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## The Spatial Development of Warsaw Metropolitan Area

Comments on "Warsaw Development Strategy until the Year 2010"

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### Introduction

In July 1999, the Municipality of Warsaw published a development strategy covering the period until the year  $2010^1$ . Many aspects of the strategy have direct implication on the spatial development of the city. The objective of this report is to provide the Municipality of Warsaw with an outsider view narrowly focused on the spatial issues implied by the municipal strategy. A particular emphasis is given to the implementation aspects of the strategy.

This report has been prepared after our visit to Warsaw between March 27 and April 3<sup>rd</sup>, 2000. The visit was organized and coordinated by the staff of the Development Strategy and European Integration Department of the Municipality of Warsaw.

We want to thank the various officials and professionals in the municipality of Warsaw who generously provided their time during our visit and shared with us a vast amount of data in the form of reports and digital maps. The very high quality of the briefings provided by various members of the professional staff on Warsaw's major development issues were invaluable materials in the preparation of this report. Most of the data and maps presented in this reports were provided by the Planning Department of the Municipality of Warsaw. The authors are particularly grateful for the efforts made by the managers and their staff to provide digital copies in a convenient format on very short notice.

### A. Report Summary

Warsaw's municipal strategy defines a number of economic and environmental objectives. These objectives have spatial implications for the development of Warsaw. The municipality has 3 tools at its disposal to achieve its spatial objectives: (i) land use regulations, (ii) infrastructure investments, and (iii) taxation. Only the first two are covered by the strategy itself and by this report.

The Municipality of Warsaw<sup>2</sup> and a number of suburban towns form the Warsaw metropolitan area. At present, the suburban towns are growing while Warsaw Municipality is losing population. This development trend disperses the metropolitan population over an area significantly larger than the one occupied by greater London but with only 1/3 of the population. The implementation of the Municipal strategy will require reversing this trend. In particular it will be important that regulations and infrastructure investments allow the rapid redevelopment of obsolete land use in the central areas of the city and the development of about 100 square kilometers of land – developable but still vacant – located within the Municipal boundaries.

The land use regulations and the infrastructure investments proposed in the Municipal strategy will certainly contribute to reverse this trend. However, the success of the implementation of the municipal strategy depends on a number of immediate actions listed below. Some of these actions have already been recommended in the Municipal strategy. The list of priorities is divided into 2 parts: in the first part are the actions that will affect the municipality but that have to be taken at a higher level of government, in the second part are the actions that can be taken by the Municipality itself.

#### (1) Priority actions external to the municipality

• Create a metropolitan authority that could coordinate land use regulations across administrative boundaries;

<sup>&</sup>lt;sup>1</sup> "Warsaw Development Strategy until the year 2010, a synthesis", Warsaw City Hall, 1999.

<sup>&</sup>lt;sup>2</sup> In this report we will use the term Municipality of Warsaw to designate the association of the eleven Boroughs of Warsaw (Miasto Stoleczne Warszawa). Each of the Warsaws' Borough is a legal bodies with the normal rights and function of a Municipality.



- Give priority to solve land tenure problem in the center;
- o Establish a suburban Railway Company to oversee the management of commuter trains

#### (2) Priority actions internal to the municipality

#### Regulatory work

- Make more explicit the development rights of land owners and developer by indicating on a map the permissible floor area ratio;
- Give a deadline to Boroughs for completing their detailed zoning plans;
- Develop and monitor spatial indicators to guide future metropolitan strategy;

Management of cities land assets

- Make an inventory of municipal land assets.
- Sell commercial property owned by the municipality; do not try to manipulate the market by using municipal land assets;

Infrastructure development

- Implement the planned investments in roads and bridges
- Provide the primary infrastructure required to develop the 100 km2 of buildable vacant land within the municipal area

### B. Warsaw's Municipal Strategy

The strategy prepared by the municipality of Warsaw set the international context in which the future development of Warsaw is going to take place: Warsaw is competing with Prague and Budapest and, to a certain extent, even with Berlin to become one of the leading metropolis of Central and Eastern Europe. To win this competition, Warsaw must improve (i) <u>the efficiency of its labor and consumer market</u> and (ii) <u>the quality of its urban environment</u>. If these goals are achieved, Warsaw will be able to retain its existing highly skilled labor force; it will become an important regional service hub and the preferred headquarters location of many international corporations and organizations in Central and Eastern Europe.

If this strategy is successful, households and enterprises in Warsaw will receive an economic and environmental benefit. Given the role of Warsaw in the Polish economy, additional economic benefits are likely to be distributed widely among Polish households outside Warsaw metropolitan area.

The Municipal strategy contains the following explicit strategic goals:

- Improving residents' living environment and the city attractiveness;
- Expanding and improving municipal transportation system;
- Creating conditions to stimulate economic development;
- Ensuring that development process in Warsaw is harmonious, and integrating metropolitan area further.

The municipality disposes of 3 tools to achieve the spatial integration of its labor market and the environmental improvement mentioned above:

- The land use regulatory framework
- Strategic infrastructure investments
- Local taxation

The Warsaw Municipal Strategy contains a description of the regulatory framework and of a program of infrastructure investments. The strategy does not contain any local taxation component as yet. We are going to analyze how the proposed regulatory framework and the infrastructure investment program are likely to contribute to the implementation of the Municipal strategy. A discussion of local taxation and user and impact fees is beyond the scope of this report, but Municipal authorities should bear in mind that (i) local taxation should be part of the strategy, and (ii) taxation, user and impact fees<sup>3</sup> have a spatial impact which should be consistent with the overall spatial objectives.

### C. Spatial Implication of Strategy

The objectives of the strategy could be summarized into 2 main themes. The first one is economic: the creation of an integrated labor and consumer market of 2.5 million people; the second one is environmental: creating an urban environment worthy of one of the cultural capital of Europe. The two themes are closely interrelated. A polluted and boring city does not retain skilled workers; neither does it attract foreign investment in the service sector. A city with a weak economy cannot afford to clean its environment, maintain its parks and forests, and can even less support world class cultural amenities like museums, concert halls, art festivals, etc.

In the following section we will discuss the spatial implications of the two main themes – economic and environmental – of the Municipal strategy.

#### a. Creating an integrated labor market of 2.5 million people

The real size of Warsaw's labor market is the main issue. The population of Warsaw Municipality was 1.6 million people in 1996. An additional 0.9 million people were living in suburbs adjacent to the municipal area. If the population of the municipal area and the population of the suburbs were sufficiently integrated to form a unified labor and consumer market of about 2.5 million, Warsaw would be the 6th largest capital City of Central and Western Europe<sup>4</sup>. (See Figure 1) If the spatial integration between municipality and suburbs is not successful, labor markets will stay fragmented and Warsaw will never have the economic weight that would be suggested by its position as the capital of the largest country of central Europe. The spatial integration of the suburbs in the Metropolitan economy is therefore one of the key factor in the success of the strategy proposed by the Municipality.

<sup>&</sup>lt;sup>3</sup> Impact fees are fees that are collected at the time of construction. They constitute the financial participation of the private sector to the primary infrastructure costs incurred by the municipality. Impact fees are usually calculated on a per m2 basis. For instance, there might be an storm drainage impact fee rate calculated by applying the rate to the total impervious area built on the site. Other impact fee rate might correspond to the floor space, or to the number of parking space. The fee is recovered only at the time of construction, it is not a recurring tax like a property tax. <sup>4</sup> After London, Paris, Berlin, Madrid and Rome.



## (1) Suburban areas should be integrated through consistent land use policies across administrative boundaries

Obtaining the spatial integration of the population living within the metropolitan area of Warsaw will not be a trivial matter. The 2.5 million inhabitants of greater Warsaw are already spread on a radius of about 45 km, this radius is significantly greater than the one within which live the current population of London, Paris, Berlin or Budapest<sup>5</sup>. (See Figure 2) The current trends are not encouraging: the population of the suburbs is growing, dispersing further away while the population of Warsaw's municipality is decreasing in spite of large amount of vacant land already marked for development (about 110 km2 or about 23% of the total area of Warsaw's municipality) and the under-utilization of many already developed areas.

<sup>&</sup>lt;sup>5</sup> London: 30km for 6.6 million inhabitants, Paris: 23 km for 7.9 million inhabitants; Berlin:40 km for 4.2 million inhabitants; Budapest: 21 km for 1.9 inhabitants.



While population dispersion seems to have increased in the last 10 years during the economic transformation of Poland into a market economy, we strongly believe that the current spatial trend is not inherent to the functioning of markets but, rather, is due to market distortions created by a number of administrative, regulatory and infrastructural failures largely inherited from Poland's communist past. To correct these failures one must not fall back into a dirigiste trap but on the contrary rely on market mechanisms. Identifying and correcting these failures with market driven solutions will be the major tasks in the implementation of the strategy.

The future spatial structure of Warsaw metropolitan area will be shaped by the interaction between market forces and the 3 municipal tools mentioned above – land regulations, infrastructure investments and, taxation. The success of the strategy will depend on the internal consistency between the regulatory measure, the infrastructure investments and the local taxation system. But this consistency must also be spatial. It will not be possible to achieve consistency of objectives if the metropolitan area remained divided into completely autonomous entities. Under the present administrative system, there is no guarantee that the towns, communes and municipalities located outside the municipal boundaries coordinate their land use regulations, their investments and their taxation with Warsaw Municipality. Judging from the empirical evidence in other metropolitan areas around the world, there is even a strong chance that suburban local authorities will have a perverse incentive not to coordinate their spatial policy with Warsaw's municipality.

One of the first recommendations contained in the Municipal Strategy is the creation of a new administrative and political layer called the Warsaw Metropolitan Area. We believe that the objectives of the municipal strategy cannot be achieved without the creation of a Metropolitan Area as already recommended by the Municipal Strategy. At present, the area administered by the municipality of Warsaw covers only about 50% of the Metropolitan built-up area and about 65% of its population. Because the main objective is spatial integration, it is probable that the use of the 3 tools mentioned above (regulation, infrastructure and taxation) may have perverse side effects if applied only to part of the metropolitan area. For instance, the coordination of public transport investment and land use regulations should inter-react with the market to create high land use intensity areas in selected locations, increasing the supply of floor space. If across the municipal border this coordination were not possible, densities would likely remain low as either the transport investment, or the regulations or the primary infrastructure allowing these densities would be missing.

The creation of a Warsaw Metropolitan Area is of course a political issue that has to be solved at the national level. If this was not possible, the municipality of Warsaw will have to consider the suburban towns and municipalities as competitor for growth rather than partners and will have to adjust its development strategy accordingly. The consequence of this competition for private investments should be a lowering of environmental standards on both side of the municipal boundary. In the absence of across boundary coordination, it would be foolish for Warsaw's municipality to pursue an "optimum" environmental policy, as the environmental outcome of such a policy would be likely to be much worse than a "less than optimum" one. This apparently paradoxical conclusion can be illustrated by the following example.

The graph of <u>Figure 3</u> illustrates the boundary effect of uncoordinated land use regulations across administrative boundaries. On this graph, the distance from the city center in kilometers is on the horizontal axis and the population density in people per hectare is represented on the vertical axis. The line A-B shows the location of a municipal boundary. The territory of a municipality where densities are strictly controlled through zoning regulations is located to the right of A-B. On the right side, an autonomous suburban town will adjust densities according to



supply and demand. In the absence of regulatory constraints the density would have followed the curve C-H across the municipal boundary. We assume that in the built-up area, located between C and D, the density is following the unconstrained market curve. On the vacant land located between E and F, the municipality, for environmental reason, imposes a density of 45 persons per hectare – a density much lower than the one that would have been generated by an unconstrained market. Developers find a much more congenial regulatory environment

on the other side of the municipal boundary (line A-B), they therefore adjust density to level G to meet the additional demand which has been generated by the regulatory constraint on supply on the municipal side. Eventually density get back to its market equilibrium level at point H. After a few years, the density profile of the metropolitan area (municipality + suburban towns) will look like the broken line made by the segments CDEFGH.

What is the practical consequence of this density profile?

- a part of the population which would normally have lived between E and F has been pushed away several kilometers to the areas between G and F outside of the municipal territory, increasing travel distance, travel time, and pollution due to transport, possibility fragmenting the labor market. In addition, the municipality has lost a number of taxpayers who would still most likely commute to the center where they will use services paid by municipality residents.
- There is no guarantee that the original environmental objective, which prompted for a lower density between E and F, has been met. The higher density between G and H might be more damaging to the environment than the market driven density that would have occurred along the curve DH if the density had not been regulated to the level EF.

One could ask what would have happened if the municipal boundary had been farther to the right of H and if the density controlled by regulations had been maintained at the level E up to the point J? In this case, outside the areas where the density is limited to density E, the price of land would have risen significantly, triggering incentive for densification and redevelopment in other areas of the city. This desirable result would have happened, providing that regulations would have allowed densification in already developed areas and that some vacant land adjacent to EF had been zoned at densities similar to the market driven density represented by the curve segment DH.

The case study described above might appear theoretical to some, but in reality the problem of density control across boundary has created serious spatial pathologies in a large number of administratively fragmented metropolitan areas. It is possible that a density profile similar to CDEFGH has already occurred in Warsaw between the municipality and the suburban towns.

<u>Figure4</u> illustrates the problem of regulations across boundaries with a real case. <u>Figure 4</u> shows the density profile of Barcelona municipality compared to the density profile in the rest of metropolitan area. One can see that the case of Barcelona is even more dramatic than the theoretical case study presented above. The density in the suburban towns adjacent to the municipal boundary is even higher than the density in the center of Barcelona. The consequences

for the functioning of the metropolitan area are serious. Barcelona has one of the worst performances of among European cities in terms of population dispersion in relation to its built-up area.



The issues raised by the inconsistent regulation of land use across administrative boundaries are very serious. Warsaw should face this issue squarely. If the problem cannot be resolved within a reasonable amount of time, the municipality of Warsaw should amend its land use strategy. Decision affecting land use regulations should take into account the boundary effects discussed above. Ignoring the boundary effects created by the lack of consistency across administrative boundaries might result in a complete failure on all

fronts during the implementation of the strategy: fragmented labor markets, higher transport overhead costs and a more polluted environment.

Indicators should be developed to measure Metropolitan spatial integration. Jump in density or land prices across administrative borders indicate a lack of integration. The integration of the labor market can be measured by surveys, but also by indicators such as transport isochrones, which measure the number people who have access to the CBD for a given travel time. The dispersion index, which measure the ratio between the average distance per person to the CBD and the radius of the built-up area is a simpler physical indicator that can be used to compare Warsaw metropolitan dispersion with other cities of Europe.

## (2) The largest area possible should be submitted to market forces to promote land recycling, and increase land use intensity,

Inconsistency of regulations across administrative boundaries is not the only cause of labor market fragmentation. The successful economic development of a city requires that all commodities be priced by the market with a minimum of distortions, and land is one of the most important commodities in an urban economy.

Serviced land accessible to a large highly skilled labor force is a scarce commodity. The most accessible land is located around the city center where public transport and the road network converge. It is therefore important for the development of the city economy that the land the closest to the center be submitted to market forces and developed with a density consistent with its market price. While some areas should be explicitly protected from land market pressures – as we will see in the next section – in and around the central business district, land use intensity should

be mostly market driven. The underutilization of potentially valuable land in and around the city center has obvious spatial consequence: if land is wasted in the center, more land will have to be used in the periphery at a longer distance from economic activities. The labor market will be dispersed and possibly fragmented.

The successful implementation of Warsaw's strategy requires therefore the municipality to take the necessary steps to have the largest possible area of land submitted to market forces. A number of factors are preventing the economic development of urban land in Warsaw. We will see below that, within Warsaw municipal limits, inadequate or imprecise land use regulations, tenure uncertainty, the underutilization of large government land holdings may contribute to land use underutilization and, therefore, to labor market fragmentation.

## *(3) Investment in new primary infrastructure should allow the development of new areas close to the center*

The market, however, is usually not able to develop the primary infrastructure required to use land to its best potential use. At present, large areas of land within the municipal limits are impossible to develop because of lack of primary infrastructure. If the municipality could not find a cost recovery mechanism to pay for this infrastructure, large area of otherwise well-located land would stay undeveloped. The spatial development consequence is easy to forecast: Warsaw metropolitan area will develop further along the primary transport radials, bypassing large areas of vacant land located much closer to the city center.

### b. <u>Creating an urban environment worthy of a cultural capital of</u> <u>Europe</u>

The improvement of the quality of the urban environment will also requires a unified and consistent approach between the city current municipal area and its suburbs. Therefore, the recommendation concerning the creation of a metropolitan authority coordinating policy across administrative boundaries is also a requisite for the improvement of the urban environment.

As seen above, meeting the economic objective of Warsaw's municipal strategy requires putting the market in the driver seat and removing as many regulatory obstacles as possible to avoid price and spatial development distortions.

By contrast, some of the measures required for improving the urban environment will consist in weakening market forces within clearly delimited perimeters. Other environmental measures, however, will consist in removing regulatory supply constraints and therefore a strengthening of market forces. To describe the spatial implications of the municipal environmental strategy, we will therefore look first at the objectives that will require a weakening of market forces, then at the ones requiring a strengthening of the functioning of markets. We will discuss later how this apparent contradiction can be solved.

## (1) Historical and natural zones have to be protected by a weakening of markets forces inside clearly delimited perimeters.

Warsaw contains a number of attractive historical areas, which have been preserved or reconstructed. These historical areas play an important cultural role for the citizens of Poland and for the foreign visitor; the importance of this role cannot be measured by their real estate value. Many of these areas are close to the city center where the real estate pressure is very high. Without a regulatory shield, historical monuments would soon disappear and be replaced by new structures, or possibly, adjacent modern buildings, which height and bulk would be commensurate with the

value of the land on which they are built, would dwarf them. The same reasoning could be done for the preservation of the natural environment: forest, parks, river views and embankments etc.

The preservation of historical and natural sites requires therefore severe restrictions on land use in selected protected zones, and, as a consequence, an increase in area and more dispersion outside these protected zones than would have been the case if the markets had been unfettered in the entire metropolitan zone. Identifying carefully the zones to be preserved and the land use constraints that will be applied can solve the apparent contradiction with the economic objectives. A common mistake is to promulgate regulations in overlapping layers. Regulations aiming at land use efficiency and encouraging density are set in one layer, while regulations contained in the other layer aiming at preservation discourage redevelopment and densification. The solution lay in a clear separation of the perimeters where the market will dominate and the perimeters where regulations will weaken market forces to preserve historical and natural sites. The balance between the two zones is a political choice.

## (2) Maintaining a high share of public transport requires a compact city and a well functioning land market.

For environmental reasons, Warsaw's municipal strategy calls for maintaining public transport as the main mean of transport in the metropolitan area,.

With 66 % <sup>6</sup> of all non-pedestrian trips, the current share of public transport is very high. Public transport, in the majority of cases, creates less pollution and requires less road and parking space than individual transport. European cities have a tradition of public transport that certainly contributes to the attraction of their urban center by making it more accessible and by having a larger proportion of land area devoted to pedestrians over the areas devoted to cars. However, the development or even the maintenance of public transport as the main transport mode is very dependent on the type of urban spatial structure. The municipal strategy concerning public transport has therefore a direct spatial implication that is analyzed below.

Public transport has a supply side and a demand side. Local government often assume that increasing the supply and quality of public transport will automatically increase demand for it – that creating new tramway, buses or metro lines will create demand for their use. This is of course not true. In most European cities, public transport is provided by the municipality or a quasi-government company and is heavily subsidized. When demand for public transport falls, it is often assumed that the quality of services or the amount of subsidies would have to be increased to reestablish demand at its previous level. In fact, a fall in demand for public transport is often caused by a change in urban spatial structure. Changing land use patterns may lower demand for public transport in an irreversible way. When this happen no supply response can reverse the trend.

Public transport remains a viable choice for the majority of the population when the main centers for employment, retail and culture are concentrated in one central location and when a large part of the population is living in high or medium density residential areas.

There is a definite threshold of residential density below which public transport becomes a non-practical mean of transportation. Distance between bus or metro stops cannot be much longer than 1600 meters. The population served by a public transport stop is therefore not larger than a circle with an 800 meter radius (corresponding to a walking time of 15 minutes) or a catchments area of 11.5 hectare. The frequency of service of public transport is linked to the potential demand for transport in the catchments area. The lower the density, the lower is the demand for transport per stop, the lower will be the frequency of services. For instance, the average density in the catchment areas of all the Warsaw's metro station operating at the moment is 133 people per

<sup>&</sup>lt;sup>6</sup> Warsaw Transportation Survey, 1988, Warsaw Municipality, Department of Land development, p13.

hectare, this should be compared to the average density in the built-up area of Warsaw of 67 people per hectare.

A low frequency of services (meaning long waiting period between buses or metro cars) makes it impractical for households to use public transport. Therefore there is a direct link between residential densities and the use of public transport.

Densities corresponding to market demand are usually higher than the ones permitted by most land use regulations. Land use regulations usually limit height, density, floor area ratio, plot coverage, etc. The objective of these restrictions may be aesthetic, environmental, or due to infrastructure limitations. The result is always to decreases the densities that would correspond to market demand. In order to meet the public transport share objective, land use regulations should therefore interfere as little as possible with the densities corresponding to market demand. One must bear in mind that in this case, this recommendation is not made to gain economic efficiency but to protect the environment.

The dispersion of jobs, retail and cultural activities across the metropolitan area and away from the traditional center contributes also to decrease demand for public transport. In very large cities, this dispersion will always occur, but it can be accelerated by poor regulations preventing the transformation of land use in the city center, or by tenure problem in the central area.

#### (3) Improving housing conditions is both an environmental and economic objective

The improvement of housing conditions is part of both the environmental and the economic objective. Households always put a high value on higher housing consumption as part of the quality of their urban environment. But improving housing conditions is also an economic objective as there is neither labor mobility nor economic growth without a vibrant housing market.

Many factors contributing to the dynamism of the housing market are beyond Municipal government control. This includes inflation, interest rates, national taxes, productivity in the construction industry, etc.

However, municipal governments control three very important factors affecting the supply of housing: (i) the area of land which can be used for housing construction, (ii) the intensity of use permitted on this same area of land, and (iii) the time required and the complexity to obtain a building permit.

Regulations that prevent land from being developed contribute to the high price of housing by reducing the overall supply of land. While some areas must be protected from market forces, as we have seen above, there is a definite trade off between preventing development in large areas of land in urban areas to protect the environment and increasing the supply of land to make housing more affordable to the majority. A delicate balance between the 2 objectives has to be struck. For a large family living in small apartment it is of little consolation to have a large park near by.

Regulations mandating low residential densities are often associated with sound environmental practice. The opposite is often true. Low residential density, as we have seen above, render public transport inefficient, increase commuting time, and obviously, by consuming more land per person, put a higher pressure on the natural environment. At the same time, low residential densities mandated by regulations raise the price of housing for low-income households and reduce their housing mobility. Theoretically, low-income households could afford to locate anywhere in the metropolitan area providing they are allowed to adjust their consumption of land. When regulations mandate low density, they fix the amount of land that will have to be spent to buy a unit of floor space and therefore prevent low-income households from locating in the area.

I am not implying here that high residential densities are superior to low density. On the contrary, low residential densities have a number of advantages, but in the majority of cases



densities should be established by households' preferences rather than by government fiat. High densities are very rarely mandated by regulations.

# c. Summary of the spatial implications derived from the Municipal Strategy

To implement the strategy, the municipality disposes of 3 tools: land use regulations, infrastructure investments and taxation. To meet the economic and environmental objectives of the strategy land use regulations and infrastructure investments should be designed in such a way as to allow a spatial development as compact as the market dictates, with the exception of well delimited areas where historical and environmental constraints will require a suspension or a weakening of market forces.

In the section below we will first analyze the current spatial structure of Warsaw and second we will look at the way the regulations and the infrastructure investments are consistent with the objectives of the strategy.

#### D. Current spatial trends, municipal strategy and corrective actions

The main feature of an urban spatial structure is the geographic distribution of inhabitants within a metropolitan area. This structure is shaped by the interaction between market forces and land use regulations and primary infrastructure. Some types of spatial structures are more efficient than others at promoting economic growth by allowing a good integration of labor markets. For a given population, the cost of building and operating infrastructure and transport network depends also on the spatial structure. For this reason, it is important to monitor the evolution of urban spatial structures and to take corrective action with appropriate regulations and infrastructure investments when the spatial structure departs from the Municipal objectives. Most urban spatial structure problems are caused by inappropriate regulations and administrative structures and poorly developed primary infrastructure networks.

The concept of spatial structure appears a little abstract. <u>Figure 5</u> could help in visualizing it. It shows a 3 dimensional representation of the spatial structure of Warsaw. The city is divided into neighborhood mapped in the X and Y dimensions. The number of people per neighborhood is represented in the Z vertical dimension. The urban structure of Municipal area is thus represented by a 3 dimensional solid, which can be further analyzed for its geometric properties.





### a. Spatial trends

### (1) Average density, average land consumption

Within the municipal boundaries of Warsaw, the average density of the built up area<sup>7</sup> is 67 peoples per hectare or about 150 square meters of land per person. This is a "normal" density among the cities of Central and Western Europe (Figure 6), it could go up or down about 20% in the future without putting Warsaw in an outsider position in term of density and land consumption. The successful implementation of the municipal strategy would imply that the average density will rise as plot of land with obsolete land use – in particular obsolete industrial areas – are recycled. The average density is an important indicator, which should be monitored in the future.



<sup>&</sup>lt;sup>7</sup> The built-up area is defined as all areas which are built or paved or unpaved and less than 4 hectares. Areas for roads, utilities, parking and open space below 4 contiguous hectares are included, but large parks, forests, agricultural land and airports are not included.



#### (2) The spatial distribution of densities

The map on <u>Figure 7</u> shows the spatial distribution of densities within Warsaw's municipal boundary. One can see the high-density fingers extending from the center and the fragmentation of the built up area. Actually only 44 % of the area within the municipal boundary is built-up.



Figure 7: Map of population densities in the built-up areas within the Municipal boundaries



#### *(3) The profile of densities*

The map of <u>Figure 7</u> shows a complex structure that is difficult to analyze. It is easier to understand the spatial structure of a city by measuring average densities by equal interval from the city center. The graph shown on <u>Figure 8</u> shows the profile of population density from Warsaw's city center (Crossing of Jerozolimskie and Marszalkowska Av.) outward. <u>Figure 8</u> shows a profile of density that is a close approximation of a negatively sloped exponential curve – apparently an



urban economics textbook This is a surprising result, case. as during 40 years Warsaw developed under a command economy and the pre-war city was nearly entirely destroyed during the Second World War. It must be given as a tribute to the planners and architects who reconstructed Warsaw in the post years without the war that guidance of а market thev reconstructed citv whose а structure mimic the one which would have been obtained by markets.

The density profile of  $\underline{Figure 8}$  is useful to test the

structural change that are projected to occur in the next few years if the municipal strategy is successfully implemented. The red line on <u>Figure 8</u> represents the new density according to the projection of Warsaw's Planning Department. We see that there is a slight decrease of density in the center, and a significant increase in the areas beyond 8 km from the center. Land use regulations indirectly control densities. It would be important therefore to analyze land use regulations to make sure that they will allow the densities that are currently projected.



#### Figure 9: Comparative Density profile of 11 European cities

#### (4) Warsaw density profile compared to other cities of Europe

The profile of densities is a good indicator of the functioning of land markets during the historical life of a city. <u>Figure 9</u> Shows the density profile of 11 European cities, divided into 3 categories: (i) cities where markets have operated continuously through their history, (ii) cities of Central Europe where markets were interrupted for about 40 years, and (iii) cities of the former Soviet Union where markets were interrupted during 70 years. It can be observed that – among the cities with a socialist past – Warsaw's density profile is the closest to market economy cities and do not show any of the profile's disturbances seen in other socialist cities and observed in a more dramatic way among former Soviet Union's cities.



## (5) The spatial distribution of land prices: market forces shaping Warsaw's spatial structure.

Figure 10 shows the average spatial distribution of land price from the city center toward the periphery. The sharply decreasing curve of Figure 10 shows that Warsaw is still a very monocentric city. Because of the efficient radial public transport system and the lack of ring roads and bridges on the Vistula, the center is the only location with good access and therefore land prices reflect this privileged accessibility. Accessibility drops sharply as soon as one follow one of the high-density fingers observed on the density map. There is also a contradiction between the relatively high density observed on Figure 8 between 3 and 12 km from the center and the very low price in the same area seen on Figure 10. In a market economy, the density profile and the price profile have about the same slope, as it is the land price that trigger density. We would therefore expect in the future that land prices will go up in the area between 3 and 12 km from the center as the Municipal strategy is implemented and as accessibility at the periphery of the center improves with the investment program in infrastructure. We can already observe the effect of the metro on land prices in the periphery (better access= higher density). The red line on the graph of Figure 10 shows the land price along the metro line. One can see that the land price at the end of the metro line is about 4 times the average at this distance from the center. This price increase is most probably in large part attributable to the metro. The vacant land located near the end of the line has been recently developed at high density. This is a sign that land markets and regulations have been working in harmony at least in this case. As accessibility of the rest of the municipal area increases it is expected that land value will increase significantly. The effect of new tramway lines on land prices should be similar to metro.





## b. The impact of land use legislation and of infrastructure investment on the spatial structure of Warsaw

Warsaw's spatial structure, briefly described above, is going to transform itself under the inter-reaction between market forces and the land use regulations and primary infrastructure investments proposed in the strategy. We will try to assess whether this new structure will be consistent with the Municipal strategy's objectives.

What is called in this report the Municipality of Warsaw is in fact an association of the 11 Warsaw Boroughs, which are themselves municipalities in their own rights. The respective regulatory role of the Municipality and the Borough is important and their coordination is an important issue.

#### (1) Land use legislation system

Warsaw's land use regulations are prepared under a two-tier system: the Municipal Planning Department prepares a master plan – called "binding arrangement" – that provides objectives and broad zoning guidelines in the form of a overall zoning map. The Boroughs' local authorities prepare a detailed zoning plan following the requirements of the overall zoning map. At present, no Borough as yet produced its detailed zoning plan. In the absence of detailed zoning map, development authorization and building permits are delivered by the borough's planning departments on an ad hoc basis but within the broad requirements of the "binding arrangements" plan.

In the following sections, to avoid confusion, we will call "Municipal zoning map" the "binding arrangements" zoning map, and we will call the detailed zoning map prepared by boroughs, "the Boroughs' zoning map".

We will comment, first, on the concept and possible effect of the Municipal zoning map and, second, on the effects on the market of the building permit process in the boroughs in the absence of a Borough's zoning map.



#### (2) The Municipal zoning map ("binding arrangement" plan)

A simplified version of the Municipal zoning map is shown on <u>Figure 11</u>. The concept of the zoning map is clear and sound. <u>Table 1</u> shows the detail area break down by zone. Warsaw municipal territory is divided into 3 basic zones:

- A zone where development is mostly market driven, (sub-zones C1 and MU), where mixed land use is allowed and with few restrictions on densities, except for a relatively generous height limitations. (48 % of the total municipal area)
- A special activities area where obviously noxious activities are segregated (subzones TP and UT). (14% of the total municipal area)
- A zone where market forces are seriously constrained to preserve historical, cultural and natural landmarks. (37% of total municipal area)

The proportions of the municipal area that are allocated to the three main zoning categories are consistent with the municipal objectives and their spatial implications. About 1/3 of the area of the market driven zone is still vacant. This gives a lot of opportunities to reverse the past demographic trend where the areas outside of the municipal boundaries were developing faster than the municipal area.

Distribution of land use categories in the municipal zoning map									
Area (km2)	%	Code	e Land use Type						
13.38	13.38 3%		CBD						
224.76 45%		mu	Mixed land use						
238.14	238.14 48%		(1) Market driven area						
22.24 5%		tp	Industries						
49.37	10%	ut	Technical infrastructure						
71.61	14%		(2)Segregation area for noxious uses						
3.47	1%	c2	Central Historic District						
3.59	1%	с3	Central Academic area						
6.43	1%	c4	Central recreation district						
12.06	2%	mu1	Residential with coverage restrictions						
2.65 1%		mu2	Academic area						
25.49 5%		um	Housing and services						
63.07 13%		o1	total ban on investment						
22.40 5% <b>o2</b>		o2	recreation only						
26.28	5%	о3	single family housing very low density						
5.57	1%	o4	special green zones						
13.35 3% <b>r</b>		r	river						
184.34	37%		(3) Protected areas						
494.09	100%		Total						
Table 1 : Area Distribution by zoning categories									



#### Figure 12 Warsaw- Regulatory zones per km from the city center

<u>Figure 12</u>. Shows the spatial distribution of land use zoning categories corresponding to the map of <u>Figure 11</u>. It is probable that if the functioning of land markets had not been interrupted for 40 years, there would be less land dedicated to industries and utilities and that this land would be located more toward the periphery, if not outside the Municipal boundary altogether. This graph shows – between 9 and 19 km from the center – the large amount of land that is outside the regulatory jurisdiction of Warsaw's Municipality.

#### (3) The Boroughs' zoning map.

The individual Boroughs have not yet completed their detailed zoning maps, and it the opinion of the authors of this report that they are unlikely to complete them soon. Detailed zoning maps require drawing precise boundaries over real properties and making public the development rights corresponding to the boundaries between zones. This process affects immediately the land value of the current property owners. Boroughs' local officials are, understandably, not eager to confront the landowners from their constituency that might be unhappy with the way the new zoning affect the value of their property. Apparently, the climate in Poland in the last few years has been particularly litigious. Boroughs' officials are therefore quite happy with the status quo. They have a municipal map that they can refer to when a zoning decision is needed but they can negotiate with individual development or building permit applicants the details of their property rights. And when a zoning conflict arise, it is easier to deal with one individual than with an entire neighborhood, which would be the case if a detailed zoning map were to be published.

What are the long terms consequences of this state of affair? There are a number of reasons to be concerned if the Boroughs postpone ad infinitum the completion of the detailed zoning maps:

- In the absence of explicit zoning parameters, which are not contained in the Municipal zoning map (such as set backs, floor area ratio, etc), it is difficult to know whether the zoning is market friendly or not. It is also impossible to seriously anticipate the densities that are permitted by the zoning. It is therefore impossible to know whether the zoning as applied by the Boroughs is consistent with the municipal objectives.
- The absence of detailed zoning maps hinders the development of the land market. When selling a property, the development rights attached to the property remains uncertain. Consequently, land prices have to include a risk factor that represents the development rights uncertainty. This risk factor, in turn, might deter development on parcels of land that would get normally developed if the risk factors were absent. Some Boroughs' officials argue that property developers could ask for a development permission before considering buying a property, in order to know what development right is attached to the property. This is not a practical solution, as it slows down decision making, it restricts the number of alternative plot considered and it add to the administrative overhead of the developer.
- There is always an appearance of administrative arbitrariness and even a possibility of corruption when zoning laws are "negotiated" plot by plot.

Boroughs detailed zoning maps should be prepared as soon as possible. Possibly, the laws governing public hearings and approval process should be modified to give a fair hearing to public opinion while not paralyzing local government regulatory initiatives.

When the Boroughs zoning maps have been completed, Warsaw Municipality should tally the zoning parameters contained in them and calculate the resulting permissible floor area ratio  $(FAR^8)$  per zone for the entire Municipal area. Because of the multiplicity of layers of different land use regulations, it is important that developers be aware of the overall effect on the use of land. For instance, regulations might restrict ground coverage, building heights and set backs from plot boundaries. The combined value of all these regulatory parameters is captured by the FAR. The FAR is also directly linked to densities. The Planning Department of Warsaw's Municipality should use the FAR to extrapolate permissible densities and superimpose these densities to the current densities (graph of <u>Figure 8</u>) to verify that the overall effect of the land use regulations as implemented by the Boroughs are consistent with the Municipal objectives contained in the strategy.

#### (4) Land tenure and property rights

Uncertainty about property right is freezing a large amount of land within the municipal boundaries. Although this issue is not directly under the Municipal Government control, it has a large negative impact on the spatial structure of the city. Plot with uncertain tenure do not get developed. Because uncertainty of tenure affects mostly parcels of land in the central area of the city, it result in (i) freezing the most valuable land assets in the city, and (ii) increasing the dispersion of people and jobs away from the central city – the area the most accessible by public transport. Solving tenure problems in the central city should be one the most important priority of

<sup>&</sup>lt;sup>8</sup> The floor area ratio (FAR) is the ratio between the total area of floor space that may be built on a lot divided by the area of this same lot. For instance a zone with a FAR = 0.5, applied to a plot of land of 2000 m2 means that the regulations allow a developer to build a maximum of 1000 m2 on this plot. The price of land is often linked to the permissible FAR. The lower the FAR, the lower the price of land per m2 but the higher the price of property, as it increases the amount of land that is needed per m2 of floor space.



the Government. If not properly addressed, this issue could jeopardize the economic and environmental objectives of the Municipality.

Large Municipal land holdings in the central city are also an issue. The strategy document mentions that "today 30% of the Warsaw area, mainly within its prewar limits, is owned by municipal authorities or by state owned enterprises. Outside of these limits, however, the land is predominantly in the hands of private individuals." The strategy mentions further that these land holdings could be used to regulate the land market by retaining or releasing land in order to match supply and demand and keep price down. This is the single issue with which the authors of this report disagree virulently with the Municipal strategy. There are 2 reasons why the municipality should not hold land beyond what is necessary for the services it provides. One is ethical, the other is practical.

The municipality is a regulator. It should pass laws impartially, to the best of its ability in the common interest. The municipality cannot be at the same time a regulator and a player in the land market. What would be the credibility of a municipality that will be making laws that will affect the value of its own land holdings, which would be subsequently traded? The fact that a number of municipalities around the world are engaged in this disingenuous game does not justify the practice.

The second reason why the municipality should not engage in what has been called "land banking" in other part of the world is that it does not work. Real estate is a subtle trade that is better played by competing professionals with losers and winners. Civil servants have not proven competent in managing large real estate assets. Municipal land assets are typically either under used, or a factor of government corruption, or so inadvertently managed that it has resulted in extreme land shortage and very high land prices. The track record of Municipalities as landlords is very poor, in every country that I know of, without exceptions.

We suggest that the Municipality makes an inventory of its land assets that are not directly required to provide Municipal services like public parks, bus terminals, social and administrative services. The Municipality should then produce a selling plan over a period of , say, 5 years for all the parcels of land falling into the category of "non directly related to municipal service".

#### (5) Ring road investments

The Municipal strategy includes a number of planned infrastructure investments that will have an influence on the spatial structure of Warsaw. These are:

- Additional bridges on the Vistula
- Construction of an inner ring road
- o Construction of external metropolitan bypass

• Extension of primary roads, water and sewer network in areas not yet developed These investments will contribute to the transformation of Warsaw's spatial structure in a manner that is entirely consistent with the strategy and the economic and environmental objectives mentioned at the beginning of this report. The planned investments are represented on the Map of Figure 13.



The new ring roads will provide better accessibility between different parts of the city, which up to now had good connections to the center but poor connections between themselves. How is the land markets going to react to this increased in accessibility? Increased accessibility will be reflected by increased land price in the areas affected. We could anticipate the relative land prices to move from its original steep drop to a higher price level similar to the red curve shown on Figure 14.



The increase in land prices triggered by better accessibility should not be cause of alarm. To the contrary, increased land prices will stimulate land use changes (in areas where the regulations permit it) and therefore improve the overall land use efficiency of the city. Higher relative land prices indicate a surge in demand for land located close to the city center, which is exactly one of the spatial objectives of the strategy.

On the other hand, the increase road accessibility caused by the bridges and ring road will encourage more dispersion of employment and retail away from the

city center. Providing this employment and retail stays within the municipal boundary – and the location or the ring road and by-pass insure that it will be the case – the objective of the strategy will still be met.

#### (6) Public transport investments

A number of public transport investments are planned as an integral part of the Municipal strategy. These investments are:

- o Extension of Metro
- o Extension of tramway lines
- Creation of suburban rail company that would run the existing suburban rail service independently from the National Railway Company.
- $\circ$  Improvement and coordination of the entire public transport network

Investment in public transport will reinforce the monocentricity of the city and will make the city center more valuable by making the center easily accessible by a larger number of people. The metro is already partially implemented and is serving one of the densest "high density finger" mentioned above. Its northern extension is also planned in a high-density area. (See Figure 15).



Figure 15: Catchment of 800 m around metro and railway stations

	Current Metro line		Railway		Tramway	
		projected		projected		projected
	1997	2015 (1)	1997	2015	1997	2015
Total Population in station catchment areas	217,104	232,179	238,727	264,979	1,157,470	1,229,925
percentage of total population in Municipality	14%	13%	15%	15%	73%	68%
Total Area in catchment area (Ha)	1,627	1,627	4,813	4,813	14,545	14,545
density in station's catchment areas (p/Ha)	133	143	50	55	80	85
number of stations	11	11	34	34	na	na
average number of people per station	19,737	21,107	7,021	7,794	na	na

#### Warsaw - Average number of people within 800 meters of metro, railway stations and tramway

(1) Based on demographic projections provided by the Municipality

Table 2 .Population within 800 meter of railway stations, metro stations and tramways

However, the stations of the suburban railway system are not, at present located in high-density area (with the exception of the main central stations). The map of <u>Figure 15</u> shows a catchment area of 800 meters around each railway station. The number of people in these catchment areas is shown on <u>Table 2</u>. We can see that under the current land use, metro stations have on average nearly 3 times more people per station than the railway stations. A density of about 50 people per hectare around suburban railways stations might not be sufficient to support the system in the future, unless land use around the stations changes and become much denser.

At present only 14% of the population within Warsaw's municipal boundary live within 800 meters of the current metro stations, another 15% are located within 800 meters of railways stations, while73% are located within 800 m of a tramway line. While rail and metro stations may attract additional people who may take a bus to the stations from outside the catchment area, transfers greatly decrease the attractiveness of public transport, in particular in cities where cars are affordable to a large number of households.

It is clear that if public transport has to stay the main mean of transport in Warsaw, tramway will continue to play a major role and will continue together with buses to carry the bulk of passenger load. Tramway will be more efficient than buses if the city is able to maintain its monocentric pattern. In Warsaw, tramlines are mostly built on their own right of way and therefore will not be greatly affected by the congestion produced in the future by the higher use of private cars. Buses, on the other hand, have the advantage of being more flexible to accommodate the decentralization of activity centers that may occur in the future. For instance if the construction of the ring road and the bypass triggers a dispersion of jobs and retail locations, buses would be the only mode of public transport able to carry passengers to their new destination but they will have difficulties in competing with private cars.

The Municipal strategic objective concerning public transport has a better chance of being met, first if the city is able to maintain its dominant monocentric structure in the years to come and second, if the land use in the center and around railway stations increase significantly in intensity.



Because "Nothing succeeds as planned"<sup>9</sup> Warsaw's municipality should monitor the implementation of the spatial aspects of the strategy by developing spatial indicators. These indicators should be updated at least twice a year. If these indicators show a trend that departs significantly from the strategy, regulatory tools or investment programs will have to be modified to correct the trend, or under the worse scenario, the strategy itself will have to be modified to reflect more realistic objectives.

The following indicators should be developed and monitored:

Real Estate

- Map of Building permits and building permits per distance from the city center;
- Map of Occupancy permit and Occupancy of permits per distance from the city center;
- Map of real estate Investments (\$per m2 of land)
- Land prices and rents (map and per distance from center)
- Median housing price
- $\circ$  Densities
- o Differences between permitted FAR and built FAR per zone;

Transport

- Average distance per person to the center
- Traffic count at peak hour
- Passengers per transport mode
- Number of registered cars

As a first step, the Municipality should develop a spatial demographic model showing the geographical distribution of densities, built-up land and population disaggregated between Warsaw's Municipality and the suburban towns. An example of such a model is presented in Figure 16. This model is based on the data available from the census and the land use maps provided by the municipality for the area within the Warsaw's municipal boundaries and very rough approximation from census data and maps for the area outside the municipal boundary. Obviously better data will be required to monitor the development of the metropolitan area outside Warsaw's municipal boundaries.

<sup>&</sup>lt;sup>9</sup> Joseph Heller in "Good as Gold"



Figure 16: Preliminary spatial model for the development of Metropolitan Warsaw.

## F. Summary of main recommendations

The regulatory proposals contained in the Municipality zoning plan ("binding arrangements") and the infrastructure proposals are consistent with the Municipal objectives. However, the success of the implementation of the municipal strategy depends on the following actions listed below being taken as a priority. Some of these actions have already been recommended in the Municipal strategy. The list of priorities is divided into 2 parts: in the first part are the actions that will affect the municipality but that has to be taken at a higher level of government, in the second part are the actions that can be taken by the Municipality itself.

#### (1) External to the municipality

- Create a metropolitan authority that could coordinate land use regulations across administrative boundaries;
- Give priority to solve land tenure problem in the center;
- Establish a suburban Railway Company to oversee the management of commuter trains

#### (2) Internal to the municipality

#### Regulatory work

- Expand the work done on "binding requirements" to the entire metropolitan area;
- Calculate the maximum floor area ratio and densities authorized by the various regulations;
- Give a deadline to Boroughs for completing their detailed zoning plans;
- Develop and monitor spatial indicators to guide future metropolitan strategy;

Management of cities land assets

- Make an inventory of municipal land assets.
- Sell commercial property owned by the municipality; do not try to manipulate the market; <u>Infrastructure development</u>
- Provide the primary infrastructure required to develop the 100 km2 of buildable vacant land within the municipal area
- Implement ring roads and by pass roads as planned