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## Brussels, a sustainable city

Synopsis, CFB No. 4

*Bruxelles, ville durable*

*Brussel, duurzame stad*

**Pierre Vanderstraeten, Stefan De Corte, Bernard Deprez and Benoît Thielemans**



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Synopsis nr. 4

## Brussels, a sustainable city

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As a reminder: Sustainable defines that which meets the current generations' needs without jeopardising the possibilities for future generations to meet their own needs (that is to say, without exceeding resource renewal rates). More simply put, that which is capable of continuing is sustainable.

## I. Observations

### 1. *A layout inherited from the modernist era*

#### a. The zoning of the city's territory

Brussels has been marked by monofunctionalism over the past few decades. This applies to both its central neighbourhoods (administrative zones of uptown Brussels, the European quarter, and the North Station neighbourhood, where the real estate market has exerted great pressure; and the shopping districts in downtown and uptown Brussels) and the many predominantly residential neighbourhoods. So, public transport neglected some of the most densely populated neighbourhoods in the city (central and upper Saint-Gilles, the area between Flagey Square and "La Chasse" that straddles the Ixelles/Elsene-Etterbeek boundary, the historical heart of Schaerbeek/Schaarbeek around Pogge and Lehon Squares, and the environs of chaussée de Louvain/Leuvensesteenweg between Dailly and Saint Josse Squares) to give priority to serving the administrative and shopping areas of the centre (Zone A<sup>1</sup>). This helped reinforce the divisions between zones and weaken the vitality of many parts of the city.

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<sup>1</sup> See the accessibility map of Title VIII in the RRU/GSV (Regional Town Planning Regulation). The ABC localisation policy that was implemented in the Regional Development Plan (PRD) and Regional Land Use Plan (PRAS) aimed amongst other things at promoting offices near railroad stations helped to reinforce the monofunctionalism of the city's central areas by failing to support other activities, especially housing, sufficiently.

b. The geography of Brussels has been given short shrift

The city's various networks have failed to take sufficient account of the physical substrate of the valleys that cross Brussels. New awareness of the limited availability of natural resources and the necessary interactions with the environment have led people nowadays to consider the potential that Brussels's catchment areas have as structuring areas when it comes to rainwater management, biodiversity, climate regulation, biomass, environmentally friendly mobility, recreation, and landscape.

c. "Green" mobility modes penalised by the car

Pedestrians' fears for their safety, the limited use of bicycles for transport, and the surface public transport's poor performance result primarily from the car's encroachment of public spaces. We have inherited a specialised public area that encourages speed in motor vehicles. Despite that, the "car system" (see the footnote on mobility) has become saturated and inefficient (hours wasted in congested thoroughfares; additional pollution from traffic jams). The city's lasting vitality is contingent on controlling speed<sup>2</sup>: The city induces slowness and slowness reinforces the city.

2. *A versatile but energy-wasting stock of housing and buildings*

a. The character and resiliency of Brussels's architectural heritage has a great deal to do with its versatility

The identity and image of Brussels is that of a city of houses, even though the number of flats (350,000) remains greater than the number of single-family homes (135,000). This impression stems from the large number of houses that are actually rental properties, i.e., let out as flats, but have the same characteristics of use and image as a single-family home. The Brussels house is as a rule characterised by remarkable versatility that is seen in its ability to meet changing living and working patterns.

b. Excessive levels of energy consumption and CO2 emissions

Energy consumption for heating in Belgium as a whole and Brussels in particular is amongst the highest in Europe, regardless of climate (5 toe in Belgium compared with a European average of 3.6 toe). The houses and more generally buildings in Brussels are poorly insulated. Seventy percent of CO2 emissions in Brussels can be attributed to building occupancy. Brussels's houses and buildings are old (80% built before 1970) and the number of square metres per inhabitant remains high on average. As a result, the possibilities for energy-saving renovations are great [CERAA, 2008]. Reducing the amount of energy used for heating has become a major social welfare concern. It is important to underline the fact that a broad movement of awareness-raising and training in the stakes riding on energy use is sweeping across the Brussels Region today and affecting residents, young people, and students as well as professional circles (Energy Performance of Buildings training, regional facilitators, green construction guides, and so on).

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<sup>2</sup> Speed wastes public space: The space between vehicles lessens with their deceleration.

### 3. *Compartmentalised city governance*

An extensive set of tools, instruments, and planning zones has been set up over the past few years. They include ZIRs, Lever Zones, ZIPs, PDI priority zones, IRIS plans, green and blue networks or systems, major intermodal nodes, A zones, structuring spaces, etc.)<sup>3</sup>. However, their objectives are not integrated enough. This abundance blurs and weakens the urban project by making it fairly illegible. The lack of concerted scheduling of services and infrastructure makes the synergisms specific to urban contexts impossible to achieve.

The need to reduce Brussels's ecological footprint drastically calls in particular for a gradual transition to a more circular urban metabolism such that all of the material and energy flows that are indispensable for a city to work should be reduced upstream, come primarily from the city's hinterland, and be recycled downstream from the city<sup>4</sup>. This can be done only if governance becomes transverse and gives the material cycle's management the fundamental place that it used to have in the city's policies.

### 4. *Strong local and multicultural dynamics*

The vitality of Brussels's communities is expressed through a dense fabric of associations and a wealth of committees involved in and attached to the various neighbourhoods and living spaces of the town. The immigrant communities'<sup>5</sup> social lives are very often anchored in mutual assistance networks and family and community solidarity ties. The dynamics of life in Brussels is thus structured around and out of a host of more or less formal social, cultural, economic, and environmental local initiatives. However, Brussels doubtless does not have enough central places suited to generating supralocal dynamics and foundations for an intercultural, metropolitan atmosphere in which "weak links"<sup>6</sup> can be expressed.

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<sup>3</sup> ZIR = Zone of Regional Interest; ZIP = Privileged Initiative Zone; PDI = International Development Plan, IRIS plan = Regional Transport Plan

<sup>4</sup> Making residents more aware of the consequences of their lifestyles on the environment and the terrestrial ecosystem's ability to support them is of fundamental cultural importance. Today, 500,000 metric tonnes of waste, including a large percentage of organic matter (42% of the unsorted white bags), is incinerated in the Brussels Region each year and accounts for 11.5% of the Region's CO<sub>2</sub> emissions. Despite the regional sanitation agency's "dematerialisation" targets, the total tonnage of the region's waste remains far too high.

<sup>5</sup> As of 1 January 2006, 26.87% of Brussels residents were foreign nationals, accounting for 30% of Belgium's resident alien population. However, the 2001 census put the number of Brussels residents of foreign origin (nationalities represented by at least 1000 people) at 46.3%.

<sup>6</sup> "...This formula distinguishes strong links, that is to say close, immediate links, ties with similars, with the network of affiliation, and weak links, those that establish contacts outside the primary network of affiliation; that connect the latter with other networks. Weak links are those by means of which one can be part of a society and not just a community. We know that the strength of weak links is contingent on the existence of strong links, that is to say that weak links are strong only as long as one has strong links." Free translation from DONZELOT J., 2004, "La mixité urbaine est-elle une politique ?", *Esprit, La ville à trois vitesses: gentrification, relégation, périurbanisation*, 303, March-April 2004, p. 136

5. *A remarkable rail and harbour potential*

Brussels has twenty-nine working railroad stations, a seaport, and four harbour basins, as well as a 267 km network of tracks for the underground, pre-underground lines, and trams. This offers exceptional potential for green mobility, the intermodality of which is struggling to get off the ground for lack of integrated management of both passenger and goods transport and given a general context that has given priority to cars, lorries, and planes.

6. *Wastelands and property reserves for exemplary projects*

Today there is no lack of potential for well-thought-out urban development. These areas are, however, still linked to industrial uses, especially to the railroad, the redevelopment of which must be considered. They are atypical for residential uses, given the presence of certain infrastructure, embankments, local pollution sources, and so on, and their redeployment must be backed up by serious environmental studies.

## II. Questions-issues

### 1. *How can a green mobility structure be made efficient?*

How can the modal shift from private cars to softer transport modes, public transport, and shared modes be promoted and accelerated in order to enable residents to have less need of cars? How can parking pressure be reduced in the various neighbourhoods? How can environmentally friendly transport intermodality be facilitated for both people and freight in order to reduce the negative environmental effects of car traffic, lorries, and airplane travel?

### 2. *How can the transformation of the city's housing and building stock be sped up to minimise its environmental impact?*

How can one produce architectural quality that takes the measured management of natural resources (land, energy, and materials) on board? How can the city's building transformation policies be broadened to include passive and low-energy housing standards for the rental and co-op markets? What can be done to get everyone, of every walk of life, interested in improving energy performance? How can policies of the "Social Real Estate Agency" type be spread? How can one move toward a despecialisation of buildings<sup>7</sup> in favour of material and space savings?

### 3. *How can the autonomous sphere be promoted?*

How can the spheres of the State and market be completed by promoting the autonomous sphere<sup>8</sup>, especially the common areas between public and private, whilst taking account of the singular sociological characteristics of Brussels? How can the pooling of resources and community management of waste, mobility, energy, water, and biodiversity be facilitated to achieve the best yields and a friendly environment?

### 4. *How can comprehensive management and planning tools be developed?*

How can urban governance be made to cut across and permeate all sectors from top to bottom so as to embrace a long-term logic and decompartmentalise linear operations? How can Brussels's institutions be made to work more effectively based on the principle of subsidiarity? How can one conciliate the institutional and socio-economic geographies of the real situation on the ground? How can one stimulate civic participation on the regional level ?

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<sup>7</sup> New wastelands are cropping up in significant numbers today: These consist of the overly energy-intensive office buildings built in the '60s, '70s, and '80s, which can be put to other uses only with great difficulty.

<sup>8</sup> "It seems to me that this autonomous sphere that ecology is supposed to promote must be understood to be the set of activities carried out freely alone (or preferably collectively) without any hierarchical or market relationship in order to meet the greatest number of material and immaterial needs that are considered to be legitimate, making the most appropriate use of natural resources in so doing" (free translation from BOULANGER P.-M, 2007, "Une vérité qui dérange (certains): on a encore besoin de l'écologie politique !", *Etopia, Autonomie et écologie*, 3, p. 44.

5. *What place does nature have in the city?*

How can the city's attractiveness be enhanced by the presence of nature via the intra- and interregional green, blue, and grey (GBG) networks, which are founded on the geographical substrate, and taking account of the blocks' interiors? How can floods be prevented, biodiversity preserved, the climate regulated, biomass and food crops developed, and the countryside and wooded areas connected to the various parts of the city whilst giving priority to Brussels's valleys? How can nature with an urban face be made to surface?

6. *How can the city's metabolism be changed?*

How can the city's urban services and infrastructure be enhanced based on the principles of industrial ecology's intervention [Erkman, 1998]<sup>9</sup>? How can what is known as an economy of functionality (replacing products by services) allowing integrated management of the city's impacts (selling comfort rather than gas entails thermal improvements to housing) be set up? How can training in maintenance and recycling be developed to reduce the city's consumption of materials and energy?

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<sup>9</sup> Meaning closing the loop (making the flows of material almost cyclical), plugging the gaps (minimising losses due to dissipation), intensifying (making the economy less dependent on matter); and lightening (generating energy without CO<sub>2</sub> emissions).



### III. Policy options

#### 1. A sustainable spatial armature

To become sustainable, the city's spatial armature must be converted so as to become compatible with and complementary to environmentally-friendly mobility structures (networks, lines, and stops of the railroad lines, inland waterways, mass transit, bicycle paths, and pedestrian walkways) and ecological structures (all of the urban open spaces that make up the natural ecosystem, i.e., what are known as green, blue, and grey areas). These two sets of structures, which must be seen and designed at least on the scale of the morphological urban area, are inseparable and interdependent: The concentration of built-up areas around environmentally-friendly intermodal stations increases the magnitude and performance of the ecological structure. The green mobility structure's performance depends on the hierarchical close-knit nature of the mesh of which it is made and is optimal only if the right degrees of density and mixture of functions are met (closeness of stop from the pedestrian's point of view<sup>10</sup>, e.g., 300 m, 600 m). The European "lobe city"<sup>11</sup> and "twin track"<sup>12</sup> models are useful references in this regard.

##### a. Designing a major ecological structure to support local interconnections

Fifty percent of the region's acreage, or some 80,000 hectares, is not built up and is covered with vegetation. Whilst these open spaces are distributed very unevenly in the central boroughs and those of the first ring, they are part of a geographically balanced triptych in the second ring and beyond<sup>13</sup>. The first challenge of environmentally friendly spatial planning for Brussels necessarily involves an approach by valley and catchment area. Just as a reminder, such land use and development planning would facilitate the separate management (as part of the indispensable

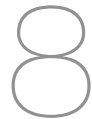
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<sup>10</sup> Ten minutes on foot, or about 600 m at a speed of 3.5 km/hr, can be considered a threshold in our European regions today beyond which other travel modes become competitive. The town planning conditions most conducive to getting exercise by walking are effective within a 300 m radius, that is, 5 minutes on foot. Brussels's Flemish Environment Council, BRAL (*Brusselse Raad voor het Leefmilieu*) proposed the rule of a maximum of five minutes (5 minutes between one's home and the mass transit stop, 5 minutes' wait for transport, and 5 minutes between transfers) twenty years ago.

<sup>11</sup> "A lobe city is probably the best form for an ecopolis. In a lobe city the water-chain carries the green fingers, the (public) traffic-chain carries the built-up lobes." TJALLINGII S.P., 1995, *Ecopolis, Strategies for Ecologically Sound Urban Development*, Leiden, Backhuys Publishers.

<sup>12</sup> "The two tracks are the public transport hierarchy and the greenspace/waterspace system. One provides the shaping for concentrations of human activity, while the other enables the ecology of the settlement to work effectively. The whole morphology of the settlement is the defined by pedestrian accessibility: the built form, streets and public spaces flow on from that." BARTON H., GRANT M., GUISE R., 2003, *Shaping Neighbourhoods, a Guide for Health, Sustainability and Vitality*, London, Spon Press, p. 213.

<sup>13</sup> Including Soignes/Zonien forest to the south-east, the Pajottenland countryside to the south-west, and the string of parks (King Baldwin Park, Ossegem Park, the Royal Estate, Meudon Park, and 3 Fontaines Park) to the north via the fields and woods of Trassersweg in Over-Heembeek



renovation of the existing sewer network<sup>14</sup>) of run-off from precipitation (the grey network: rate-of-flow reduction, retention, evaporation, and infiltration), which would relieve pressure on the emergency facilities that have been set up (e.g., storm basins). It would give a great many residents the possibility of getting around on foot and above all by bicycle safely in town, but also that of getting out into the Brabant countryside and Soignes/Zonien forest, and would form corridors with relay niches for birds and other wildlife. It would help to cool down the city, as most of the valleys are oriented in the direction of the prevailing winds, and would encourage the development of vegetable gardens, orchards, and urban farms. This ecological structure would also be incorporated into the PRAS<sup>15</sup> when it is revised, as a continuation of the Flemish Brabant valleys included in the Hal-Vilvoorde land use plan.

b. Designing a multicentric green mobility structure for people

This “walking-public transport” tandem is what determines urban concentration and intensity. Activities concentrate according to the criteria of the viability of public transport and its closeness on foot. The town councillors of Nantes expressed this clearly with the slogan “le tramway, c’est un piéton qui fait une pause” (the tram is a pedestrian taking a break). Priority must be given to the location and quality of connections and the urbanity of these places before considering the lines’ development. This is a sine qua non to make the green mobility chain for people and goods credible. Far from all nostalgia for the historical spoke-and-wheel structure of mass transport, the multicentric network that results offers sustainable performance levels that are a function of the balance between the freedom of movement amongst all points on the network and controlling the cost of the transport service armature. A regular, hierarchised distribution of the concentrations (with the historical centre conserving its predominant role) offers the public transport companies the best possibilities. The proximity<sup>16</sup> of major and diversified centres is an advantage for the neighbourhoods, just as the natural and recreational routes of penetration (GBG networks) are. Creating the conditions under which the urban communities and an urban society, weak links and strong links, can express themselves calls for a balanced distribution of the neighbourhood’s centres that are not too far from the metropolitan centres.

c. Designing together compactness and mixed functions

Restoring the city’s attractiveness leads to improving the quality of public space (notably via the GBG networks) and to reducing the negative effects of the car (pollution, fear for one’s safety, and financial charges). To create the town planning conditions that allow households to give up their cars, many European experiences are working toward a minimum population density of about 100 per hectare on average per neighbourhood (about 67 for the Brussels Region as a whole). So, the neces-

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<sup>14</sup> A third of Brussels’s sewage network, or some 500 km of sewers, is urgently in need of renovation today.

<sup>15</sup> Regional Land Use Plan

<sup>16</sup> See the isochronal curves accessible by mass transport for various Brussels neighbourhoods in *STIB 2020: visions d’avenir pour le transport public urbain à Bruxelles*. The thirty-minute curves in particular, which are recognised as having a threshold value, show the merits of planning a more multicentric structure for Brussels. It should be pointed out that trips by bicycle currently correspond more or less to the same isochronal curves.

sary housing density conditions for the viable development of sustainable neighbourhoods in Brussels are often found, if we exclude the parts of the territory that are located in the second ring of the city, although the closeness on foot of the old village cores or neighbourhood centres (centre of Neder-Over-Heembeek, Sainte Alix neighbourhood, St-Job Square, Roodebeek, etc.) offer some interesting prospects. Complementarily, the viability of “sustainable centres” in a multicentric city must be designed on the basis of much higher housing densities.

What is more, a mixture of functions, which, like density, must be differentiated according to the existing contexts, provides a series of significant sustainable urban advantages, such as reinforcing community activities through the presence of daytime and evening clienteles, contributing to the feeling of safety by constant presence day and night, reducing distances between complementary activities, giving the possibility of living near one’s work, reinforcing the neighbourhood’s image, using the ground efficiently by “time-sharing” over the day, and making heating network systems viable.

d. Designing shared public spaces

Whilst density and mixed use are two essential conditions for promoting walking and cycling, designing public spaces with these two forms of travel in mind is just as necessary. Current road safety approaches upset many preconceptions in this regard. Today it has been clearly shown that safety depends primarily on the attention that users pay to each other rather than to the presence of separations such as curbs, bollards, posts, barriers, different road surfacings, and so on. Indeed, the latter actually induce more accidents than they avoid because they reduce user vigilance. The lifting of responsibility that results from an excess of falsely reassuring measures and devices and, beyond that, an excess of regulations, actually generates a strong feeling of fear for one’s safety amongst the most vulnerable users. This attention to “softer” modes of travel also calls for converting all of the mainly residential neighbourhoods into 30 kilometre per hour speed zones. Moreover, reducing the speed of motor vehicle traffic will also reduce polluting emissions and noise levels significantly.

2. *Changing Brussels’s urban metabolism to reduce its ecological footprint*

a. Coordinating goods transport and processing

Integrating the new (freight trams, freight bicycles, etc.) and old (trains, barges) modes of transport to manage the material and energy flows in the processing chains requires closely concerted scheduling as well as reserving places for the city’s services and supply chains. The measured management of natural resources requires new urban development choices. Seen from this standpoint, it is useful to associate the environmentally friendly intermodality sites for goods and the city’s general services regarding their processing<sup>17</sup>. As we explained above, the credibility of the green mobility chain is contingent on connections with the canal (studying the possibility of building new sheltered basins to increase the wharf capacity in the outer harbour) and the railroad, from which other urban transport modes will take

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<sup>17</sup> In Lille, the Centre de Valorisation Organique (Organic Recovery Centre) recycles the organic waste of 300,000 inhabitants and green waste, which it turns into biogas that is used by the city’s public transport.

over with more environmentally friendly urban vehicles (goods trams, cargo bikes, vans, and minimally polluting small lorries) that will deliver to places rather than businesses.

b. Promoting the autonomous sphere and mutualisation of resources

On the local level, attempts should be made to encourage the forms of mutualisation of individual resources that take place daily in the various neighbourhoods and are already confirming the re-emergence of the autonomous sphere compared with the State and market. So, the development of local trading systems (LTSs) and mutual or collective purchasing groups (GAS and GAC in French) attest to this movement to make use of local projects. Setting up heating networks, car sharing schemes, etc., belong to this same trend.

3. *Designing green buildings*

a. Aiming for zero carbon, zero waste, and zero rainwater

It must be possible to apply the principles of green building, which aims to minimise the environmental impacts of buildings and engineering work, without changing the heritage value and character of public spaces. So, getting the “low energy” label for renovations and “passive” label for new buildings and major transformation projects must become financially accessible<sup>18</sup>. Tools such as the third-party investor mechanism and Social Real Estate Agency policy must be bolstered in Brussels, which is characterised by a large rental market.

b. Integrating lifestyles and uses

The reduction of energy consumption and transformation of buildings mentioned above must take account of the great diversity of lifestyles of the people who live in Brussels to avoid widening social divides. In particular, the city must embrace new recreational resources, which will become increasingly necessary and travel becomes more expensive.

4. *Setting up sustainable governance*

The democratic and ecological management of the sustainable city entails some major changes in the ways that things are done. Five characteristic features warrant special emphasis:

a. There must be a match between the scale of a phenomenon and how it is managed

The consistency and effectiveness of green mobility and ecological structures, transformation of the urban metabolism, and invention of a new relationship between town and country require comprehensive control that it must be possible to apply on the scale of the functional greater metropolitan unit.

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<sup>18</sup> The structural rise of oil prices and increased global demand for commodities are causing construction costs to rise significantly. In the near future, the material value of existing buildings, transport in short circuits, and, consequently, the use of local output and the recycling of materials will become decisive in making investment choices.

b. A permanent process

Sustainable spatial planning entails setting up planning, administration, assessment, and reorientation cycles through the monitoring of performance indicators (energy consumption, air pollution, etc.) It thus becomes a permanent process that creates a long-term commitment for the authorities involved.

c. Project-based management

Unlike a strict approach by area of competence, the practices of vertical interdisciplinary transversality (between levels of power) and horizontal interdisciplinary transversality (between the departments of the same administration) are indispensable for implementing sustainable comprehensive answers. Project-based management (rather than management by jurisdiction) calls for a fundamental cultural change in both the public powers and undertakings. Brussels's experiences with neighbourhood contracts and master or overall development plans (schémas directeurs) are extremely enlightening in this regard.

d. Participatory democracy

Project-based management is an avenue that enables representative democracy to reach agreement with the various forms of participatory democracy by getting all of the stakeholders involved. Taking account of each party's expertise offers the best chances of success, provided that the exchanges take place right from the start and continue throughout the process;

e. Social time management

Our western societies are increasingly out of syncs. Spatial planning must be accompanied by social time planning. The sustainable city must be able to organise access to services (for example, open the municipal library in the evening) and share the occupation of spaces (for example, privately owned car parks), in line with the best collective coordination over time. In Brussels, the boroughs are doubtless the best placed to set up such multipartite consultations.

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