

Embarking the Whole Territory on the Path of Sustainability

On the occasion of the 10th European Urban and Regional Planning Award on Sustainable Energy, the Canton of Geneva presents an innovative approach to the move to sustainable energies. The area of energetic planning is being extended to the ecoterritory, generating an unprecedented cooperation between energy and urban planning. Several ongoing projects illustrate the main features of this process.

This new approach was born in the specific context of the Canton of Geneva, whose economic attractiveness has generated for the past decades a demographic and urban growth on the outskirts of the city. The objective of the Canton is to build 50,000 new dwellings by 2030, in order to restore a balanced urban development and to fight against housing shortage.

Territory planning must integrate the energy dimension

In response to the challenges of global warming and the depletion of fossil energies, the city must undergo a reorganisation process. Energy, which so far was essentially

a technical and economic issue, has now become a global social issue. There is a need for energy transition, involving the responsibility or the obligation for all public and private entities to rethink their way of producing and consuming energy. Territory planning must now integrate the energy dimension.

Adapting the city requires a strong coordination between urban planners and energy experts. In the next chapters, we will describe the tools that were designed to face this challenge, as well as the first projects that include this energy and urban planning process.

ENERGY IS BECOMING A SOCIETAL ISSUE

In Geneva, this commitment to tackle the issue has resulted in the adoption of a cantonal act, which came into effect in 1987 and was revised in 2010, raising the energy issue to the rank of public policy. Far from being trivial, this step effectively brings energy and town planning together, as it requires that energetic issues be integrated into spatial planning projects. Since December 2013, moreover, the town planning, house-building and energy units have been grouped under the same political direction, namely the Town Planning, Housing and Energy Department (DALE).

ENERGY AND SPATIAL PLANNING: AN ASSERTED INTERDEPENDENCE

Energy and the form in which it is available have always significantly contributed to shaping cities. By enabling everybody to travel by car at low cost, oil has led to the emergence of cities built on individual mobility, thus encouraging urban sprawl and structuring the city around its major roads. Available and storable everywhere, fuel oil has for its part spread the model of individual boilers in each accommodation unit, thus contributing to urban sprawl.

Completing energy transition means giving up very dense, cheap, largely available fossil energies, easy to ship and store, for lower-density renewable energies, often intermittent, hard to store and technically more complex, that require major investments.

Such a substantial change in the nature and mode of energetic procurement involves major changes in the organisation of the city and its urban forms. Although fossil energies have initially oriented town development, it is obvious today that cities have a crucial role to play in the success of energy transition.

AN INDISPENSABLE COORDINATION AMONG STAKEHOLDERS

It is essential to include the energy policy into the urban territory so that it may evolve towards forms that are compatible with renewable energies. Admitting this interdependence between energy and spatial planning is being aware of the need for coordination among urban planners and energy experts.

A common space must be created, where energy and town planning may make energy issues its own. This will start by developing a shared vocabulary to define the territory in terms of resources and places of production, storage, distribution and consumption.

Making the city move towards renewable energies requires the coordination of a very high number of public and private participants, from the extraction of the local resource to its final use. Unlike fossil energies, renewable energies usually are more difficult to extract, store, transport and transform. As a result, their implementation often requires a critical mass of consumers on a same territory, so that all the economic and technical barriers may be overcome.

In this context, industrial sites, tertiary sector sites and even housing sites of a certain size are to play a lead role. They can become privileged consumers in order to generate a supplying network in renewable energies, and also production/storage places for the benefit of other consumers. Industrial ecology plays a major part in promoting this type of synergies, as well as all those who can make the link between energy suppliers and consumers.

SCALING UP FROM THE BUILDING AND THE NEIGHBOURHOOD TO THE TERRITORY

In this perspective, a change of scale is necessary. With fossil energies, we were used to thinking in terms of buildings rather than in terms of territory.

From now on, the whole territory is considered from an energetic point of view. Each project is analysed within an extended area in order to encourage an overall solution including renewable energies into the existing building, rather than the emergence of isolated green spots in the middle of a grey town.

During this transition period, fossil energies should act as a complement and a rescue to the benefit of renewable energies. In the case of district energy, fossil energies make it possible to create network infrastructures that may later be powered by renewable energies.

THE TERRITORIAL ENERGY CONCEPT (TEC), A NEW TOOL

In order to bring together energy and urban planning, the Canton of Geneva has developed a certain number of territorial energy planning tools.

There is now a territorial energy concept for each of the spatial planning procedures

Resource management is now included in the new Town and Country Planning 2030¹ that gathers all the territorial policies. This plan also contains

the key directions of the energy policy. A more detailed master plan for net-bound energy (PDER) is underway.

There is now a territorial energy concept for each of the spatial planning procedures - from the local zoning plan to much wider areas.

The purpose of this concept is:

- to identify key participants and their respective roles
- to co-ordinate them, take their interests and constraints into account
- to offer energy supply strategies that best promote local resources.

The TEC is used in particular for the ten Big Projects of the canton of Geneva - those true "pieces of town" that are one of the city's major challenges in terms of energy and urban planning.

INNOVATING PROJECTS AS A TESTING GROUND

Geneva has several assets available to carry out its energy transition - a dense built fabric that facilitates synergies, thermal resources that are yet under-exploited, such as the water of the Lake of Geneva and the Rhone, the water tables and the shallow and deep geothermal energy.

The development of these sources of energy involves the implementation of collective infrastructures on extended portions of territory. Therefore, these projects require a coordination of energy and spatial planning policies.

The projects launched on the canton's territory are a testing ground for energy transition. They enable the stakeholders, including spatial planners and energy experts, to draw valuable lessons for future projects while readily demonstrating the added value of a narrower coordination.

The GeniLac® project is a first major illustration of this process. Once it is completed, this vast hydrothermal system will cool and heat several neighbourhoods by using the water from the Lake of Geneva; it will extend from the city centre to the airport area.

A similar system, though smaller in scale, has already been developed in the United Nations district (GLN). This pilot project, supported by the

European Union, was proof of the thermal potential of the lake and was an essential experience with a view to launching a larger project.

GeniLac® is now promoted by energy experts and spatial planners together and is the subject of a broad partnership. The territory concerned includes three big urban planning projects to the south of the airport. A dedicated unit was created to coordinate the different ideas on the cross-cutting infrastructures of this challenging territory, such as the GeniLac® system, the motorway and the high voltage lines. This unit includes private stakeholders as well as representatives of the Swiss Confederation, the Canton and the municipalities. This is a good example of coordination, where a high number of participants involved in large spatial planning projects integrate the energy issue into extensive planning.

In relation with the GeniLac® project, some reflections conducted in connection with a new neighbourhood located in the Jonction district are an example of the need to think about energy within an extended territorial environment. While a 100% renewable energy supply was

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planned on the restricted area, the option of long-distance heating on a wider territory was selected, although that alternative rests on 10% of fossil energy as a supplementing source of energy.

Powered by the thermal energy of the Rhone combined with a high temperature heat pump, this long-distance heating

system will make a larger portion of the territory move to sustainability than in the initial project. Another advantage is that the system will be compatible with GeniLac® when that project is completed.

Playing with the scales of analysis and ending up with this kind of compromise is of great strategic importance, for the achievement of big network infrastructures such as GeniLac® depend on the existence of a sufficient critical mass of consumers.

The long-distance heating project connecting the **industrial zone of Plan-les-Ouates** and the **housing construction project of Les Cherpines** is another example of the need to bring energy and town planning together. The point is to use the waste heat of the industrial zone beyond that area. The purpose is to use that waste heat for the future constructions, located in a portion of the territory with scanty renewable energy resources. Unlike the Jonction project where the existing buildings are integrated, the housing constructions that are to be connected to the long-distance heating network are not yet erected.

To put those two areas on the path of sustainability, the challenge lies in the coordination among different participants and time horizons, and the management of the related uncertainties.

Our last illustration is the **Praille-Acacias-Vernets** (PAV) project, which is an exceptional opportunity for urban renewal. Elaborating the local master plan together with the territorial energy concept enables the establishment of spaces that are dedicated to deep geothermy while

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the territory in its diversity and all its dimensions, and to develop complementarities. This is an opportunity which will help the spatial planner to realise the importance of the support that can be given by the Canton of Geneva to these projects, by means of subsidies, with co-funding or by sharing risks.

A WHOLE TERRITORY IN PROJECT

The territorial energy planning tools mentioned herein are quite new - some of them still being prepared. The projects described in this document are also, for some of them, still in their nascent stage. In relation with this competition, the Canton of Geneva does not aim at submitting completed and exemplary projects, but rather at sharing its concepts and the general principles that have emerged in order to support its energy transition.

dealing with the issues relating to the energy transition of a built-up area and those of neighbouring areas with lower energy resources.

On these four projects, the stakeholders are required to consider

We are convinced that this energy transition is possible only by redesigning the city, which makes cooperation between energy experts and spatial planners an essential prerequisite.

The efforts already made in Geneva to extend the energy policy to the whole territory and at all levels enabled to consider the issue of the transition towards sustainable energy from another angle. Today, the point is no longer to have all of a sudden, plot by plot, some pieces of territory switch to what is considered as absolute sustainability, but to engage all the territory in a project and gradually adapt it to renewable energies.

State Councilor

Antonio Hodgers

In charge of the project

Cantonal Energy Office (OCEN):

Olivier Epelly, General Manager

Rémy Beck, Scientific Manager, Head of the Energy Planning Team

Cantonal Town Planning Office (OU):

Isabel Girault, General Manager

Collaborators

OCEN:

Martin Clerc, Pascal Briod, Réginald Destinobles, Fabrice Guignet

OU:

Nicole Surchat-Vial, Aliénor Giroud Bonnefond,

Vincent Delabrière, Stéphane Thiebaud, Emmanuel Chaze

