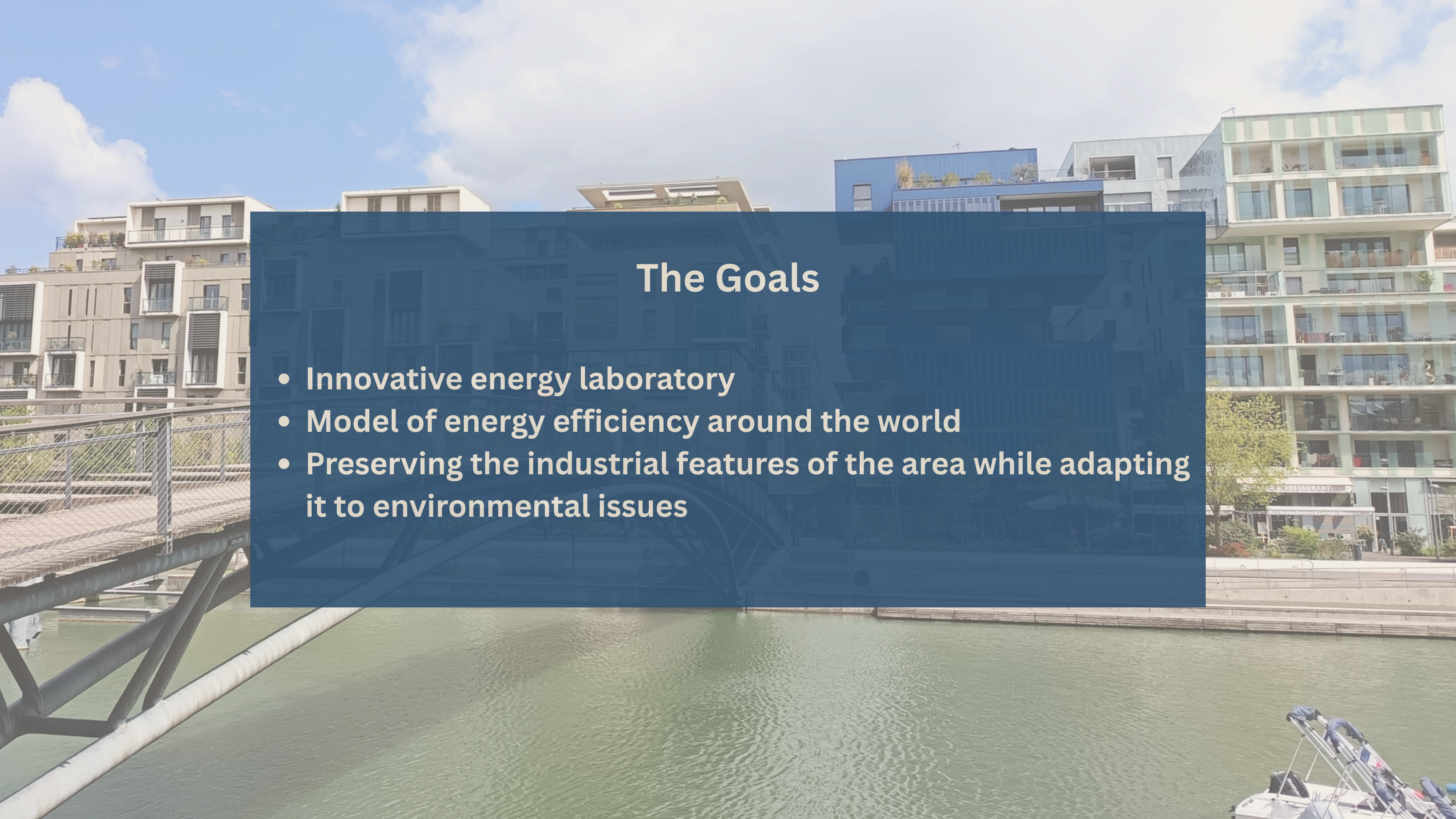
- Abandoned neighbourhood
- Industries are leaving the area

Begining of 2000's



Lyon confluence website

- The mayor Raymond Barre is launching a redevelopment project
- Goal : to double the surface area of the city center



The Goals

- Innovative energy laboratory
- Model of energy efficiency around the world
- Preserving the industrial features of the area while adapting it to environmental issues

The buildings focus on :

- High end insulation,
- intelligent electrical network
- use of the urban heating
- Dual-aspect flats / offices
- Renewable materials : pisé, wood, recycled concrete
- Easily converting buildings



Lyon confluence website

In the district, real estate developers have to comply with energy obligations beyond current regulations.



An aerial photograph of a city, likely Lyon, France, showing a dense urban environment. Overlaid on the image are several architectural renderings of proposed buildings. These include a large, modern building with a grid-like facade and a flat roof, a smaller building with a curved facade and arched windows, and several other rectangular buildings of varying heights. The background shows existing city buildings, streets, and green spaces. The text 'Key projects in Confluence' and 'Ydeal Confluence' is centered over the image.

Key projects in Confluence

Ydeal Confluence

An aerial photograph of a city, likely Lyon, showing a dense urban landscape. In the foreground, there are modern, light-colored buildings with flat roofs. In the background, there are older, more varied buildings with red-tiled roofs and some greenery. A river is visible in the far distance on the left. A semi-transparent blue rectangle is overlaid on the center of the image, containing text.

Ydeal Confluence

- Innovative real estate project
- Based on collective energy consumption
- Five buildings sharing energy
- Around 50% energy from solar sources
- Energy distributed between buildings
- Improves efficiency and reduces emissions



Ydeal Confluence

- Mixed-use: housing, offices and retail
- Different energy needs throughout the day
- Better balance between production and consumption
- Promotes collective self-consumption
- Uses local resources efficiently
- Strengthens urban energy resilience

An aerial photograph of a city, likely Lyon, showing a mix of modern and traditional architecture. A semi-transparent blue rectangle is overlaid on the center of the image, containing white text. The text includes a title and a bulleted list of five points related to sustainable urban design. The background shows various buildings, streets, and green spaces.

Ydeal Confluence

- Sustainable construction and urban design
- Integration of green spaces and soft mobility
- Reduces environmental impact
- Improves quality of life
- Model for future sustainable cities





L'orangerie

- Sustainable real estate project
- Uses raw earth (pisé) as main material
- Locally sourced materials
- Reduces transport and carbon emissions
- Low environmental impact
- High durability and construction quality



L'orangerie

- Traditional technique applied in modern construction
- 100% recyclable material
- Supports circular economy
- Reduces construction footprint
- Natural materials as innovation
- Model for sustainable urban development

Hikari



Hikari - Concept & Energy

Basic Information:

- Located in Lyon, designed by Kengo Kuma (2012–2015)
- Mixed-use complex (housing, offices, retail), ~12,800 m², three buildings
- First positive energy urban block in Europe
- Produces more energy than it consumes (electricity, heating, cooling)
- Buildings act as active energy producers

Climate-friendly energy:

- Photovoltaics on roofs and facades
- Solar glass façade generates power and controls daylight
- Combined heat & power (rapeseed oil)
- Geothermal energy
- Cooling via the Saône
- Hybrid system combining multiple sources

Hikari - Concept & Energy

Energy Efficiency through Passive Design

- Bioclimatic architecture maximizes solar gain
- Building form enhances natural daylight
- Natural cooling via night ventilation
- Heat recovery (ventilation system & wastewater)
- Focus on natural processes over complex technology

Energy Management & System Integration

- Goal: Local energy production, storage, and distribution
- Mixed-use program balances energy demand (day/night)
- Optimized load management across functions
- Photovoltaics embedded in façades
- Efficiency through intelligent, integrated design

Hikari - Concept & Energy

Key Messages

- Flagship for sustainable urban development
- Model for future positive energy districts
 - Solar energy is central, but not the only source
 - Simplicity means smart reduction, not limitation

PART III
PERRACHE - A COMPLEX
URBAN HUB IN TRANSFORMATION

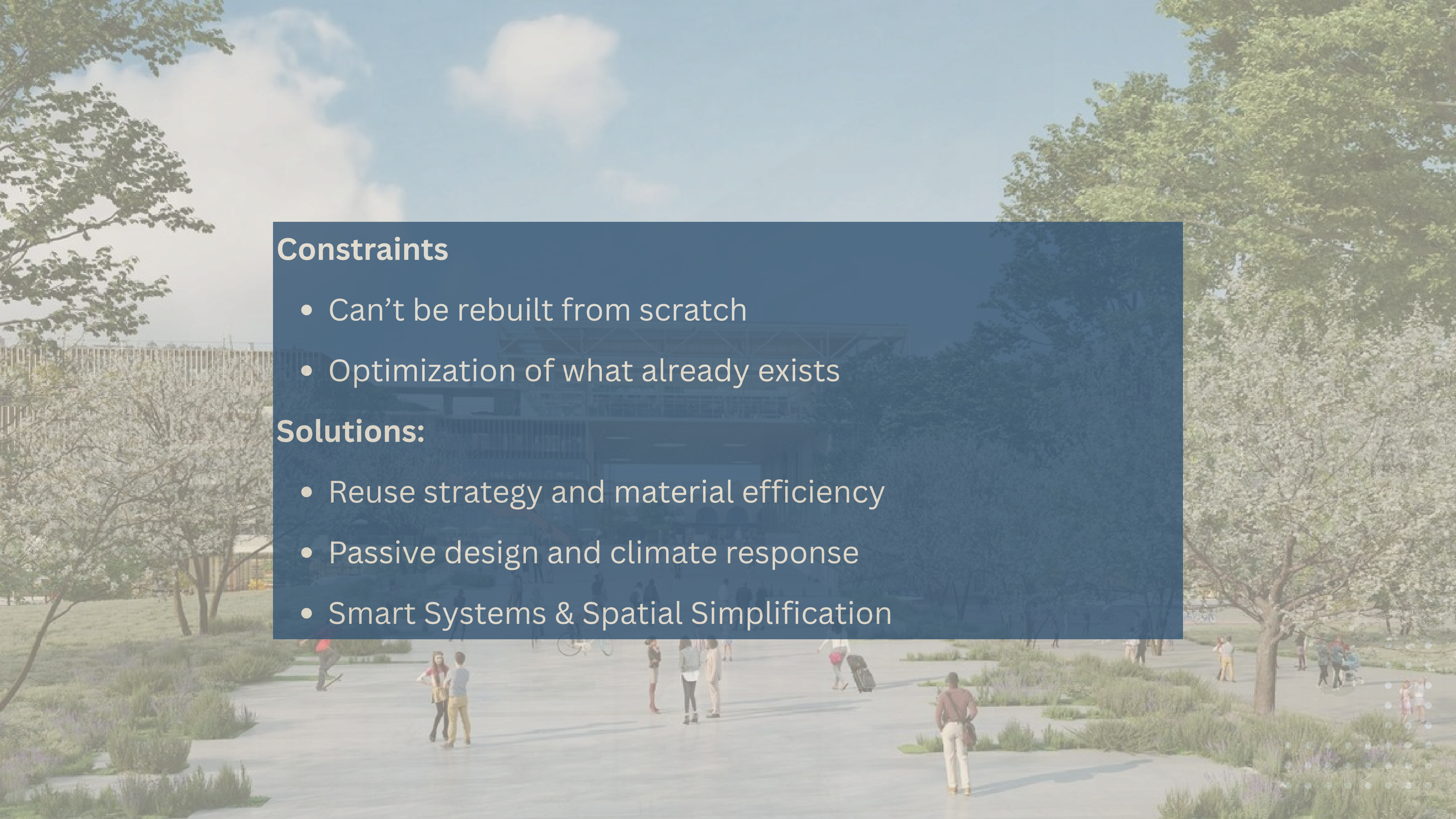


PART III

PERRACHE - A COMPLEX

URBAN HUB IN TRANSFORMATION

- Perrache is a major multi-layered transport hub in Lyon, connecting train, metro, tram, and bus networks
- At its center: the CELP (Centre d'Échanges de Lyon Perrache), built in 1976
- Handles ~100,000 users per day
- Historically designed for cars and infrastructure, creating a physical and visual barrier in the city

An architectural rendering of a modern park. In the background, a large, modern building with a glass facade and a flat roof is visible. The foreground is a wide, paved plaza with several people walking and standing. There are large, leafy trees on the left and right sides, and some smaller trees with white blossoms in the middle ground. The sky is blue with some white clouds. A semi-transparent blue rectangle is overlaid on the center of the image, containing text.

Constraints

- Can't be rebuilt from scratch
- Optimization of what already exists

Solutions:

- Reuse strategy and material efficiency
- Passive design and climate response
- Smart Systems & Spatial Simplification

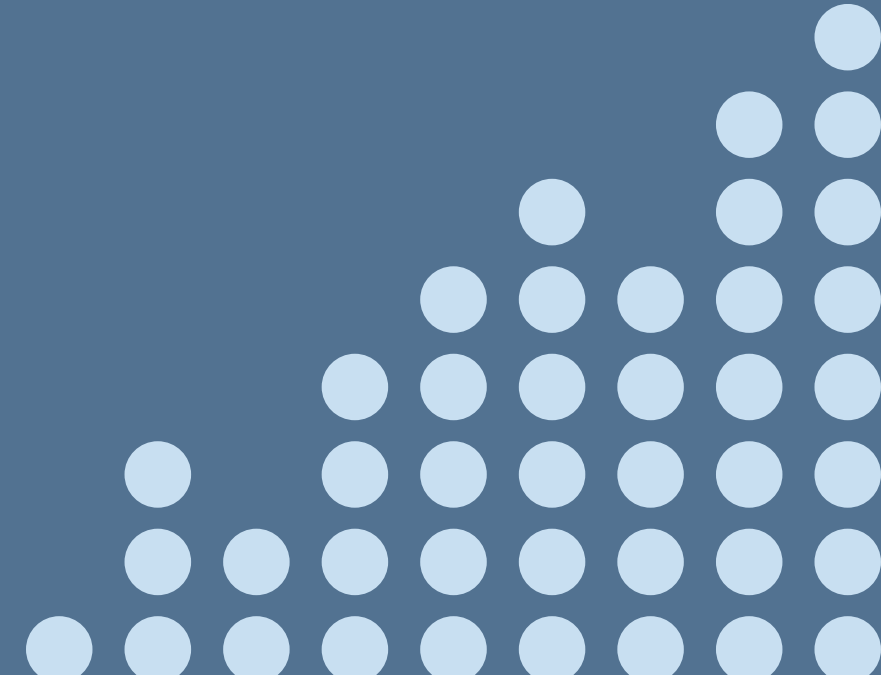
1. Reuse & Material Efficiency

Choice

Preserve and adapt the existing structure instead of demolishing, minimizing new construction.

What is on the project

- 80% of the original building preserved
- Reuse of materials (on-site and off-site)
- Use of recycled elements (e.g. glass paving reused for urban furniture, windbreaks, lighting)
- Use of biosourced materials (wood fiber insulation, timber structures)
- Low-carbon renovation strategy with carbon monitoring



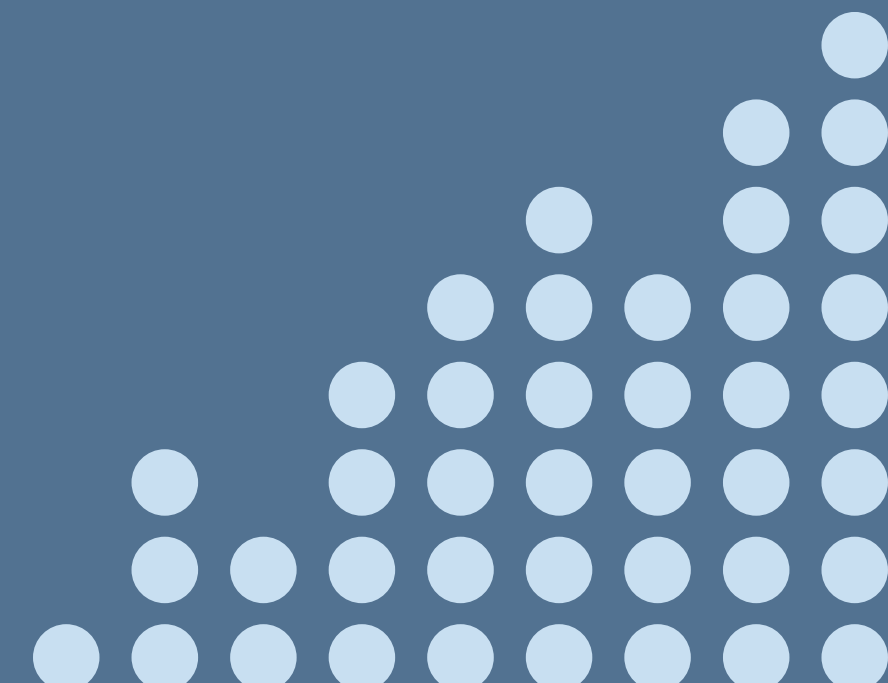
Why it matters

- Avoids high embodied energy from demolition and new construction
 - Reduces material production and transport
 - Improves thermal performance with low-impact materials
-

Result

- Lower lifecycle carbon footprint
- Reduced heating and cooling needs
- More resource-efficient construction

Reusing a 1970s structure creates performance constraints, especially in insulation and geometry → requires compensation through other strategies.



2. Passive Design & Climate Response

Choice

Reduce energy demand by designing with climate instead of relying on systems.

What is on the project

- Façade-by-façade solar optimization
- Sun protection systems
- Building opening for better airflow and ventilation
- Maximization of natural daylight
- Green spaces integrated in and around the building for heat regulation
- Greywater reuse from the hotel for irrigation
- Organic waste from food outlets composted into fertilizer
- Nitrogen recovery from urine reused as natural fertilizer



Why it matters (energy efficiency)

- Reduces cooling, lighting, and HVAC demand
- Improves thermal comfort naturally
- Supports microclimate cooling through vegetation
- Energy demand reduction, making it more efficient.
- Reduced resource input (water, fertilizers)

Result

- Lower operational energy consumption
- Improved thermal comfort with minimal mechanical input

Limitation: performance depends on climate and user behavior



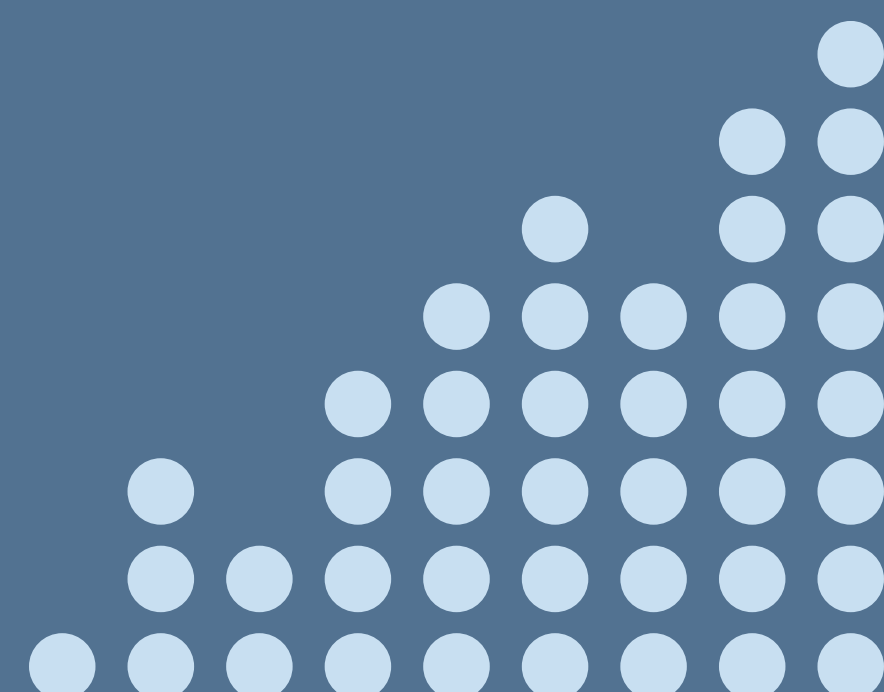
3. Smart Systems & Spatial Simplification

Choice

Use minimal, targeted systems and simplify how the building works.

What is on the project

- Connection to underground public heating system
- Solar panels integrated into the building
- Simplified circulation and opening of the central structure
- Improved visual connections and airflow

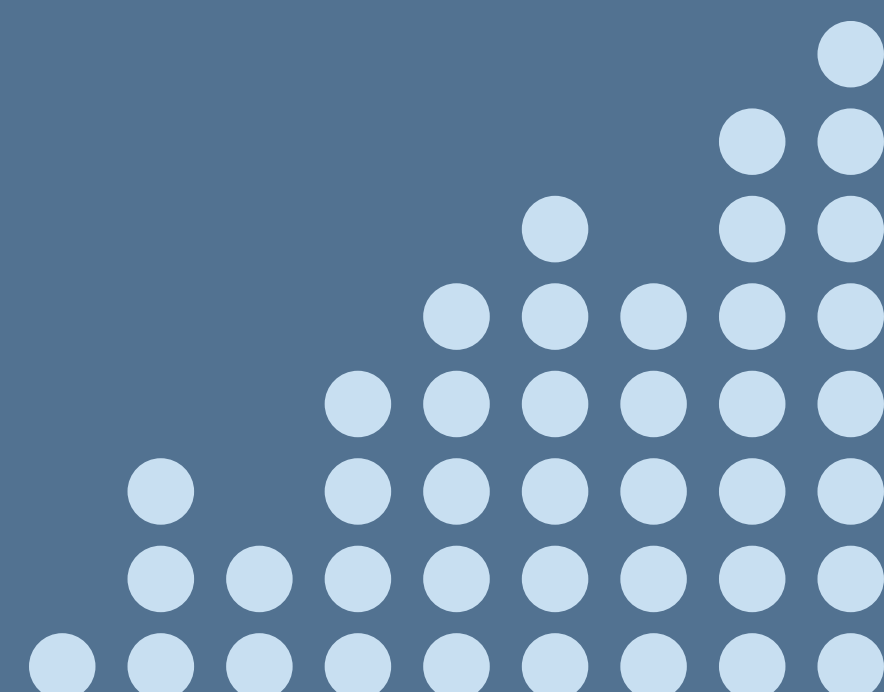


Why it matters

- Systems cover remaining energy needs efficiently
 - Simpler layouts improve airflow and daylight
 - Reduces dependence on complex mechanical solutions
-

Result

- “Low demand + smart supply”
- More stable and efficient energy performance
- Indirect energy savings through spatial efficiency
- Lower long-term energy use



CONCLUSION



THANK YOU

