

THE “LE SYCOMORE” ECO-NEIGHBOURHOOD: FROM THE NEW TOWN TO THE SUSTAINABLE TOWN

The “Le Sycomore” eco-neighbourhood is located in the municipality of **Bussy Saint-Georges**, a town with one of the highest urban rates of development in Europe. Bussy Saint-Georges comes within the perimeter of the **New Town of Marne-la-Vallée**, created more than 40 years ago to organise the growth of the metropolitan area of Paris to the East. The EPAMARNE public development authority is the State tool responsible for the development of the New Town, the population of which increased from 100,000 in 1976 to more than 320,000 in 2013. As the owner of significant land reserves, it finances urban projects by selling the developed land to developers or investors. It works in conjunction with the 27 municipalities in the area. Its planning objectives are to balance housing and jobs, provide high quality public amenities and spaces, create transport infrastructures and protect the environment.

2008 – 2010: THE ECO-NEIGHBOURHOOD APPROACH BRINGS ABOUT A CHANGE IN THE URBAN PROJECT DESIGN PROCESS

THE HOUSING CRISIS AND THE FRENCH GRENELLE AGREEMENT ON THE ENVIRONMENT LEAD TO THE EMERGENCE OF THE “ECO-NEIGHBOURHOOD” APPROACH

With more than 2,000 housing units built on average over the last 10 years, Marne-la-Vallée is actively contributing to property development in the Paris region to reduce the housing crisis.

The national awareness of the sustainable development issues brought about by the “Grenelle” challenges EPAMARNE in its practices as a local planning and development authority. The signing in 2009 of a State/Municipality/Planner **tripartite agreement** for the development of “Le Sycomore” neighbourhood commits EPAMARNE to change its practices to an “eco-neighbourhood” approach. The densification of the initial “Le Sycomore” project is one of the first measures adopted to jointly meet the home building and energy saving challenges, with building targets increased from 1,650 to 4,500 units.

The setting up of a **State/Municipality/Planner governance**, made it possible, from the outset, to consider issues and objectives collectively and define a framework for choosing, adjusting and assessing the means of action. The objective was to provide for diversified residential development (social housing, residential facilities for students, apprentices, young working people, senior citizens), within a high-quality environment framework, to provide a better response to the needs of local populations and ensure continuity of residential opportunities. The project is then no longer just a matter of programming (density, types of use), and physical and economic requirements (financial equilibrium of the operation): it also considers how to ensure “social harmony” and reduce its environmental footprint.

TOOLS TO DEAL WITH ENERGY ISSUES

In November 2008, EPAMARNE launched the calculation of a **Carbon Footprint**, on the scale of the Bussy-Saint-Georges municipality and for the whole area, and raised the first questions about Marne-la-Vallée's potential for renewable energies.

The carbon footprints calculated highlight three levers for reducing the Greenhouse Gas (GHG) emissions of future developments: transport, especially **short daily trips** (rather than commuting), the **heating** of new buildings and **“grey energy”** corresponding to GHGs dissipated in the manufacturing, transport and use of the materials for building the infrastructures and buildings of future new neighbourhoods.

From 2010 onwards, the Bussy Saint-Georges municipality drew on the findings to develop its **own sustainable development strategy**, as an Agenda 21, with extensive consultations with the population. The **renewable energy potential survey** carried out in 2009 showed that large wind turbines were not viable and solar energy would barely be sufficient. However, medium depth and very deep geothermal systems, corresponding to an energy of 30 to 85°C, and the biomass available within 50 km were found to be of real interest. Other surveys “upstream” of the design of the Bussy Saint-Georges eco-neighbourhood were carried out on mobility and eco-materials, in particular.

However, the **eco-neighbourhood approach** is not just an accumulation of upstream surveys.

THE URBAN PLANNER AS PART OF A CROSS-FUNCTIONAL MULTI-TEAM ORGANISATION: A NEW APPROACH TO PROJECT MANAGEMENT

In 2009, EPAMARNE hired thirty young professionals, including several urban planners to act as project managers and provide a cross-functional view. A project team dedicated to the “Le Sycomore” neighbourhood was set up around an urban planner. The municipality also hired an energy engineer, responsible for the sustainable development section. In parallel, discussions between EPAMARNE and the community were changing towards comparative thinking and co-construction of the urban project.

The project's ambition was enhanced but this also increased the risks of deterioration due to unexpected events and economic crises. To ensure the long-term implementation of objectives (up to 2026), **EPAMARNE enlisted the skills of a sustainable development management assistant**. Cap Terre thus provides independent cross-functional insight. This insight was formalised in a **Sustainable development Commitments Charter** signed by the municipality and EPAMARNE.

2010 – 2012: THE QUEST FOR LOW-CARBON MOBILITY AND AN INCREASE OF RENEWABLES IN THE ENERGY MIX SHAPE THE LE SYCOMORE ECO-NEIGHBOURHOOD

Following a competitive tender, in 2010, the governance selected the architect-urban planner J. Treuttel (TGT), working with the landscaper F. Mercier, to produce the **masterplan for this 117-hectare eco-neighbourhood**. This was the first time that EPAMARNE had made use of an **external urban project designer** and a sustainable development management assistant. At the start of the project, TGT was thus provided with a new approach, project governance, sustainable development objectives and financial means for carrying out studies and for supporting the project's coordination, information sharing and consultation.

THE LOW-CARBON MOBILITY SCHEME AS A PREREQUISITE FOR PRODUCING THE MASTERPLAN OF THE 117 HA NEIGHBOURHOOD

Following the carbon footprint calculation, the project team suggested reducing the extensive use and space devoted to the private car in Bussy Saint-Georges' existing neighbourhoods, to act as a **first "mobility" lever**, and also promoting public transport and "active" modes.

To provide an optimum blend of urbanisation and public transport, a **public transport system on a dedicated right of way** was provided in the neighbourhood. Its route provided the backbone of the overall layout plan and a platform for the development of lively neighbourhood urban centres around stations, including public amenities or local shops. The road network (road and active modes) was extended to provide urban continuity between the “Le Sycomore” new urban neighbourhood and the rest of the municipality.

The presence of the State, the Region and the Department in the project governance facilitated the **financial arrangements and the planning of the public transport system on a dedicated right of way** (BRT). The more so as **project densification** - from 1,650 to 4,500 housing units - was significant in an area where the promoting of individual houses had long prevailed.

Urbanism would also **restrict the use of private cars**. Public parking areas were shared and all private parking areas were underground. Streets were made one-way and speed limited to 30 km/hr.

Work was also carried out on **waste management**. Up to this time, in Bussy Saint-Georges, the 3 sorting containers, once taken out of the refuse room of buildings, were collected on the street at the foot of each building by truck. The strategy for “Le Sycomore” was based on the desire to limit the removal of vehicle traffic (saving of fuel, reduction of GHG emissions and noise pollution). The project thus provided for **"voluntary deposit points" in the public space**. The project management coordinated the deposit points with the flow of users: each voluntary deposit point was located on the route to bus stops or public facilities. This innovation in the area involved working in partnership with the relevant syndicate. This radical change in practices could eventually be envisaged in the rest of the municipality and in other municipalities in the area.

THE CHOICE OF A HEATING NETWORK IMPACTS THE PACE OF DEVELOPMENT OF THE NEIGHBOURHOOD

The work on the **second lever** of the carbon footprint involved mobilising the renewable energies available in the area and establishing the appropriate governance to supply the neighbourhood with **heat**. The population density of the future neighbourhood was sufficient to allow the provision of a district **heating network** across the “Le Sycomore” area. The **biomass** was selected as a renewable energy for economic reasons: the investment was less than what would have been required for a geothermal system and the cost per kw/h was more advantageous than that of natural gas. In

addition, the use of a collective wood-powered boiler provided with powerful filters **minimised polluting discharges into the air** compared with an individual boiler.

The team of urban planners thus included the deployment of a heating network throughout the neighbourhood in the layout plan. The general road, cycle lane and footpath network was used to route the network pipework and facilitate maintenance. The **boiler** was positioned centrally in the neighbourhood to optimise the network distribution and take gradual urbanisation development into account. It was located near the A4 motorway to avoid residents being bothered by the traffic noise of trucks supplying the wood boiler.

The wood was to come from a **biomass platform** located about 20 km from "Le Sycomore". However, the **wood energy potential of Marne-la-Vallée**, as mapped in 2009, would allow, in addition to the 4,500 "Le Sycomore" housing units, the heating of 10% of the 135,000 housing units of the New Town.

Biomass opens up new perspectives, such as the building of a biomass platform running on **wood energy** in a "**short loop**" (within and for Marne-la-Vallée area), the development of forest utilisation tracks providing new **relaxation spaces** for residents, and forest regeneration by replacing diseased trees thereby creating **new habitats**.

A BIOCLIMATIC DESIGN FOR THE MASTERPLAN

The **masterplan of the urban project** was thus shaped by the goals of radically changing mobility practices and the use of a low-carbon energy supply. It also included a **bioclimatic design of buildings**, to provide healthy, comfortable accommodation, even in the summer, while **maximising the supply of free solar heat**: south-facing, setbacks in lots to decrease masking, taking into account of shadows, noise masking allowing night-time over-ventilation, protection from prevailing winds.

Through the bioclimatic design of the overall layout plan and the requirements for the walls of buildings in particular, the **energy performance of housing units** has been improved: from 340 kWh primary energy/m²/year (measured in Bussy Saint-Georges in 2003), it increased to 65 kWh/m²/year (2005 French Building Energy Performance Regulation for newbuilds) and then to 40 kWh/m²/year (– 10% on top of the more demanding 2012 Regulation), a performance achieved with no economic or technological discontinuity.

The 1st public facility in the neighbourhood, which is due to be delivered in 2015, is a **positive energy school**, connected to the district heating network. It was awarded in 2013 by ADEME, the French environment and energy management agency.

Finally a **street light plan** has been implemented across the neighbourhood to lower the power consumption of public lighting while ensuring the safety and sense of security of users in pleasant surroundings. In this way, it facilitates the implementation of **black frames** having a positive impact on biodiversity – and benefits the municipal budget.

FROM 2013 ONWARDS: FROM THE NEIGHBOURHOOD SCALE DOWN TO THE SCALE OF THE CONSTRUCTION PROGRAMME

ECO-FRIENDLY BUILDING MATERIALS: EMERGING SECTORS BOOSTING LOCAL EMPLOYMENT

The **third carbon footprint lever** to reduce fossil fuel consumption is the use of innovative and renewable materials, to save "grey energy" and future waste. To meet this challenge, the project governance has encouraged players in the building sector to turn to new building techniques, use products with a low grey energy content, which do not emit hazardous compounds in indoor air, and which do not compromise the balance of natural resources through their use or their manufacturing process.

The **specifications** set up by EPAMARNE for developers and project managers of public spaces, require the use of low carbon products derived from the **enhancement of construction waste** from public works, as an alternative to aggregates from quarries. Certain materials for public spaces (pavement curbs) or street furniture (benches) are selected following a comparative **Life Cycle Analysis**.

Wherever possible, priority should to be given to the use of wood in the finishing work, with the use of PVC being prohibited for joinery. **Eco-friendly building materials**, wood fibre, hemp and cellulose wadding should gradually replace rock wool or glass wool. Their use accelerates the development of sectors boosting local employment, in a territory where there is already an agriculture and forestry impetus.

The project also aims to promote **wood-frame construction** (very little developed in France) for the few individual housing units to be built, and then impose it gradually in collective housing. The **"dry" assembling construction process**, without concrete foundations, with a structure based on screwed metal piles, providing a "clean" work site with shorter deadlines.

ANTICIPATING THE MANAGEMENT OF URBAN PUBLIC SPACES AND BUILDINGS

The choice of a renewable energy heating network not only lowers the heating carbon footprint, but also **secures supplies in the long term**.

Specifications encourage developers to establish a **booklet aimed at new residents** specifying the key factors in the eco-neighbourhood's success and all the actions contributing to sustain this performance, including energy efficiency.

In public spaces, landscaping choices give priority to the use of native species produced in local nurseries. The **differentiated management** of these green spaces minimises the use of pesticides and energy consumption, and therefore the impact on the municipality's budget. The neighbourhood will also accommodate a conservatory for local varieties of old fruit trees.

A PROJECT ASSESSMENT PROCESS TO ENSURE ACHIEVEMENT OF THE OBJECTIVES AND CAPITALISATION

The sustainable development management assistant annually assesses project progress, as submitted during steering committee meetings, through indicators. These indicators (energy performance, density, parking spaces for motorcycles/bicycles, green space %, etc.) are used to **quantitatively and qualitatively measure** the achieving of the objectives agreed on a contractual basis in the Sustainable development Charter. Construction work is monitored during the key phases of lot development (Tender for developers, Execution drawings, Building permit, Tender for builders and Construction).

At neighbourhood level, the Future Urbains University Excellence Laboratory of the Descartes Sustainable Cities cluster has been given the responsibility of carrying out a **survey of the impact on the eco-neighbourhood's energy consumption** (characteristics of buildings, public spaces, household practices, etc.)

The neighbourhood is also included in the State **national Eco-neighbourhood certification process** to demonstrate the "Le Sycomore" neighbourhood's contribution to national issues. The "Le Sycomore" operation has thus provided EPAMARNE with the opportunity to radically change its practices and register all its future operations in this certification process.

THE LE SYCOMORE EXPERIENCE UNDERPINS THE FUTURE PLANNING MARNE-LA-VALLEE

EPAMARNE's **Strategic and Operational Plan** for Marne-la-Vallée to 2030 was drawn up on a co-construction basis with municipalities and local stakeholders. With the pace of construction set to increase from 2 to 3,000 housing units per year in the area, the strategic and operational plan provides a shared framework to ensure a transverse approach to urban planning, sustainable development and energy. It addresses key issues relating to housing, economic development, transport, the environment and innovation. The "Le Sycomore" experience has provided insight for this Plan and also for the **gradual "spin-off" of good practices across all the sectors** being developed in the Marne-la-Vallée region.

Several projects already embody this energy ambition:

- The "**Les Lodges**" operation in Chanteloup-en-Brie (35 flexible wood-frame housing units) was given an Ile-de-France outstanding building award by ADEME, the French environmental and energy management agency, as part of its positive building/"passive" building call for projects.
- EPAMARNE has signed a partnership with energy providers (EDF, ERDF and Dalkia) to design the first energy demonstrator based on an **electrical and thermal smart grid system** in Cité Descartes (on about 200 hectares). This involves promoting the real-time optimisation of energy generation based on the neighbourhood's needs, the mobilisation of local renewable energy and energy saving.
- The **Village Nature** holiday destination project in Villeneuve-le-Comte (509 hectares) is jointly developed by Pierre & Vacances, Euro Disney and the Public Development Authority in accordance with a Sustainable Action Plan. The capturing of deep geothermal resources reduces the environmental footprint of the project which aims to be a positive energy site.
- EPAMARNE is deploying a **network of ecomobility platforms across the whole area**. These 85 stations will allow the charging of electric vehicles and will also facilitate the development of car sharing and carpooling, while optimising traveller information.