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# Urban Sprawl in the Context of Cracow City Limit

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**Abstract.** Urban sprawl is one of the biggest problems of the contemporary spatial planning. Since the 20th century there has been discussions amongst theoreticians and practitioners, devoted to delimitation of urban functional areas, agglomerations, or metropolises. The example of Cracow demonstrates that the attention of researchers should be also directed to the accuracy of city limits. A comparative analysis of the functional and spatial structure of Cracow and of its northern suburbs demonstrated that the rural areas examined exhibit a much higher degree of urbanity than – for example – a considerable part of Nowa Huta, which was incorporated to the city in 1951. Building permit decisions issued in Cracow in the period 2014-2016 regarding residential buildings illustrate uniform development, with the exclusion of the western wedge of green areas and the eastern industrial areas. Multi-family investments are located within the radius of ca. 6 km from the Main Market Square. One-family buildings are developed within the ring between the 6th and 10th km. This ring goes beyond the administrative limits of the city only towards the north (communes of Zielonki, Wielka Wieś, and Michałowice), which entails a question regarding the rationality of the city limits of today. Shortage of potable water hindered the development of northern outskirts of Cracow in the mid-20th century. The launch of a new water main in 1974 overcame this development obstacle. Over subsequent decades the priority of protection of soils of a high valuation class against land development grew weaker. After the economic transformation, due the development of local governments the policy relating to the areas discussed was directed towards liberal transformations of arable lands into para-urban structure. New residents live an urban lifestyle, taking advantage of the social infrastructure and services offered by the city. The absurd northern city limit, present there for nearly three decades now, has not interrupted the natural process of the city development, but it has prevented a rational spatial policy consistent with the idea of balancing development.

## 1. Introduction

One of the most important problems of spatial planning, especially for larger cities, is unsustainable development of their suburbs, connected with uncontrolled urban sprawl. This unfavourable phenomenon on observed in American cities was the subject of interest of L. Mumford already in the 1960s [1]. Ever since then many publications on this subject have been written and various methods of fighting this phenomenon have been developed, such as e.g. surrounding the city with a greenery belt (e.g. in Ottawa or London), or limiting suburban shopping and service centres (in Belgium, Germany, or France). Meanwhile, in Poland we are dealing with the urban sprawl which is on the rise, a good example of which is Cracow, the European Union's twenty-sixth biggest city in terms of population.

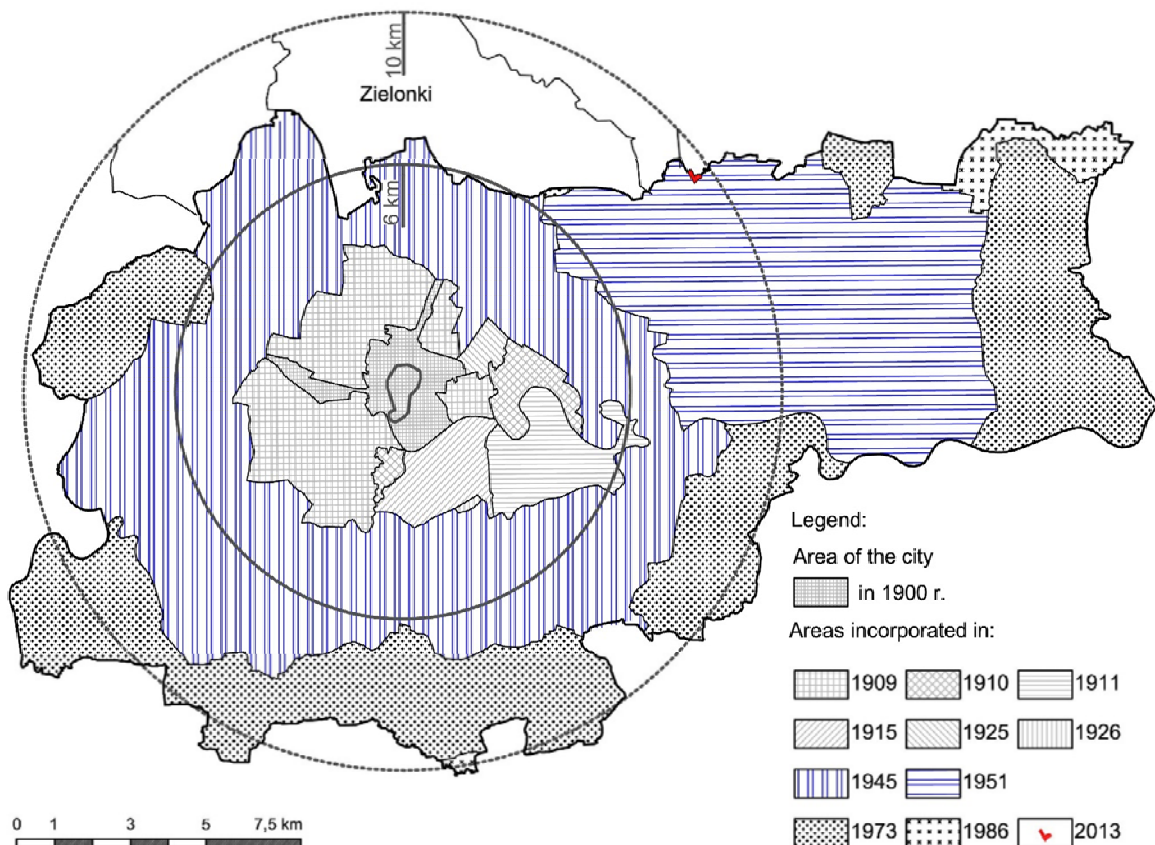
Rapid development of this now big city was initiated by a decision of the government (1947) on the construction of a metallurgical combine. Consequently, it was necessary to build new housing estates for the inflowing workforce. While in 1950 the population of Cracow was ca. 340 thousand, 25 years



later it was twice as high, reaching 700 thousand in 1976. The location of Nowa Huta to the east from Cracow deformed the spatial layout of the city.

## 2. Cracow city limit

An analysis of the distance of the administrative limits of Cracow from its historic centre exhibits anomalies towards the north and the east. Dynamic spatial development of the city took place in the 20<sup>th</sup> century, when the surface area of the city increased nearly fifty times. One of the more important extensions of the territory of Cracow from 1945 was characterised by a uniform, centric development towards all directions. Six years later eastern territories connected with the construction of the metallurgical combine and workers' housing estate Nowa Huta were incorporated to the city, which deformed the previously marked radial/ring spatial layout of the city. The next big extension of the city limits from 1973 took place in all directions but the north. For 45 years now, the northern areas, located only 6 km from the Main Market Square in Cracow, belong to a rural commune of Zielonki (see Figure1). Today these are attractive building lands intended for one-family buildings on small plots of land, where development of any architecture evokes numerous controversies.



**Figure 1.** Development of the territory of Cracow after 1900. Prepared by the Author basing on [2], [3], [4].

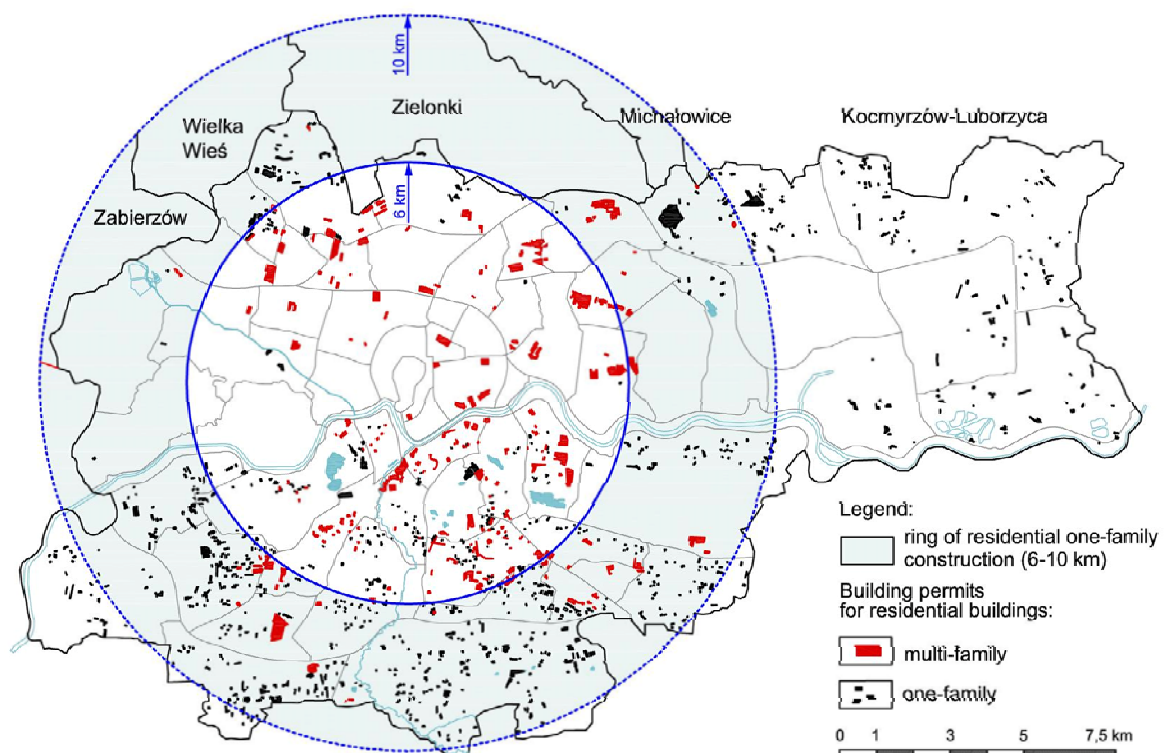
Although today communes surrounding Cracow implement their own local policies, it should be noted that in the 1970s the spatial policy of Cracow and its surrounding communes was implemented together, by means of a single planning document. Even then, analyses of the functional/spatial structure pointed to the creation of the Cracow agglomeration. In 1977 *General Plan of the Cracow Urban Complex* was resolved for the area covering: Cracow, Skawina, Wieliczka, and Niepołomice, as well as parts of communes of Skawina, Biskupice, Niepołomice, Zielonki, Zabierzów, Kocmyrzów, and Wielka

Wieś, of the total area of ca. 470 km<sup>2</sup>. Despite various subsequent attempts of delimitations of the functional area of the city of Cracow, no planning document coherently shaping the space of the entire agglomeration has been adopted to this day. Due to the lack of any measures that would prevent urban sprawl and due to an extremely liberal spatial policy of the neighbouring communes, dysfunctional para-urban structures will come into being.

### 3. Trends in housing in Cracow

The Author's analysis of decisions on building permits for residential buildings in Cracow in the years 2014-2016 demonstrated uniform development, with the exclusion of the western wedge of green areas and the eastern industrial areas. Investments falling into the category of multi-family buildings (marked in red in Figure 2) are located within the radius of ca. 6 km from the Main Market Square. One family buildings, on the other hand (marked in black in Figure 2) develop dynamically within a ring between the 6<sup>th</sup> and the 10<sup>th</sup> kilometre. This ring goes beyond the administrative limits of Cracow only towards the north (communes of Zielonki, Wielka Wieś, and Michałowice), which generates a question on the rationality of the today's city limits of Cracow. Today there is no barrier for the development of one-family complexes in this part of the city.

The interest in such construction is well visible – only in the years 2015-2016 292 building permits were issued in Zielonki commune, according to which the planned number of one-family residential buildings (consisting of one or two apartments) in villages adjacent to Cracow was 322, with 109 houses built in Bibice, 111 in Zielonki, and 79 in Wegrzyce.

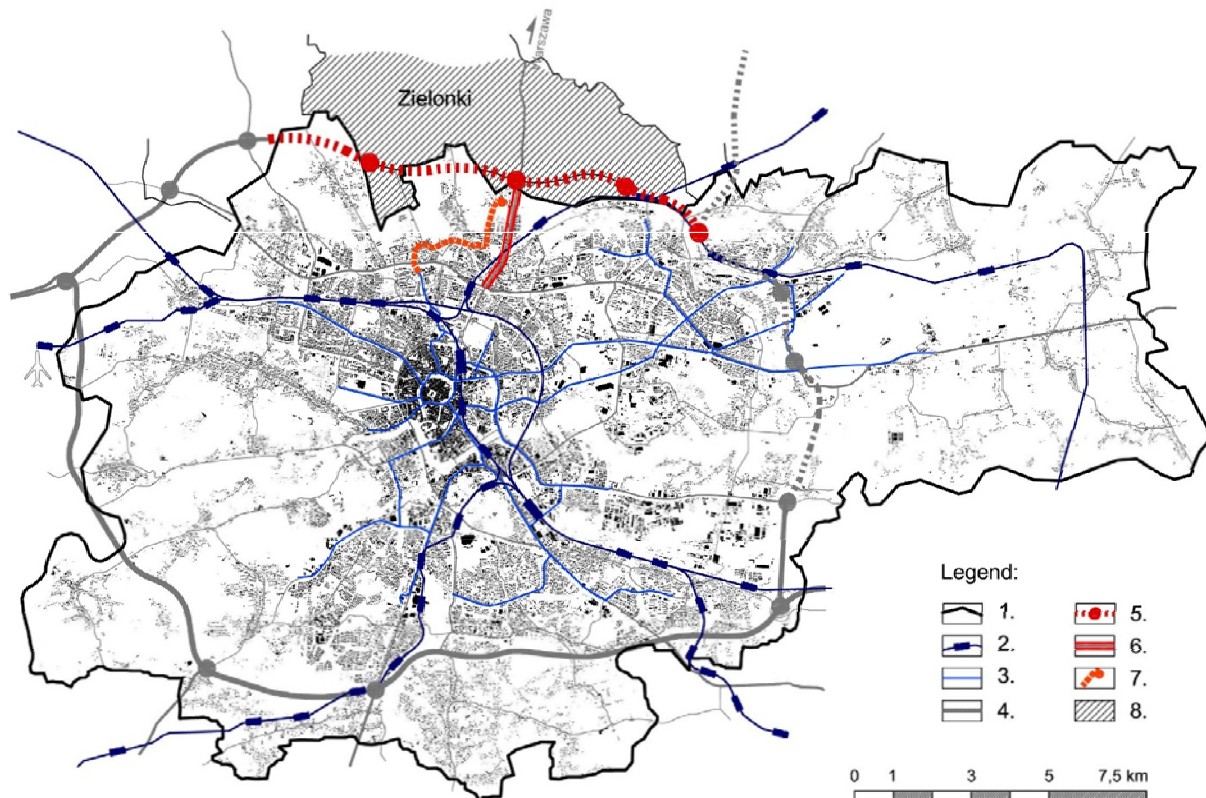


**Figure 2.** Development of housing in Cracow in 2014-2016 based on building permits [5]

The effect of car traffic on the process of suburbanisation is broadly known. The trend presents in the northern suburbs, relatively weak to this day, has been explained by very bad connections between these areas and the city. However, implementation works have been already launched at as many as three investments, strategic for this area:



- the northern ring road of Cracow with 3 motorway interchanges located within the territory of Zielonki commune (marked in burgundy in Figure 3)
- modernisation of the entry road to Cracow from the side of Warsaw – national road No. 7 (marked in red in Figure 3)
- construction of a tramway to Górka Narodowa (marked in orange in Figure 3).



**Figure 3.** Strategic traffic investments implemented in the northern suburbs of Cracow, author's work

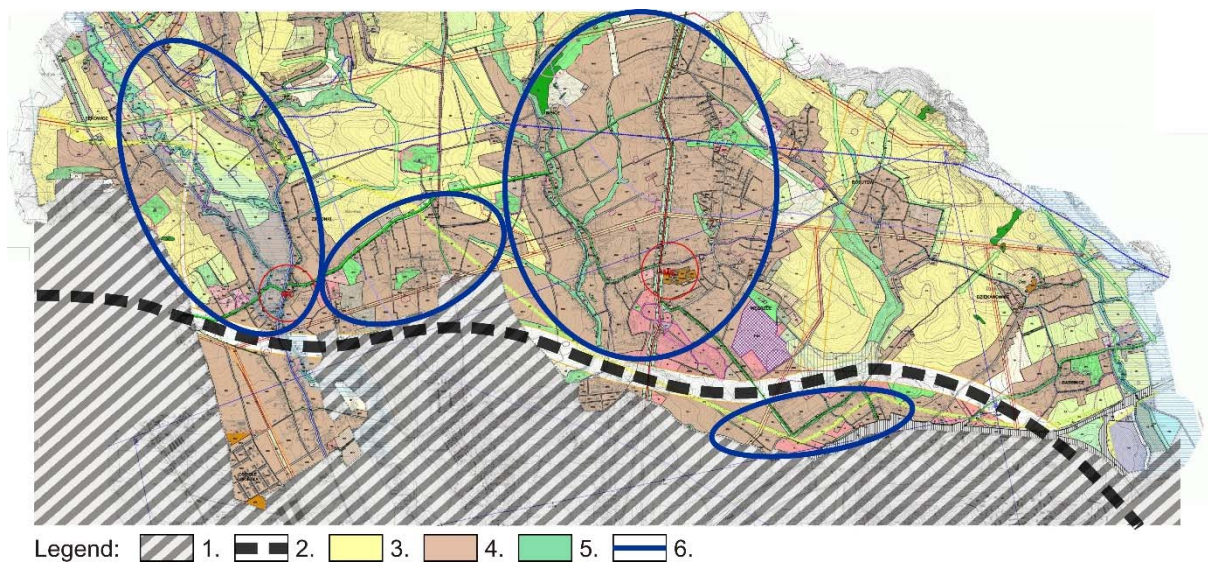
Legend: 1. Administrative limits of Cracow; 2. Railway stops and lines; 3. Tramway lines; 4. Ring road; 5. Ring road with interchanges under construction; 6. Broadening of the national road No. 7 under construction; 7. Tramway under construction; 8. Part of Zielonki commune.

#### 4. Vision of the northern suburbs of Cracow according to planning documents

Sustainable development is a statutory foundation [6] for determining development and housing principles in Poland. Besides the definition of a policy as measures directed towards achieving specific goals, which in planning documents are tools of the spatial policy, they should contain a prospective vision (for 10-30 years) of a sustainable polycentric structure.

A new planning document for the entire Zielonki commune (study on spatial development conditions and directions) has been already agreed upon with all competent institutions, subjected to social consultations and at the moment it is at the final stage of the proceedings. The main goal of the development of the commune according to the study is *sustainable economic and civilisation development of Zielonki commune*, which is to be closely connected with the spatial plane – including the environmental and socioeconomic one. The strategic goal in the spatial sphere is to be *harmonious development of the spatial structure of the Commune, the foundation of which shall be rational use of resources of the natural and cultural environment and functional links with the region*. The study also

emphasises the need to design top-quality space of housing estates in the southern part of the Commune, as well as shaping a system of recreational grounds basing on the existing resources of the natural and cultural environment [7]. In the subsequent part of the document the authors mention that the spatial development of the commune will be based on the principle of sustainable development, i.e. development which will not deprive the future generation of the possibility of satisfying their needs (Brudtland) and on the rule of the primacy of quality over quantity. They also emphasise the need to cooperate with adjacent communes within the scheme of the Cracow Functional Area and the Cracow Agglomeration. In the Author's opinion, the provisions referred to above do not find any reflection in the graphical part of the aforementioned document, which is dominated by residential areas (marked in brown in Figure 4).



Legend: 1. Territory of Cracow; 2. Northern ring road of Cracow under construction; 3. Agricultural land; 4. One-family residential buildings; 5. Green areas; 6. Areas of questionable structure sustainability according to the Author.

**Figure 4.** Part of the proceeded study on spatial development conditions and directions for Zielonki commune

Vast monofunctional areas of one-family buildings (marked in brown in Figure 4), with isolated plots without any access to public spaces and local centres, are closely adjacent to the administrative limits of Cracow and the planned ring road, reducing the possibility of the generations to come of creating a recreational system of a good quality. The only greenery, insular in character, is constituted mainly by graveyards and the former Austrian forts. Greenery connected with rivers also plays a marginal role in the system of recreation as there is no room left for a pathway and a cycling lane – along the watercourses there are narrow asphalt carriageways with no shoulders or pavements and fenced one-family houses (Figure 5).

The actual changes are divergent from the views of scientists, who for years now have been emphasising the crucial role of the greenery system in the urban and metropolitan structure. E. Węclawowicz-Bilska believes that it is impossible to create greenery systems in the city and in the metropolitan area basing on individual green areas in residential estates, as it is often tried to be done in many communes. [8]





**Figure 5.** Green corridor in the reality – in the background a bridge over the Bibiczanka river; along the waterway to the left - a narrow carriageway with no space for pedestrians; new residential architecture (in the centre, behind the bridge) with fences close to the bank of the river. Photo: the Author, Bibice, Zielonki commune, 2018.



**Figure 6.** Dominating belts of one-family architecture built by developers in the rural commune of Zielonki (adjacent to Cracow). Photo: the Author, Bibice, 2017.

### 5. Suburbs of Cracow – urban sprawl in Zielonki commune

In the territory of the northern suburbs a process of transformation of villages into a para-urban structure with dysfunctions typical for urban sprawl has commenced. The area is starting to be dominated by belts of arranged housing development (Figure 6), which makes it often much different from the local architecture in terms of style.

Unfavourable housing environment is created by fenced plots along narrow, dead-end access roads, with no pavements (Figure 7). Another problem is also the lack of parking spaces, as well as no “park and ride” areas.



**Figure 7.** New forms of one-family houses built by developers in the rural commune of Zielonki (adjacent to Cracow). Photo: the Author, Bibice, 2017

Cracow grapples with a large wave of cars entering the city on working days. As it was demonstrated in the latest measurements commissioned by the city hall on 18 and 19 October 2017, the number of inflowing cars reached 246 vehicles per day, and most of them stay in the city. This problem calls for solutions in the scale of the agglomeration and for relevant provisions to be included in plans of adjacent communes. Furthermore, the ring road under construction, instead of bypassing the city, will divide the urban system, strengthening spatial conflicts.

The planned development of suburbs is subordinate to the dominance of the car, despite numerous publications which emphasise quite opposite global tendencies. Z. Ziobrowski believes *that the role of the car in the city will be limited, mainly due to the huge and unsatisfiable demand for space and, considering heavy traffic, degrading the public space and indirectly the quality of life*. Further on he also stresses: *The right balancing of the role of the car in the city has a significant effect on the quality of life felt by city residents. Streets should be designed so as to prefer pedestrian and bicycle traffic*, [9]. This attitude coincides with the view of e.g. J. Gehl: *The concept of a sustainable city gets strengthened when most public transport is constituted by “green mobility”, that is pedestrian and bicycle traffic and public transport. (...) Good public space and a good public transport system are principally inseparable from each other* [10].



## 6. Summary

The analyses presented herein demonstrate that the administrative limits of Cracow are not adjusted to the actual transformations of the spatial structure, especially towards the north. Likewise, they do not take into account the unavoidable intensification of the building trend presents in the northern suburbs resulting from the road investments in progress. The progressive development of the pathological monofunctional structure, characteristic for urban sprawl, in the close vicinity of the historic centre of Cracow questions the rationality of the spatial policy, because the architecture of these areas is not contrary to the concept of a compact city – it is only an analogous development towards the remaining directions of the city.

The second problem presented herein is the different understanding of the concept of sustainable development. Scientific papers devoted to this issue are quite different from the implemented spatial policy. According to the Author, the lack of planning standards and of a balanced development standard is very important in this respect. Taking into account protected areas in planning documents does not exhaust the problem of a healthy housing environment, and a compact monofunctional residential area certainly does not fulfil its requirements. Authorities of adjacent communes, protecting the interests of their constituents wishing to sell the grounds well, implement the spatial policy of planned urban sprawl.

## 7. Conclusions

In light of the examples described above, the solution for urban sprawl in Cracow seems to be the extension of the administrative limits of the city towards the north and the development of a planning document covering the entire functional area. Measures aiming at a balanced form of the northern structure of Cracow should be undertaken urgently. Along with the subsequent development of these areas, the change of a sustainable housing environment will be lost. The city authorities do not draw any conclusions from the past in this respect.

Planty Park in Cracow, along with the radial green sequences along streets, planned in the 19<sup>th</sup> century, between the medieval layout of the city and the ring of Austrian fortifications, gave rise to a radial/ring model of greenery, which was consistently implemented for nearly 100 years. This model occurred in such planning documents as the Plan of Great Cracow from 1909, but most importantly it was implemented by the municipal authorities (purchases of strategic grounds and implementation of park projects). After the World War II the policy of the city in the field of arranged greenery ceased to be effective. In the 1990s an analysis of the existing state was performed, according to which lands which would enable the radial/ring layout of municipal greenery had been already built up. This is when the concept of the greenery of river parks came into being. Today a number of investments are being implemented which undermine this concept, too.

Meanwhile, examples of European metropolises, such as Copenhagen or Stockholm, point to an appropriate direction of the spatial policy, consisting in consistent long-term implementation of the greenery system and settlement zones located in compliance with the TOD principle (Transit Oriented Development).

In this respect, it seems necessary to apply a systemic solution strengthening the position of urban planners taking care of the common good over particular interests of land owners. A legally authorised urban planning standard would certainly be helpful.

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