# 2 PROGRAMMES OF MEASURES FOR THE SCATTER CASE CITIES

This section presents the programmes of measures which were elaborated by the partners for the 6 SCATTER case cities, on the basis of the results and outcomes of the whole project. These local programmes of measures take into account the local opportunities and constraints and highlight the difficulties which could raise in each case when implementing the policies. The programmes for Brussels, Helsinki and Stuttgart are largely based on the simulation results.

## 2.1 Brussels

## 2.1.1 The general context

### 2.1.1.1 Brussels, a brief description

Brussels is a metropolitan area of about 2.9 million inhabitants. Moreover, it is the administrative capital of Europe and the federal capital of Belgium. Its central part, the so-called "Brussels-Capital Region", is an important centre, grouping a little less than 1 million inhabitants.

The Brussels-Capital Region is made up of 19 communes. But this administrative entity is only one part of the actual morphological agglomeration, which could be defined for example on the basis of the density or the typology of the dwellings.

The observed urban sprawl generated by the income growth (increase of car ownership, access to cottages in the countryside…) and the opening of the city to the car created a strong decline of population in the Brussels-Capital Region (loss of about 120 000 inhabitants in 30 years).

In parallel of these decrease in population in the urban centre, economic activities – with a rather stable total number of jobs (about 650 000) - were undergoing an important mutation: strong decline of industrial and heavy tertiary activities and strong growth of administrative, high tertiary functions and services to firms. The result of this evolution is an increase in the number of daily commuters and traffic congestion.

### 2.1.1.2 Issues raised by the future RER

To face the drastically increasing congestion in Brussels, the Brussels-Capital Region decided to ask to the federal government the implementation of a Regional Express Rail Network (REN), which aims to improve the global accessibility of Brussels by improving the rail services supply between the periphery and the city. Two basic principles are the guidelines of the project:

- firstly, the new suburban railway scheme will propose high capacity, rapid and frequent train services (9 new lines) to the commuters within a radius of about 30 km around the centre of Brussels;
- secondly, within the Brussels Region, the new lines will serve directly most of the high-density trip generating developments and redevelopments.

The implementation of the RER goes with ambitious objectives as regards the modal shift from private car and the total number of RER passengers. However, within studies conducted about the RER, many experts and local authorities were afraid that long term indirect impacts of the RER project could re-launch urban sprawl and, consequently, induce a new reduction of the population of the Region and contribute to its impoverishment.

Therefore, the authorities decided to start the design and evaluation of a set of *accompanying measures* to the RER, which have 3 objectives:

- ensure the quality of the whole public transport system through an integrated vision of the service to be delivered to the commuters from door to door ;
- remedy the external costs of congestion;
- counterbalance the accelerating effect of the RER on the urban sprawl and reverse the process of central-city decay.

The Brussels-Capital Region is all the most interested in reducing the sprawl that 2/3 of its financial resources are issued from the income tax on the residents of the Region.

## 2.1.2 Overview of opportunities and constraints

### 2.1.2.1 Opportunities - The priority measures

Brussels has already some opportunities to reduce its urban sprawl. Indeed, there seems to be a consensus among the authorities about a set of priority measures. Even if no legal texts have yet been set up, these priority measures are very likely to be implemented in the near future. These 5 measures have been selected because they meet 2 main objectives: achieving a modal shift towards public transport and, hence, decreasing the total car mileage, and secondly, reducing the urban sprawl. These measures are as follows:

- the implementation of a network of regional express buses (so-called "REN-Bus"), with a frequency of 4 buses/hour ; lanes will be dedicated to these express buses on radial highways leading to Brussels ; consequently, there will be simultaneously a reduction of the highway capacity for the private cars ;

- increasing the commercial speed of surface public transport (buses and tramways) in the Brussels-Capital Region (VICOM plan) ; the speed improvement could be e.g. obtained through rules giving priority to PT at the crossroads with traffic lights;

- increasing the commercial speed of suburban local buses which drive users towards the REN stations ;

- creation of "residential zones without transit traffic" in the centre and in the first ring of the Brussels-Capital Region ;

- implementation of a hierarchy in the road network in the Region (this measure is a necessary corollary of the previous one).

The impacts of these measures are favouring the Region in terms of population as well as of employment. Indeed, the set of priority measures has been simulated with the Brussels land-use/transport model (see Deliverable D5-D6[1]). The simulation results indicate that, when all the priority measures are combined, it leads to an increase by 4 000 households and 4 300 jobs in the Brussels-Capital Region. This means that 23% of the households who potentially could out-migrate towards the periphery due to the REN would stay into the Region, but these (not out-migrating) households are mostly low income households. Priority measures also multiply by 1.8 the Region employment growth induced by the REN but inhabitants of Brussels occupy only 32% of these jobs; this leads to an obvious increase in the number of commuters entering the Region from outside.

[1] For detailed simulation results, see Deliverable D5-D6 of SCATTER. This scenario is the scenario 711, "local investment plan".

Another consequence of the implementation of the priority measures is a significant modal shift towards public transport. Simulations have shown that the modal share of public transport would increase by 8.6 points and that the total car mileage would decrease by 7.2% (which means a decrease by about 840 000 vehicle-km) at the morning peak hours.

In addition, the increase in commercial speed of public transport and the reduction in congestion (the road traffic speed increases by 4%) contribute to a reduction of the average travel time towards the Brussels-Capital Region.

#### 2.1.2.2 Constraints – The institutional context

As it was said above, in the 1980's, the area around Brussels grew steadily while the 19 communes of the Brussels-Capital Region lost population ; in the same time, the number of workers commuting to the centre increased. The overall nature of employment shifted from industrial activity to office work and administration. Sprawl slowed after 1989; some re-centralisation has begun, starting in 1993. The key factor has probably been the settlement of EU institutions in and around the city centre.

After the creation of the "Region of Brussels-Capital" in 1989[2], one of the first symbols of independence was to realize for the first time an integrated regional development plan for the Region (*Plan Régional de Développement* - PRD), covering all its competences, i.e. mainly land use planning, transport planning (all transport modes except railway) and public housing. However, as it was said above, the Brussels-Capital Region represents only the central part of the actual morphological agglomeration. The Brussels regional development plan therefore covers only that part, while the rest of the urban area is managed by the development plans of the two other Belgian Regions, quite different by their philosophy and means. Urban sprawl has extended far beyond the limits of the Brussels-Capital Region, and is an issue concerning also the Flemish Region and the Walloon Region, but the institutional situation makes the management of urban sprawl particularly difficult. In fact, it relies on the existence of a dialog between the 3 Regions. But at the moment, this dialog does not exist, except in the field of transport, between the Flemish Region and the Region of Brussels.

### 2.1.3 Proposal of a strategy

The main components of the strategy proposed for the Brussels urban area are derived from the simulations which were performed with the land-use/transport models, in WP5-WP6[3]. These simulations were aimed to test policies and evaluate their impacts. The evaluation led to recommend a set of measures, which are resumed here below.

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[2] Along with the two other Belgian Regions, the Brussels Capital Region was established, and was given the same powers as the two others with regard to land-use, town planning, urban renovation, housing, public transport, the regional economy, employment, and the environment.

[3] See Deliverable D5-D6, chapters 4 and 7.

### 2.1.3.1 Criteria adopted for the evaluation of policies

The “most appropriate” measures were selected on the basis of two criteria, which were two objectives on which all the 3 Regions and the federal government agreed. The two criteria are as follows:

- urban concentration, by opposition to urban sprawl: the 3 Regions have somewhat different opinions on this issue :
  The Brussels-Capital Region wants to keep households on its territory and increase the part of inhabitants of Brussels in the total employment of the Region ;
  the Walloon Region wants to use the REN to reinforce the network of urban centres and structure its territory ;
  the Flemish Region wants to concentrate its development within the existing urban centres and reduce urban sprawl.
  Nevertheless, all the 3 Regions agree on the fact that limiting urban sprawl is an important objective ;

- reduction of the emissions of greenhouse gases (GG) due to road traffic: within the protocol of Kyoto (1997), Belgium has agreed to reduce its emissions of $CO_2$ and other GG by 7.5% compared to the 1990’s levels. Measures adopted by Belgium are grouped in its National Climate Plan, which is made up of the measures decided by the three Regions and by the federal authorities.
  Generally speaking, transport is responsible of a quite limited part of the $CO_2$ emissions (mainly produced by industry and heating). In 1999, only 13% of the $CO_2$ were produced by transport in Wallonia[4]. This rate increases to 19% in the Brussels-Capital Region because there are less pollutant industries and because of the traffic congestion which increases the $CO_2$ emissions.

One more remark has to be mentioned: most of the selected measures are fiscal or pricing measures. As such, they raise issues such as acceptability, administrative and political feasibility (e.g. with regard to the repartition of competences between the different institutions, etc). These aspects are crucial but were not considered in the current proposal for a strategy.

The next sub-sections describe each (except 3.6) one measure proposed, as a component of the strategy. Sub-sections 3.2 to 3.5 present policy measures which were simulated and evaluated through quantitative indicators. Sub-section 3.6 resumes the effects of the package of these 4 policy measures. Sub-sections 3.7 to 3.10 present measures in relation with the institutional issues, the awareness of citizens, etc.

### 2.1.3.2 Decrease of public transport fare for home-work trips

There is currently a political debate on the possibility of a reduction of fare for the railway users, or even public transport in general, on home-work journey. The hypothesis chosen for this scenario is a decrease by 20% of the price for all public transport. It is however known that such a measure is able to significantly accelerate the sprawl of households. However, this measure is a social measure and can contribute to a more sustainable development by reducing the use of car.

[4] Sources: CORINAIR, Walloon Region

Nevertheless, this measure can be considered like an accompanying measure to REN only if it is compensated by another policy, which has opposite spatial effects (which means supporting urban concentration of both employment and households).

Another way which would both comply with the objective of reducing urban sprawl and would be in line with the current political willingness to reduce public transport fare, would be to reduce PT fare *only* in the central urban area (only in the Brussels-Capital Region). Simulations have indeed shown that an improvement of the PT system, when it is implemented *only* in the urban centre, leads to an increase in population and jobs in that urban centre.

#### 2.1.3.3 Increase of car use cost per km

An increase of 50% of the cost per kilometre of private car use, during the peak hours, in the study area, would support a decrease of car use. This will contribute to a reduction of the car mileage and to a modal shift towards public transport. This would also support the car-pooling.

The acceptability by the drivers of such an increase is difficult to estimate. Nevertheless, this level of increase has been selected because a smaller increase (for example 25%) did not allow to reach the objectives in terms of urban concentration (i.e. counter-balancing the effects of the REN).

In practical, the increase of car use cost could be implemented by a combination of several measures, such as, for example, the increase of cost for the company cars.

#### 2.1.3.4 Fiscal measure applied on residential suburban developments

This measure consists in setting a tax ("impact fee") for the new residential developments in suburban areas. This tax is in a way an internalisation of the external long-term costs generated by these new developments, in terms of equipments and infrastructures, and connections to existing networks (water, gas, electricity provision, sewage, etc). A compensatory tax reduction could be simultaneously adopted, as "push measure", for households locating in the urban areas, or for restoration projects in the city centre.

In fact, "impact fee" exists in the USA for about 35 years, and is currently applied in 23 American States.

In the beginning, during 50's (period of first great expansion of the American suburbs), municipalities were troubled by the fact that the developers of new suburban developments provided only minimum infrastructures and urban space planning, because the municipality would have to fund and provide them anyway later. Therefore, the idea is born, in the 70's, to impose to developers a one-shot tax that would finance the works.

#### 2.1.3.5 Fiscal measure applied on offices

This measure consists in setting a tax on the offices locating outside “A-type” zones. The objective is to incite them to locate in A-zones.

According to the Dutch “ABC” planning approach, “A-zones” are defined as zones that have an excellent accessibility by public transport at long range. This means for example zones distant by less than 10 min walk or public transport from important railway stations. This type of area is well suited to activities which are sedentary (i.e. require no or few transport), and with high job density, i.e. all administrative and intellectual activities of public or private sectors which take place in offices. High density and sedentary feature allow organization of mass transports.

The annual tax is intended for covering the social marginal cost of transport, generated by the settlement of an economic activity in a site located out of the A-zones. The level of the tax can be proportional to the employment or to the ground surface and should be fine-tuned following the activity type and the location (all non-A zones are not equivalent in terms of public transport services). As well as for the impact fee for residential suburban developments, the level of the tax should be calculated to be as close as possible from the actual cost generated.

Finally, note that a compensatory measure of fiscal reduction for companies locating in A zones could be envisaged to reinforce the effects of this policy.

#### 2.1.3.6 Conclusions on this first set of 4 measures (sub-sections 3.2 to 3.5)

### A. Against the first criteria

The simulation results obtained with the combination of these 4 measures together with the priority measures (described above) are in line with the targets set by the 3 Regions in terms of concentration of population and employment:

- 59.2% of the household growth is locating in urban zones, both in Brussels and in peripheral cities (the Flemish regional plan set as objective 60%) ;
- 95.6% of the employment growth is locating in urban zones (the Flemish regional plan set as objective 80 to 85 %).

### B. Against the second criteria

With regard to mobility, the package of 4 measures also leads to good scores: a significant decrease of the number of vehicle-km travelled by car (-15.3%), an increase by 8.4% of the traffic speed, an increase by 5.6 points of the public transport modal share.

In terms of emissions, compared with the 1991 situation, the package is not able to meet the Kyoto objective of reduction by 7.5 % of the $CO_2$ emissions but it almost brings the emissions back to the 1991 level. The others pollutant emissions are greatly reduced (reduction by 70 to 80 %, compared with the 1991 situation).

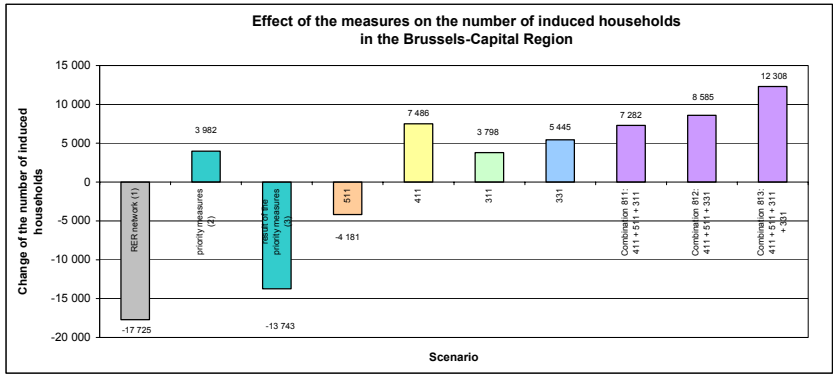
## C. General conclusions

In conclusion, this package provides many advantages.

First of all, it is quite close of the objectives expressed by the 3 regional plans and thus, it creates a “win-win” situation, which is favourable to the search of co-ordinated solutions to tackle common issues.

It calls also upon the principle “polluter pays”, which is considered by experts like the most equitable repartition of the cost of transport negative effects. Also, fiscal and pricing measures can give means to the authorities to finance policies of improvement of the public transport supply. However, the acceptability of fiscal and pricing measure can be low. That is why, in the next sub-sections, the creation of an integrated regional management department is proposed, and also awareness campaigns intended to all the citizens.

The following figures present the effects of the package of 4 measures on key indicators addressing urban sprawl/concentration and the car use rate.




Types of scenarios:

- 2021 RER network
- Priority measures (new 2021 reference)
- Decrease of PT fare
- Increase of car use cost
- Fiscal measure on housholds
- Fiscal measure on services to business
- Combination of measures

(1) The effect of the RER network is calculated in comparison with the 2021 reference scenario
(2) The effect of the priority measures is calculated in comparison with the 2021 RER scenario
(3) The effect of the priority measures is calculated in comparison with the 2021 reference scenario
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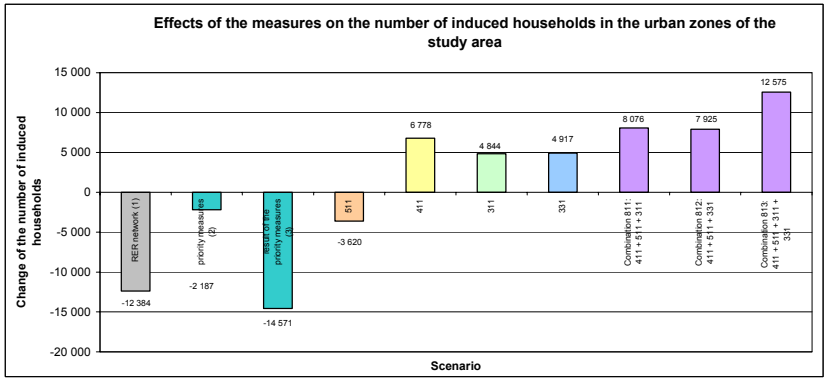


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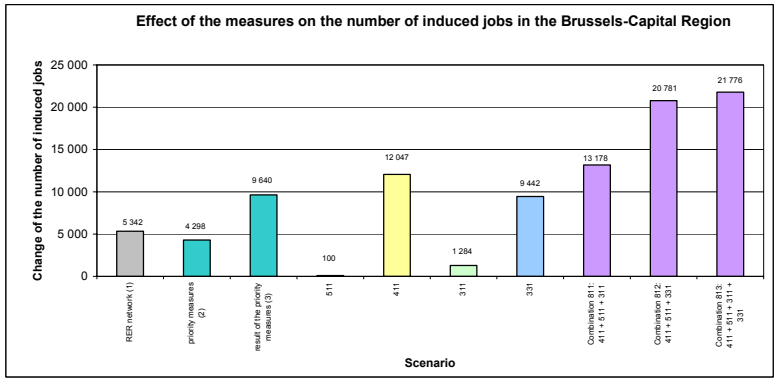


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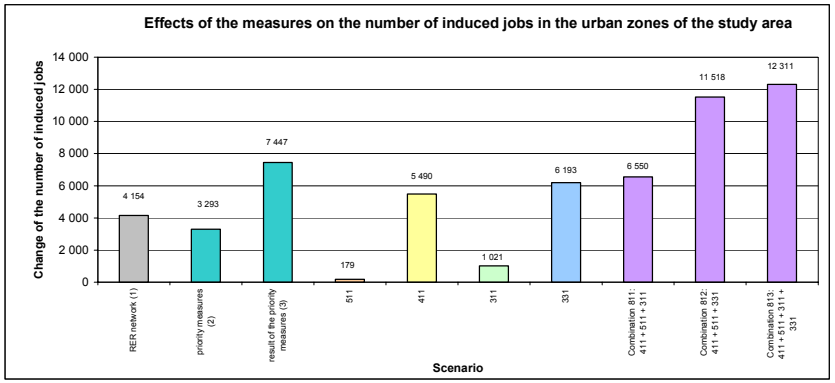


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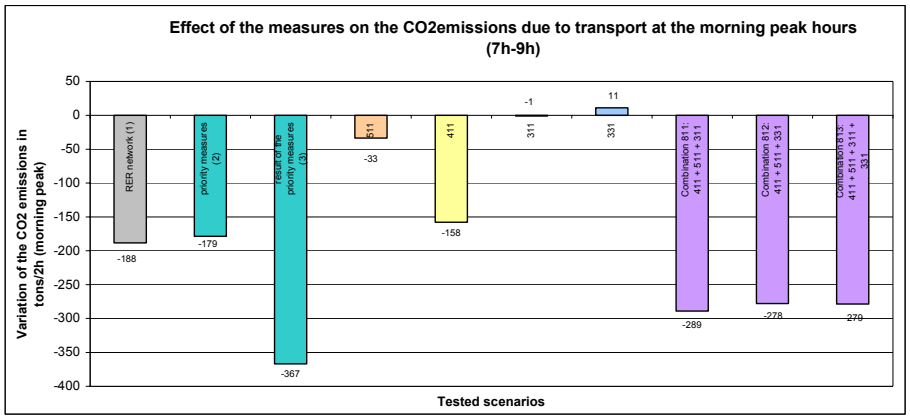


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### 2.1.4 Creation of an observatory of the sustainable development at the scale of the area served by the Regional Express Network (REN)

This observatory would be a permanent structure. It would monitor the evolution of mobility and land use in the area served by the REN. More precisely, it would forecast and monitor the effects of the accompanying measures which would be implemented together with the REN. According to the assessment of these effects, it would propose adjustments of the measures or propose new measures, in the perspective of supporting the sustainable development of the area.

### 2.1.5 Creation of an integrated regional management department at the scale of the whole area served by the REN

The next proposed measure is the creation of a department in charge of the integrated land-use/transport management of the whole area served by the REN. This of course raises major political difficulties, as the area served by the REN includes the Brussels-Capital Region, and territories of the Flemish and Walloon Regions.

### 2.1.6 Studying the possibilities of financing the REN by road pricing

The possibilities of cross-funding the operation of the REN services by road pricing should be investigated.

### 2.1.7 Informing the public opinion

The citizens of the 3 Regions should be informed about the future REN, the issues related to urban sprawl (e.g. environmental effects, collective costs of suburbanisation) and the accompanying measures which are envisaged. This could be done by means of a web site dedicated to the REN.

## 2.2 Helsinki

### 2.2.1 Introduction

Helsinki, the capital city of Finland, forms a metropolitan area with its neighbouring cities Espoo, Kauniainen and Vantaa. The study area covers not only the metropolitan area, but also other parts of the Province of Southern Finland as well as the largest neighbouring towns of Lahti and Hämeenlinna. This is due to the fact that the influence of the metropolitan area is expanding as an employment centre to serve the surrounding region. There are almost 50 municipalities in the study area.

The study area is actually a large region including both urban and rural areas. The area is situated in the coast of the Gulf of Finland. It is some 200 km wide and extends approximately 150 km inland to the North totalling approximately 11 000 $km^2$ (95 % land, 5 % water). The metropolitan area itself covers 764 $km^2$ (excluding sea area).

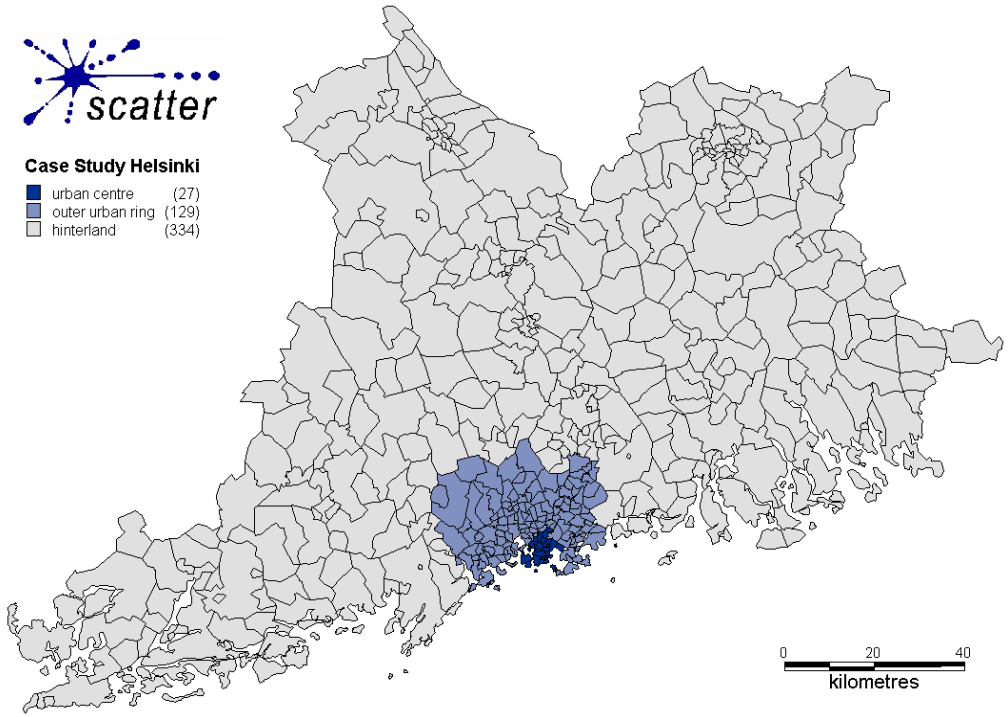



**Figure 1 The case study area of Helsinki.**

Helsinki region comprises about one third of the national GDP of Finland. In addition to its administrative status as the capital city and home for industry headquarters, the economy of the region is based on retail, wholesale and private services. The city has, in general, expanded in concentric rings as the population and economy have grown. However, the important transport corridors have attracted growth further away from the centre than otherwise would be expected.

By the 1960s, the radial road network was largely in place and the currently visible "Maple Leaf" form of the urban sprawl began to form, supported by the second industrialisation and the resulting migration from the countryside to the cities.

The completion of the two ring roads and the current plans to build more private and public transport facilities in a circular fashion in the metropolitan area are likely to lessen the outward trend of land use away from the city centre.


**Figure 2 The Helsinki Metropolitan Area (HMA) and its target road and rail network in 2030.**

This report gathers together a package of measures found in the case of Helsinki to combat urban sprawl. The chapter 2 is an overview about the opportunities and constraints that may be faced when designing the programme of measures. The future action plans and summarised results of the case study Helsinki as well as recommendations based on SCATTER model runs are presented in chapter 3.

## 2.2.2 Overview About Opportunities And Constraints To Be Kept In Mind When Designing The Programme Of Measures

### 2.2.2.1 Local opportunities to tackle urban sprawl

## The regulative land use planning system

The Finnish land use planning system has changed recently. In 1999, the Parliament approved the new Land Use and Building Act, which came into force at the beginning of the year 2000. The Act gives local authorities more extensive power to make independent decisions in land use planning matters. Central government control was reduced. The local authorities are now adopting a more open and interactive approach to planning. The levels of the planning system are regional plan, local master plan and detail plan.

The land use guidelines in Finland have been grouped according to subject as follows:

1) well-functioning regional structure,
2) more coherent community structure and a quality of the living environment,
3) the cultural and natural heritage, recreation uses and natural resources,
4) well-functioning communication networks and energy supply,
5) special issues of the Helsinki region and
6) areal entities of outstanding interest as natural and cultural sites.

## The regional co-operation and the strength of the local master plan

Since its foundation in 1970 the Helsinki Metropolitan Area (HMA) Council has enhanced regional co-operation with the objective of regionally co-ordinating master plan level land use objectives and promoting various measures to secure balanced development in the region. For this purpose the council has prepared so-called co-operation plans approximately every five years. The Helsinki Metropolitan Area Vision 2025 (PKS 2025), is a continuation of this work, though putting more emphasis on the application of future studies, participatory planning and co-operation with transport planning.

Within a local authority, the local master plan is an instrument for guiding and co-ordinating land use at a general level. It can be either a very general strategic plan or a more detailed one for direct regulation of building, depending on the need. Municipalities may also decide on joint master plans, regulating road planning, and the location of retail trade, workplaces, and residential areas. The local master plan is used to resolve questions concerning the functionality and economics of the community structure, the accessibility of services, the preservation of natural and cultural values, the quality of the living environment and

the reduction of environmental hazards. The transport system plans are connected with the local master plans. Thus the development of the regional transport system and land use structure depends on the cooperation of municipalities.

## Co-operation between municipalities

Planning decisions, which have a large impact on the development of the city structure are made by the municipalities. The Finnish municipalities have relative high autonomy in decision making compared to municipalities in other EU countries. Urban planning capability is rated high in these authorities. The co-operation between municipalities occurs from voluntary basis. A democratic decision-making dilemma, however, arises from the competition between municipalities: the municipalities compete to attract businesses and taxpayers, and also from the municipal autonomous decision-making on planning matters.

Thus, there is competition of businesses and taxpayers by more than 10 municipalities. Private citizens and businesses have through their own choice of location an impact on municipal decision-making.

Spatial planning develops gradually over decades and demands a long-term national policy. Local decision-making though is short term in nature due to the brief time frame in between elections. The elimination of boundaries between areas in the capital region and peripheries would likely shift the city structure question to a longer period, but the administrative structure changes might also not remove the conflicts arising from local area interests.

## Social profile and its consequences in housing demand

The Helsinki region has a surplus in its trade with the rest of the country. While the traditional manufacturing industries have been declining, the share of high-technology industries and services has been growing. The large and concentrated traditional industries such as metal and paper are not typically located in the region. Consequently, the foreign exports are not so dominant as for the rest of the country. As a big concentration of population, the level of imports is high.

A sign of the structural change in the 1990s is the stratification of population and regions. The spread in income levels has increased along with the demand for the less educated labour force diminishing. The Helsinki Metropolitan area and its surroundings form a region that has been the most successful one in the country, but also within the region itself certain areas are prosperous while others are impoverished.

The tendency now is that people want to live in a peaceful environment in a single-family house, with often two cars per family. The feasibility of living this way is dependent upon having a job. In a research survey about living preferences of young IT users (“What address directs” and “Peace and carnivals”) it was found that only designers wished to live, after graduation, in a city milieu for a long term basis. All other school faculties wished to own a single-family house in the future but were, however, relatively satisfied living in apartment buildings, in the meantime, while still at school.

During the latest decades all areas in the capital region and its surroundings have grown rapidly. Especially the neighbouring municipalities of the capital area have grown fast, ca. 10 – 15 % in 10 years. Thus one cannot only speak about sprawl, but also regional growth. Commuting in the capital region has grown and appears to be still increasing. At the end of the 1990s most of the new jobs, 45%, were created in the Helsinki region.

#### 2.2.2.2 Local constraints to tackle urban sprawl

## A non-existing common will of political co-operation at large scale

The Helsinki Metropolitan Area (HMA) faces a rapid population growth from the present 920.000 to 1.1 million inhabitants by the year 2020. This increases the pressures of urban sprawl as well as the use of natural and other green areas. It is expected that Helsinki can only accommodate less than one-fourth of the forecast growth, the rest being directed to the other cities of the Metropolitan Area.

From the city structure standpoint one cannot bypass a clear factor limiting the growth in the Helsinki metropolitan area: the language barrier between the two counties East Uusimaa and Uusimaa. East Uusimaa has had its own policy to limit the growth of the capital region by not accepting the growth pressures – especially housing. The goal has been to preserve the status of the Swedish speaking population in East Uusimaa.

At the moment the Minister of Regional and Municipal Affairs is preparing a proposal for a legislative co-operation organ that would be an umbrella for most of the Helsinki Metropolitan area municipalities. The main task for the new organ would be to set a land use strategy. Right now, however, it seems to be quite unlike that the proposal would go through, because of the scepticism of the municipalities – especially the capital region municipalities.

## Municipalities compete with each other

A regional land use plan over municipal boundaries is not, in the existing conditions, a significant factor, because the regional land use planning is totally dependent on politicians of local administrative units, and therefore the decisions, in most cases, can be on very general level, only. Efforts to limit urban sprawl could be possibly supported in the future through binding provincial land use plans. Existing land use plans guide general plans and furthermore the provincial plans. It should be completely the opposite; a top down approach with employment areas being planned comprehensively. Under the existing circumstances, environment and transport policy goals are usually generally approved but in practice these principles are not always applied.

The delay in implementation of different infrastructure schemes has been partly caused by the government's lack of unity. However, an important contributing factor for urban sprawl is the competition between municipalities. They do not co-operate together for the sake of achieving an overall benefit. Instead, they compete for businesses and taxpayers, which leads to a non-favourable arrangement from the development perspective of the entire capital region and its surroundings.

If we take a look at the political life, which is divided in periods of four years, we see that in practice the levers for managing area planning are limited. Should a politician happen to support a policy that is favourable from the overall standpoint, but at the same time against the interests of his own area, the politician would probably not enjoy the confidence in his electoral riding any longer.

## Land ownerships and urban sprawl

Shaping of the city structure can be viewed through many development trends. The Helsinki capital region spatial structure can be considered as scattered. The rail lines (local commuter rails and the metro line) form linear structures, where the land use is clustered along the lines. The city structure isn't solid, however. Leapfrog phenomenon occurs in areas where the municipality has been unable to gain ownership of the land.

The land use structure could be affected by adequate plan reserve. The private landowners, however, own a significant portion of the land area and thus the levers available to affect the development pattern in this respect are limited. The privately owned land is from municipalities' point of view not advantageous and thus the areas are exploited at the last possible stage when the municipality does not have any land of its own available.

## The prise of the building lot

In urban sprawl one the most important factors from the city structure standpoint is the price of the building lot. Planning matters fall significantly behind this. Expensive lots lead to sprawl and sprawl is made possible through exceptions to the building by-law. Many choose to live outside the capital region but within its vicinity, because of lower prices. As a result commuting increases. On the basis of exceptions to the building by-laws the overall trend of land use leads to the provision of the most expensive infrastructure.

## A limited opportunity to concentrate new urban development in existing urbanized spaces

Infrastructure development costs are highly dependent on how the infrastructure within the area has been shaped and how the connections between the areas have been formed. Construction costs are also largely area specific. The most favourable areas for building in the capital region are already filled up. Densifying the outlying areas means using lower quality land that would make construction more expensive.

## The fight against sprawl – an onerous task?

The fight against sprawl seems to be an onerous task in the Helsinki region:

- The overall mega-trend of population/economic growth that result in higher mobility would require strong counteractive measures decreasing accessibility (time, cost and comfort of travel) in a right way.
- Current trends and plans most probably lead to more sprawl;
- Investments (popular measures) reducing especially radial congestion increase population sprawl;
- General price increases of petrol and fares and especially more effective pricing measures that would alleviate sprawl while saving travel times are very unpopular measures;
- Regulation is difficult too and may lead to unexpected side-effects.

## 2.2.3 proposal for a policy tackling the issue of urban sprawl

### 2.2.3.1 Future action plans

The population in the whole Helsinki study area is expected to grow significantly to nearly 2 million inhabitants by year 2020. Economic development in the region is estimated to grow annually by 2 % in real terms. Household living space per capita is expected to grow from 39 $m^2$ in year 2000 to 50 $m^2$ in 2020. Over the same period, employment floor space is expected to fall from 46 $m^2$ to 44 $m^2$ due to structural changes in employment from traditional industry towards office work. The following main issues are currently discussed in order to better manage the urban structure development.

## The environment for integrated planning and implementation

In the future, one should strive for general concentration as well as the integration of land use and transport policies. Land use policy needs a long-term perspective. At the moment, however, the current political system leads to short-term decision-making. Similarly land use plans (provincial plans) and transport system plans need to be renewed so that they were integrated with one another. Instead of separate land use and transport system plans there should be only one regional plan, which would cover both. Also should the land use plans be more prescriptive than now. In the existing situation, the lot and area plans guide the municipal general plans which in turn guides the provincial plan. In practice it should be just the opposite. Guidance should flow from top to bottom.

If we aim to integrated transport and land use planning, then these topics should also be taught together. Now the topics are taught separately and this is seen widely also in the planning culture in which land use and transport system planning are not integrated well enough.

In the same fashion as education should be integrated, the co-operation between ministries needs strengthening. The transport and environment matters could be jointly dealt with under the same ministry. At the moment the direction has been quite different: instead of environment it's been transport and communications that have been combined under the same ministry.

## Co-operation between the municipalities and the HMA Council

Co-operation between the municipalities will be increasing soon although the political will is still tepid. The planning knowledge in the municipalities and the HMA Council as well as in the county of Uusimaa is good. The HMA Council though does not have the possibility to mange the growth since it has not been given the authority to do so. Conflicts in the area in goal setting and implementation are apparent. For example the subsidy level for public transport (PT) has been cut. One solution for many of these "cross-border" problems would be to give more decision power for the HMA Council.

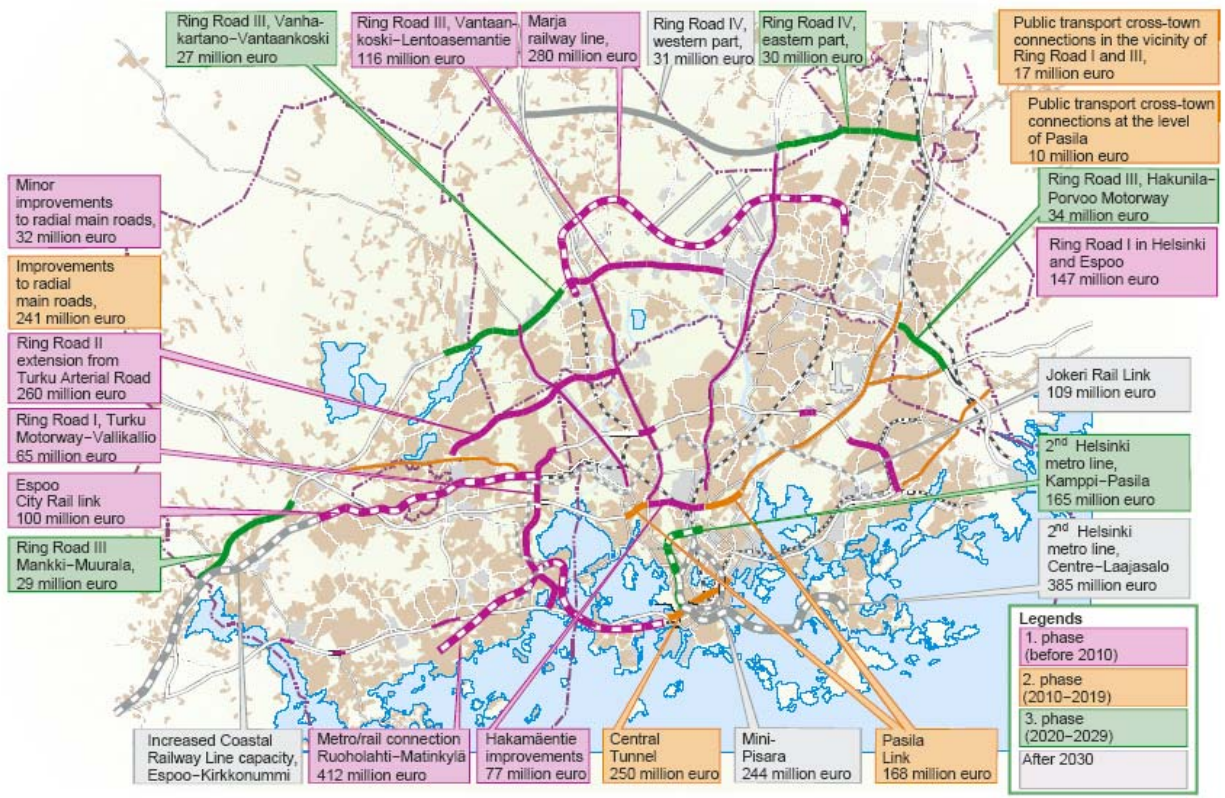



**Figure 3 The road and rail projects of the Helsinki Metropolitan Area Transport System Plan (PLJ) 2002. The HMA council's investment programme for the years 2002-2029.**

The Helsinki Metropolitan Area Transport System Plan (PLJ) is a strategic, long-term plan of transport in the Helsinki Metropolitan Area. It is updated approximately every fourth year and examines especially the target network for road and rail transport as well as public transport's level of service in different areas and the possibilities to improve conditions for goods transport. Lately, the transport system plan has concentrated particularly on the investment plans and thus hasn't paid much attention on other strategic actions. This tendency, however, should be (and seems to be) changing towards wider scale strategic transport planning including all fields of strategic operations such as traffic management, mobility management and pricing as well as stronger integration with land use planning.

### 2.2.3.2 Recommendations based on SCATTER model runs

The SCATTER model runs were divided into the following groups:

The **investment policies** are local policies. The aim is to test the Helsinki Metropolitan Area Transportation Master Plan projects in large groups, namely public transport investments on the one hand and road investments on the other hand. In addition, a project improving the orbital connections has been tested separately.

The aim of testing the **"new town" alternatives** is to theoretically study, from urban sustainability and city sprawl point of view, alternative locations for a large new concentration of workplaces.

**Land use policies** consist of fiscal measures applied to residential developments (annual tax i.e. development impact fee applied on households locating in non-urban zones), of regulatory measures applied to companies, inspired form the ABC theory (ABC-type policy applied to a part of the tertiary sector) and of fiscal measures applied to companies, inspired form the ABC theory (tax on jobs of the employment sector "business services" locating in non-A-type zone).

**Transport pricing policies** consist of car operating cost increase policies and of a public transport policy where the fare is assumed to be reduced by 20%.

The **policy combinations** consist of car operating cost increase and public transport fare reduction combined with alternative land (pricing) policies.

As a general rule, the relation between the accessibility and sprawl is the following (according to the Helsinki modelling case study experience):

- Firms (employment) try to utilise the agglomeration benefits of the centre by locating as close to it as possible. Therefore the crowding out -effect of land use increases the value of land, which forces the households to live outside the centre by commuting in. Transport accessibility (and mobility due incomes) largely determines how far this is possible.
- Firms need to remain accessible to the employees (households) living outside. If the accessibility reduces, they need to move towards the supply of labour. Sprawl happens. If accessibility increases, employment sprawl decreases.
- The inverse is true for households. When the (especially the radial) accessibility increases the households utilise the better access by moving further out and sprawl increases. If accessibility reduces, sprawl reduces, as people need to move closer to their jobs.

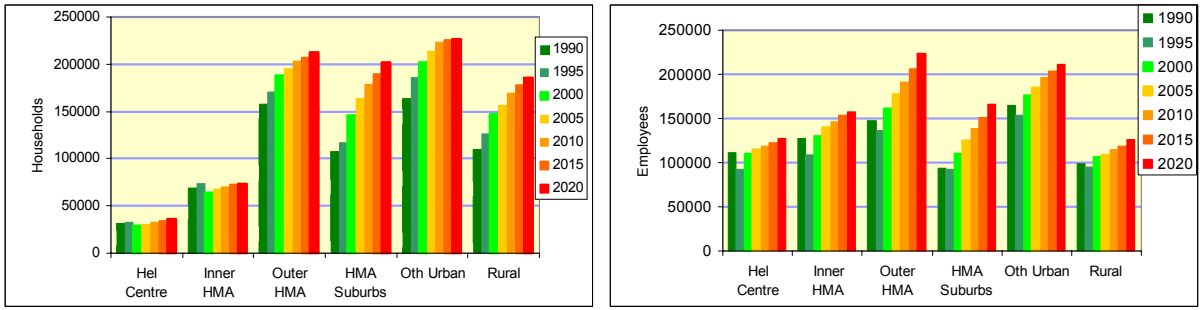



**Figure 4 Observed development of the population and households 1990-2000 and as forecasted by the model for 2000-2020.**

The sustainability evaluation showed that most of the tested policies reducing sprawl also improved the three dimensions of sustainability. This means that reduced sprawl also adds to sustainability. However, the public transport improvements may add to city sprawl but still add to urban sustainability.

Congestion proved a significant constraint on sprawl as the lack of accessibility makes it difficult to live far away from the central areas where the jobs usually reside. Therefore the investment policies that tackle congestion especially enhancing the access from the peripheral locations may in many cases increase kilometres travelled and emissions and have city sprawl effects. However, this depends on the exact circumstances and from the sustainability point of view their effect proved small in this analysis.

The theoretical study concerning alternative locations of a “new town” in the Helsinki Metropolitan region showed that the differences between the alternatives were small even if the relocation effects were significant. The most central location had some advantages but also added to city sprawl due to very good traffic connections.

The land use policies had some positive effects on the city sprawl variables but from the sustainability point of view the differences compared with the base scenario were small. Land use pricing was particularly effective. The sprawl patterns indicated that various regulatory actions (both land-use and transport) like could also be efficient constraints on sprawl due to their pure nature of directly affecting the development of the region.

The most effective policies to tackle urban sprawl were the car pricing policies. They also clearly added to urban sustainability. Out of the pricing policies the cordon peak pricing alternative was the most effective one but had at he same time some negative land use impacts. Reducing public transport fares also worked well from the sustainability point of view but had, as a negative side effect, the consequence of adding to sprawl. When combining the car pricing and the public transport fare reduction policies this side effect could be mitigated.

Overall the best policies were the combinations of car pricing, public transport fare reduction and land use policies. They had positive impacts on most of the city sprawl variables and improved simultaneously all dimensions of sustainability. They were economically very efficient, could socially improve the current situation and environmentally improve the situation of the reference scenario. The results included:

- 14-18 % car-km reduction,
- 11-12 % reduction in CO2 emissions,
- 12-14 % accident reduction,
- 1900 € / inhabitant economic benefits (net present value),
- less exposure to noise and pollutants,
- improved accessibilities and
- less sprawl.

An overview of the city sprawl variables and the sustainability evaluation of all policies is presented below in Table 1. The sustainability indicators in the tested policy alternatives are presented in Figure 5.

SCATTER

| Helsinki case city | | Base | | Investment policies | | | | | New town alternatives | | | | | | Land use (pricing) policies | | | | Transport pricing | | Combinations | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | Unit | PRESENT | Base 2021 | Do not invest | Only car investments | Only PT investments | All reference investments | Develop orbital connections of PT | Vuosaari | Marja-Vantaa | Keski-Pasila | Espoon keskus | Matinkyl | DIF 670 euro/a | DIF 340 eur/a | DIF 1000 euro/a | ABC land use regulation for businesses | ABC land use pricing for businesses | Car operating cost +50% | Cordon (peak) pricing 2,55 euro | PT fare - 20% | Comb. 411+512+311 | Comb. 411+512+331 | Comb. 411+512+311+331 |
| **Overall mobility** | | | | | | | | | | | | | | | | | | | | | | | | |
| Average travel time (all modes) | minutes | 29,8 | 29,2 | -0,5% | 0,0% | -0,3% | 0,0% | -0,2% | 0,2% | 0,9% | 2,8% | -0,4% | 3,2% | -0,4% | -0,4% | -0,7% | -0,3% | -0,1% | -5,1% | -3,5% | 5,1% | 0,8% | 1,1% | -0,2% |
| **Public transport** | | | | | | | | | | | | | | | | | | | | | | | | |
| Modal share of modes | % | 44,1 | 42,3 | -1,4 | -1,4 | 0,2 | 0,0 | 0,1 | -0,5 | -0,2 | 0,7 | -0,2 | 0,0 | -0,1 | 0,1 | -0,1 | -0,2 | 0,0 | 0,8 | 3,4 | 4,5 | 6,1 | 12,3 | 12,2 |
| Passenger-km by public modes | km/inhabitant/a | 5232 | 5734 | -5,1% | -4,2% | -0,6% | 0,0% | 0,3% | -1,4% | -0,9% | 2,4% | -1,0% | 0,1% | -0,6% | 0,0% | -0,4% | -0,5% | -0,3% | -0,8% | 6,2% | 14,8% | 16,8% | 16,9% | 16,2% |
| **Road traffic** | | | | | | | | | | | | | | | | | | | | | | | | |
| Private vehicle-km | km/inhabitant/a | 2451 | 2930 | -6,7% | -1,4% | -4,9% | 0,0% | -0,7% | 1,8% | 1,2% | 4,7% | -1,4% | 6,0% | -1,1% | -0,2% | -0,9% | 0,6% | -0,4% | -17,4% | -35,9% | 0,9% | -16,1% | -15,9% | -17,6% |
| Greenhouse gases from transport | eq.ton/inhabitant/a | 1,41 | 1,78 | -1,6% | -0,9% | -0,5% | 0,0% | -0,8% | 2,6% | 1,5% | 4,1% | -0,4% | 5,6% | -1,0% | -0,2% | -0,9% | 0,7% | -0,4% | -11,8% | -25,1% | 0,0% | -10,7% | -10,6% | -12,0% |
| Average road traffic speed | km/h | 37,3 | 31,6 | -1,6% | 0,4% | -2,9% | 0,0% | 0,9% | -1,3% | 0,6% | -1,4% | 1,4% | -1,7% | 0,8% | -0,1% | 0,1% | -0,8% | -0,5% | -2,0% | 20,0% | 8,7% | 1,8% | 1,9% | 2,6% |
| **Land use** | | | | | | | | | | | | | | | | | | | | | | | | |
| Households in urbanised zones | # | 639565 | 772313 | -0,1% | -0,2% | -0,1% | 0,0% | -0,1% | 0,0% | 0,0% | -0,2% | -0,2% | -0,4% | 0,7% | 0,2% | 1,0% | 0,2% | 0,0% | 0,7% | 0,1% | -1,0% | 0,6% | -0,1% | 0,6% |
| Households in core metropolitan area | # | 265432 | 304320 | 0,1% | 0,0% | 0,1% | 0,0% | -0,1% | 0,0% | -0,9% | -0,4% | -0,2% | -0,6% | 0,6% | 0,3% | 0,9% | 0,5% | 0,1% | 1,7% | 3,0% | -2,3% | 0,1% | -0,5% | 0,2% |
| Households in the city centre | # | 28812 | 36485 | 0,0% | -0,2% | 0,1% | 0,0% | -0,1% | -0,4% | -1,2% | -0,5% | -0,4% | -1,1% | 0,6% | 0,3% | 1,0% | -1,5% | 0,0% | 2,5% | 5,4% | -4,0% | -0,7% | -1,4% | -0,6% |
| Employees in urbanised zones | # | 698209 | 904015 | 0,0% | 0,0% | 0,0% | 0,0% | -0,1% | 0,4% | 0,6% | 0,0% | 0,1% | 0,0% | 0,3% | 0,1% | 0,4% | 0,8% | 0,2% | 0,2% | -0,4% | 0,1% | 0,6% | 0,5% | 0,7% |
| Employees in core metropolitan area | # | 392807 | 499005 | -0,2% | -0,2% | -0,2% | 0,0% | -0,1% | -3,6% | -3,9% | 0,5% | -1,6% | -2,4% | 0,2% | 0,1% | 0,4% | 1,8% | 0,3% | 0,0% | -1,9% | 0,2% | 0,9% | 0,8% | 1,2% |
| Employees in the city centre | # | 109706 | 127650 | -0,5% | -0,3% | -0,3% | 0,0% | 0,0% | -3,5% | -3,6% | -2,6% | -1,5% | -2,5% | 0,1% | 0,1% | 0,2% | -2,9% | -0,2% | -0,1% | -1,2% | 0,7% | 2,3% | 2,1% | 2,5% |
| **Accessibilities** | | | | | | | | | | | | | | | | | | | | | | | | |
| Average home-work travel distance | kilometres | 16,2 | 15,0 | -0,7% | 1,0% | -0,9% | 0,0% | -0,3% | 1,0% | 0,8% | 3,4% | 0,1% | 4,7% | -0,1% | -0,1% | -1,1% | 0,5% | -0,2% | -13,8% | -3,9% | 16,4% | 0,5% | 0,9% | -0,3% |
| Accessibility to city centre | minutes/trip | 29,3 | 29,8 | -0,9% | -0,6% | 0,0% | 0,0% | -0,3% | -0,4% | -0,6% | 1,0% | -0,9% | 0,6% | -0,7% | 0,1% | -0,6% | 0,0% | 0,0% | -2,7% | -6,7% | -1,7% | -2,1% | -2,3% | -2,6% |
| Accessibility to services | minutes/trip | 27,7 | 28,2 | -1,6% | -1,2% | -0,4% | 0,0% | 0,3% | 0,1% | 0,7% | 0,5% | 0,0% | 0,6% | -0,1% | 0,0% | -0,2% | -0,5% | -0,1% | -2,3% | -3,2% | 1,7% | 0,0% | 0,1% | -0,1% |
| Productivity gain from land use | % | 0,0 | 0,0 | -0,5 | 0,4 | -1,1 | 0,0 | 0,2 | -0,4 | -0,2 | -0,7 | 0,4 | -0,7 | 0,2 | -0,1 | 0,1 | 0,2 | 0,0 | 1,0 | -0,6 | 0,4 | 0,3 | 0,4 | 0,7 |
| | HMA | | diff. in % units | | | | | | | | | | | | | | | | | | | | | |

**Table 1**
***Urban sprawl variables in the tested policy alternatives. The policies are in the following groups:***

- Investment policies,
- New town alternatives,
- Land use pricing policies,
- Transport pricing and
- Policy combinations.


Figure 5 Sustainability indicators in the tested policy alternatives.

## 2.3 Stuttgart

## 2.3.1 The general context

### 2.3.1.1 Stuttgart, a brief description

The Stuttgart Region is situated in the south-west of Germany and covers five state districts (Kreise) called Boeblingen, Esslingen, Goeppingen, Ludwigsburg and Rems-Murr, and the City of Stuttgart with a total of 179 (Gemeinden) communities. The overall population of the Stuttgart Region is about 2.6 million inhabitants. The region represents the economic and cultural centre of the state of Baden-Wuerttemberg. With an area of 3,700 $km^2$ this region is one of the most densely populated regions of Germany.

The Region of Stuttgart has only a few geomorphologic constraints (horseshoe-like hills in the south of the centre). Therefore, the urban development is almost uniformly spread over the whole area. This is reflected in the location of many medium size and big municipalities (sub-centres) organized almost uniformly around the City of Stuttgart

There are about 570,000 inhabitants concentrated in the City of Stuttgart. This corresponds to 22% of the total population of the Stuttgart Region. Taking into account the adjacent communities (Sindelfingen, Boeblingen, Esslingen, Leonberg, Leinfelden-Echterdingen, Ludwigsburg, Schorndorf) within a small circle (15 Km) around the centre of the City of Stuttgart about 38% of the total population can be found. Not only is the City of Stuttgart densely populated so too are those neighbouring communities.

A very strong networking can be found for the City of Stuttgart with the surrounding districts of the Region of Stuttgart, and vice versa. This underlines that the Stuttgart Region should be seen as an agglomerative unit, or in other words as one metropolitan area.

The partly massive out-migration from the City of Stuttgart into the peripheral districts Ludwigsburg, Esslingen, Rems-Murr-Kreis and Boeblingen has several reasons. Of course, economic considerations of the individuals in the sense of cost-benefit optimisation may play an important role in the spatial restructuring of the population distribution. In such a way the peripheral districts offer considerable advantages:

- Lower rent and land prices.
- A very good local accessibility of services covering daily needs which are often covered better by the peripheral districts than by the City of Stuttgart.
- A good accessibility of Stuttgart's city centre from the peripheral districts via a good traffic infrastructure.

In the production sector an out-migration of enterprises during the last decades can be found from Stuttgart mainly into the adjacent districts of the city (90% of all firms which fully changed their location, 100% of companies which opened an additional production place), with corresponding shifts of the places of work. The chosen city-near shifts of firms indicate that the centre of Stuttgart did not lose its economical importance as a whole but also that firms are interested to be located close to the heart of the Stuttgart Region.

In Figure 1-1 the development of the population numbers of the five districts and of the total population of the Stuttgart Region between 1992 and 2003 are depicted. The total population of this metropolitan area has grown by about 3% since 1992, beside the enormous decrease in the scaled population of the City of Stuttgart of about 4.5% (599,415 inhabitants in 1992, and estimated 571.910 inhabitants in 2003). Especially the neighbouring districts Boeblingen (7.1%) , the Rems-Murr-Kreis (5.5%), and Ludwigsburg (5.0%) are gaining inhabitants, Esslingen (2.4%) and Goeppingen (2.9%) seem to follow the general trend.

In addition, an enormous growth in industrial and business zones took place in the peripheral zones, which, besides its traffic-generating impact on commuting and passenger transport in general, surely affects freight transport as well and has lead to an increase of urban sprawl.

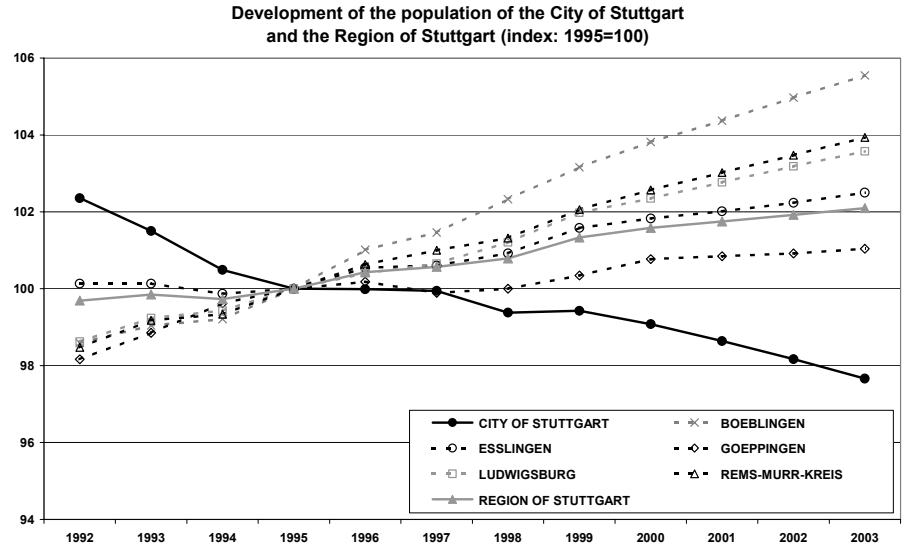



**Figure 1-1: Development of the scaled population shares of the Stuttgart Region (Index: 1995=100)**

Increasing demand for available floor space led to a disproportionate enlargement of the settlement area and its corresponding land use not only during the last decades. Forty years ago the available floor space per person was merely 26 $m^2$, nowadays about 40 $m^2$ are required. In addition the required areas for production and services expanded also dramatically. Both effects were, and are still much stronger than population growth in this particular region.

## 2.3.2 Overview of opportunities and constraints

### 2.3.2.1 Opportunities - The priority measures

The Stuttgart Region has already some opportunities to reduce its urban sprawl. Indeed, there seems to be a consensus among the authorities concerning a set of priority measures. Even if no legal texts have yet been set up, these priority measures are very likely to be implemented in the near future.

These policy measures have been selected in order to support positive economic effects in the Region of Stuttgart and simultaneously to reduce urban sprawl. These measures are as follows:

- Better coordination of the different planning systems and a better inclusion of the population.
- The municipalities of the Region of Stuttgart should develop a common area development concept (Flächennutzungsplan) so that a better settlement control can occur against urban sprawl.
- This also requires a system of supporting measures, for instance for those municipalities refusing to extend new land-use developments and which are compensated by the other municipalities for it.
- The tariff system of public transport should become more flexible.
- Increasing the commercial speed of public transport (buses and S-Bahn) in the Stuttgart Region; the speed improvement could be e.g. obtained through rules giving priority to PT at the crossroads with traffic lights.
- Introduction of a telecommunication system for the busses and the trains in order to obtain better information about the schedule and to minimize possible delays.
- Strengthening the centre (City of Stuttgart) of the Stuttgart Region
- Stuttgart 21 Plan

The urban planning has shifted in two main directions. On the one hand the development towards the southern part of the Stuttgart region: the new fair complex in the Filder area, the ICE station and the expansion of the airport have acted as attraction centre of further residential and industrial developments. In addition, a cluster of leisure and service activities close to the motorway in the southern periphery of Stuttgart has developed. On the other hand, the Stuttgart 21 Plan aims at rebuilding the Stuttgart – Ulm – Augsburg rapid rail line, comprising improvements in regional and long-distance transportation; excellent connections to the Filder Plain and the airport; development of new urban neighbourhoods in the city centre; enlargement of park areas and creation of new jobs at the centre of the Stuttgart region. This aim will be achieved by rerouting a part of the tracks through underground tunnels and lowering the station, it is possible to significantly reduce the inner-city area required for tracks. This opens up urban development opportunities and space for new development (about 1 $km^2$) right in the heart of the city.

The impacts of these measures are favouring the Region, and especially the Stuttgart city in terms of population as well as of employment. Indeed, the set of priority measures has been simulated with the STASA Stuttgart land-use/transport model.

The simulation results indicate, that combined policy measures (see policy measure 813S, Deliverable D5-D6), have the strongest effect on the reduction of sprawl.

The combined and simulated measures are (without Stuttgart 21):

- increase by 50% of the private car cost/km applied to all drivers
- decrease of public transport fare by 20% for all trips
- change in the annual tax (development impact fee) applied on households locating in non-urban zones (about 670 € per household and year) and redistribution of the revenue of impact fee to the urban areas, as fiscal incentive to all households located in urban zones. Urban zones are the cities of Stuttgart, Ludwigsburg, Sindelfingen, Böblingen, Esslingen and Göppingen.
- ABC-type policy applied to a part of the tertiary sector: tax on new jobs of the employment sector "business services" locating in non-A-type zones. The tax amounts to 976 €/job. An A-zone is defined as a zone of the capital of a district (NUTS3). In general those zones are served by high quality public transport at regional scale. There are 7 A-zones in the Region of Stuttgart considered (Stuttgart, Ludwigsburg, Sindelfingen, Böblingen, Esslingen, Waiblingen und Göppingen).

This combination of the different policy measures (policy 813) has the strongest effect on the reduction of sprawl. A strong concentration of households in the urban zones (+1.0%, about 14.100 inhabitants) and urban centre (+2.8%, about 16.500 inhabitants in Stuttgart) must be stated. The jobs follow the same pattern, namely an increase of jobs in the urban zones (+0.2%, about 1.300 new jobs) and in the urban centre (+0.6%, about 2.200 new jobs). This is also confirmed by the variation of the relative *H*-measures.

The total care mileages in the study area decrease by about –5.0% accompanied by a corresponding decrease of CO2 emissions. The average modal share of public transport in the study area increases by about +7.7 points. The passenger-kilometres by public transport per inhabitant increase by about 9.4%.

However, the simulated measures are rather strong and could be difficult to introduce. Nevertheless it is of crucial importance to quantify and to evaluate the effects and impacts of different policies on the spatial structure of the Stuttgart Region.

#### 2.3.2.2 Constraints – The institutional context

As it was said above, in the 1990's, the area around Stuttgart grew steadily while the centre of Stuttgart lost population; in the same time, the number of workers commuting to the centre increased. The overall nature of employment continued shifting from industrial activity to office work and administration.

The organisational networks Kreistag, Landtag, Verband Region Stuttgart play an important role in the decision-making process of the Stuttgart region with respect to land-use and transportation. The VVS (Verkehrsverbund Stuttgart) is responsible for the common tariff system in the Stuttgart Region.

The following description of the structural organisation and the aims of the Verband Region Stuttgart are directly obtained via the web-side www.region-stuttgart.org.

The Verband (= "Association") Region Stuttgart was founded in 1994 to give the Region a political organisation with its own directly elected representatives of the population: the Regional Assembly. This democratically legitimated decision-taking body covers the central planning policies - regional, infrastructure, landscape, and traffic and transport - as well as business promotion, local public transport, waste management, trade fairs and exhibitions and tourist marketing and can present an objectively uniform picture of the Region inwardly and to the outside world.

On 24th October 1999, the population of Greater Stuttgart decided for the second time on the composition of their Regional Assembly, and elected 90 representatives for a 5-years term.

The central aim of the Verband is to marshal the forces of the 179 independent municipalities (towns and city districts) within the Stuttgart conglomeration in order to enable the Region to compete effectively at the European and the world level.

According to Baden-Württemberg state law, the Verband Stuttgart has the following responsibilities:

- Regional planning
- Landscape planning
- Traffic and transport planning
- Business promotion and tourism marketing
- Local public transport
- Waste disposal

The Verband can take on other tasks voluntarily:

- organising new trade fairs and exhibitions of regional importance
- organising cultural and sports events and congresses.

The Baden-Württemberg *Landtag* - the state assembly - passed an amendment Act in October 1999 granting the Verband additional rights

## A. Regional planning

The Verband Region Stuttgart draws up and finalises a Regional Plan, with a time-horizon of some 10 to 15 years. It formulates the goals, basic principles, and suggestions from which the planners at municipal level have to take their line. For instance, it contains the area's first in line for new housing or commercial and industrial development, routes and locations for infrastructure, and also the green belts and zones that are to be kept free of development.

The preparation of the Regional Plan is based on a long-term view of the Greater Stuttgart Region characterised inwardly by clearly defined residential and commercial areas and outwardly as a metropolitan region of European dimensions. The existing innovation potential of the Region in business and science is to be strengthened in particular in the field of mobility services and products.

The common factor running like a thread through all aspects of planning is the aim of developing the Region on a sustainable basis and to ensure it has a secure future.

## B. Landscape planning

Landscape planning is an important component part of regional planning. This is where the landscape and ecological specifications of the Regional Plan are prepared in technical terms. Regional green belts and wedges form the necessary counterweight to the inevitable spread of commercial and residential areas.

It also defines which areas deserve special ecological protection, such as biotopes or water catchment areas.

The Verband has drawn up an all-embracing concept called the "Greater Stuttgart Landscape Park", showing where open areas are to be improved, redesigned, and linked up together. The basic idea of the landscape park is enable people to enjoy the landscape and thus to protect it at the same time.

The combined commitment of the Region, the municipalities, and all the various authorities is necessary for implementing these plans. The Verband has not so far been able invest directly in landscape projects.

## C. Traffic and transport planning

The traffic and transport infrastructure is the nervous system of a conurbation like Greater Stuttgart. For the first time, the Region now has an integrated traffic and transport concept, which is at the same time co-ordinated with regional, and landscape plans.

The regional traffic and transport plan contains long-term strategies for roads, railways, and cycle paths, and a list of priorities for future investments. It is expected to be finalised and approved in 2000. This traffic programme will represent a blueprint for county and municipal planning, and will ensure that the Verband is able to influence the investment programmes of the State of Baden-Württemberg and the German Federal Government.

## D. Business promotion and tourism marketing

Business promotion is absolutely essential for a location like Greater Stuttgart. Programmes have to be aligned inwards as well as outwards, so that local business are given the prospect of development as well as the location being made known and attractive to inward investment. The Verband has established a company called *Wirtschaftsförderung Region Stuttgart GmbH* to co-ordinate all the activities from a database full of information on business locations and advice to municipalities, investors, and business start-ups to a regional employment agency that comes to the aid of companies and their employees in times of crisis.

In the field of tourism, the Verband Region Stuttgart fulfils its obligations by participating in a company called *Regio Stuttgart Marketing und Tourismus GmbH*, the aims of which are to promote tourism, particularly in the geographical outskirts of the region as a specific part of business promotion, and the local recreational facilities as a contribution to reducing traffic volumes.

### E. Local public transport

The Verband Region Stuttgart is the organising body behind the local suburban electric railway system and, since October 1999, for all regionally important rail traffic. This means that the Regional Assembly decides on extensions to the regional rail network, vehicles, special offers, and so on. The Verband "buys in" the transport services from the transport companies such as suburban electric services from Deutsche Bahn AG (German Railways). The recent amendment Act also enables the Verband to uses buses instead of rail transport.

In this function, for example, the Verband is working on the extension of the suburban electric railway network, has decided on improvements to the timetable, and will be introducing a regional night-bus service at week-ends in the spring of 2000. As a partner of the transport companies, it has committed itself to ensuring the local public transport should continue to operate in such a way that both passengers and the public sector can afford it.

### F. Waste disposal

The Verband Region Stuttgart is responsible for part of the waste-disposal business, which also includes the disposal of contaminated soil. Regulations have been drawn up, in collaboration with the counties, which for the first time cover the whole Region on a uniform basis. The introduction of competitive elements has led to substantial price advantages for suppliers.

The Verband also takes the view that the Region should in general be regarded as a single area for waste-disposal purposes, in order to prevent over-capacity situations from arising, exploit market opportunities, and create transparent strategies for business and private households.

## 2.3.3 Proposal of a strategy

The main components of the strategy proposed for the Stuttgart Region are derived from the simulations which were performed with the STASA land-use/transport model, in WP5-WP6[5]. These simulations aim to test policies and evaluate their impacts in order to recommend a set of measures, which are resumed here below.

[5] See Deliverable D5-D6, chapters 4 and 7.

### 2.3.3.1 Criteria adopted for the evaluation of policies

The “most appropriate” measures were selected on the basis of two objectives:

- Urban concentration in the A-type zones, namely the cities of Stuttgart, Ludwigsburg, Sindelfingen, Böblingen, Esslingen, Waiblingen und Göppingen.

- Reduction of the emissions of greenhouse gases (GG) due to road traffic: within the protocol of Kyoto (1997). Since transport is responsible of a quite limited part of the $CO_2$ emissions (mainly produced by industry and heating) especially the transport system has to be considered and optimized in order to reduce traffic congestion which increases the $CO_2$ emissions.

One more remark has to be mentioned: most of the selected measures are fiscal or pricing measures. As such, they raise issues such as acceptability, administrative and political feasibility (e.g. with regard to the repartition of competences between the different institutions, etc). These aspects are crucial but were not considered in the current proposal for a strategy.

The next sub-sections describe the measure proposed, as a component of the strategy.

### 2.3.3.2 Decrease of public transport fare

The measure for this scenario is a decrease by 20% of the price for all public transport. It is however known that such a measure is able to increase the sprawl of households, if radial transport lines are considered (see Deliverable D5-D6). On the other hand, this social measure can contribute to a more sustainable development by reducing the use of car (modal shift).

Nevertheless, this measure can be considered like an accompanying measure if it is compensated by another policy supporting urban concentration of both employment and households.

Another possibility with the objective of reducing urban sprawl could be a reduction of public transport fare *only* in urban zones (cities of Stuttgart, Ludwigsburg, Sindelfingen, Böblingen, and Esslingen).

### 2.3.3.3 Increase of car use cost per km

An increase of 50% of the cost per kilometre of private car use support a decrease of car use. This will contribute to a reduction of the car mileage and to a modal shift towards public transport. The acceptability by the drivers of such an increase is difficult to estimate.

In the long run, there is an increase in the number of households in the urban zones and in the urban centre (Stuttgart). The jobs, however, will be more concentrated in the urban centre. Since car use is directly affected by this policy, the total car mileage in the study area will decrease by about 4.2% accompanied with an shift of the modal share towards public transport (1.00 points). The reduction of care use leads further to a big improvement of average

travel times (-1.1%) and home-work travel time (-2.2%) and CO2 reduction (-4.5%). As a consequence public transport increases (+ 5%) and accessibility becomes worth. A positive effect on urban sprawl for households can be observed (table S13), but jobs are more spread over the whole region

***The effect of a cordon pricing was also simulated (tariff 2,1 €/day). The cordon is described by the boundary of the city of Stuttgart and the adjacent communes Ludwigsburg, Sindelfingen, Böblingen and Esslingen.***

The effects on the spatial population distribution and the workplace distribution are considerable (+1.5% population increase in urban zones). In the long run, the commuter flows are dramatically redistributed. The overall effect on the total car mileage and the average modal share seems to be negligible. Even the average travel time increases slightly, and the accessibility to the city centre is decreased (-0.4%). However, a positive effect on urban sprawl for households can be stated. Because of the strong effect of the structure of the cordon on spatial development and the related socioeconomic effects, cordon pricing is not recommended.

#### 2.3.3.4 Fiscal measure applied on residential suburban developments

This measure consists in setting a tax ("impact fee") for the new residential developments in suburban areas. Annual tax (development impact fee) applied on households locating in non-urban zones and redistribution of the revenue of impact fee to the urban areas, as fiscal incentive to all households located in urban zones (Stuttgart, Ludwigsburg, Sindelfingen, Böblingen, Esslingen and Göppingen). In the simulations an impact fee of 670 € per household and year was chosen.

This tax is in a way an internalisation of the external long-term costs generated by these new developments, in terms of equipments and infrastructures, and connections to existing networks (water, gas, electricity provision, sewage, etc). A compensatory tax reduction could be simultaneously adopted, as "push measure", for households locating in the urban areas, or for restoration projects in the city centre.

In fact, this kind of tax ("impact fee") exists in the USA since about 35 years, and is currently applied in 23 American States.

#### 2.3.3.5 Fiscal measure applied on offices

This measure consists in setting a tax on the offices locating outside "A-type" zones. The objective is to incite them to locate in A-zones. According to the Dutch "ABC" planning approach, "A-zones" are defined as zones that have an excellent accessibility by public transport at long range. This means for example zones distant by less than 10 min walk or public transport from important railway stations. This type of area is well suited to activities which are sedentary (i.e. require no or few transport), and with high job density, i.e. all administrative and intellectual activities of public or private sectors which take place in offices. High density and sedentary feature allow organization of mass transports.

The annual tax is intended for covering the social marginal cost of transport, generated by the settlement of an economic activity in a site located out of the A-zones. As well as for the impact fee for residential suburban developments, the level of the tax should be calculated to be as close as possible from the actual cost generated. The tax amounts to 976 €/job in the simulations.

Finally, note that a compensatory measure of fiscal reduction for companies locating in A zones could be envisaged to reinforce the effects of this policy.

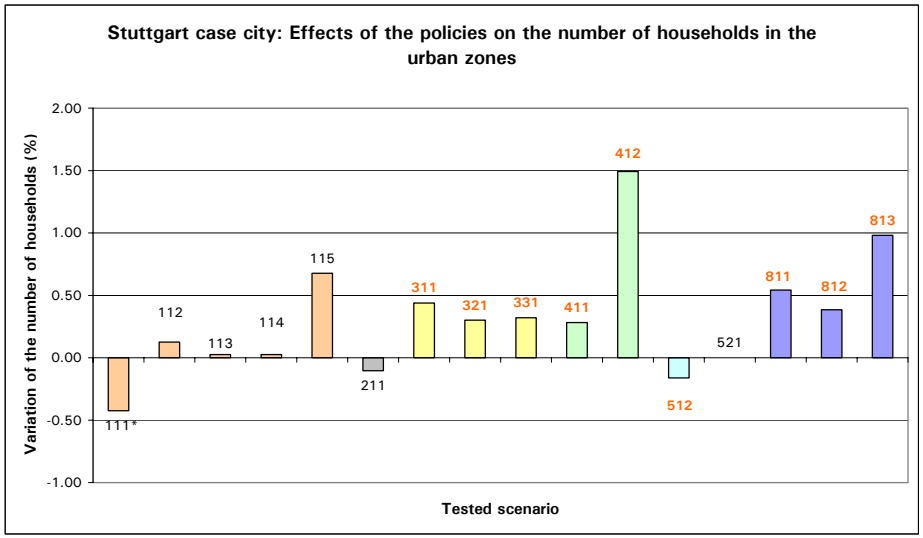
#### 2.3.3.6 General conclusions

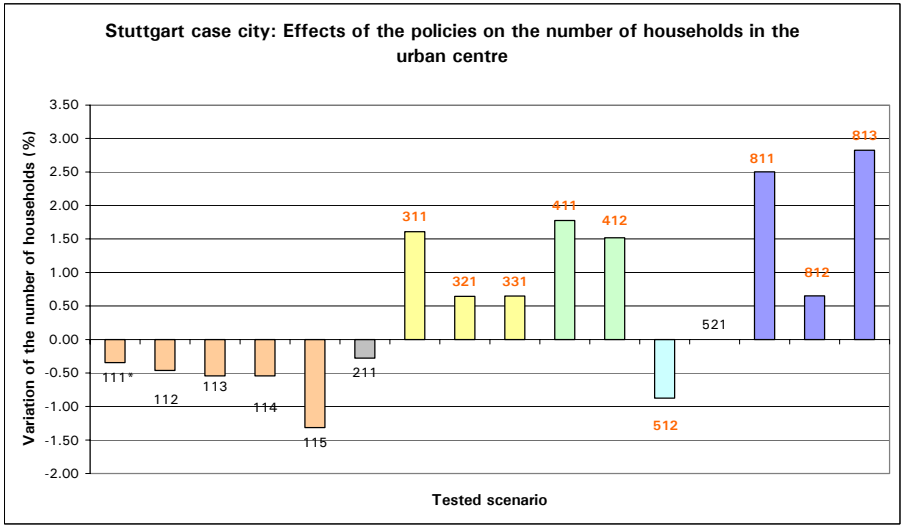
In conclusion, the combination of different policy measures seems to be advisable with respect of the different targets (see chapter 2.1): reduction of sprawl without considerable negative effects on the economic development of the region. Of course, the strength of the different measures to be combined is not yet optimised for the Stuttgart Region. It was one central aim of the project to apply the same strategies and measures to the 3 case study areas (Brussels, Helsinki, Stuttgart) with the same taxation levels. In case of concrete decisions about the applied bundle of policy measures to the Stuttgart Region further, even more comprehensive simulations must be carried out.

The proposed measures, however, are quite close to the objectives and are favourable to the search of co-ordinated solutions to tackle the common issues. It considers also the principle “polluter pays”, which is considered by experts like the most equitable repartition of the cost of transport negative effects. In addition fiscal and pricing measures can give means to the authorities to finance policies of improvement of the public transport supply.

Of course, the acceptability of fiscal and pricing measure can be low. Therefore, the creation of an integrated regional management policy is needed, and also awareness campaigns intended to all the citizens.

The following figures present the effects of the package of 4 measures on key indicators addressing urban sprawl/concentration and the car use rate. The measures 111 to 115 are related to the extension of the transport infrastructure (S1, A81 and Kappelberg-Tunnel) (see Deliverable D5 – D6).

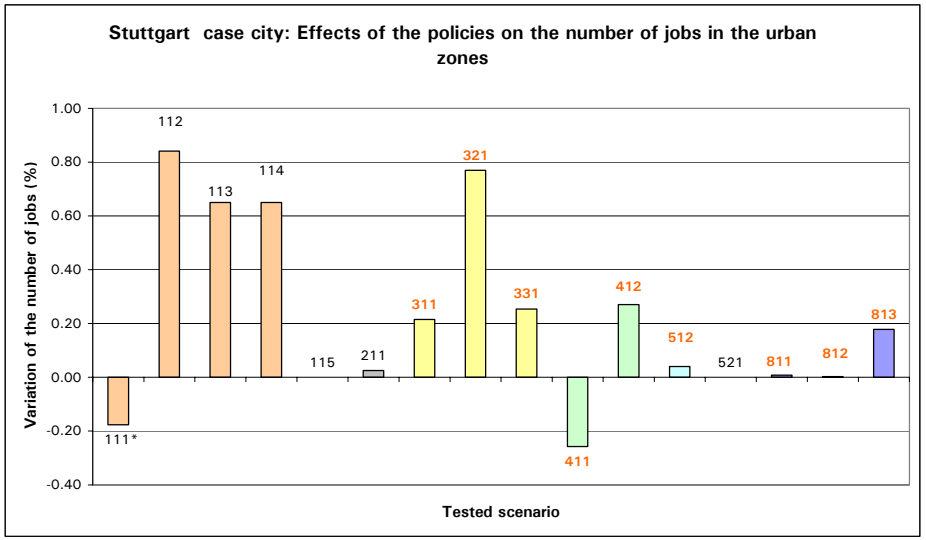


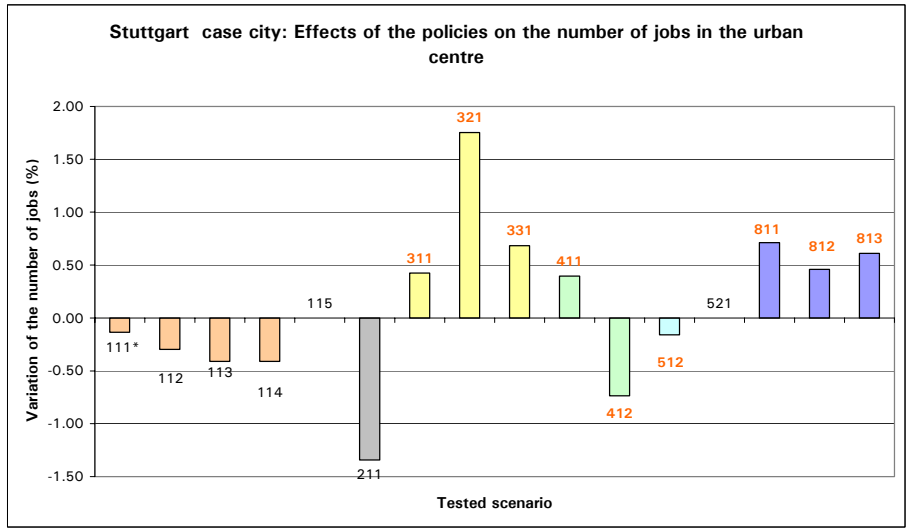




Type of scenario:

- Transport infrastructures / services
- External factor : relocation of work places
- Land use measures having an influence on urban sprawl
- Measures aiming at a modal shift towards public transport by increasing travel costs or time by private car
- Measures aiming at a modal shift towards public transport by decreasing travel costs or times by public transport, or by provinding P&R facilities
- Local investment plan and combinations of measures

* The effect of motorway A81 and leight rail S1 (111,112,113,114) is calculated by comparison with scenario 001 (situation without motorway and leight rail).
The effect of tunnel Kappelberg (115) is calculated by comparison with scenario 002 (which is also 114 - situation with motorway A81 and leight rail S1).
The effects of the other measures are calculated in comparison with scenario 003 (present state)

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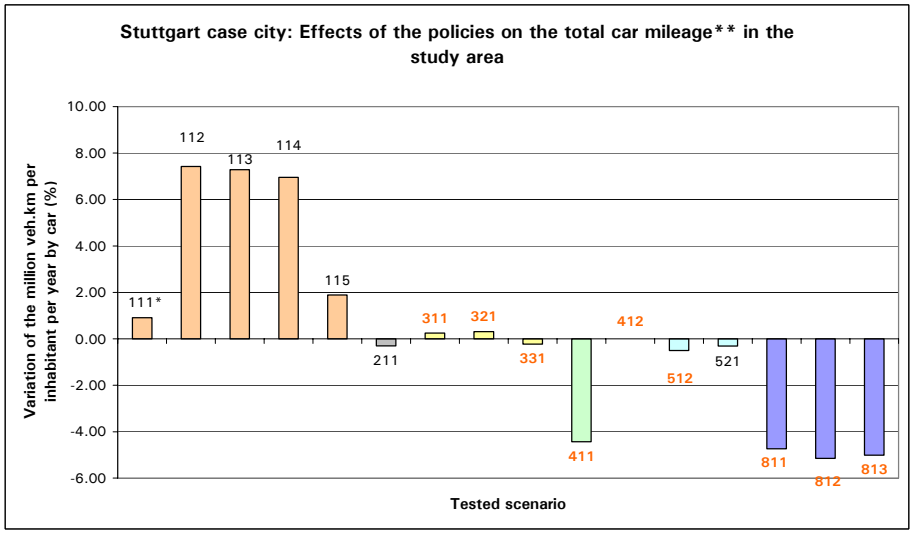


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- Measures aiming at a modal shift towards public transport by increasing travel costs or time by private car
- Measures aiming at a modal shift towards public transport by decreasing travel costs or times by public transport, or by providing P&R facilities
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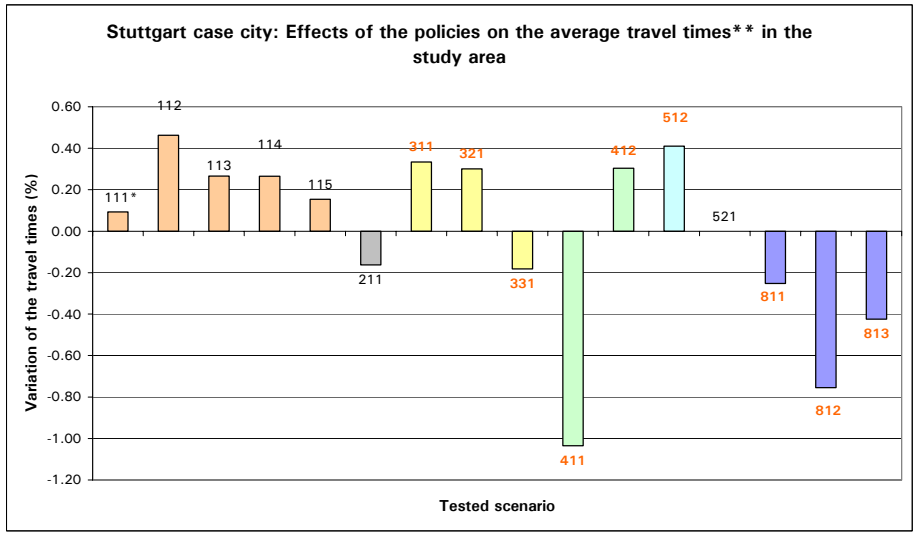
The effect of tunnel Kappelberg (115) is calculated by comparison with scenario 002 (which is also 114 - situation with motorway A81 and leight rail S1).
The effects of the other measures are calculated in comparison with scenario 003 (present state)
** Total vehicle-kilometers by car per inhabitant in the study area, including the incoming and outgoing commuter trips, per year, for all purposes.




Type of scenario:

- Transport infrastructures / services
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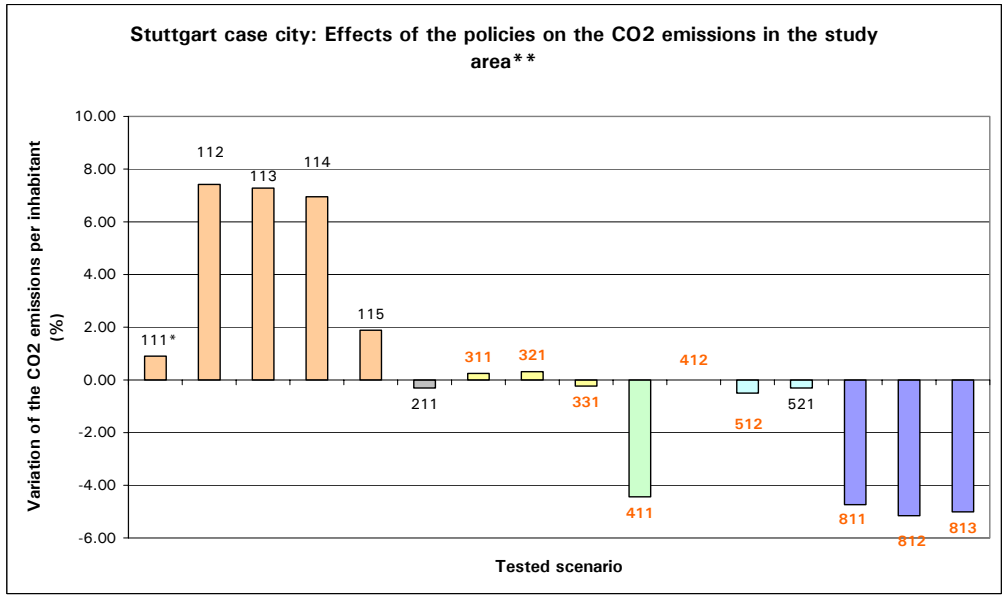
The effects of the other measures are calculated in comparison with scenario 003 (present state)
** Average travel times for the trips inside the study area, all modes, all purposes.




* The effect of motorway A81 and leight rail S1 (111,112,113,114) is calculated by comparison with scenario 001 (situation without motorway and leight rail).
The effect of tunnel Kappelberg (115) is calculated by comparison with scenario 002 (which is also 114 - situation with motorway A81 and leight rail S1).
The effects of the other measures are calculated in comparison with scenario 003 (present state)
** The CO2 emissions are calculated on the basis from the veh-km on the roads in the study are, including the incoming and outgoing commuter trips, all purposes, on one year.

## 2.4 Rennes

## 2.4.1 Introduction

The aim of this report is to design a program of measures that could be implemented in the Rennes context to combat urban sprawl.

Before presenting this program in details, a sum up of opportunities and constrains will be presented to remind key features about the Rennes situation concerning the urban sprawl issue and policies ever implemented. Indeed, to enter in the formulation of widespread recommendations without taking account of existing policies would be a bias. Indeed by the different case studies, we explored the diversity of urban sprawl modalities and the diversity of policies and tools implemented to control it. Analysing the local tradition in these policies help to propose evolutions in practises adapted at the local shared meanings concerning the mechanisms of urban growth or concerning the roles of public and private bodies. Without excluding possibilities of deep changes, earlier policies will act as a sort of common heritage constraining the ability of public administrations to design and to deploy new sort of tools and procedures.

After the description of opportunities and constrains in Rennes context concerning the control of urban sprawl, a program of measures to combat urban sprawl will be described. To sum up, this program will be based on the valorisation of existing policies (land banking, social housing building, integrated project) and the promotion of a better strategic use of local development. The context of a growing of population and employment could be transformed in a way to involve property developers in actions concerning a “smart growth”.

Of course the success of this strategy depends on the local actors implication. This proposals are largely shared by technicians but elected officials and private developers are key actors of this process. A communicative action should be designed to increase collective action. This point isn’t treated in details in this program but it appears as a central element determining the success of control sprawl policies.

## 2.4.2 Overview About Opportunities And Constraints To Be Kept In Mind When Designing The Programme Of Measures

### 2.4.2.1 Local opportunities to tackle urban sprawl

#### A. Public Land banking

Rennes and the most part of municipalities included in *Rennes Métropole,* the political institution created in 1970 to implement planning at the metropolitan area level, have a tradition of land banking. Traditionally, public subsidies have been allocated to buy green spaces with two main objectives. The will to preserve non urbanized spaces was a first motivation for local elected officials to set up large public land banking. Not only to maintain agricultural activities but also to prevent from the development of *banlieues* around Rennes. As example, the protection of a greenbelt around the city centre has been obtained by this kind of actions. There was a negative representation shared by political leaders about the suburbanization of Rennes area. Second, by controlling land, the mayors had the resource to control the residential development of municipalities preventing from deep evolutions in sociological and political characteristics.

In the last years, several municipalities have limited their land banking policy. The growing land prices have considerably limited their financial capacity to control local market. The city centre has pursued because of higher financial facilities. But this type of tool seems to be considered as a priority in local agenda. *Rennes Métropole* will deploy an important budget in the last years and will be sustained by municipalities in this effort.

#### B. Regulative land-use master plans

Rennes is recognised among French cities as one with the most important tradition in spatial planning. Since the middle of seventies, a master plan elaborated at district's level is implemented. Continuously revised (1983, 1994), this document has constituted a tool to tackle urban sprawl. The spatial organisation of urban development model pursued in this documents is a decentralised concentration. This model is recognised by commentators as one of the two main patterns of controlled growth, the other being "compact city". The main form of decentralized concentration inscribed in Rennes spatial planning documents is multiple village extensions. In this case, urban growth is channelled to all existing villages with development on the edge of the existing area. The policy of decentralised concentration has the advantage of creating a balanced metropolitan area system with several growing municipalities.

The most part of municipalities have adopted a regulative land-use plan respecting the objectives defined by the District. According to French regulative land-use framework, spatial planning documents elaborated by municipalities must respect zoning defined in the master plan.

## C. The strength of local property developers

In Rennes context, the existence of a set of local property developers can represent an opportunity to develop actions to tackle urban sprawl issues. Indeed achieving new urbanist design operations needs to establish a co-operation between local authorities and property developers. Negotiations about land, architectural specifications and prices seem to be easier to stabilize when existing long-term partnerships between public and private bodies. Any more, this local property developers can see the development of high density housing as a market opportunity. In a context of urban growth controlling by Rennes local authorities, the lack of land could affect their economical activity. Indeed, their market area is local.

## D. A old political integration

The co-operation between municipalities isn't recent in Rennes case. At the beginning of seventies, a urban district has been created with competences in spatial planning and public land banking. The existence of a political institution able to mobilize financial and legislative resources has constituted an opportunity to set up a regulative and "public-led" urban planning framework.

Elected officials felt also concerned by spatial planning. They participated in technical groups set up to achieve the elaboration of land-use or sectoral plans. The most part of mayors have translated general goals at local level by constituting public land banking or by negotiating with property developers to obtain a cluster urban development and the building of social housing. By the way, a spatial planning culture has emerged in the local political elite. Some political leaders had also technical capacity in urban planning which can explained why this topic has been so important in the local policies.

## E. A railway network that can be valorised

The Rennes urban area is crossed by several regional railways. This network, so called "star network" because of the convergence of railways in Rennes, represents an opportunity to localize new urbanized zones near stations. It will participate first to tackle peripherical urban extensions around existing villages by giving an operational capacity to produce new buildings in existing towns. Second, it will be a way to develop the public transport use by commuters.

Actually, the Region *Bretagne,* in charge of rail public transport, has increased the service quality on this railway axes with a modernisation of materials and the electrification of sections. Municipalities and other political institutions start developing a housing policy for a densification of the spaces located near the railway station and to build car parks.

## F. Social profile and its consequences about housing demand

The Rennes population is characterised by a large proportion of high income people and intellectual professions. This groups represent types of consumers preferring denser neighbourhoods. They are attracted by urban amenities (culture, concerts,…) and access to pedestrian shopping.

This social characteristics could be integrated in a housing policy which attempts to change the demand for housing location. Taking into account the experience of “located efficient mortgage” piloted by several US cities, one idea could be to provide a better mortgage for families choosing to live in the city centre of Rennes or in peripherical areas accessible by public transport. From a long time, the implementation of this type of fiscal policy was difficult to implement in French context. But the reinforcement of decentralization in the actual period could give perspectives to design new policies.

### 2.4.2.2 Local constraints to tackle urban sprawl

## A. The pursuit of demographic and economic growths

Until 2010, the Rennes metropolitan area will face a demographic growth of 60.000 people according the INSEE forecasts. To accommodate this population and to respond at the local demand concerning housing, it will be necessary to build 2000 new dwellings each year during the last decade.

This evolution will have two main consequences about urban sprawl issue. First, a strong pressure will exert on the local individual housing market. Property developers and land owners will try to obtain from mayors the permits to urbanize green or agricultural spaces. Already, they establish financial contracts with old farmers in order to have the exclusivity when old farmers decide to stop their activity and sell their land even if the property developers haven't the insurance that this lands will be authorized by spatial planning documents to accommodate a residential development. Secondly, in this growth context, land and house prices are increasing so rapidly that politicians are faced to a dilemma. Do they keep protecting green spaces with the risk of a social segregation in housing: only the households with the highest income can afford to live in the city centre and in the municipalities near Rennes whereas the poorest households must live at 30 or 40 kilometres increasing travel demand, energy consumption and emissions? Or do they accept a more generalized urban development that will deteriorate the quality of life, one the most important criteria in the Rennes attractiveness ?

## B. A limited opportunity to concentrate new urban development in existing urbanized spaces

The reuse of industrial waste lands to develop new residential estates is limited in Rennes. Indeed, industrial and economical development in Rennes set up in the sixties and seventies. By the way, new firms have been implanted in specific industrial areas around Rennes. In some cases, urban planning of old manufactories located in the city centre has been driven with famous national architects. This type of urban operations is disappearing progressively. Then, urban regeneration doesn't represent a central topic for the control of urban growth in Rennes.

## C. A polycentric development

Since the middle of seventies, the priority has been given in spatial planning documents for a polycentric urban development. Each municipality has benefited from regulative authorizations for its residential development. A sort of equilibrium in demographic growth has been obtained : all the municipalities have increased their population. But in Rennes, the policy of decentralised concentration didn't manage to create complete sub centres with a polarisation of development on several municipalities. The result is a set of little or middle size communes without the emergence of secondary centres as foci of local economic growths and urban functions (cf. annex 1). As consequence, this spatial planning schema represent a strong constrain in the managing of local public transport system.

### D. A non existing common culture of political co-operation at large scale

A larger spatial planning will cover the Rennes urban area in the next years with the achievement of the "*schéma de cohérence territoriale du Pays de Rennes*" (SCOT). Nevertheless, the territories composing this large scale areas have not a common habit of political co-operation. Some of them have just been politically institutionalised with the creation of a "*communauté de communes*", a political institution with limited competences and non directly elected members. The existence of a different level of political co-operation habit can have consequences to tackle urban sprawl. Without a common political voluntary, the master plan could stay a non directive document, a set of consensual recommendations without concrete decisions permitting to limit urban sprawl.

## 2.4.3 Proposal For A Policy Tackling The Issue Of Urban Sprawl

### 2.4.3.1 Valorising local opportunities

### A. The elaboration of a new master plan : a way to combine land use and transport policies

The process of *« schéma de cohérence territoriale du Pays de Rennes »* elaboration can be an opportunity to re-active the local tradition of a voluntarist spatial planning. Quantitative objectives could be discussed concerning the part of new buildings in extensions and new buildings in urban regeneration sectors and the perspectives of demographic growth. Other quantitative objectives could be detailed concerning the part of social housing in new buildings. The master-plan could become a sort of political institution in charge of the coordination between urban policies more politically acceptable than the creation of a metropolitan institution. Peripherical communes keep their autonomy even if they accept to negotiate about general goals in spatial development.

Because the issue of urban sprawl is multi-dimensional, defining a new master plan can help to develop an integrated strategy with objectives in land use, transport, environment, housing, social matters and economy. To achieve this inter-sectoral approach, groups of experts, technicians and private actors, including associations, should be organized. From its participative process depends the capacity to go beyond thematic policies.

Any more, the importance of new urbanized zones can be also limited in the master plan, and, by contrast, the importance of agricultural or natural areas can be increased. The law SRU (*Solidarité et renouvellement urbains*) has constrained the possibility for local authorities to develop urban extensions. Only areas served by public transport should be concerned. The aim is to coordinate the location of urban growth with public transport improvements and encourage greater intensity of development where public transport accessibility is good. The new master plan in Rennes can organize the residential development of areas located near railways stations and prevent from large urban development in non urbanized areas. By the way, a gain of efficiency in public policies

implementation will be achieved with the valorisation of regional railway transport policy. Indeed, high densities in central part of peripherical towns will make the provision of public transport easier.

By the end, the law SRU (*Solidarité et renouvellement urbains*) introduces the evaluation of the *schéma de cohérence territoriale* each ten years. It represents an opportunity to set up a global system to evaluate how the objectives are implemented. This tool will help to propose modifications in the content of policies in order to increase their positive effects in tackling urban sprawl, or limiting its negative effects.

## B. The development of public budget devoted to housing

Existing public budgets to promote social housing and public land banking could be increased and more linked with the control of urban sprawl. Actually, budgets are allocated to constitute land banking. But often this land banking plays a role of reserve for new dwellings. A proposal could be to affect a part of this public budgets at the protection of green spaces. Specific conventions could be carried out between local authorities and farmers.

### 2.4.3.2 Developing local practises with “win to win” processes between market and regulative regulations

The context of a economical and demographic growth represents an opportunity to develop tools tackling urban sprawl dealing with market-led processes. It seems possible to tax private investors because of the market housing attractively. A budget participation could be negotiated with private developers because they are attracted by the dynamism of local housing market.

The existing French urban planning system contents impact fees to offset the cost of local government provision of infrastructure (*taxe locale d’équipement)*. Since 2000, a legal procedure (*Participation pour le financement des voies nouvelles et de leurs réseaux)* authorizes municipalities to ask for land owners a financial participation at the building of new streets and technical networks when their land is recognized as a future residential space in the local spatial planning document.

An other way to be explored in Rennes case could be a sort of collective mutualisation of costs linked with active policies controlling urban sprawl. Existing solidarity policies are focused on social and economical equilibria in spatial development. District funds are deployed on the poorest municipalities of the Rennes urban area (*dotation complémentaire de solidarité*). A proposal could be to extend this policies to urban sprawl issue. In that case, a commune that would decide to limit voluntarily its urban development could perceive a sort of financial indemnity. This budget could be allocated to the protection of green spaces and to assure the viability of local agriculture. Of course risks exist concerning this new policy. First, it could limit the level of new dwellings and then to involve an urban sprawl in zones located around the District. However, elected officials will keep developing their commune. A growth of households and employments is still being perceived as a sign of political capacity. Second, the creation of this fund.

The development of impact fees could be completed by the valorisation of public-private partnership tackling urban sprawl. In a demographic pressure context, public bodies benefit from a advantageous position to negotiate with property developers. By controlling land and spatial planning, they can obtain a stronger

private investment concerning the building of higher density programs. A local public engineering should be developed to help elected officials in this negotiation. Financial costs induced by new architectural constraints should be defined more precisely in order to give a response at economical arguments. The public-private partnership could be extended to the implementation of a global system of land use exchange. A property developer that would buy land for urban extensions should, in exchange, buy agricultural and natural land and protect their use.

The economic pressure context represents also an opportunity to set up actions to tackle urban sprawl induced by the economic activities settlements. First, a local policy recommending and financially inciting companies which generate high travel demand to locate within existing towns could be implemented in Rennes case. Several elements of the local context increase the feasibility of this measure. The importance of firms in the new technology sector and public administrations in the local economy can be underlined in that sense. Secondly, reductions to parking standards to encourage public transport use and discourage car use should be generalised in all projects of office buildings. There are sufficient alternative modes of transport (metro, bus, train) in the city centre of Rennes to restrict parking spaces. Also, the city centre is a strong economy area and benefits from the proximity to light rail stations.

#### 2.4.3.3 Developing local practises with cognitive and symbolic actions

### A. Convincing elected officials to promote a cluster development

Design solutions are existing to preserve land consumption at the level of the individual housing development. The PUCA, a research centre dependant from the French housing Ministry, has financed between 2001 and 2004 several operations showing that a gain of density could be obtained by architectural innovations. A balance can be reached between the social demand for a better quality of urban life and an architectural conception with a pedestrian scale, mixed uses and high density housing.

The main problem isn't technical but cognitive. For the most part of elected officials, a high density housing is linked with peripherical high rise estates concentring social difficulties that can be found in French cities (so called *quartiers politique de la ville*). This representation keeps being strongly in Rennes because of the lack of a old urban history and because of the relevance of the spatial limit between urbanized and agricultural zones. The organization of conferences and visits of operations with a diversity of urban form but a same density, represents a first way to tackle this common representation. An other should be the allocation of public budget (*Rennes Métropole*) to finance new projects presenting a real effort concerning urban design and accessibility issues. Because of the high level prices in housing, an other criteria to choose projects should be that they provide affordable housing and that the projects mix private and social housing.

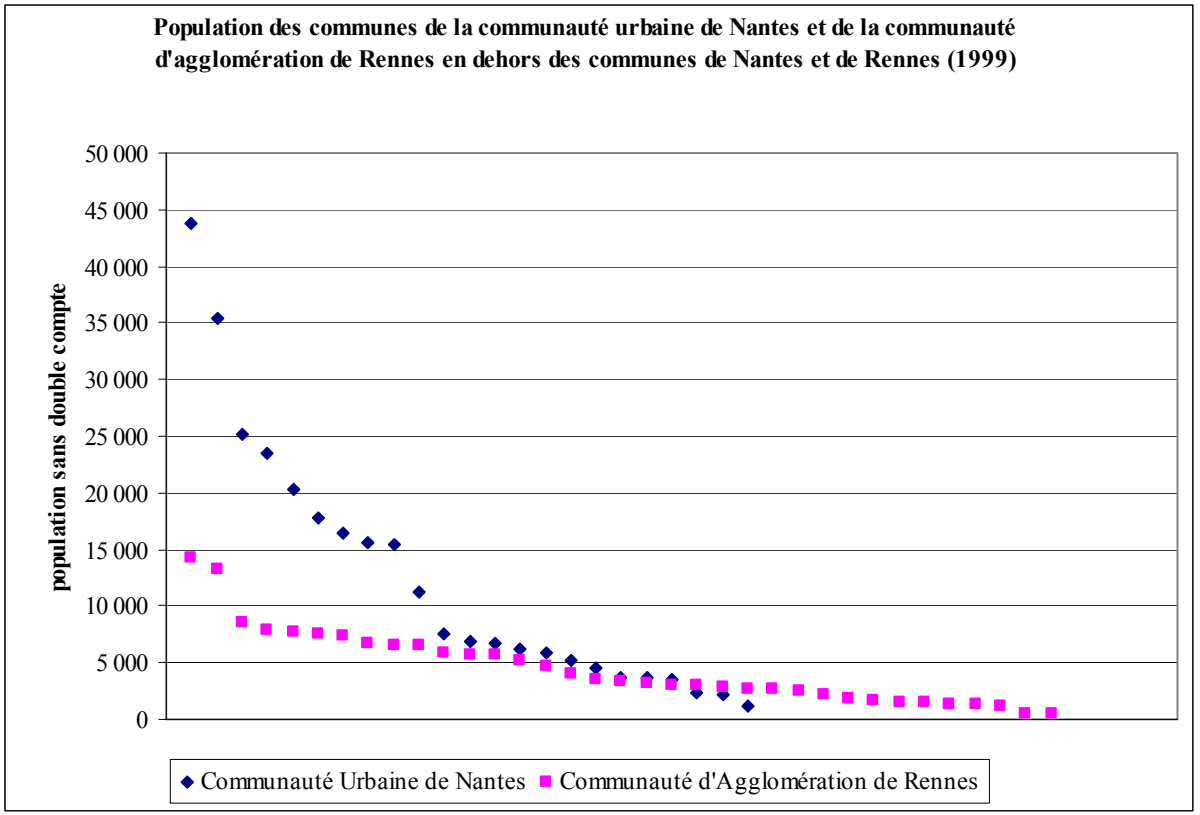
### B. Convincing elected officials to create mixed income groups

The building of social housing in the most part of peripheral municipalities is still limited. Elected officials share a negative representation about this type of housing. A sort of assimilation is made between social housing and large peripheral estates concentrating social problems in large cities. Whereas, financial

and regulative tools exist to reduce segregation. In the local plan, specific zones (*emplacements réservés*) can be defined to build social housing. State and District give direct provision of below-market-price housing.

A symbolic action could be implemented to tackle this negative representation about social housing by insisting on the diversity of urban form and on the existence of a local demand for this type of housing. Visits of local projects and conferences of mayors could be organised.

## 2.4.4 Annex 1 : comparison of demographic size of municipalities in Rennes and Nantes urban areas



## 2.5 Milan

## 2.5.1 Introduction

This note put forward some suggestions for the definition of policies capable to reduce urban sprawl in Milan. The suggestions derives from the analysis of the case city of Milan carried out in the first part of the SCATTER project (WP2 and WP3) and are coherent with the general recommendations put forward by the research project.

The text is divided in two parts: an overview about opportunities and constraints to be kept in mind when designing the programme of measures and a list of proposal for measures and policies aimed at tackling urban sprawl.

## 2.5.2 Overview About Opportunities And Constraints

### 2.5.2.1 Local opportunities to tackle urban sprawl

### A. Regulative land use

An opportunity to tackle urban sprawl in Milan is the availability of several disused industrial areas (*brownfields*) in the central part of the city. Their transformation, even though in many parts already completed, could be strategic from the point of view of containment of urban sprawl.

In the middle of nineties (according to an analysis of the Centro Studi Piano Intercomunale Milanese – PIM) there were 28 millions $m^2$ of disused areas in Lombardia: 9 millions were located in the Milan metropolitan area and 6 millions just in the city of Milan. Beside these, there were 1 million $m^2$ of disused rail yards.

Unfortunately, the city has not made the optimum use of such an opportunity. The adopted planning tools[6] have been in many cases lost chances. Without a strategic urban planning framework, the uncoordinated interventions have been essentially driven by the urban investors' interests and did not constitute occasions for urban regeneration.

[6] *Programmi di Riqualificazione Urbana* and *Programmi Integrati di Intervento.*

## B. Increase of transport costs

One of the causes of the loss residential land use in the city of Milan is the high value of urban land rent. While in the last years transport costs have not increased (at least direct costs), people have preferred to move outside the city increasing commuting distances and keeping both equal cost and equal time of the trip. A strategy to invert this trend is to increase transport costs and to consider also the external diseconomies ("polluter pay" principle). Road pricing policies have been studied by the Milan municipality, but it is very unlikely that these will be implemented in the next future. On the other side, park pricing policies are most popular and have been extensively introduced by the *Programma Urbano dei Parcheggi* (January 2002).

### 2.5.2.2 Local constraints to tackle urban sprawl

## A . Demographic and socio-economic growths

The demographic and economics trends in the area of Milan during the last decades are definitely clear: the lost of residential population by both the municipality of Milan and the municipalities of the hinterland in favour of the more external areas. Since 1981 to 2001 the population of the municipality of Milan decreased from 1,605,000 (42% of the all province) to 1,256,000 (34% of the all province). Dwellings of the other municipalities in the province continued to increase from 2,234,000 to 2,451,000 (on the whole, the population of the province decreases from 3,839,000 to 3,707,000 dwellings). The employees in the municipality of Milan passed from 818,000 in 1981 to 761,000 in 1991, to 809,000 in 2001, while in the province the growth was progressive. Still considering the years 1981 and 2001, the employees on industry halved in the municipality of Milan (from 287,000 to 126,000), and decreased in the other municipalities too (from 515,000 to 429,000), so that in the whole province the balance is negative (-247,000).

## B. Land use pricing (urban land rent)

As already mentioned, the high level of house prices within the city of Milan is on of the causes of the tendency to choose external areas as a residential solution. After a period of stable prices for both dwellings and offices during the second half of the nineties, since the year 2000 the real estate market has continued to rise, recording relevant increases of dwelling prices.

## C. Territorial fragmentation

One of the aspects that mainly influence the urban sprawl of the metropolitan area of Milan is the absence of planning strategy that aim to tackle the urban sprawl and the lack of effective planning tools regarding the entire metropolitan area. The same municipality area of Milan was developed in the last years on the base of several urban projects, not always coherent between them. The municipality planning was based on sector tools like the *Documento Direttore del Progetto Passante* and the *Documento Direttore per le aree industriali dismesse*, which aimed to guarantee a coherence in the transformations that would be implemented on the previsions of the *Variante Generale al Piano Regolatore* of the year 1980.

The *Documento d'Inquadramento delle Politiche Urbanistiche Milanesi* is the planning tool currently in force in the municipality of Milan (beside the old PRG). This document, in accordance to many experts, continues the deregulated approach of the last years where the vague addresses seem not to guarantee the real control of the urban transformation.

With respect to the urban sprawl issue, the document states the intention to bring back the residential land use to the city and to control the prices of dwellings in the city, but it seems not to have the tools to implement such objectives and, in addition, it is only referred to Milan and not to the metropolitan area.

Despite the formal institution of the Milan metropolitan area dates back to the year 1991, the current lack of metropolitan land use planning strategy has caused a strong residential pressure on the municipalities outside the city of Milan and these municipalities have the interests to satisfy such demand because of the tax revenues it guarantees (*Oneri di urbanizzazione* and *ICI, Imposta Comunale sugli Immobili*).

## D. Increase of road network capacity

Table 1 reports the main projects selected from the long list of regional trunk road network investments (Regione Lombardia, 2001). In addition to these investments, the Region intends to complete and improve safety characteristics of the provincial network for a total of about 832 millions Euro in the next 10 years.

Tab. 1 Lombardia motorway network main projects

| |
|---|
| Pedemontana motorway (Malpensa-Bergamo) |
| South Brescia motorway ring |
| New link between South Brescia motorway ring and Val Trompia |
| New link between Piacenza–Brescia (A21) motorway and Cremona (inland harbour) |
| TI.BRE. new link between Brennero (A22) motorway and Cisa (A15) motorway - |
| New motorway Milano-Brescia |
| East Milan new motorway ring |
| New link between Malpensa, Milan-Turin motorway (A4), Pavia and Piacenza-Turin (A21) motorway |
| New link between Malpensa, Pavia and A21 motorway |

Source: Regione Lombardia, 2001

There is yet a certain degree of incertitude concerning the availability of funds both for the main network (*Grande Viabilità*) investments, which is part of the *Accordo di Programma Quadro* between the Region and the National Government, and the regional priority projects. In spite of having guaranteed the necessary funding, nothing has been done to start up the financing procedures and therefore it seems unlikely that it would be possible to stick to the time schedule forecasted by the regional programme: there is then the real possibility that some of the projects will remain on paper for a long time. The more interesting projects for the metropolitan area of Milan:

- Pedemontana motorway (Malpensa-Bergamo),
- New motorway Milano Brescia,
- East Milan new motorway ring.

## E. Increase of public transport capacity

According to the *Programma Triennale del Servizio Ferroviario Regionale* (Regione Lombardia, 2003), many projects concerning rail infrastructures are under approval or in executive stage. Few of them are going to be ready and operative before summer 2006. The Region has also planned to increase the number of trains-km in the next three years adding 3,8 trains-km mainly split among the lines connecting Milan with the rest of the region. 52% of such trains/km are concentrated in the *Passante Ferroviario* link between Dateo station (recently opened), Porta Vittoria and Pioltello, while 3% are devoted to the service on the rail link between Milan and the Malpensa airport. The completion of the urban section of the *Passante Ferroviario* is one of the most important projects in the area and is expected to significantly improve the rail service in the metropolitan area.

In the Milan municipality plans there are other important public transport projects. The most relevant is the fifth metro line that will join Milan (Porta Garibaldi) to Sesto S. Giovanni and Monza in the northern metropolitan area and whose estimated cost is 504 millions Euro (37% from private financing); the project time schedule is not yet precisely defined as administrative and financial procedures to start the project financing tender are still to be completed. Other public transport network investments currently in progress are:

- extension of metro line M1 to the new exhibition area of Fiera di Milano in Rho-Pero (western metropolitan area);
- extension of metro line M2 from Famagosta to piazza Abbiategrasso and until Assago (western metropolitan area);
- extension of metro line M3 from Maciachini to Affori (north western border of Milan municipality)
- extension of F. Testi-Bicocca-Precotto LRT line (northern part of the city);
- construction of the Castello-Parco Nord LRT line (northern part of the city);
- construction of the Duomo-Rozzano LRT line (southern part of the city).

## 2.5.3 Proposals for a policy tackling the issue of urban sprawl

a. The key proposal is the **implementation of a (new) metropolitan institution** for the Milan Area in order to overcome the current fragmentation of institutions and competences in the local government. Such a new institution will give practical implementation of the federal government principles introduced in the newly amended Title V of the Constitution and will have to share its prerogatives between the Province and the Municipality.

b. The following step is the development of a **new metropolitan management instrument**, i.e. a new master plan to combine land-use policies with transport policies and investments, bringing together tools which currently operate at different level in different sectors like the PTCP (Piano Territoriale di Coordinamento Provinciale) and Agenda 21. A good example of governance of urban development is the *Piano Strategico del Nord Milano* (Agenzia Sviluppo Nord Milano, 2001), which has stimulated a virtuous process of urban regeneration of the impressive stock of disued industrial areas localized on the northern metropolitan area of Milan. The aim of the *Piano Strategico* was to promote coordination and cooperation within the public and private subjects.

c. Along the lines of the general recommendations of the SCATTER project and the local experience, integrated land use and transport policies appear to be the most effective in reducing urban sprawl in Milan. On the one side, regulatory measures like urban design can help in creating mixed land use areas (residential, employment, services) in order to reduce the need for private mobility. Such philosophy could be even reinforced adopting the *ABC* approach of Dutch cities, i.e. using the fiscal leverage to drive the location of services and economic activities according to the different levels of accessibility to the public transport network. Eventually, road pricing measures (such as fiscal, pricing and ticketing instruments) could play an important role if these are coupled with the implementation of measures to control urban rent values.

## 2.5.4 Références

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## 2.6 Bristol

## 2.6.1 Overview Of Opportunities And Constraints

### 2.6.1.1 Local opportunities to tackle urban sprawl

In the last two years a wide range of new institutional frameworks for the delivery of planning strategies and policies have been set up in the South West of England and in the area previously referred to as the Avon County and now West of England.

These new institutional arrangements are largely responsible for the design of long-term strategies and spatial framework for the sustainable development of the area. This is in line with many of the findings of the SCATTER project that has identified in the institutional fragmentation one of the major barriers to tackling urban sprawl. These new arenas for decision-making are mainly voluntary coordination agreements rather than officially elected administrative powers.

The key new actor in the region of the West of England is the West of England Partnership which is in charge for the design of four different and coordinated strategies: Housing, Economy and Skills development, Planning, transport and environment (formerly addressed by the Joint Strategic Planning and Transportation Committee) and Culture, leisure and tourism.

### A. The Vision for the West of England in 2026

The Vision for 2026 was developed by the West of England Partnership and it mirrors a similar document (the Regional Spatial Strategy) developed by the South West Regional Assembly for the wider region of the South West. The Vision addressed delivery priorities in the context of the future quality of life in the region, of the development for connectivity and accessibility and of the future economy. In short the Vision for the area is one of sustainable growth supported by successful investment, to improve the quality of life for all in the sub-region.

A sub-regional spatial strategy accompanies these objectives in order to coordinate the spatial development of homes, jobs and transport and taking a broad view of social, economic and environmental change to achieve sustainable development.

The concrete objectives are identified as:

- Re-use vacant land and buildings, modernise housing and employment premises, and renew outdated social infrastructure;
- Integrate new development with transport and community benefits, and environmental improvements.
- Seek higher standards of housing layout and design to achieve attractive higher density developments where there will be good access to local facilities and public transport;

- Promote regeneration in areas of social deprivation to close the gap between disadvantaged and other communities;
- Introduce measures to improve public transport, safety and access to communities, and reduce road congestion and pollution;
- Encourage the renewal and efficient use of commercial areas close to existing town and district centres to protect local employment;
- Enhance the environment, including urban open spaces, and ensure that new development fits into its surrounding.

According to the Vision renewal of previously developed urban sites will contribute much of the land required for new industrial and office development. It will also help to meet housing needs. Studies are under way to assess the long-term potential of the principal urban areas (Bristol, Bath and Weston-super-Mare) and secondary towns to accommodate further housing development. The spatial strategy will need to identify what sort of high density development would be appropriate and acceptable, and where it might be located in general terms.

These are clearly targets that, if achieved, will be a major element of the battle against urban sprawl and its negative impacts.

## B. The Greater Bristol Strategic Transport Study

## C. The Joint Local Transport Plan

In the British planning system the Local Transport Plan is a five-year plan setting out local Councils' objectives for improving transport and detailing the ways in which this is to be achieved.

The new LTP is a Joint document being produced by the Joint LTP team which consist of officers from the four local authorities: Bath and North East Somerset, Bristol, North Somerset and South Gloucestershire. The four Councils have joined forces to plan for the future of transport in the area. They are developing a Local Transport Plan for the period 2006 - 2011 to meet the area's transport needs, increase transport choice and improve access to jobs, education and service.

Local authorities and the Government have agreed four “shared priorities" congestion, road safety, air quality and accessibility) aimed at tackling the impacts of transport and improving the overall quality of life.

The draft LTP will be available for public consultation in Spring 2005 and it will focus on the following action areas:

- Buses: This package will include key priorities on all main routes, looking at more cross-city services and new ticketing measures. Accessibility problems will be addressed through expanding existing bus services, and providing new services such as 'demand responsive' public transport that provides services when and where people need them'.

- Accessibility: The Joint LTP will work closely with the public and service providers to ensure that everyone's needs are met. New technologies such as GIS for accessibility analysis and mapping will be used to produce maps showing the opportunities for using public transport, walking and cycling access to get to facilities such as hospitals.

- Promoting social inclusion by tackling the spatial imbalances in infrastructure accessibility and service provision.

#### 2.6.1.2 Local constraints to tackle urban sprawl

### A. Greenbelt and urban extent

The RPG10 (see D3-Monographic annex on Bristol) proposes that local authorities should consider a revision of the current boundaries of the greenbelt in order to allow for long term sustainable development needs. When preparing their local plans or local development frameworks, local authorities should anticipate urban extension studies, which "will need to take account of and be taken into account in reviews of any Green Belt." (RPG10, p.25).

This proposal indicates a view of the Green Belt both as a constraints to sustainable development and as a "living boundary" that can and should be altered in order better control over the location of urban growth.

### B. Constraints to sustainable economic and urban development

Population and employment have grown steadily in the last 20 years and projections suggest a high rate of growth for the next years. Employment in particular has had a significant growth with top figures of 44% growth in the South Gloucestershire district in the decade between 1991 and 2001. The majority of new development has taken place on green fields sites on the fringes of the main urban areas. The commercial and high-tech employment development that have taken place to the north of Bristol, together with major housing development, have been attracted by land availability close to the main transport corridors and by easy access to other market offered by the motorway network.

Housing development in the North Fringe has been, since the late 1970s solely dealt with by the private market. As a result the planning was very poor and uncoordinated. The local services were kept to a minimum and more recent attempts to balance the poor service supply in the area have to fight against the resilience of the housing market as well as the buoyancy of the main shopping centres.

The Greater Bristol Strategic Transport Study has identified 12 areas, which have potential for future economic and urban development. Each development area offers opportunities for sustainable development as well as risks to increase the problems of the Bristol urban region notably traffic congestion and consumption of natural resources especially green land and water.

| | | DEVELOPMENT OPPORTUNITIES | RISKS TO SUSTAINABILITY |
|---|---|---|---|
| | 1) AVONMOUTH | It is the largest homogeneous area previously identified for new development which is not constrained by existing green belt.<br><br>It's main potential are for the development of economic (commercial, distribution, industrial). | Traffic generation is a highly contentious issue in the area.<br><br>The level of traffic that could be generated to and from the North Fringe of Bristol, following the development of the area, is problematic and indicated that the scale and type of development should be carefully assessed. |
| | 2) PORTISHEAD | Substantial availability of brownfield for housing and employment development. Need green belt revision. | Expansions need to be evaluated against the risks of damaging the current wildlife corridors and landscape.<br><br>Considerable transport implications in the connections with Avonmouth, Weston-super-Mare and North Fringe. |
| | 3) PORT OF BRISTOL | Potential for economic development currently constrained by lack of available and suitable sites. | Expansions need to be evaluated against the need to protect the environment. |
| | 4)WESTON-SUPER-MARE | There are signs of a considerable economic regeneration in the city and its immediate fringe with the location of several business activities that are leaving the Bristol area and the North Fringe due to high costs of land and traffic congestion. | Due to the spatial organisation of the region which revolves around the node of Bristol, the implications of the development of WSM upon out-commuting and congestion are likely to become unacceptable without considerable action towards a regional transport system. |

| | | | |
|---|---|---|---|
| | 5) EMERSONS GREEN | Substantial mixed development (housing and employment) has been made in the recent past and future plans locate here a Business and Scientific Park. | The area needs to be supported with better public transport both towards Bristol and the North Fringe in order to avoid congestion on existing motorway routes. |
| | 6) NORTH FRINGE | The area has potentials for infilling and mixed development in the already built-up area, but this depends on the attitude of the private landowners who have been the sole actors of the development in the area. | Substantial further growth will require a revision of the green belt and could have implications for the operations at motorway junctions. |
| | 7) BATH | Housing completions in Bath have gradually declined in the last 5 years, but there is still residual potential for development through the use of brownfields and dismissed buildings from declining industries. | Given the status of World Heritage site, Bath must carefully evaluate the potentials for urban extensions on the fringe. |
| | 8) BRISTOL CITY CENTRE | There is considerable scope for mixed use development. The city centre has already welcomed regeneration projects that have accommodated new business activities as well as tourism facilities and new housing | None identified |
| | 9) YATE / CHIPPING SODBURY | The area has minimum provision for housing development with the majority of potentials for the South Gloucestershire area having been allocated to neighbouring Emerson's Green | None identified |

| | | | |
|---|---|---|---|
| | 10) SOUTH BRISTOL | This ares is seen has potentially able to release the urbanisation pressure from the north of Bristol. Both housing and employment developments sites have been identified in the Bristol's Urban Framework Plan and in the 2026 Vision. | None identified, possibly further segregation for lack of transport connection with the centre and north of Bristol |
| | 11) NEW SOUTH WEST AIRPORT | The development of a new airport in alternative to the existing one in the south of Bristol was suggested in a consultation document produced by the Central Government.<br><br>It is not a feature of the current regional spatial strategy or regional policies. | Significant environmental implications, generation of new traffic. |
| | 12) KEYNSHAM | Alternative housing and employment development site for the Bath and North Somerset District. | None identified, possible increase of traffic towards Bath and Bristol. |


**Figure 6: Location of Development Areas identified in the Greater Bristol Strategic Transport Study**

## 2.6.2 Recommendations For Tackling Urban Sprawl

According to the Vision for 2026, renewal of previously developed urban sites will contribute much of the land required for new industrial and office development. It will also help to meet housing needs. Studies are under way to assess the long-term potential of the principal urban areas (Bristol, Bath and Weston-super-Mare) and secondary towns to accommodate further housing development. The strategic vision also takes into account the possibility of accommodating further major growth beyond existing built-up areas. To do so, three spatial scenarios have been identified and are currently under public consultation. The spatial scenarios help focus thinking and highlight some future directions for development that may need to be considered. They are not separate “options” but can be integrated.

Here we will suggest some recommendations and policy measures that can accompany the delivering of the spatial scenarios, according to the results of the SCATTER project.

Scenario 1 – Focusing major development and infrastructure improvements in South Bristol and North Somerset. This scenario suggests a turn around in the current direction of development mainly taking place in the North Fringe. It supports the development on the south edge of Bristol through a sustainable community model.

Recommendations for Scenario 1: In order for the scenario to be successful in delivering sustainable development, investments in new public transport infrastructures and connections would be required at an early stage of the development process in order to prevent the car from becoming the dominant mode of transport. A second recommendation regards the definitions of accurate building densities and housing models in order to prevent the possible loss of open land and landscape.

Scenario 2 – Developing new sustainable communities to the north and east of the Bristol built-up area, such as north of the M4 and east of the Ring Road. This scenarios reinforces the current unsustainable trends of development that have generated high congestion on the radial and orbital road system at the north of Bristol, high land consumption for low density residential models, and mono-functional sprawl landscape.

Recommendations for Scenario 2: Fostering this model of development has the major impact of preventing development from occurring elsewhere and therefore increase the problem of segregation for the south of Bristol. The only recommendation possible if this scenario is selected for future development is to increase the provision of effective public transport in the area, to promote mixed and high-density development.

Scenario 3 – Polycentric City region. More dispersed development around the smaller towns, which offers the potential for improving public transport, particularly in the key corridors linking Bristol, Bath and Weston, and north of Bristol and protecting “green wedges” of natural land between the transport corridors.

Recommendations for Scenario 3: The polycentric model has the advantage of distributing urban and economic growth across the region. However its sustainability relies on an efficient public transport system. This involves not only the location of the corridors but also the location of transport hubs and the

creation of an integrated and reliable service. Because one of the key impacts of urban sprawl is the increased congestion over radial routes to access the main urban centre and a lack of connections for suburb to suburb commuting, it would be preferable if the new transport system would provide adequate orbital links.

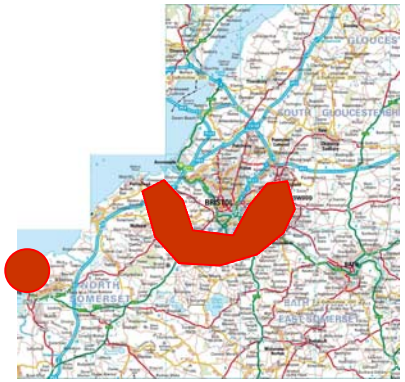

**Figure 7a: Scenario 1**

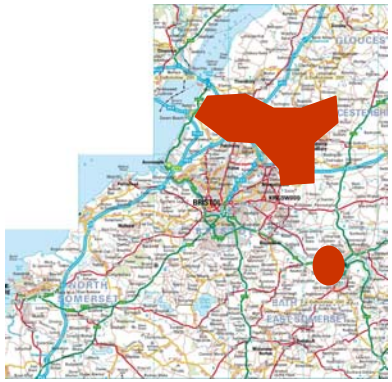

**Figure 8b: Scenario 2**

**Figure 9c: Scenario 3**

## 2.6.3 Références


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