



## Lyon-Confluence, Lyon, France

Grand-Lyon is a conurbation of 1,4 millions inhabitants, the second largest in France and is located close to the Swiss and Italian borders. At the heart of Lyon is the peninsula formed by the Rhône and Saône, Lyon's two rivers. Lyon-Confluence is the name of the southern part of this peninsula. It has for a long time been given over to industry and transport logistics but is now undergoing a radical change. Reclaimed in the past from both rivers, the site is now returning to its riverbanks and natural setting, with ongoing development highlighting a remarkable space and its' unique landscape. Ultimately the project will double the area of Lyon's city centre: a rare achievement in Europe, a real challenge for the metropolis and a great opportunity for residents.

With Lyon-Confluence, Grand-Lyon has opted for attracting to its' centre the jobs, services, institutions and major events that characterise capital cities, contributing to the city's international future.

The project aims to:

- create a new central-city neighbourhood to enhance Grand-Lyon's prestige and influence
- reclaim industrial and logistics wastelands
- open up the south of the peninsula, notably via the use of public transport
- highlight the two rivers and the sites' landscape
- provide innovative, attractive forms of urban leisure

Since its creation in 1999, SEM Lyon-Confluence, the semi-public company in charge of city planning, has been pursuing a concrete, balanced sustainable development programme.

As part of the PV UP-SCALE project, interviews were held with many people involved in the development of this new area. These included members of SEM Lyon-Confluence and of the Operational Urban Planning Department of the Grand-Lyon Community.

Discussions focused on the changing perception stakeholders had of PV; from an initial poor image, where PV was considered to be not relevant to high density urban areas and not adapted to the high architectural quality of the project, to a final more open opinion at project completion where PV is acknowledged to be an easy technology to deal with and suited to large scale urban projects.

### Description of the urban plan developed and it's evolution

Within the Lyon-Confluence area, PV will be first installed in 3 sections of the development estate composed of 620 dwellings, offices and shops. Up to five emblematic buildings will also be equipped with PV and probably more in the future.

Supported by a study carried out in late 2000 by a team of planners and architects, the challenge is to establish a new City centre through a 30 year plan including more than 1 200 000 m<sup>2</sup> of new buildings (housing, commercial, services and cultural infrastructures), plus the refurbishment of roughly 60 000 m<sup>2</sup> of an existing residential area.



Lyon-Confluence  
Overview at present stage



Lyon-Confluence  
Site plan at project completion

A political impetus toward sustainability as a major axis of the project was given by the new Municipality elected in 2001. There is now a comprehensive approach to sustainability including ground de-pollution, transport re-organisation, waste management, water conservation and sustainable energy.

In 2003, an environmental study was carried out by a specialised engineering office in order to analyse environmental options of this development. This study concluded that energy efficiency and the use of renewable energy sources were the main weaknesses of the project.

In order to correct this, SEM Lyon-Confluence set up an informal group composed of local experts to submit ideas and help SEM Lyon-Confluence define the energy strategy of the project. Discussions focussed on the energy performance of buildings and the relevance of renewable energy sources. It became apparent to participants of this group that the development should be emblematic also in terms of energy efficiency, but there was no consensus on the level of performance. A fear of over-costs and innovation preventing the commercialisation of buildings led some participants to propose designing buildings just slightly more efficient than the regulations and equipped only with solar thermal collectors for domestic hot water.

Hespul, as a participant of this group, highlighted the opportunity provided by a call for proposals launched by the European Commission, the CONCERTO initiative, set up to support innovative urban projects and define ambitious goals in terms of energy efficiency and renewable energy sources. In December 2003 a proposal was submitted to the European Commission relating to the first housing to be constructed in the area. The objectives set out in this proposal were:

- a maximum energy consumption for heating of 60 kWh/m<sup>2</sup>/year (40% less than the then French regulation (RT2000))



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- 80% of heat and domestic hot water demand from renewable energy
- 50% of electricity demand for communal areas from renewable energy

When, in March 2004, the European Commission evaluated this proposal and ranked it in first position, SEM Lyon-Confluence immediately upgraded its' guideline for the selection of developers that provided architectural and environmental requirements with the technical details of the proposal.

In January 2005 3 developers were selected to each build one section of the estate, following the architectural, environmental and energy guidelines provided. Buildings designed by each developer included wood chip fired boilers, solar thermal systems and PV in order to comply with the renewable energy requirements of this guideline.

The **RENAISSANCE** project is a European Commission funded project under the CONCERTO initiative that involves the construction in Lyon of 80 000 m<sup>2</sup> of energy efficient eco-buildings equipped with renewable energy systems.

As part of the RENAISSANCE project, 3 sections of estate are under construction and will be equipped with PV:

- 80 kWp on the A section developed by Nexity Apollonia
- 100 kWp on the B section developed by Manignan Bouwfonds
- 50 kWp on the C section developed by ING Real Estate

The experience gained within RENAISSANCE led SEM Lyon-Confluence, the semi-public entity in charge of city planning, to upgrade its' guidelines for the construction of other buildings to include requirements to install PV. Thus PV will also be installed on other emblematic buildings in this area :

- Le Progrès headquarter, the local newspaper
- Eiffage headquarter, a large building company
- The Regional Council building
- The Natural History Museum
- ...

Over a 2 year period, meetings and workshops were organised to assist architects, engineering offices and developers of this project to finalise building design. Discussions focused first on building envelopes in order to reach the energy consumption targets without impacting the architectural appearance of buildings. In the second stage, discussions focussed on wood chip fired boilers and on PV systems. These were at first seen by developers as irrelevant and unpractical for this kind of urban project.



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Lyon-Confluence area  
Energy efficient buildings to be constructed

A series of site visits, training courses and technical analysis finally convinced the developers that PV was not a difficult technology to deal with, although some questions about price were still pending. The success of the commercialisation of the first dwellings in 2006 definitely ended the discussions about the price of PV and concretely showed developers that energy efficient buildings have a market, with no negative feedback received during the commercialisation of dwellings.



Lyon-Confluence area  
First housing buildings under construction

At the time of writing, most infrastructure works for this development; such as the harbour inlet, parks, roads, networks and the tramway were completed. The first sections of the estate were still under construction but the success of the project has already made several significant impacts at local and national levels.

At a local level, SEM Lyon-Confluence adopted the energy guidelines used for the first buildings to other buildings in the Lyon-Confluence area. Consequently, PV will also be installed on several



other emblematic buildings in this area such as private companies' headquarters, the Regional Council building and the Natural History Museum.



Lyon-Confluence area  
PV on the roof of the local newspaper headquarters (Le Progrès)

At a national level, other semi-public companies in charge of city planning included energy requirements in their guidelines for the selection of developers as successfully done by SEM Lyon-Confluence.

### Summary of problems, barriers, solutions and recommendations

#### **Lack of RES in global project focused on sustainable development**

In 2003, an environmental study carried out by a specialised engineering office to analyse environmental options for this development concluded that the lack of energy efficiency and the use of renewable energy sources were the main weaknesses of the project.

**Solution:** An informal group composed of local experts was set up by the semi-public company in charge of urban planning in order to help define the energy strategy of the project. The CONCERTO call for projects launched in 2003 by the European Commission was of great help in order to set energy consumption and renewable energy supply targets.

#### **How to make developers design energy efficient buildings including PV?**

Lyon-Confluence aims to showcase best practice in terms of design and construction of energy efficient buildings. The objective is not to install PV on buildings that are not energy efficient but to design and construct architecturally pleasant and energy efficient buildings powered by renewable energy sources.

**Solution:** Instead of requesting a defined power to be installed per building, the guidelines mention the share of the total electricity consumption to be provided by renewable energy sources. This has the effect of making rational use of energy measures more cost effective since any additional investment in energy efficiency will reduce the investment in PV. The more efficient buildings are, the less PV will be installed!

#### **Lack of knowledge of engineering offices and developers**



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Although the guidelines for the selection of developers gave some requirements on the need to have in the team an engineering office specialising in energy efficiency and renewable energy systems, it appeared that none of them had any serious experience in PV.

**Solution:** As part of the CONCERTO project, a team of local specialists was set up to assist engineering offices and developers at all stages of the project, from the preliminary design to the commissioning of PV systems. This local team also organised site visits and training sessions and will help developers in dealing with a complex financial scheme with multiple sources of funding.

### **Is PV a technology suited to high architectural quality buildings?**

The architectural quality of the Lyon-Confluence project is high with each architects team in charge of a section of the estate under the leadership of a world recognised architect. Prestigious names such as Tania Concko, Massimiliano Fouksas and MVRDV are associated with the project. In addition, Lyon has two world heritage listed districts next to which the installation of PV on roofs may be complicated or impossible. This was why, at the beginning of the project, the semi-public entity in charge of urban planning wondered if PV was a technology really suited to high architectural quality buildings.

**Solution:** PV is of course a technology suited to high architectural quality buildings. But in order for PV to be integrated in buildings in a pleasing manner, whether the choice is to make it highly visible or invisible, the architect has to take it into account at the beginning of the building design process, otherwise PV will give the feeling of being added to the building at the last minute. In most cases, architects will find good opportunities to integrate PV in the building design but it is always necessary to make sure that PV will operate under acceptable technical conditions. In Lyon-Confluence, although most of the PV modules will not be easily visible, PV increases in some cases the global aesthetic of the development since it is used to build homogenous surfaces that cover and therefore hide technical systems generally installed on roofs such as ventilation. Also, as standard PV modules are generally less expensive than custom made PV products, architects and engineering offices of this project choose to use standard PV modules and find a way to install them in an architecturally pleasant way.

### **Present Distribution network design guidelines not adapted to new urban plans with PV**

During the design stage of the project, it appeared that the distribution network operators' usual way of designing distribution networks is not adapted to new urban plans with PV. Presently, the distribution network operator (DNO) can design new distribution networks according to the type of buildings to be supplied with electricity and their distance from transformers but can't take into account distributed electricity generation during the design phase, since the DNO requires detailed information about the power plants that can not generally be provided at this stage. The main risk is that due to a lack of anticipation by the DNO, additional infrastructure work will be necessary in order to connect PV systems to the newly built grid, leading to high grid connection costs.

**Solution:** As soon as the semi-public entity in charge of urban planning was alerted to this specific problem, it organised a technical meeting with the Distribution Network Operator to find a way to take into account, during the design phase of the distribution grid, the fact that several buildings would be equipped with PV. The objective was to correctly size the new distribution grid to be built and avoid any additional infrastructure work once buildings will be effectively completed and PV systems about to be commissioned. Particular attention is now paid to the location of Medium Voltage/Low Voltage (MV/LV) transformers and the size of transformer feeders to make sure that each PV system can be connected to a strong enough LV grid.



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## Sources of further information

Lyon-Confluence project: [www.lyon-confluence.fr](http://www.lyon-confluence.fr)  
Lyon-Confluence project: [www.laconfluence.fr](http://www.laconfluence.fr)  
Grand-Lyon Community: [www.grandlyon.com](http://www.grandlyon.com)  
Renaissance project website: [www.renaissance-project.eu](http://www.renaissance-project.eu)

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