<table>
<thead>
<tr>
<th>investor</th>
<th>ICADE EMGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architect</td>
<td>Brenac &amp; Gonzalez</td>
</tr>
<tr>
<td>Structural engineering</td>
<td>SCYNA 4</td>
</tr>
<tr>
<td>Mechanical engineering</td>
<td>INGENI</td>
</tr>
<tr>
<td>Window design</td>
<td>Van Santen</td>
</tr>
<tr>
<td>Green building consultant</td>
<td>THOR ingénierie</td>
</tr>
<tr>
<td>Colours and lighting</td>
<td>Grandeur Nature</td>
</tr>
</tbody>
</table>
1- Parc Pont de Flandre
2- Parc du Millénaire
3- Parc des Portes de Paris (Saint Denis)
4- Parc des Portes de Paris (Aubervilliers)
5- Quartier du Canal – offices area
6- Quartier du Canal – shopping center
7- Parc du Mauvin

Land: **76.5 ha**

**410 000 m²** gross letting area
TARGETS

Indoor users health:
- Building materials: checking of chemical emissions
- Indoor air quality control
- Prevention of sick building syndrome

Energy efficiency
- CO2 emission reduction

Users comfort
- Individual control possible also in open plan offices
- Air conditioning
- Coloured natural light
- Light with dimmer control
- Window blinds

Communication
- Internal
- External
- End Users
- Shareholders

Financial outcome and return on investment control
Management

Asset management

Initiate project

Design

Validation of theoretical statements

Keep / dispose of

Facilities in use

Feed back on measures and benchmarking

Statements of requirements

Measurements

Adjustments

Minor repairs

PROGRAMMING

CLIENT BRIEFING

DESIGN

CONSTRUCTION COMMISSIONING

OPERATION AND MAINTENANCE

 USERS SATISFACTION

LIFE CYCLE ECONOMY
Project kick off in september 2003
Opening in september 2005

View from Paris of the building 270

Opposite view
2 basement floors for 126 carpark spaces
Ground floor for commercial activities, main entrance and services access
7 floors for offices 8 500 m²
Triple glazed windows with integrated blinds:
- Efficient daylighting
- Efficient noise reduction from the street

Lobby entrance

The north orientation of the entrance allows a totally glazed side without air conditioning
Floor lobbies with chilled beam air conditioning

Lavatories with light controllers
Analysis of adaptable office space

END-USER OF BUILDING:

- Comfortable and healthy indoor environment
- Individual control possible also in open plan offices
- Areas which fulfill the specific needs of different user groups over the years
- Reduce non-operating time for maintenance

BUILDING OWNER:

- Satisfied, long-term customers
- Energy efficient solution and sustainable building scheme: Lighting, Cooling and heating, airflow
- Areas which fulfill the specific needs of different end-users over the years
- Increase cycle life of technical systems
WORKING SPACE

Core vertical circulation
Each floor 1200 m²
Partitioning flexibility
Work space with direct daylight access
Office Environment

- **Typical customer needs and requirements**
  - Satisfied users
  - Energy efficiency
  - Cost efficiency
  - Flexibility
  - Ease of use
  - Total solutions

- **Solutions:**
  - Adaptable air diffusers: one product, several operations
  - Adaptable, energy efficient system design
  - Individually adjustable indoor conditions
  - Light with dimmer
  - In-built flexibility for fast and cost efficient changes
Office Chilled Beams

Chilled beams CBC 1250-1100 equipped with
- asymmetric nozzles
- Changeable nozzles
- HVC system
- Temperature sensor

Single Office : Meeting room :
Nozzle B-C 50m³/h/u Nozzle D-D 100m³/h/u
HVC OFF HVC ON
Built in Solutions:

External wall insulation

Motorised controlled blinds
(automatic shutdown at 120 W solar heat/m²/ facade)
Building Management System
Cooling - heating

Technical roof plant with:

2 air/air heat pumps of 20 000 m³/hour each
One the north side and the second one for the south east/west side
- Air recirculation with on-line air quality control
- Electrical air heating in each diffuser for individual space comfort
- Hydrometric control for a 40% to 60% indoor air humidity range
- Free cooling
ICADE EMGP obtains the French sustainable building label through evaluation of 14 main items

2 items basic:
- Building materials life cycle
- Acoustic

6 items High level:
- lighting
- Chemical emissions of building materials
- Building materials quality
- Air quality
- Water quality
- Site construction management

6 items Very high level:
- Energy performance
- Water savings
- Waste policy
- Indoor Air climate
- Maintenance
- Building environmental impact
What’s next?

• 95 000 m² of project under process of evaluation to achieve the targets of the French « green building »
Parc du millenaire 3

- 50% cut-off of energy consumption for the next building « PDM 3 » to compare to building 270:
  - 270: 120 kwh/m²/year (final energy use)
  - PDM 3: 60 kwh/m²/year (final energy use)

CO2 emission: 15 kg/m²/year