

C L I

THE ECO-DISTRICT

C H Y

A REFERENCE IN SUSTAINABLE
URBAN DEVELOPMENT IN PARIS

- B A

T I G

N O L

**AWARD
WINNER
IN 2016**

HONOURS FOR ENVIRONMENTAL EXCELLENCE

ECOQUARTIER LABEL
FRENCH MINISTRY
OF HOUSING AND
SUSTAINABLE HABITAT

ERDF FUND
WINNER OF THE CALL
FOR INNOVATIVE URBAN
PROJECTS

ADEME
"ADAPTATION TO CLIMATE
CHANGE & REGIONAL
DEVELOPMENT" AWARD

CONSTRUCTION 21 NETWORK
"SUSTAINABLE CITY" GRAND
PRIZE IN THE INTERNATIONAL
CITY SOLUTIONS AWARDS

L E S

About Paris Batignolles Aménagement

Paris Batignolles Aménagement (PBA) is the planning authority for the Clichy-Batignolles project. A local public company with €6 million in capital, owned by the City and County of Paris, it is headed by Annick Lepetit and managed by Jean-François Danon. PBA holds the concession to the Cardinet Chalabre and Clichy-Batignolles urban development zones.



© Sergio Grazia

Clichy-Batignolles at a glance

Located in the 17th district of Paris, Clichy-Batignolles is an ambitious eco-district project currently under construction.

Like a number of major operations in Paris that have been recently completed or are currently underway, Clichy-Batignolles makes use of land that has traditionally been occupied by logistics activities and features heavy transport infrastructures such as the Saint-Lazare rail tracks and the ring road.

One of the major aims of the project is to form a dense urban fabric within a restrictive zone and to build continuity between urban areas that have long been separated by the railway. This will in turn help to create the conditions for large-scale construction of housing in a neighbourhood with diversity in its DNA.

The urban planning and landscaping for the project was handled by architect and town planner François Grether, winner of the *Grand Prix de l'Urbanisme* 2012, landscape designer Jacqueline Osty and the OGI engineering firm. The urban planning, based on the existing topography, transforms Clichy-Batignolles into a link between the various surrounding neighbourhoods.

The district is organised around a 10-hectare park – already among the largest in Paris – that is highly accessible and easy to cross. The Paris courthouse (*Palais de Justice*) will be housed in an emblematic 160-metre-high building designed by world-renowned architect Renzo Piano. Real estate development programs, for housing and tertiary activities alike, make Clichy-Batignolles a neighbourhood that is great to both live and work in.

In coming years, Clichy-Batignolles will bring together 7,500 inhabitants and 12,700 jobs. The neighbourhood will offer excellent public transport service, thanks in particular to two metro lines – including the extension of the M14 line as part of the *Grand Paris Express* project – two commuter train lines and a tramway line.

Launched in 2002 by the City of Paris, the project is today headed by a local public company, Paris Batignolles Aménagement. An initial phase of the park was completed in 2007. The first inhabitants moved into the development in 2012. Nearly all of the building rights have been sold and the remaining construction sites will be finished in succession until the project is fully completed in 2020.

54 hectares overall

10 hectares
of park

3,400
housing units

140,000 sq. m.
of office space

120,000 sq. m.
for the courthouse and regional headquarters of the judicial police

31,000 sq. m.
of shops, culture and recreational facilities

38,000 sq. m.
of public facilities

Highlights of the eco-district

The Clichy-Batignolles project, today seeking the *EcoQuartier* label awarded by the French Ministry of Sustainable Development, was designed from the very beginning as an eco-district.

The City of Paris wanted to make Clichy-Batignolles a model for sustainable urban development, bringing to life through this project its ambitions in terms of mixed functions and social diversity, energy efficiency, reduction in greenhouse gas emissions (Climate Plan) and biodiversity.

5 AWARDS FOR CLICHY-BATIGNOLLES

ÉcoQuartier Label
Awarded by the French
Ministry of Housing
and Sustainable Habitat

**European Regional
Development Fund (ERDF)
of the European Union**
Winner of the call for
innovative urban development
projects for the creation of a
smart grid

ADEME
"Adaptation to Climate Change
& Regional Development"
Award

Construction21 Network
Sustainable City Grand Prize
in the international City
Solutions Awards competition

Écojardin Label
for Martin Luther King Park
in 2015

Île-de-France (Paris) region
Winner of the "New Urban
Districts" call for projects
in 2010

ENERGY

LOW-ENERGY BUILDINGS

The energy consumption of buildings is limited to 50 kWh per sq. m. per year, making it lower than required by current energy regulations in Paris (RT 2012: 70 kWh per sq. m. per year for housing). Heating, which consumes the most energy in a home, must not exceed 15 kWh per sq. m. per year, i.e. equivalent to that of Germany's Passiv Haus certification.

GEOTHERMAL ENERGY: RENEWABLE ENERGY FOR HEATING AND DOMESTIC HOT WATER

All of the buildings in Clichy-Batignolles will be connected to a heating grid supplied with geothermal energy, i.e. energy that uses the natural heat from a warm groundwater table. Geothermal energy enables heat production using at least 85% renewable energy sources.

SOLAR ENERGY: A NEIGHBOURHOOD THAT PRODUCES ELECTRICITY

Many rooftops and some facades will be equipped with photovoltaic panels, creating an overall surface of 35,000 sq. m. producing nearly 3,500 MWh per year. This production is the equivalent of roughly 40% of the electricity consumed by buildings in Clichy-Batignolles, primarily for lighting.

BIODIVERSITY, WATER AND THE CLIMATE

GREENERY AT THE HEART OF THE PROJECT

Alongside the vast 10-hectare park will be over 6,500 sq. m. of private green spaces in the heart of the blocks of buildings and 16,000 sq. m. of green roofs, gradually increasing the amount of flora in the area and extending the green network in northwest Paris. In all, nearly 500 plant species can be found at Martin Luther King Park, which in 2015 was awarded the *Ecojardin* label, a reference in the eco-friendly management of green spaces.

RAINWATER: PROMOTING THE NATURAL WATER CYCLE

Impermeable roadways make up only 12% of the total surface area of the eco-district. Thanks to the park and the many green spaces on rooftops and in the centre of the complexes, the volume of rainwater that runs off into the sewer system is limited to 50% in the public area and 70% in private plots. In the park, rainwater is collected and channelled towards wetlands. Moreover, 40% of the park's watering needs are met by rainwater.

ADAPTING TO CLIMATE CHANGE: PREVENTING URBAN HEAT ISLANDS

The park acts as a veritable urban "air conditioner" thanks to the shade of the trees and to the natural phenomenon of evapotranspiration generated by the greenery. The plants and trees collect rainwater, sprinkler water and underground water and transform it into water vapour that cools the ambient air.

SETTING

MARTIN LUTHER KING PARK: A MEETING PLACE AND LINK BETWEEN NEIGHBOURHOODS

Located at the heart of the eco-district, Martin Luther King is open and can be easily crossed thanks to its footpaths and its 14 access points. It has become the meeting place for the people living in the surrounding area. Its many facilities encourage people of all ages to take part in sports and recreational activities.

OPTIMISED USE OF SPACE, A SCARCE RESOURCE

The blocks of buildings were each designed to fulfil several functions: shops, schools and recreational facilities have been created on the ground floor of the buildings. A dense, multi-functional city is being organised compactly around the park's vast open public space. Real estate developments offer shared terraces or premises.

SOCIAL DIVERSITY: HIGHLY SEGMENTED HOUSING

Clichy-Batignolles will offer 50% social housing, 20% capped-rent housing and 30% housing at market prices. The public housing is tailored to the specific needs of various populations, e.g. families, students, young working people, dependent seniors and the disabled. These various types of housing are spread throughout the entire eco-district without any distinction regarding location or quality. In most cases, the public housing is incorporated in the mixed-use blocks of buildings.

MOBILITY AND TRANSPORT

MOBILITY: 5 MAJOR PUBLIC TRANSPORT LINES AND WALKING MADE EASY

The eco-district will feature five major public transport lines. Emphasis has been placed on “active” means of mobility. Martin Luther King Park is a pleasure to cross on foot, thus shortening the distances between surrounding neighbourhoods and public transport stations. The new roadways, especially the main north-south thoroughfare, have been designed as shared spaces. Meanwhile, individual cars are discouraged. Parking is limited, using the minimum levels of the Local Urban Development Plan as a guideline. Ground-level parking is reserved for deliveries and short stops.

LOGISTICS: ACTIVELY REDUCING TRUCK TRAFFIC IN PARIS

All household waste (with the exception of glass and bulky items) is automatically collected using an underground pneumatic network, a first in Paris. This pneumatic collection system, managed by Veolia Propreté and ENVAC, helps reduce the need for refuse containers in public areas and eliminates trash removal vehicles.

The eco-district is also home to large-scale services required in any major city, with operating conditions and insulated locations that make them compatible with the neighbouring area. Their location near points of use and taking advantage of railway areas helps curb heavy vehicle traffic in the city. This is the case, for example, of the concrete plant and the freight hub, where city-centre logistics activities can make use of electrically-powered light utility vehicles.

Project management in line with aims

In order to meet the project’s ambitious aims, the planning authority has mobilised significant engineering and project management resources.

THE CARBON FOOTPRINT, A DESIGN TOOL

The City of Paris aims to make the eco-district’s buildings and public spaces carbon neutral. The carbon footprint has been used since 2009 as a design tool and resource for technical choices regarding the project. The eco-district’s carbon footprint is currently being updated in order to incorporate recent changes in the project (geothermal energy) as well as the actual performances of the buildings already in operation.

MEETING ENVIRONMENTAL REQUIREMENTS ALONG WITH PROPERTY DEVELOPERS

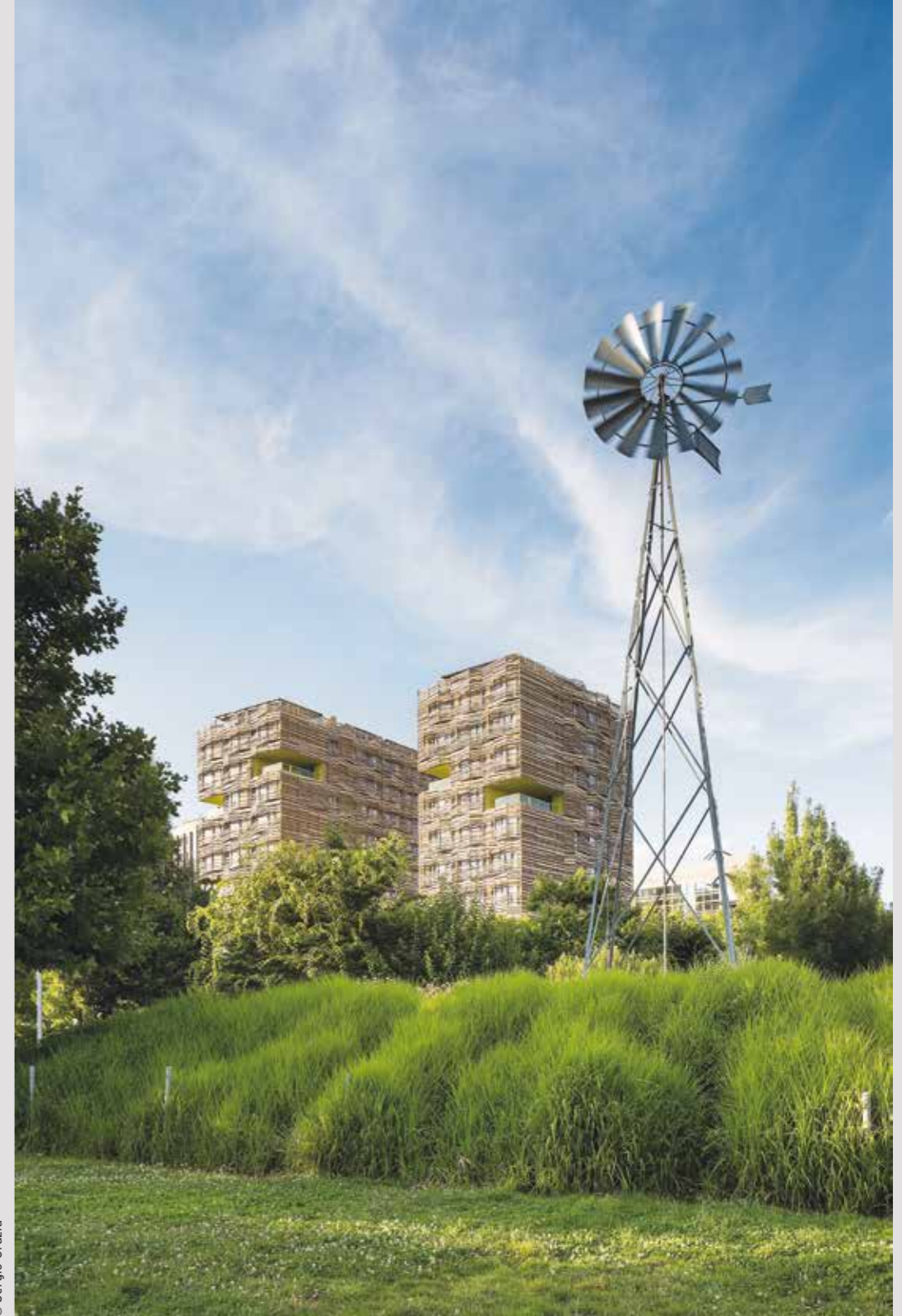
Construction of the eco-district has brought together over 20 different property development firms to build the 27 lots. Bringing them on board to the eco-district’s ambitions has required specific project management tools that aim to ensure the environmental requirements are indeed met in the buildings. These tools include: binding environmental specifications paired with financial guarantees, methodological tools, consultancy for contracting authorities and assessment of the projects at various phases.

FUTURE INHABITANTS AND USERS: PART OF THE PROJECT SINCE DAY ONE

The choice to focus the initial work on creating the first part of Martin Luther King Park (4.5 hectares) in 2007 enabled the population to discover the site even before the start of construction work. A number of festive and informational events have been organised, attracting a broad audience. An ambitious form of consultation, this process has involved over 3,000 inhabitants of all ages since 2008. Innovative forms of participation have also helped to educate people about the project. **Highlights of the eco-district and project management tools are discussed in greater detail in the following pages of this press kit.**



Wet ditch
Martin-Luther-King Park



ENERGY

Energy savings

Low-energy buildings

REFERENCES

In the coming years, Clichy-Batignolles will have over **550,000 sq. m. of floor area**.

In France, tertiary and residential real estate account for nearly 25% of greenhouse gas emissions and 43% of total final energy consumption (Source: French Ministry of Ecology).

* For housing, regulations limit the amount of solar electricity production to 12 kWh per sq. m. per year that can be deducted from consumption; at Clichy-Batignolles, this production is not taken into account so that the housing units consume little and actually produce energy.

Energy consumption in the buildings is limited to 50 kWh per sq. m. per year, i.e. below the requirements of current energy regulations in Paris (RT 2012: 70 kWh per sq. m. per year for housing).*

Heating, which consumes the most energy in a home, must not exceed 15 kWh per sq. m. per year, i.e. equivalent to that of Germany's Passiv Haus certification.

In order to meet these aims, the buildings have been designed to limit their primary energy needs:

- Small volumes to limit number of areas in contact with the outside
- Dual exposure and solar protection, with green roofs
- Exterior building insulation

Innovative heat regulation and energy recovery solutions enable user consumption to be optimised. Air conditioning systems have been kept to a bare minimum in order to curb electricity consumption for specific uses such as server rooms or temporary solutions during heat waves (housing for the elderly).

With less than 75 kWh per sq. m. per year, i.e. around half of the consumption of the newest skyscrapers delivered at the Paris la Défense business district, the Paris courthouse has become the new standard-bearer for low energy consumption in high-rise buildings.



© Sergio Grazia



© Sergio Grazia



© Chartier-Dalix - Brenac & Gonzalez

1 Compactness

PLOT E1 Paris Habitat and Franklin Azzi
A very compact cubical shape that minimizes the surface area in contact with the outside, the main area where heat loss occurs, and double insulation on exterior walls using very high performance mineral wool help reduce a building's energy needs to a minimum.

Thermal slab

PLOT 05 Jean-Paul Viguier and Search Architecture
The building's concrete slab is used as a reservoir for heat and coolness and allows heating or cooling with little energy use. Thus, office spaces can be naturally cooled in summer and basic heating is covered in winter.

2 Bioclimatic design

PLOT 07 Chartier-Dalix and Brenac & Gonzalez
The façade features a diverse array of windowed surfaces, larger on the lower floors and smaller on higher ones, thus creating an optimal balance between heat input, natural light and solar protection.

Dual exposure

PLOT 01 Le Penhuel, Saison Menu and Sud Architectes
In this residential building, wintertime access to the sun is maximized thanks to the dual exposure of nearly all of the apartments.

Canadian well

PLOT E4 Philéas K Architecte
The school's recreation centre is heated at minimum cost thanks to the use of a Canadian well. This technique uses geothermal energy in a passive way: outside air passes through a duct buried in the ground, which is warmer than the winter air. There air is thus warmed before being distributed throughout the home.

Recovering heat from greywater

PLOT E7 Antonini and Darmon
The water from washbasins, sinks, washing machines and showers is channelled to an underground unit where its heat is recovered and then re-injected into the hot water production unit. Thus, 58% of the energy needed to produce hot water for the home is covered.

Geothermal cooling

PLOT 03 Le Penhuel, Saison Menu, and Sud Architectes
Cooling via geothermal energy – or “geocooling” – utilises the coolness of groundwater to lower the temperature in office spaces. This direct cooling process offers unparalleled efficiency, as no energy is lost due to heat pumps.

Adiabatic cooling

Several office buildings use this age-old method that involves piping hot, dry air through a humid exchanger, which cools the air through water evaporation.

ENERGY

Geothermy energy

Renewable energy for heating
and domestic hot water

REFERENCES

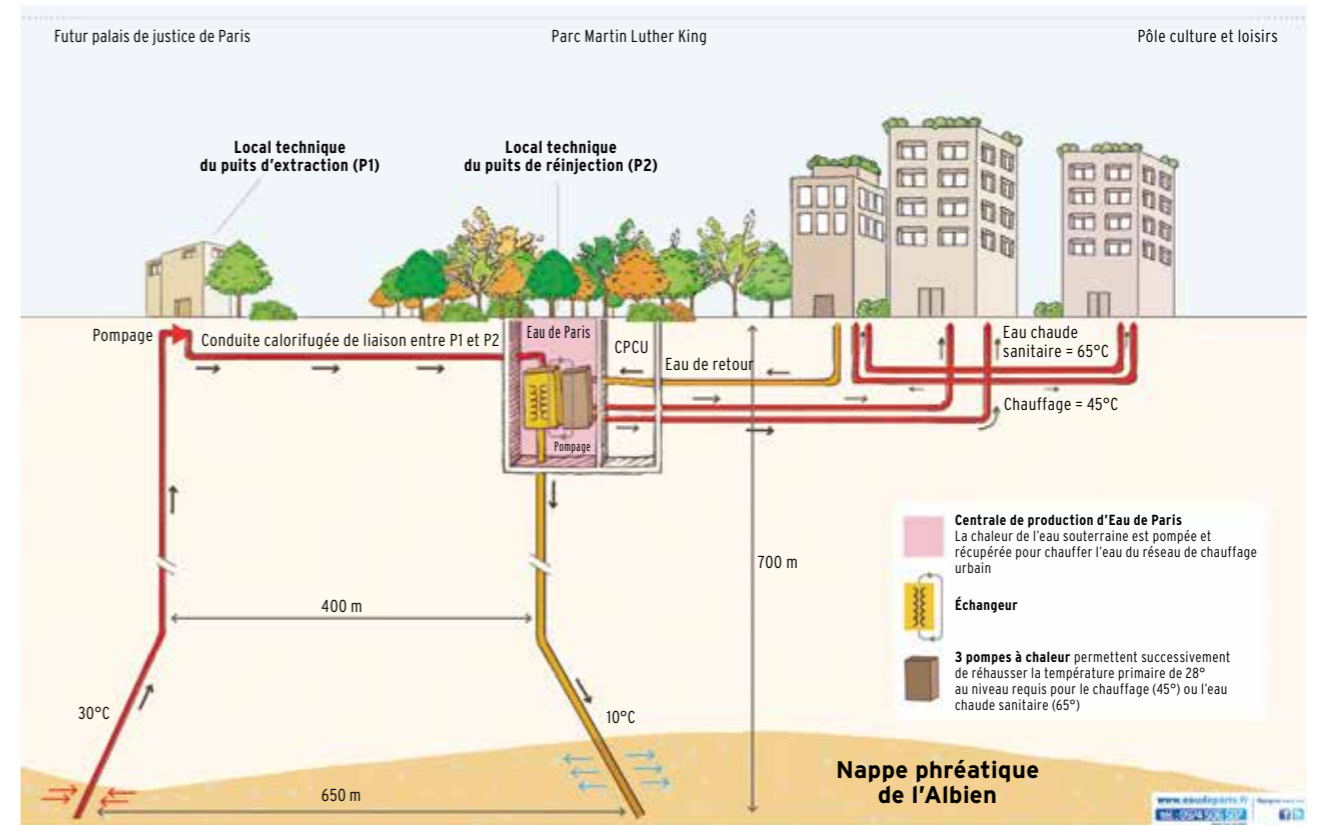
67% of energy consumption at primary residences is related to heating. (Source: Apur, 2007)

Some 80% of heating and domestic hot water requirements are today covered by energy sources (natural gas, electricity and fuel oil) whose production or use lead to high CO₂ emissions. (Source: Edf 2013)

All of the buildings in Clichy-Batignolles will be connected to a heating grid supplied with geothermal energy, i.e. a system using the natural heat from a warm groundwater table.

Geothermal energy enables heat production using at least 85% renewable energy (the Paris urban heating network remains a necessity in order to meet occasional needs in the neighbourhood).

Emissions of CO₂ are low, primarily generated by the electricity used in heat pumps. As a result, nearly 4,000 tons of CO₂ are saved every year compared to a heat network using natural gas. This is equivalent to the emissions generated by heating 3,000 apartments.



HOW GEOTHERMAL ENERGY WORKS

Water at 28°C is drawn from the 650-metre-deep Albien water table by *Eau de Paris*. Channelled to plate heat exchangers, the water transfers its heat, through a pump system, to an urban grid operated by *Compagnie Parisienne de Chauffage Urbain - CPCU* which distributes the heat to the various buildings, then to the heating and domestic hot water pipes, which reach temperatures of 45°C and 65°C respectively. The water is then sent back to the table 650 metres underground at a temperature of 10°C to be reheated.

Splitting this system into three distinct networks and its loop operation help to protect the table water from any pollution and to capitalise on an unending source of renewable energy.

ENERGY

Solar energy

A neighbourhood that produces electricity



© Philippe Guignard - Air Images

Aerial view of the photovoltaic panels on rooftops



© Sergio Grazia

REFERENCES

Annual average household electricity consumption (not including heating, domestic hot water and cooking) is around 2,700 kWh. (Source: ADEME)

This consumption is covered by the energy produced using approximately 25 sq. m. of rooftop photovoltaic panels (1 sq. m. generates around 112 kWh).

* Household electricity consumption (from home appliances, computers, etc.) has not been taken into account due to the great variations between the appliances used in individual households and to the fact it is impossible to obtain strict commitments as regards their levels of consumption.

Photovoltaic panels are installed everywhere they can efficiently produce electricity, for example on rooftops with the best exposures as well as on some facades.

The photovoltaic cells used in the panels capture sunlight and transform it into electrical current.

Some 35,000 sq. m. of panels will be installed at Clichy-Batignolles in the coming years and will produce nearly 3,500 MWh per year. The electrical current produced, purchased by EDF, is fed back into the overall electricity grid.

Photovoltaic panels produce the equivalent of approximately 40% of the electricity consumed in the buildings of Clichy-Batignolles, used mainly for lighting.*

1 Photovoltaic panels incorporated in the architecture

PLOT E2 Périphériques

The roof of the "Quintessence" apartment building is equipped with an electrical unit of over 600 sq. m. that produces enough energy for approximately 25 households. The slope at the top of the building helps to incorporate the photovoltaic cells into the roof with an exposure that is at once highly efficient and aesthetically pleasing.

Façade panels

PLOT 05 Viguié and Associés + Agence Search

To reach yearly photovoltaic production of 248,000 kWh, two systems will be used: standard panels to be located on the four roofs of the buildings, as well as 388 monocrystalline silicon high yield (over 18%) photovoltaic shutter systems installed on facades whose southern exposure and approximately 30° slope guarantee maximum electricity production.

Courthouse

The photovoltaic panels blend in with the courthouse's architecture like a backbone. They cover the elevator shaft from top to bottom of the building, frame the green terraces and the interior courtyards, and are interspersed throughout the façade without blocking any windows or doors. The system will produce 75,000 kWh per year.

BIODIVERSITY, WATER AND THE CLIMATE

Biodiversity

Greenery at the heart of the project

REFERENCES

Cities are home to a high level of biodiversity: there are 2,000 plant species and as many animal species in Paris. (Source: Paris City Hall)

Ecological diversity provides essential services to improve the quality of life of city dwellers: fertile soil, reduced air pollution, consistent water quality and more.

In 2011, the City of Paris passed its "Biodiversity Plan" which includes, in particular, the development of a green and blue networks and environmentally-sustainable management of green spaces and waterways.

The park and natural areas in the eco-district help to extend the green network in northwest Paris, which plays a vital role in maintaining the region's biodiversity.

Alongside the 10-hectare park are more than 6,500 sq. m. of private green space in the heart of the blocks and 16,000 sq. m. of green roofs, helping to gradually increase the quantity of flora in the area.

The green spaces have been designed to bring together a wide diversity of environments, providing the conditions required for many species, e.g. tall trees, shrubs, grasses, brambles, rocky areas, basins and wet ditches. In all, nearly 500 plant species can be found in Martin Luther King Park.

The flora has been chosen for its ecological benefits: birds are particularly fond of the berries of the amelanchier; tilia trees – whose dead leaves make for better compost – have been chosen over plane trees, and the selected grasses require little watering.

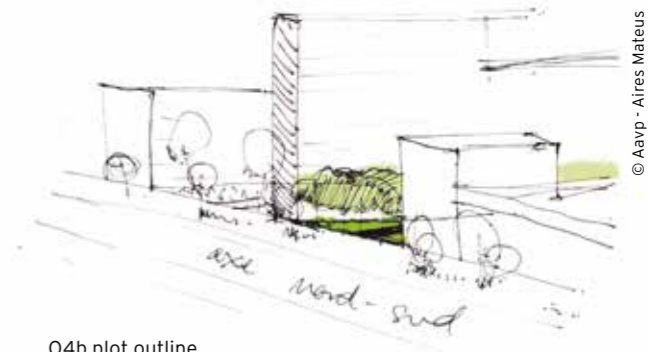
The park is managed using a sustainable, highly differentiated approach tailored to each specific type of vegetation. In 2015, it was awarded the Ecojardin label, the gold standard in the eco-friendly management of green spaces.



1



© Aavp - Aires Mateus



© Aavp - Aires Mateus

O4b plot outline

1 Biotope pond

The park is home to a landscaped biotope pond, rare in Parisian parks, suitable for the reproduction of many plant and animal species. Water plants, ducks, moorhens, dragonflies and frogs thus form a rich ecosystem at the heart of the neighbourhood.

Differentiated management of each environment

A guide listing each species enables park gardeners to adapt their management to the specific needs of the area's flora and fauna. The amount and frequency of watering, pruning and maintenance are specific to each milieu: constant and intense in flowerbeds, this care is rarer and more flexible on the edges of wet ditches where insects and amphibians hide out.

2 A large garden in the heart of the blocks

PLOT O4B Aavp+Aires Mateus
This apartment building is home to a 500 sq. m. garden with in-ground beds. Its three strata – trees, bushes and grasses – lend it a diverse range of milieus suitable for the development of flora and fauna.



© Querkraft Architekten - Sam Architecture

A view of the green rooftops and heart of the O6a block

BIODIVERSITY, WATER AND THE CLIMATE

Rainwater

Promoting the natural water cycle

REFERENCES

Impervious surfaces prevent rainwater from infiltrating into the soil.

- Water streams onto the roadways and becomes loaded with pollutants.
- Cleaning this wasted natural resource is costly.
- Overflow of combined sewer systems (that collect all wastewater and rainwater) due to heavy rain leads to pollution of water tables and waterways.

Impervious roadways make up only 12% of the eco-district's total surface area.

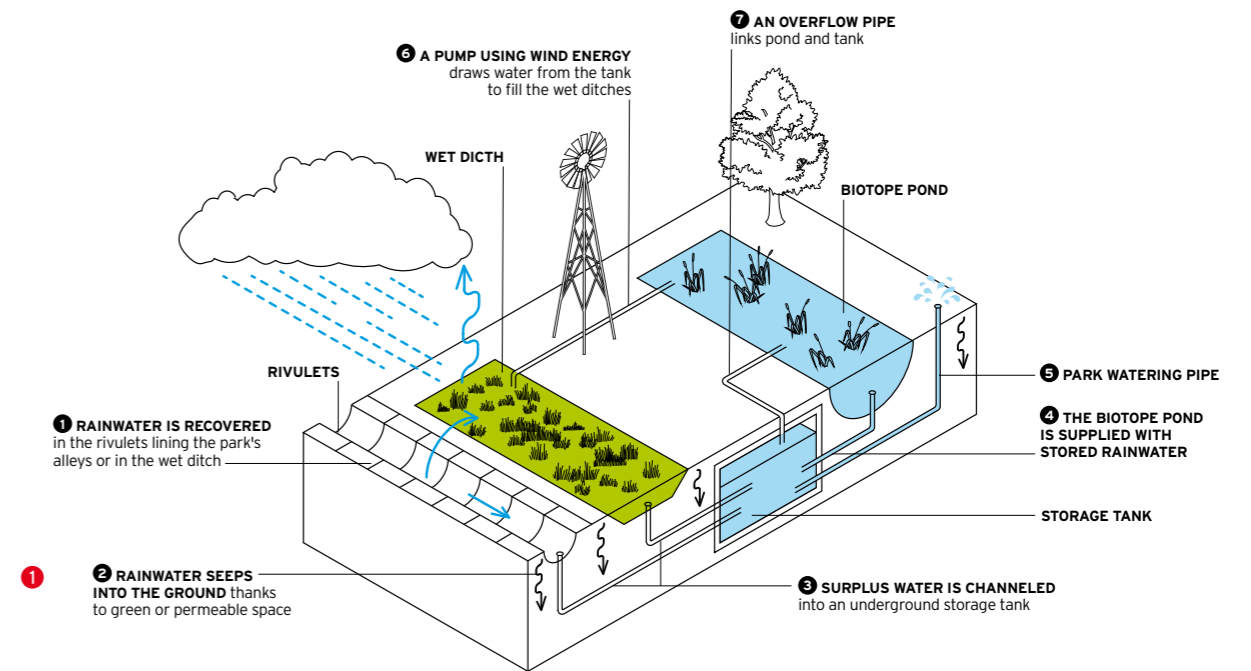
Thanks to the park and the many plant species in the green roofs and central gardens, the volume of rainwater that runs off into the sewer system is limited to 50% in public areas and to 70% on private plots.

In private areas, water is managed on a plot-by-plot basis. The runoff water collected is used to water green spaces or wash floors and restrooms, and only excess quantities drain into the sewer system.

Around 30% of the rooftop surface is covered with plants, thus helping to naturally manage rainwater and create a cooler microclimate through the release of water vapour into the atmosphere.

In the park, rainwater is collected and channelled to wetlands. Moreover, this rainwater covers 40% of the park's watering needs.

BIODIVERSITY, WATER AND THE CLIMATE



© Polymago



© Jean-Claude Forquet - Mairie de Paris

2



© L'autre image, Labtop et Lansac - RPBW

3

1 Recovery of rainwater to supply the biotope pond

The large surface area of permeable ground helps promote the natural infiltration of rainwater into the water table. Surplus water is recovered in an open wet ditch and then stored in an underground tank that supplies the biotope pond. The water-purifying plants found in this pond clean the water naturally. During dry periods, a pump using wind energy draws water from the tank to fill the wet ditches.

3 Terrace gardens

The new Paris courthouse will feature 10,000 sq. m. of planted surfaces on the terrace, which will retain most of the rainwater that falls.

**BIODIVERSITY, WATER
AND THE CLIMATE**

Adapting to climate change

Preventing urban heat islands

REFERENCES

Large cities store more heat and **cool more slowly** than rural areas

The climate is on average 2.5°C warmer in Paris than in rural areas in the surrounding Ile-de-France region, a temperature difference that can rise to 8.5°C during heat waves.

Anticipating the increasing frequency of heat waves, the eco-district has been designed to prevent urban heat islands (localised high air and surface temperatures). The park acts as a veritable **urban “air conditioner”** thanks to the shade of the trees and to the natural phenomenon of **evapotranspiration** generated by the greenery. The plants and trees collect rainwater, sprinkler water and underground water and transform it into water vapour that cools the ambient air. This phenomenon is accentuated thanks to the **large quantities of water in the park**, and to the widespread vegetation in the centre of the blocks of buildings, on green roofs and on building walls and façades.



1

© Sergio Grazia



2

© TVK - Tolila Gilliland



3

© Sergio Grazia

1 Water in diverse forms
The water sprays and fountains promote evaporation. The four ponds and the wet ditches store much less heat than inorganic surfaces, which helps night-time cooling. The canal bordered by greenery, some 300 metres in length, acts as a cooling circuit in the centre of the park.

2 Cool blocks within the buildings
PLOT 08 TVK + Tolila Gilliland
This multi-development building brings together over 3,200 sq. m. of planted surfaces in the ground, on slabs and on rooftops. Gardens, tall trees, meadows and hedges thus help to reach an excellent temperature regulation coefficient (i.e. the capacity not to “trap in heat”) for such a dense block.

3 Green wall
PLOT E4 Philéas K Architecte
Bernard Buffet Elementary School and the Martin Luther King Student Dormitory share a 520 sq. m. green wall whose plants cool the ambient air.

SETTING

Martin Luther King Park

A meeting place and link between neighbourhoods



© Sergio Grazia



© Sergio Grazia



© Sergio Grazia



© Sergio Grazia

REFERENCES

The 17th district is one of the capital's densest areas, with 287 inhabitants per hectare compared to an average of 210 per hectare in the rest of Paris.

When the project was launched, the 17th district had only 1 sq. m. of green space open to the public per inhabitant compared to 2,3 sq. m. (not including woods) on average in Paris. (Source: Apur, 2004)

With its 10 hectares, Martin Luther King Park is larger than Monceau Park but smaller than André Citroën Park.

Located at the heart of the eco-district, Martin Luther King Park is open and can be easily crossed. It has become a meeting place for the people living in the surrounding areas, Batignolles, Épinettes, Monceau Pereire, Clichy-la-Garenne and Hauts-de-Malesherbes. Its walkways, which are extensions of the existing streets, and its 14 access points provide easy, direct connections to Rue Cardinet, Avenue de Clichy and Boulevard Berthier. Its size makes it one of the capital's largest parks. Martin Luther King Park is the expression of a modern conception of nature in the city. Here, nature is not at all distant, but ever closer to dwellings. It is not domesticated, but free and diverse, gently landscaped without being ornamental. Another modern feature is the many facilities that encourage people of all ages to take part in sports and recreational activities.

DETAILS ON ACTIVITIES

When completed, the park will have:

Recreational and sports facilities, including a fitness trail, nine playgrounds for children, a skate park, basketball courts, handball courts, football pitches and pétanque grounds.

7,000 sq. m. of lawns for outdoor sports and paths bordered with amelanchiers or magnolias to delineate areas for walking or jogging.

Quiet areas with benches, ideal for relaxing and enjoying the quiet of nature.

SETTING

Use of space

Optimised use of a scarce resource

REFERENCES

550,000 sq. m. of floor area on a 54-hectare site, including 10 hectares dedicated to the park.

Eco-district development

3,400 housing units
140,000 sq. m. of office space
120,000 sq. m. for the courthouse
31,000 sq. m. of shops, culture and recreational facilities
38 000 sq. m. of public facilities

The eco-district brings together a highly diverse range of urban functions, including housing, offices, administrative facilities, local facilities, public transport, shops and recreational facilities. In addition, other activities that in the past were relegated to the outskirts have been maintained in the denser part of the city. These include major urban services (waste collection and sorting, bus and coach parking), industrial activities (production of concrete) and logistics (railway maintenance and freight). These activities are concentrated in areas where they will not be a nuisance.

The urban development plan places these functions in a very compact space, as it makes new use of a site primarily devoted to logistics, bordered with major transportation (railway and roadway) infrastructures. In order to save space, the blocks constructed were each designed to house several types of functions. In particular, shops, schools and recreational facilities have been placed on the ground floor of the apartment and office buildings. A dense, multi-functional city is being organised in a compact area around the park's vast open public space. Public services have been set up as closely as possible to their users, inhabitants and working people.

The built-up area, which has a number of openings and interconnections, lightens this density. In particular, city regulations (the Local Urban Development Plan) authorise Paris' 37-metre height limitation to be exceeded here in order to create an urban silhouette rising as high as 50 metres, thus freeing up ground space and offering distant views. Another way to save space involves pooling it within real estate developments, either through the 7,500 sq. m. of rooftop terraces accessible to inhabitants or through common areas, shared studios, laundry rooms, concierge facilities and more, which together account for a surface of 1,000 sq. m.

SETTING



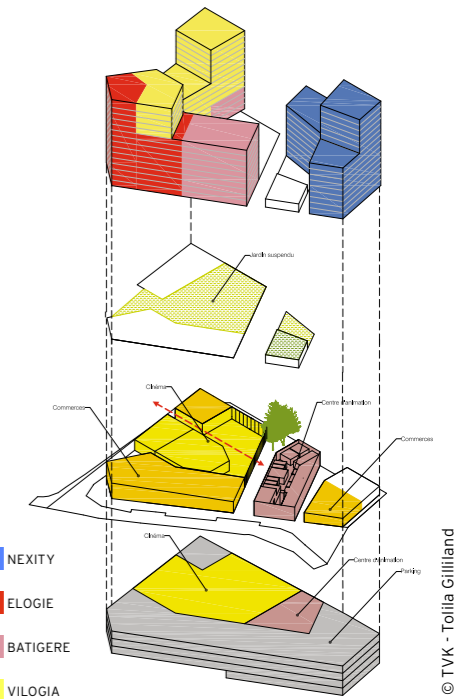
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© TVK - Tollia Gilliland



© TVK - Tollia Gilliland

1 Creating space through height

PLOT 06B *Fresh and Itar architectures*

This building's small physical footprint helps to clear out perspectives and create comfortable distances from neighbouring constructions. In total, 10 buildings will reach 50 metres in height.

2 The Batignolles platform

Some 550 metres long and 55 to 70 metres wide, rising 10 metres above the Saint-Lazare rail yard, the platform covers the reorganised railway maintenance facility and constitutes the foundation for the new neighbourhood.

3 Multifunctional block

PLOT 08 *TVK and Tollia-Gilliland*

This project proposes a complex intertwining of forms and functions within a macro plot of over 24,000 sq. m. Three buildings with housing at market prices, social housing and capped-rent housing are to be located on foundations that bring together a cinema and community centre. Careful design of the spaces, an interior alleyway linking the two facilities and optimum use of the foundation's surface make the block harmonious and easy to access.

Shared gardens and premises

The project creates a number of shared premises that contribute to the quality of the social life and make the best possible use of the available space. Examples include a large, 2,300 sq. m. terrace with a garden shared between two buildings, three small herb gardens on different floors of a commercial real estate development, a studio that doubles as a guest bedroom, concierge services, a utility room, a rooftop greenhouse accessible to children from neighbouring schools and more.

In the park, two spaces of 320 and 170 sq. m., managed by non-profit associations and open to everyone, allow gardening enthusiasts to grow vegetables and flowers.

SETTING

Social diversity

Highly segmented housing

REFERENCES

French law requires Paris-area towns with over 1,500 inhabitants to offer at least 25% social housing in 2025.

The Paris 2011-2016 Local Housing Program (PLH) requires at least 30% social housing units in private buildings of over 800 sq. m., and 50% in public urban developments.

Capped-rents, currently limited to €18.40 per sq. m., are approximately 20% lower than rents on the Paris real estate market.

Clichy-Batignolles will offer 50% social housing units out of an overall total of 3,400.

The range is broken down as follows:

- 50% social housing units (varying levels of income)
- 20% capped rent housing units
- 30% housing units at market prices

The public housing is tailored to the specific needs of various populations, e.g. families, students, young working people, dependent seniors and the disabled. The eco-district offers 500 units for university students and young working people, 200 rooms for dependent seniors, as well as a nursing home with medical care, a social residence and a housing and social reintegration centre.

Priority is placed on ample-sized apartments. At least 60% of the apartments in rent-control programs have two or more bedrooms, and at least half of these have three or more bedrooms. For public housing rentals, 70% of the apartments have two or more bedrooms, and 35% of these have three or more bedrooms. For the regular housing market, 50% of the apartments on offer have two or more bedrooms.

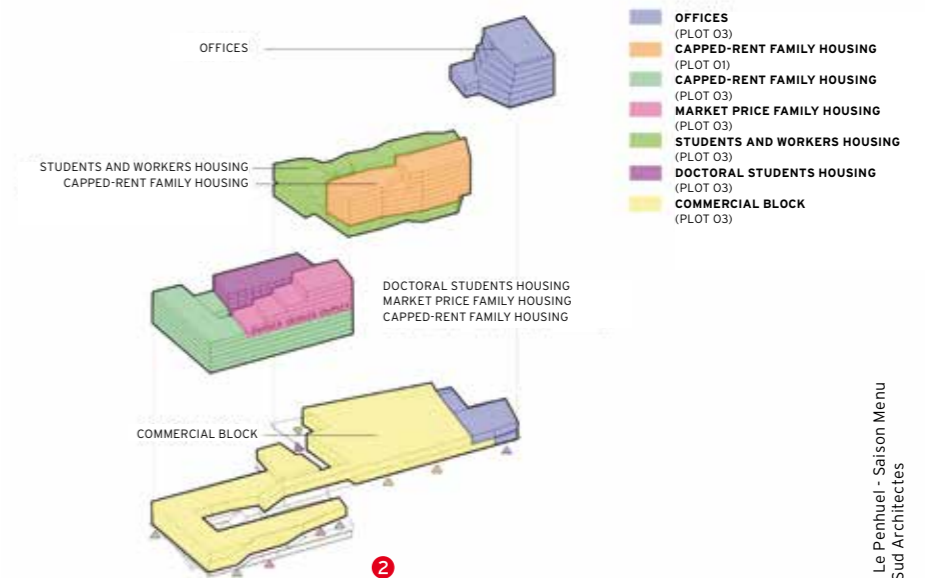
These various types of housing are spread throughout the entire eco-district without any distinction regarding location or quality (in most cases, the public housing is incorporated in the mixed-use blocks of buildings).

In addition to housing, the eco-district offers meeting places as well as a 1,000 sq. m. community centre.



© Sergio Grazia

1



1 A large mixed-use block
PLOT E10a, E10b Architectes MAAST, TOA and AASB

This 18,000 sq. m. building includes 86 housing units for sale, 46 public housing units and 128 beds for dependent seniors as well as a 2,000 sq. m. place of worship and 2,000 sq. m. of shops for a diverse, pleasant atmosphere.

2 Vertical diversity

In multifunctional block O8, the diversity of the housing units is organised by level within the three buildings.

© Le Penhuel - Saison Menu - Sud Architectes

MOBILITY AND TRANSPORT

Mobility

Five major public transport lines and walking made easy

REFERENCES

Regular use of "active" means of transport (walking, bicycling, etc.) on trips of 15 to 30 minutes reduces the risk of coronary disease by 30%. (Source: Insee 2008)

In Paris, "active" means of mobility and public transport, which already account for 55% and 33% of trips respectively, will be increasingly promoted in order to absorb the forecast rise in mobility requirements, expected to grow by 7% between now and the year 2020. (Source: PDUIF)

The eco-district will count 7,500 inhabitants, 12,700 working people and 9,000 users per day for the courthouse alone.

The eco-district will feature a wide range of easily accessible public transport. In particular, the arrival of metro line M14 will help to ease congestion on line M13 and to link the neighbourhood with major hubs in the centre of the capital. As a result, Saint-Lazare station, Châtelet-les-Halles and Gare de Lyon station will be less than 20 minutes away.

In the longer term, there will be three metro stations (M13 and M14), an RER Line C commuter train station, a T3 tramway station, nine bus lines and a Transilien train station (line L).

"Active" means of mobility will be promoted.

- Martin Luther King Park is a pleasure to cross on foot, thus shortening the distances between surrounding neighbourhoods and public transport stations.
- The new roadway areas, in particular the main north-south thoroughfare, have been designed as shared spaces.
- Improvements to major roadways (Avenue de la Porte de Clichy and Boulevard Berthier) include the creation of cycle lanes, wider sidewalks and more.
- Five new Velib public access bike rental stations will be created, for a total of 15 stations in the neighbourhood. In the buildings, 2.25% of the total floor surface will be reserved for bicycle parking and storage.

Meanwhile, use of individual cars is discouraged.

- Parking is limited, using the minimum levels of the Local Urban Development Plan as a guideline: one parking space for 100 sq. m. of housing, 0.33 spaces for 100 sq. m. of office floor area and 0.28 spaces for 100 sq. m. of shop floor area. Ground-level parking is reserved for deliveries and short stops. An Autolib car-share station will be created.



© Tobias Rehberger - Dab, Emerige



© Anyoji Beltrando - Mylucky Pixel



© Jean-Claude Bardot - Le Bar Floréal

1 New metro stations will be showcased through the way they are incorporated amidst the buildings. In particular, a work by visual artist Tobias Rehberger will indicate the entrance to the Pont-Cardinet M14 station, on the ground floor of a building constructed by real estate developer Emerige.

The north-south thoroughfare will be more like a single platform shared by pedestrians, cycles, buses and automobiles, without dedicated lanes. With speeds limited to 20 or 30 km/h, vegetation lining the paths and wide sidewalks will enable sustainable means of transport to safely travel through the area.

2 On the renovated part of Porte de Clichy, a wide sidewalk will feature terraces and cycle lanes. The passage underneath the ring road, up to Place des Nations-Unies in Clichy, will be easier to use thanks to a large pedestrian area and carefully designed lighting.

3 Pedestrian alley in Martin Luther King Park

MOBILITY AND TRANSPORT

Logistics

Actively reducing truck traffic in Paris

REFERENCES

Every year, a typical Paris-area inhabitant generates nearly 470 kg of waste that is collected and transported primarily by road. (Source: Ademe)

Every day, 100,000 vehicles make deliveries in Paris. (Source: Apur)

In Paris, truck and light utility vehicle traffic accounts for 40% of nitrogen oxide emissions into the air. (Source: Apur)

The modal share of railway freight is 10% in France compared to 23% in Germany. (Source: Ademe)

Invisible, silent and clean waste collection

All household waste (with the exception of glass and bulky items) is automatically collected using an underground pneumatic network, a first in Paris. This pneumatic collection system, managed by Veolia Propreté and ENVAC, helps to avoid placing refuse containers in public areas and eliminates trash collection vehicles. Traffic is lighter, with a positive impact on noise, air quality and greenhouse gas emissions.

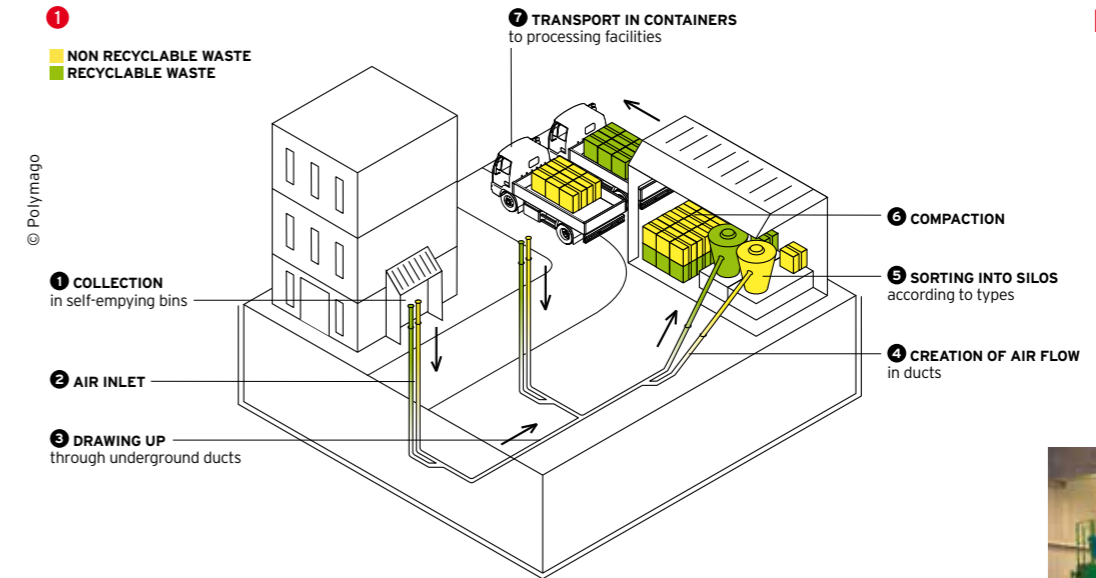
All residential buildings and public facilities are connected to this network. The vacuumed waste is channelled to a collection station located in the neighbourhood (on Boulevard Douaumont). Recyclable waste goes to a neighbouring sorting centre and other waste is compacted and taken to the Saint-Ouen incineration facility. Only three or four trucks are needed every week to remove the waste, a saving of 1,872 km in transport every year.

Production and logistics activities maintained in Paris

By taking over the railway site to create a new neighbourhood, the City of Paris made a point of maintaining or re-creating the large-scale services required for a major city: waste processing, bus and coach parking, production of concrete and freight have all found their place in the north sector of the site, directly adjacent to the railway line and ring road that provide access to the facilities, with operating conditions and insulated locations that make them compatible with the neighbouring area.

The recyclable waste sorting facility, a project headed by the Metropolitan Waste Agency (AMD) and scheduled for delivery in 2019, illustrates the strong local policy: the plant will process the waste collected in neighbouring districts and towns. The railway will be used to transport bales of recyclable paper to specialised companies.

MOBILITY AND TRANSPORT



The freight centre is devoted to local urban logistics. Joined with the railway network, this facility managed by CIEH will receive freight, mainly foodstuffs, transported by refrigerated cars (11 per day). So-called 'last kilometre' deliveries to various neighbourhoods in the capital will be handled by a fleet of electric vehicles.

The concrete plant, operated by Lafarge-Holcim, will supply construction sites in Clichy-Batignolles and the rest of the capital with fresh concrete. A rail link will enable direct transport of aggregates from the quarry via high-volume shipments that will avoid the use of 10,000 trucks a year.

The "Petite Ceinture" railway line, which continues to service the site, will enable the few trains that supply the concrete plant to carry out manoeuvres and maintain an inter-network link between the Saint-Lazare rail yard and those of the Gare de l'Est and Gare du Nord stations.

IN PRACTICE

- 1 Pneumatic waste collection explained
- 2 Waste sorting centre
- 3 Pneumatic waste collection's terminal

Pneumatic waste collection

The buildings in the eco-district are equipped with shared self-emptying bins, replacing the former rolling waste bins, in which recyclable and non-recyclable waste are placed separately. Bins can also be found locally in public areas.

The waste is then vacuumed into underground ducts that channel it to a terminal located alongside the ring road. Here, it is placed in containers and rerouted to various processing and recycling facilities, including the neighbouring sorting centre.

**PROJECT
MANAGEMENT**

Carbon footprint

Carbon neutrality,
an ambitious core aim

REFERENCES

The City of Paris Climate Plan, updated in 2012, aims to **reduce greenhouse gas emissions** in the Paris area by 75% in 2050 compared to 2004 levels, and by 25% as of 2020.

The residential-tertiary sector accounts for 23.5% of greenhouse gas emissions in France.

The so-called **“Carbon Footprint”** quantifies the **greenhouse gas emissions inherent to a product or service over its entire life cycle** (design, manufacturing, use and destruction). Applied to the Clichy-Batignolles neighbourhood, this tool is used in a simplified manner and concerns only the operation phase, not including transport.

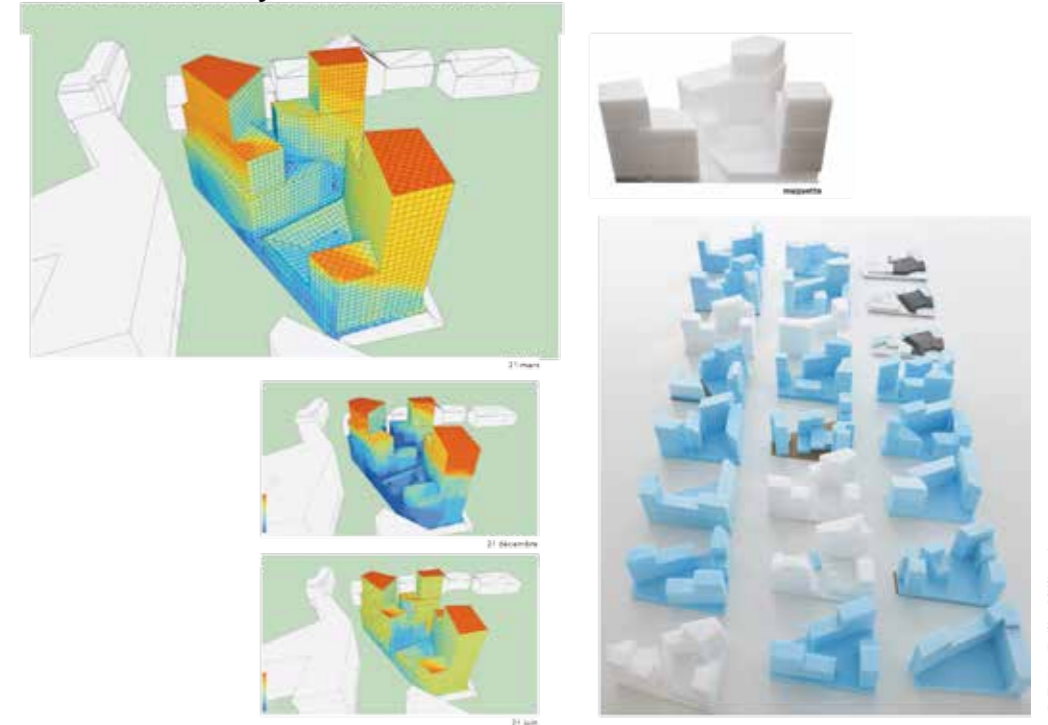
The City of Paris aims to make the eco-district’s buildings and public spaces carbon neutral. The carbon footprint has been used since 2009 as a design tool and resource for technical choices regarding the project.

The method involves:

- Setting reachable targets for energy needs (heating, hot water, lighting, various facilities, etc.), as well as for production of renewable energy sources (solar energy, geothermal energy, etc.), incorporating outside factors likely to have a future impact on consumption, such as the climate change scenarios published by the Intergovernmental Panel on Climate Change (IPCC).
- Modelling the way the district works based on these targets and adjusting the aims until a net zero carbon footprint is reached.
- Translating the aims into environmental requirements that must be met by developers and facility managers

The eco-district’s carbon footprint is currently being updated in order to incorporate recent changes in the project (geothermal energy) as well as the actual performances of the buildings already in operation.

Volumetric and sunlight studies



© TVK - Tolia Gilliland

CLARIFICATIONS

The evaluation takes in to account all emissions related to the operation of public spaces and buildings (public lighting and waste collection in particular), excluding the domestic consumption of electricity, since homes are not equipped in the same way and it is difficult to get individuals to make a commitment in terms of their consumption.

In the model, the emissions that are offset through the production of renewable energy (local geothermic and photovoltaic energy in particular) compensate for the emissions caused by consumption.

The greenhouse gas emissions associated with travel to and from the district (by residents or users)- or the trading of goods - has not been taken into consideration.

Emissions related to the development and construction of the district (production, delivery of goods, materials assembly etc.) and future emissions resulting from its deconstruction (the separation, disposal or recycling of these same materials) is not taken into consideration. Nevertheless, the specifications laid down in the local development plan stipulate that all of these buildings must achieve a controlled consumption target of this so-called ‘grey’ energy.

**PROJECT
MANAGEMENT**

Monitoring real estate programs

Ensuring the property developers' compliance with environmental requirements



© Eric Facon - Le Bar Floréal

Workshop's steering committee



A workshop meeting



© Eric Facon - Le Bar Floréal

© Eric Facon - Le Bar Floréal

REFERENCES

Developers and social landlords purchase serviced land from the planning authority along with the construction rights for a pre-determined project in compliance with architectural, landscaping, environmental and sustainable development guidelines.

The contracting authority for the courthouse signed a charter of commitment to comparable requirements.

* "Grey energy" refers to all of the energy consumed during a material's life cycle.

Creation of the eco-district has mobilised more than 20 different property developers to complete the 27 constructed plots. Bringing them on board to share the eco-district's ambitions has required specific project management tools that aim to ensure the environmental requirements are indeed met in the buildings.

- Compliance with the environmental and sustainable development specifications is a binding obligation for those who purchase serviced plots in the eco-district.
- A financial guarantee equal to 4% of the sale price is placed in escrow and returned only when compliance with the specifications has been verified (this does not apply to social landlords).

These tools also aim to assist contracting authorities in designing and carrying out their project, to promote quality and to inspire innovation.

- The specifications are thus enriched with data and methodological tools regarding the most innovative aspects: grey energy* and performances of each material, incorporation of photovoltaic panels in the architecture, dynamic thermal simulation tool, etc.
- Specialised engineering and design firms are commissioned to assist contracting authorities in designing projects so that they meet environmental requirements. The projects are monitored continuously, the performances of the buildings are assessed during the "worksite" and "delivery + 1 year" phases using indicators.

Dynamic thermal simulation is a modelling tool that incorporates contextual factors (climate, etc.) with technical design and architectural hypotheses.

It summarises the thermal balance of the project, highlighting "free" energy inputs (related to the sun, occupants and their household appliances such as computers, etc.), losses (renewal of air, infiltration, etc.) and heating needs. Thermal comfort is also taken into account. The design can thus be adjusted based on the results and desired aims.

Standard values for the choice of materials.

Architectural and landscaping choices, namely for façades and roofs, are assessed based on thermal regulation (preventing urban heat islands), biodiversity and feeding the water table with rainwater (minimizing runoff to sewer system). Using a system of coefficients for each type of material and surface covering makes it possible to check whether or not the targets are met.

The Batignolles Workshop

In the west sector of the project, the 11 plots to be built, accounting for 185,000 sq. m. in floor area, were discussed at length by designers. This process was absolutely essential in this sector which is particularly compact, extremely dense and features a diverse mix of buildings. The development was split into two phases of approximately 90,000 sq. m. each. The relative volume ratios, sharing of sunlight, views, lighting and a host of other topics were covered by all of the designers seated around the same table. The Batignolles Workshop enabled the property developers and architects involved in each phase to work together for around six months alongside the planning authority, the eco-district's town planning and landscape team and several key departments from the City of Paris.

**PROJECT
MANAGEMENT**

Sharing the project

Future inhabitants and users:
part of the project since day one

ESSENTIALS

By the end of 2015,
2,500 inhabitants will
already be living in
Clichy-Batignolles.

One important factor for the success of the project is the way that future inhabitants and users (employees and visitors) “take ownership” of the neighbourhood.

The choice to focus the initial work on creating the first part of Martin Luther King Park (4.5 hectares) as early as 2007 enabled the population to discover and use the site before construction work had even begun.

An ambitious consultation process involving over 3,000 community members of all ages since 2008 and innovative forms of participation – neighbourhood workshops to assess the various project strategies, architectural groups enabling the local population to help choose the winning projects, design workshops where everyone could take part, and more – has also helped area residents and users to claim the project as their own. Information regarding the project has been made available to the public through various media (documents on specific topics, newsletters, an Internet site, an information centre and more).

Through the Project Information Centre (*Maison du Projet*) and organisation of events on a regular basis, the local population is encouraged to get out and see the site first-hand. Events include worksite visits, strolls through the district’s streets and, above all, the Open House Days. Held in the park every summer since 2008, this event helps show how the project is moving forward and to visit the worksite in a festive setting. The 2014 edition played host to over 10,000 visitors.

As the project moves towards full completion, communication is increasingly focused on the inhabitants of the new district with an emphasis on practical matters, e.g. information on public facilities and shops, explanation of energy saving measures, biodiversity and the sharing of space.

The Project Information Centre hosts local non-profit associations active in sustainable development. The first initiatives supported are the Batignolles AMAP* and the Positive Energy Families of the 17th district.

* An AMAP is an Association to Protect Traditional Agriculture. AMAPs put individual farmers in touch with local consumers who make a commitment to purchasing the farmer’s produce.



© Polymago



© Eric Facon - Le Bar Floréal

Annual event in Martin Luther King Park (since 2009)



© PBA

« Rendez vous with the City », an event organised with Pavillon de l’Arsenal (2014)

EcoQuartier Label



CLICHY-BATIGNOLLES AWARDED ECOQUARTIER LABEL BY FRENCH MINISTRY OF HOUSING AND SUSTAINABLE HABITAT

The EcoQuartier labelling process launched in 2012 by the French Ministry of Housing and Sustainable Habitat enables official evaluation of sustainable projects. It aims to highlight outstanding projects and clarify the conditions of success for Eco-Districts.

The Clichy-Batignolles project, the Eastern sector of which has now been completed (with nearly 3,400 residents already settled in and 1,500 housing units delivered) is one of twelve operations awarded the "EcoQuartier - Stage 3" label in 2016.

Composed of 4 stages, the labelling process distinguishes the various phases of a project, i.e. design, construction, life in the completed neighbourhood and continuous improvement with and for its inhabitants and users.

Labels for stages 2 (construction work) and 3 (neighbourhood completion) are awarded by a national EcoQuartier commission following presentations of conclusions by experts.

For more information, visit: www.logement.gouv.fr/dossier-de-presse-label-ecoquartier-2016-4-ambitions-pour-un-nouvel-elan

ERDF "URBAN INNOVATIVE ACTIONS" FUND

PARTNERS

BENEFICIARY PARTNERS

- City of Paris
- Paris Batignolles Aménagement
- Une Autre Ville, an SME specialising in sustainable urban development
- Embix, an engineering firm specialising in energy and smart grids
- Armines, a research laboratory working in cooperation with the MINES Paris Tech engineering school and the Écoles des Mines engineering school network

AFFILIATED PARTNERS

- **Real estate developers:** Bouygues Immobilier, BPD Marignan, Emerige, Kaufman & Broad, Nexity, OGIC, SEFRI CIME and Linkcity
- **Public housing providers:** Paris Habitat et I3F
- Autolib, Agence Parisienne du Climat, ENEDIS, RTE, CPCU and Eau de Paris

PARTNERS PROVIDING PROJECT SUPPORT

- Non-profits and the Council of the 17th district of Paris
- Professional networks and European/worldwide city networks

Schedule and funding

- Launch in early 2017 for 3 years
- Overall budget: €5.4 million
- Funding from Europe (80%): €4.3 million

THE CLICHY-BATIGNOLLES SMART GRID PROJECT SELECTED IN A EUROPEAN UNION CALL FOR INNOVATIVE URBAN PROJECTS

The City of Paris, in partnership with Paris Batignolles Aménagement, EMBIX, Une Autre Ville and Armines/ParisTech, was a winner in the European "Urban Innovative Actions" call for projects launched by ERDF. As a result, the CoResponsibility in District Energy Efficiency & Sustainability (CoRDEES) smart grid project will receive €4.3 million in co-funding from the European Union.

This initial large-scale smart grid (intelligent energy network) project in Paris will be deployed in the western sector of the Clichy-Batignolles development project, where construction is already underway.

A neighbourhood platform will enable real-time management of data on energy production and consumption. It will be made available to local users (owners, occupants, property managers, utilities operators, local authorities, property developers and others.).

It involves testing a new form of governance based on co-responsibility in energy management by all stakeholders.

This programme is financed by the European Regional Development Fund (ERDF). It aims to identify and test new solutions addressing questions related to sustainable urban development that can be implemented across the EU. Its goal is to provide urban authorities with a forum for dialogue and resources to experiment with bold, previously untried ideas and build prototypes that can be tested in the field.

For more information, visit: www.uia-initiative.eu/en

ADEME, "Adaptation to climate change & regional development"



CLICHY-BATIGNOLLES WINS ADEME'S "ADAPTATION TO CLIMATE CHANGE & REGIONAL DEVELOPMENT" AWARD

The City of Paris was honoured by ADEME for the Clichy-Batignolles eco-district at the 18th European Energy Transition Conference held in Bordeaux on 25 January 2017.

Designed to meet the challenges created by local climate change (heat, heavy rain and drought), with a focus on high quality of life while making the neighbourhood more appealing, less isolated and more resilient, Clichy-Batignolles also aims to address a variety of other issues:

- to protect the people of Paris during extreme weather conditions (cool spaces during heat waves, with a park open 24/7)
- to anticipate the increasing scarcity of natural resources (rainwater recovery for the watering of vegetation, large-scale use of renewable energy sources and local food production)
- to develop the city sustainably (large-scale planting of vegetation for more comfortable temperatures, alternative rainwater management and more) and to promote new lifestyles and solidarity (shared gardens and more).

For more information, visit: <http://presse.ademe.fr/2017/01/assiseste-3-territoires-laureats-aux-trophees-de-ladaptation-au-changement-climatique-et-territoires.html>

Construction 21 Network, Sustainable City Grand Prize

WATCH THE VIDEO



The Clichy-Batignolles eco-district in 3 minutes

CLICHY-BATIGNOLLES WINS SUSTAINABLE CITY GRAND PRIZE IN THE INTERNATIONAL GREEN BUILDING & CITY SOLUTIONS AWARDS

At the COP22 Climate Change Conference held in Marrakech in November 2016, the Construction21 network awarded the Clichy-Batignolles development project with the Sustainable City Grand Prize.

Since 2013, this international competition has aimed to promote and disseminate good practices and concrete solutions that are helping to limit global warming. It is also part of the Global Alliance for Buildings and Construction for the Climate. Some 57 experts came together to form the national and international juries and select the winners amongst the 130 competing projects (104 buildings and 25 eco-districts).

CONSTRUCTION 21

Construction 21 is a social media initiative in the construction sector that disseminates information on good building practices and sustainable development, free of charge. This medium's power to spread information helped to showcase innovations to more than a million professionals, in France and worldwide, in 2016.

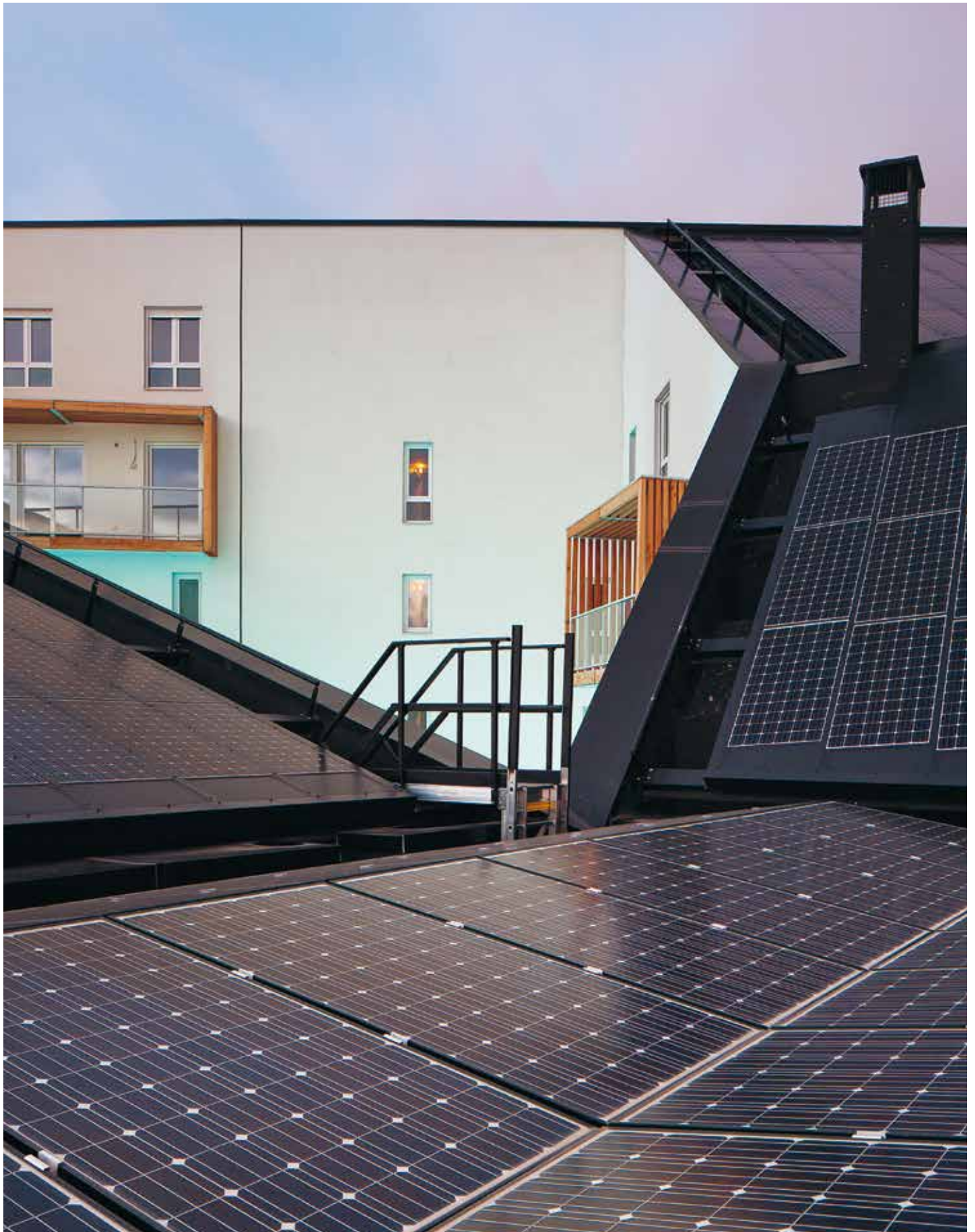
For more information, visit: www.construction21.org/city/fr/clichy-batignolles-ecodistrict-paris.html



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