



The French network of
public and private stakeholders
for sustainable cities

Innovative solutions for sustainable cities

Nature in the city



NATURE IN THE CITY

/// WHY ACT IN THE DOMAIN OF NATURE IN THE CITY?

Biodiversity is made up of the many interactions between organisms in changing environments. Humans and their infrastructures are an integral part of this living tissue. The city is an ecosystem in its own right to be shared between humans and other living organisms that are integrated in a territorial network which is also alive and dynamic.

The climate and biodiversity are deteriorating at an unprecedented pace and we must collectively invent new developments for our territories. The reconquest of nature in the city has become a major concern as nearly 51% of the world's population now lives in cities. The pressures are increasing, including beyond the urban borders, representing an ex situ footprint for urban agglomerations. The materials and resources used for cities are biodiversity issues that are sometimes very remote geographically and yet very important.

In 10 years, urbanization has increased by 19% in France, acting as a filter on biodiversity: pollutions, reduction in surface areas, fragmentation and sealing are all factors that affect the state of health of nature.

The absence of nature is damaging to us. Many scientific studies show that reinforcing nature in the city has a positive impact on our health and well-being. More and more local authorities and companies are implementing solutions in favor of nature in the city, on different scales.

/// WHAT ARE THE MAIN AREAS OF INNOVATION IN THE DOMAIN OF NATURE IN THE CITY?

There are multiple solutions for preserving, restoring or reconquering urban biodiversity. They include the creation of green spaces, parks or gardens managed in an ecological manner (zero plant protection products, late mowing, etc.). On the scale of the city, one of the challenges consists of integrating ecological continuities into urban planning documents and developing nature areas to replace mineralized areas. In terms of the architecture of buildings, there is no lack of solutions to host a living environment. Possible options include the revegetation of buildings (walls and roofs), as well as the installation of wildlife hosting structures (insect shelters, nesting boxes, etc.). Under our feet, the issue of the rehabilitation of urban soils is important, as well as the phytoremediation of polluted soils and the unsealing of artificialized soils. Restoring the water cycle should also be part of our priorities with the ecological management of storm water through ponds, rain gardens, and phytoepuration basins. In the city, it is possible to restore ecological continuities by creating wildlife crossings and urban agriculture is also an opportunity to reinforce nature areas, even cultivated ones, in urban interstices. Finally, the choice of construction materials or urban furniture can have an effect on the biodiversity of other territories, which is also essential.

When choosing which solutions to follow, one of the challenges is to link both climate and biodiversity issues, by finding common solutions (for example there are biosolar roofs that combine revegetation and photovoltaic panels).

The fields of intervention concern not only the development of ecological engineering but also derived tools and applications which can complement the solutions on offer, development of software (e.g. green and blue network [French: trame verte et bleue - TVB] mapping, recognition of species), applications for biodiversity monitoring or recognition on smartphone, etc. The professions related to ecological engineering as well as consulting firms for support (BE, Assistance to the Project Management [French: AMO], education and participative sciences) are expected to develop. On the side of architects and designers, biomimeticism, which involves taking inspiration from the forms and processes of the living world, is also growing at a fast pace.

/// WHAT ACTIONS ARE BEING DEVELOPED IN FRANCE TO SUPPORT THESE INNOVATIONS?

Stronger regulations have been put in place to reinforce nature in the city. We can mention the RCE (regional ecological coherence scheme) which aims to reconnect nature areas via ecological corridors in French regions, the Avoid-Reduce-Compensate sequence obliging project holders to minimize the impact of their developments and to consult ecologists to find solutions, as well as the Labbé Law of 2017 which prohibits the use of pesticides in some public areas.

Moreover, labels have been created to progress further. Besides Eco-Quartiers (Eco-neighborhoods), there are the BiodiverCity and Effinature labels for building projects and EcoJardin and Eve for green spaces. The BiodiverCity label is a new, unique tool to assess and promote the consideration of biodiversity in all the building projects. Effinature is a label created in 2009 to complement the environmental quality criteria of the construction industry with the consideration of biodiversity in the design, realization and use of development and construction programs. And the EcoJardin label is the ecological management reference for green spaces.

Work groups and multi-stakeholder structures are involved in sharing good practices, conciliating the issues in the best possible way and acculturating the various stakeholders of the city of today and tomorrow. That is the rationale behind work groups such as those of Naturepartif, OREE1HQE, the club U2B and Vivapolis.

In addition, there are citizen initiatives such as the biodiversity capital competition which, since 2010, has been rewarding local authorities engaged in nature as well as local initiatives such as urban pastures, participative revegetation approaches, the massive development of revegetated roofs or walls, the alternative management of water, and many others.





SOLOGNOT SHEEP AT THE HEART OF A JOINT INITIATIVE

DEVELOPING WILD AND DOMESTIC BIODIVERSITY IN THE CITY

Urban grazing is a maintenance technique for developing the wild biodiversity of our green spaces. To do even more and push the boundaries further, four landscape firms created an innovative cooperative tool in 2015, the De Natura fund, to help rescue of a breed of sheep in danger of extinction: the Solognot breed.

Thanks to these actions, this breed which is particularly adapted to city grazing, has regained an economic value and actively participates in the development of urban wild biodiversity.

INNOVATIONS

- ▶ The creation of an endowment fund by four firms is an **innovative model of cooperation** between private stakeholders acting in the public interest. This fund made it possible to mobilize resources in the service of biodiversity development projects.
- ▶ Work on **resistance to parasitism** in the Solognot breed has increased the benefits of these sheep for wildlife development. Indeed, not using antiparasitic treatments on sheep increases the positive impact of grazing on wildlife development.
- ▶ **The invention of new eco-grazing techniques** to combat invasive species has reinforced the economic interest of the Solognot breed.
- ▶ **Adding value to wool** through educational activities has created a new value chain for this breed and added a social component to urban grazing actions.

KEY FIGURES

- 615 additional ewes joined the French breeding stock to make a total of 2,297 ewes in 2016.
- 13 landscape firms are now part of the 39 breeders of Solognot ewes in France.

STAKEHOLDERS

- ▶ The **De Natura** endowment fund was created by four landscape firms: **Edelweiss SA, Plaine Environnement, SAE and TARVEL (SEGEX Group)**. These founding firms administer the fund from within the governing board, which is also open to other members.
- ▶ The **GEODE** selection organisation is a cooperative bringing together breeders of the Solognot breed of sheep. It is authorised by the Minister of Agriculture to develop this endangered breed and regulate its genetic evolution.
- ▶ “Les ateliers de la Bruyère” is an association promoting professional integration based in Haute Loire, specialised in working with wool. It manufactures products with Solognot sheep’s wool and participates in professional integration in rural areas.

IMPLEMENTATION

- ▶ In 2009, several landscape firms began acquiring breeding animals from breeders selected by the GEODE cooperative. They had to train staff to develop their urban grazing activity, design and experiment new intervention techniques and professionalize their activity. By becoming breeders within the GEODE cooperative, they contribute to developing and safeguarding the breed.
- ▶ In 2014, four firms created the De Natura fund to coordinate their activities in the public interest and to mobilize other partners around the development of domestic biodiversity.

- ▶ Thanks to partnerships with corporate funders, value is added to Solognot sheep's wool through an association promoting professional integration. This makes it possible to communicate on the future of this breed, to restore economic value to wool and to raise awareness of the general public.



RESULTS

- /// **Sustainable increase of the Solognot sheep stock and perpetuation of the farms** through the creation of a new economic value chain for this breed.
- /// **Wild biodiversity development** in areas maintained by eco-grazing. Validation of techniques for combatting **invasive plant species** (Japanese knotweed, ragweed).
- /// Adding value to a natural and environmentally-friendly material, **wool**, and to a threatened French craft, wool felting. Mobilization of staff in **professional integration** programs for the manufacture of products made from Solognot sheep's wool.
- /// Presentation of the project at the **Salon de l'Agriculture (Agricultural Show) 2017**



FINANCIAL ASPECT OF THE OPERATION

- /// Each firm financed the creation of its flock by acquiring sheep from breeders.
- /// The sponsorship activities coordinated by the De Natural fund made it possible to enhance the value of the wool and run communication campaigns on the issues related to the Solognot breed.

→ 1,500 h of work for the staff in professional integration programs created in 2015





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CALCICOLOUS ROOFS

ZAC OF THE COTEAUX DE LA MARNE - TORCY (77)

IMPROVING BIO-URBANITY WHILE CONTINUING TO BUILD

EPAMARNE has put biodiversity at the heart of its approach to urban development. The commitment to improving existing ecosystems while continuing to build is now on the path to success with the future implementation, in the ZAC (joint development zone) of the Coteaux de la Marne in Torcy (77), of a town-planning program on 14 ha, 30 % of which will be set aside for ecological continuities. The project plans to build 8,000 m² of floor area for service activities and 40,500 m² of housing floor area.

The construction methods and the uses of the buildings will contribute to improving biodiversity, to reducing the carbon footprint of the district, and to reinventing the relationship between nature and the city. The site developed in this way will offer a favourable biotope for the return of 22 protected species that are today endangered.

INNOVATIONS

- ▶ In the context of the ZAC of the Coteaux de la Marne, the project will conserve the wooded strip to the east of the site, a North-South green belt and a wet meadow north of the site. The site has a particularly interesting area in its south-eastern part: the calcicolous grassland, which has a vegetation characteristic of calcareous (limestone) hillsides. To conserve the fauna and flora of these calcicolous grasslands, calcicolous roofs have been considered, i.e., vegetated roofs which reproduce the biotope of the calcicolous grasslands by their substrate and their flora.
- ▶ The non-accessible roofs will be vegetated and for some lots, the proportion of vegetated roofs may reach 50 %.
- ▶ Those roofs are strictly reserved for ecology and will not be able to host any other activity. Such recreated environments are fragile and do not resist trampling, which would make it harder to install and maintain a rich variety of flora and fauna.

OBJECTIVES

- Preserving ecological continuities and reducing the environmental footprint of the district, including during the construction phases.
- Rethinking the relationship between nature and the city to obtain a type of nature that is not domesticated and sanitized, and reintegrating biodiversity in the urban area.
- Supporting innovative initiatives that will create the jobs of tomorrow.

Only maintenance staff will have access to them, during periods of low disturbance for the sensitive fauna (outside the birds' breeding period). The users of the building or neighbouring buildings will be able to enjoy the view of these natural spaces.

STAKEHOLDERS

- ▶ Public Development Authority of Marne la Vallée - EPAMARNE (Project leader- Concessionaire),
- ▶ the Agglomeration Community of Paris-Marne Valley (Licensor),
- ▶ the Town of Torcy,
- ▶ Consultancy firms called upon: Reichen & Robert (urban planner coordinator), Biodiversity by design (ecological expertise).

IMPLEMENTATION

► Management

Only the management of recreated natural environments is involved. The maintenance of the technical aspects of the roofs will have to comply with current standards.

No input will be admitted on the roofs (fertilizer, biocide, manure, etc.). Only one watering may be accepted in the first spring after seeding, if the weather is particularly dry.

► Replicability

Calcareous soils are widespread in Ile-de-France, calcicolous roofs could be replicated in each operation where vegetated roofs are built.

- **October 2015:** ecological appraisal
- **Second half-year 2016:** in-depth ecological appraisal and definition of the detailed procedures for the installation of the roofs
- **Last quarter 2016:** first architectural competitions
- **March/April 2017:** first building permit submissions
- **January 2017 to July 2023:** works
- **June 2017 to July 2023:** development and external networks



Green belt perspective

PROJECT AMBITIONS

/// The town of Torcy's commitment to preserving the green and blue belts and enhancing the landscapes is part of its Planning and Sustainable Development Project. Therefore, for the ZAC of the Coteaux de la Marne, the town of Torcy, the Agglomeration Community of Paris- Marne Valley (French: CAPVM), in partnership with EPAMARNE, are joining forces to:

- preserve diverse landscapes, including wooded areas, the vegetation cover of the Marne valley, ,
- create a network of quality green spaces, open to the public,
- continue to use ecological practices in the management of green spaces,
- enhance and promote the views over the Marne Valley.

/// In its Agenda 21, the town of Torcy also drew up an action plan intended, inter alia, to:

- support innovative initiatives that will create the jobs of tomorrow (Frame-Action 18),
- raise awareness and mobilise children and adults around new sustainable practices (Frame-Action 21).

/// Furthermore, EPAMARNE has always ensured that the equilibrium between town and nature is respected, whether for the lake chain of the Val Maubuée, the rehabilitation and enhancement of the valleys of Marne-et-Gondoire, the landscaped ditches and the street network of Bussy Saint-Georges, or the urban parks of the Val d'Europe. Its conception of the city has always been to integrate nature in every district and in every project. This results from a desire to fight against soil artificialisation and urban sprawl. New approaches have also been adopted to develop urban agriculture and promote biodiversity.

FINANCIAL ASPECT OF THE OPERATION

/// **Cost estimate.** Aid for economic operators for the installation of calcicolous roofs with high ecological value: €578,800 excluding tax, 11,576 m² of roofs at €50 (50 % of the roofs).



COEUR AGRO-URBAIN (AGRO URBAN HEART) MONTÉVRAIN – CHANTELOUP-EN-BRIE

ANCHORING THE ECO-NEIGHBOURHOOD OF MONTÉVRAIN IN ITS LOCALITY

The “coeur agro-urbain” (agri-urban heart) is an urban agriculture project aiming to establish a predominantly organic market gardening activity in keeping with the environmental requirements of the Eco-neighbourhood of Montévrain (77), located 30 km east of Paris. It is designed to obtain a high environmental performance and quality of life.

The Eco-neighbourhood agreement signed in 2009 between the State, EPAMARNE, the Montévrain municipality, and the ECOCITY 2 agreement for the agri-urban heart signed in 2016 are the hallmarks of the project’s ambition in terms of sustainable development.

INNOVATIONS

► Agriculture as a link with the living environment

The issue of coherence between the new neighbourhoods and the historical town centre is resolved by the well-considered decision to maintain a link that has always existed on the site, namely agriculture, but by adapting it to the area’s new urbanisation conditions.

► Limiting artificialisation of soils

In the eco-neighbourhood of Montévrain, the will to maintain an agricultural economic activity in an urbanised area, thereby limiting soil artificialisation and enabling the re-introduction of biodiversity in urban fringes, contributed to the creation of “coeur agro-urbain” (agri-urban heart), the first of its size in France.

► Local agriculture

The project provides for the strategic establishment of innovative local organic farming, to develop market gardening, orchards, community and/or family gardens in an economically self-sustaining way.

► Participative project

To take the initiative further, the inhabitants are invited to participate in consultations with citizens, to discuss the themes proposed by the project team.



Total area: 22.5 ha including 19 ha of arable land
Protective perimeter of agricultural and natural peri-urban spaces (French: PPEANP): 9.3 ha
ZAC (joint development zone): 5.6 ha
Installation of market gardeners: 3 – 4

STAKEHOLDERS

- Public Development Authority of Marne-la-Vallée – EPAMARNE (Project leader),
- Town of Montévrain,
- Town of Chanteloup-en-Brie,
- French Ministry of Territory Cohesion,
- Regional Council of Île-de-France,
- General Council of Seine-et-Marne,
- Agglomeration Community of Marne and Gondoire,
- Chamber of Agriculture of Seine-et-Marne,
- Terre de Liens,
- Cerema.

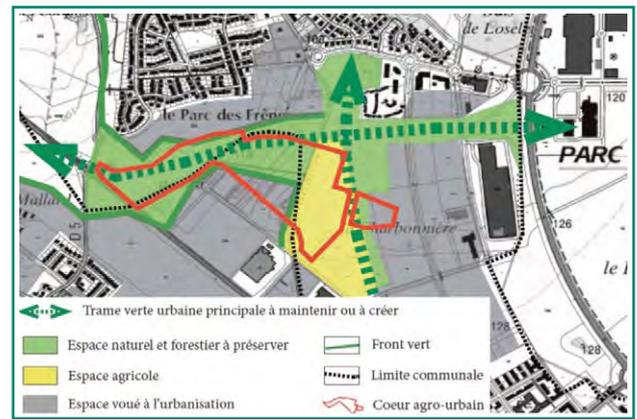
IMPLEMENTATION

► The stages of the project

- Agronomic study: 2012
- Agronomic preparation: 2013
- Economic study: 2014/2015
- Hydraulic study: 2015
- Call for expression of interest for the establishment of an urban organic farming activity: 2017

► Project objectives

- Preserve agricultural soil and landscaped areas through an urbanization which interacts with open spaces and maintains existing natural and agricultural continuities.
- Develop long-lasting links between the different districts of Montévrain and give a new territorial identity to the plateau.
- Promote a local food supply to residents.
- Develop a local agriculture project that is economically viable and self-sustaining.
- Create an inclusive, convivial place in the heart of Montévrain.



RESULTS

/// **The project showcases its territory.** The eco-neighbourhood endeavours to preserve and consolidate the hydraulic and landscape structure by advocating for an urbanization which interacts with open areas and maintains existing natural and agricultural continuities.

/// **Economic viability and reproducibility.** Within the framework of the Montévrain eco-neighbourhood, the economic study recommended the installation of three to four market gardeners developing economically viable businesses with a steady growth over the years. A land reserve will be provided for in case of enlargement of the farm. The marketing methods will have to form a coherent whole. Short channels may involve direct selling at the RER exit, a presence on the markets and on-site selling. The validation of this economic model makes it possible to assert the reproducibility of such a project.

/// **Exceptional backing.** EPAMARNE is an exception in its backing of such a project and its integration into a district development project. The themes addressed, the soils used, the consultant engineering and the governance of the project go far beyond the standard task of the planner/developer, not to mention in more detail the financial effort, which cannot be covered only by the sale of the lands.

FINANCIAL ASPECT OF THE OPERATION

/// ECOCITY, City of Tomorrow Fund: a financial lever.

Support from the Investments for the Future Program through the ECOCITY approach brings the financial lever effect required to implement this innovative project which makes it possible to reinvent urban uses and practices.

/// Financial support for substantial investment.

EPAMARNE finances the heavy equipment, such as the drilling operations and the construction of the agricultural hangar (with a contribution for the networks deployment).

→ Operation of €950,000

- Land acquisitions: € 350,000
- Drainage: €50,000
- Irrigation: €100,000
- Drilling: €200,000
- 500 m² building (slab, hangar and external works): €250,000

→ Subsidies

- Fonds Ville de demain (City of Tomorrow Fund): €122,000



COMMUNITY GARDENS OF NANTES

MORE NATURE AND MORE ACCESSIBILITY

The purpose of the community gardens is to promote an approach conducive to sustainable development, to reintegrate the nature aspect in the city, to meet the social need and to forge links with the close local environment.

In practice, humans can reinvent urban spaces through community gardens.

INNOVATIONS

- ▶ Adaptation is the driving force behind the project Each community garden is unique: the districts concerned are different, as are the needs of their inhabitants. Therefore, various partnerships have been put in place to allow everyone to take full advantage of these new areas: with schools, school gardens, socio-cultural or educational organisations, etc. For example, some gardens enable access to wheelchairs as close as possible to the plantations.
- ▶ In the social domain, the city of Nantes and ID Verde facilitate maximum professional integration on the construction sites.
- ▶ On the environmental front, a charter for the ecological management of the gardens was signed by the volunteer gardeners. Only natural products are used.

KEY FIGURES

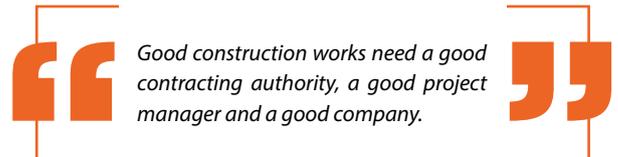
- 150 to 200 m² per garden
- 12 gardeners per garden
- A circle of influence on a dozen families

STAKEHOLDERS

- ▶ The City of Nantes is the initiator of the community gardens project as part of its social and environmental commitments. The works took place on municipal land. On the project management side, the landscape firm ID Verde undertook the development of each garden based on the landscape drawings by Atelier Ruelle.
- ▶ The user groups are supported in collaboration with the district players, namely:
 - The elected officials of the districts,
 - The development officers,
 - The municipal technicians.

IMPLEMENTATION

- ▶ Since the purpose of the City of Nantes and ID Verde was to meet the needs and desires of the inhabitants of the districts concerned, a consultation was important.
- ▶ The most sensitive issue of the project was therefore communication. It was essential to attract the residents to the information meetings prior to the start of the works. However, since each district has its own population, the city had to adapt the frequency of communication and the methods used. Likewise, sensitivities to the environment or to discussions differed, and the city therefore deployed tools that were adjusted accordingly.



Good construction works need a good contracting authority, a good project manager and a good company.

RESULTS



- /// The inhabitants are very satisfied with these new community spaces. The community gardens of Nantes have become a driving force for social exchanges in the city.
- /// Most of the volunteer gardeners have formed an association which works on contracts with the city hall:
 - The gardeners maintain the plantations and the cleanliness of the site,
 - The town hall takes responsibility for the area outside the enclosure and equipment repairs if necessary.

FINANCIAL ASPECT OF THE OPERATION

- /// The overall budget for the creation of a garden is approximately 30,000 euros, which includes:
 - The development by ID Verde,
 - The financing of tools for the users,
 - The provision of the first plants.

- Funding covered by the municipality
- No charge for inhabitants
- About a year and a half of project preparation, for a few weeks of works

atelieruelle

idverde

VILLE DE
Nantes



Powered by French creativity

The Vivapolis network aims to federate French public and private stakeholders involved in conceiving, building and operating sustainable cities, in France or abroad, in order to improve synergy and help them be, individually and collectively, more efficient in their action.

These sheets have been produced by the Vivapolis network members who attended different work groups to promote examples of innovative solutions for sustainable cities.

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