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The challenge of sustainable mobility in urban planning and development in Copenhagen Metropolitan Area

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Preface

This report presents the results of a study of the ways planners and decision-makers in Copenhagen Metropolitan Area have understood, interpreted, formulated policies and finally acted in relation to transport and land-use in a sustainability context during the period since the 1990s. The Copenhagen case is part of a comparative study also including the metropolitan areas of Oslo in Norway and Hangzhou in China. The project was funded by Volvo Research and Educational Foundation and was carried out during the period from the winter of 2007 to the summer of 2009.

This is the second edition of the report, which was published in a first version in August 2009. In this new version, a number of errors that had unfortunately occurred in the first version have been corrected. Some supplementary text and illustrations have also been added.

The report has been written by Professor, Dr. Ing. Petter Næss, Research Assistant, M. Sc. in Political Science and Administration Teresa Næss, M. Sc. in Urban Planning and Management Morten Skou Nicolaisen and M. Sc. in Chartered Surveying Esben Clemens, with the former as main responsible. Nicolaisen has written most of chapter 3, Teresa Næss has written the bulk of chapter 5 and Petter Næss has written the remaining parts of the report.

The analysis of actual spatial development was carried out by Petter Næss, who also carried out analyses of relevant articles in the journal *Byplan*. Morten Nicolaisen carried out analyses of relevant plans and policy documents. Petter Næss and Teresa Næss together interviewed relevant actors in planning and policy-making. Teresa Næss carried out the subsequent interview transcripts and analyses of the interviews. The size of urbanized land within Copenhagen Metropolitan Area at different times was calculated by M. Sc. Esben Clemens at Aalborg University's Geoinformatics Section based on aerial photographs from different years. Clemens and Næss together inspected the aerial photographs. After the discovery of a considerable number of errors in data from The Danish National Survey and Cadastre (KMS) used in the first edition of this report, Clemens and Næss also made an extensive quality check of the KMS data, which were subsequently rejected.

The authors want to thank all those who were willing to be interviewed in connection with the project. Thanks especially to Lic. Techn. Peter Hartoft Nielsen in the Danish Agency for Spatial and

Environmental Planning, who made us aware of errors in the KMS data and also gave a number of other valuable comments on the first edition of the report.

Aalborg, December 2009

Petter Næss
Project Manager

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Summary

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This report presents the results of a study of the ways planners and decision-makers in Copenhagen Metropolitan Area have understood, interpreted, formulated policies and finally acted in relation to transport and land use in a sustainability context during the period since the 1990s. The Copenhagen case is part of a comparative study also including the metropolitan areas of Oslo in Norway and Hangzhou in China.

The spatial development of Copenhagen Metropolitan Area during recent years can be characterized as a combination of densification of the continuous urban area of Copenhagen and low-density outward expansion, where the former tendency has during recent years outweighed the latter. For Copenhagen Metropolitan Area as a whole, the population density within the built-up areas increased from 27.4 persons per hectare of urbanized land to 27.7 persons per hectare between 1999 and 2008, i.e. by 0.9 %. Within the municipalities of Copenhagen and Frederiksberg, the population density increased by 3.0 % during the same period, in particular due to inner-city densification during the latest couple of years. Copenhagen Metropolitan Area has a long history of spatial urban expansion in the second half of the 20th century, in spite of low and for long periods even negative population growth in the decades prior to 2000. During the latest decade, this tendency has been reversed, at least within the continuous urban area of Copenhagen.

In the parts of the metropolitan area located outside the continuous urban area of Copenhagen, development has predominantly taken

place as spatial urban expansion. This outward urban growth has counteracted the densification and concentrated urban development taking place in the inner parts of the metropolitan area This has led to a more transport-demanding and car-dependent urban structure than what would otherwise have been the case. Having said this, it must still be emphasized that the considerable density increases that have taken place in Copenhagen and the surrounding municipalities represent an important departure from the dominant trend within the metropolitan are until the 1990s.

The trajectories of land use and transport development observed in Copenhagen Metropolitan Area since the 1990s are the results of the combined effects of a multitude of different causal mechanisms. In order to throw light on possible explanatory factors we have investigated selected plans and policy documents, interviewed key planners, policy-makers and stakeholders, and carried out qualitative content analyses of articles in the professional journal *Byplan*.

National land use policies have aimed at counteracting urban sprawl, but have not focused very explicitly on densification or compact city development. Instead, the focus has been on decentralized concentration, with the guidelines by the Ministry of the Environment recommending new office buildings in the Copenhagen region to be located close to urban rail stations as the most spectacular example. This policy is in line with long-standing ideals in Danish urban planning, where the Finger Plan of Copenhagen Metropolitan Area has through six decades had an alomst iconic status. However, most municipalities in the outer parts of the region have for a long time had such a large surplus of non-built-up areas designated for urban expansion that it has until recently been difficult to stimulate densification by limiting the possibilities for greenfield development. The Finger Plan 2007 has, however, in several ways strengthened the possibilities for national authorities to counteract urban sprawl.

Market agents have sometimes also pushed for greenfield development at locations poorly served by public transport in the outer parts of the region. Municipal competition for inward investments has often implied that such demands have been accommodated. There has also been market demand for more intensive land use within existing urban areas in the central parts of the region, reflecting, among other things, cultural trends and changes in the household structure. During the latest decade the amount of such development has outweighed the low-density housing and low-rise commercial development. There is, however, a widespread opinion among planners and policy-makers

that the regional coordination of spatial development in Copenhagen Metropolitan Area should be improved.

The land-consuming urban development in the outer parts of the metropolitan area has been encouraged by the fact that outward urban expansion in the Copenhagen region usually requires low infrastructure costs. In addition, the designation in the original Finger Plan of the open land between the 'urban fingers' as areas for non-development has not been backed by strong recreational interests, at least not in the outer areas. Farmland is ample in Denmark, and converting some of it into building sites has not been considered a serious loss.

Copenhagen has made considerable investments in a new Metro, but substantial road capacity increases have also taken place. Together with the low-density suburban development this has contributed to a steady and rapid growth in car traffic. During the period 1995-2007, car traffic within Copenhagen Metropolitan Area increased on average by 23 % when adjusted for population growth, whereas public transport decreased by 7 %. Seen from the perspective of sustainability, the combined, and quite costly, strategy of investing in increased road capacity as well as improved public transport has been similar to stepping on the accelerator and the brake at the same time, with the strongest pressure on the accelerator of car travel. The general level of mobility has been enhanced, but the shares of car drivers and travelers by other modes have changed quite substantially.

Whereas public transport improvement has been backed by broad political consensus, road capacity increases have been contested. In particular, there has been skepticism against urban highway development among land use planners, environmental organizations and politicians to the left. Transport authorities and planners involved in transport infrastructure development in the Copenhagen region have generally considered road development as a measure to combat congestion. During most of the investigated period, road pricing has not been on the political agenda, but the municipality of Copenhagen is currently acting as the spearhead of a coalition of municipalities putting pressure on the national government in order to allow the introduction of this demand management instrument.

On average for the period since the early1990s, the Copenhagen region has experienced moderate economic growth as well as population growth. Within the fields affected by land use and transport planning, the impacts on nature and the environment in terms of land take have been reduced in the most recent part of the

period. However, due to extensive road capacity increases and the few restrictions on auto usage there has hardly been any decoupling between economic growth and generation of traffic.

1 Background and methods

1.1 Introduction

The theme of this report is how the challenge of sustainable mobility has been dealt with in urban planning and urban development in Copenhagen Metropolitan Area during the period since the 1990s. The case study of Copenhagen has investigated the ways planners and decision-makers in this urban region have understood, interpreted, formulated policies and finally acted in relation to transport and land-use in a sustainability context. The Copenhagen case is part of a comparative study also including the metropolitan areas of Oslo in Norway and Hangzhou in China. The project was funded by Volvo Research and Educational Foundation and was carried out during the period from the winter of 2007 to the summer of 2009.

Since the publication of the UN report "Our Common Future" (World Commission on Environment and Development, 1987), the issue of sustainable development has been a common challenge for all nations. The concept of sustainable development, as understood by the World Commission, combines ethical norms of welfare, distribution and democracy while recognizing that nature's ability to absorb human-made encroachments and pollution is limited. This challenge is interpreted and implemented in various national contexts, including different natural topographic, socio-cultural and institutional circumstances. A comparison between nations may reveal some of the basic conditions for implementing a sustainable development. This project has focused on a particular aspect of sustainability, namely the issue of integrated land-use and transport planning and development in urban areas. Sustainable mobility is understood as mobility in accordance with the general principles of sustainable development[1].

[1] Based on, among others, Center for sustainable transportation (2002) and Høyer (1999), CIENS (2006) has offered the following definition of sustainable mobility

Copenhagen, the capital of Denmark, had in the beginning of 2009 about 1,168,000 inhabitants within the continuous urban area, of which 519,000 in the municipality of Copenhagen and the remaining 649,000 in 17 surrounding municipalities. The Copenhagen Metropolitan Area is in this report defined as being equal to Greater Copenhagen as defined in the Danish Planning Act.[2] In the beginning of 2009, Copenhagen Metropolitan Area thus defined had 1.86 million inhabitants, of which 1.78 million in urban settlements of at least 200 inhabitants and the remaining population in rural areas. The metropolitan area has had a quite moderate population growth during the latest couple of decades. For example, between 1998 and 2009, Copenhagen Metropolitan Area increased its population from 1,787,000 to 1,875,000, i.e. an increase of only 98,000 over 11 years. Like many modern European cities, Copenhagen Metropolitan Area has a trade and business structure dominated by service and knowledge industries, with a sharply declining number of jobs in manufacturing industries since the 1970s, most dramatically within the municipality of Copenhagen.

Figure 1.1 shows the area covered by Copenhagen Metropolitan Area as defined in this report. Copenhagen Metropolitan Area thus defined includes the following 34 municipalities: Copenhagen, Frederiksberg, Gribskov, Helsingør, Fredensborg, Halsnæs, Rudersdal, Egedal, Hillerød, Frederikssund, Allerød, Furesø, Hørsholm, Ballerup, Albertslund, Glostrup, Rødovre, Herlev, Gladsaxe, Lyngby-Taarbæk,

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which largely corresponds to our own understanding of the concept: "Sustainable mobility is mobility in accordance with the principles of sustainable development. That is, a volume of physical mobility, a modal-split and a transport technology, moving significant steps towards a situation where mobility in society:

- allows the basic mobility needs of individuals and societies to be met, offers choice among environmentally sustainable transport modes, operates efficiently and supports an economy meeting the population's essential needs (the economic dimension),
- takes care of ecosystem integrity and limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise (the environmental dimension), and
- is affordable, safe and consistent with human health as well as with equity within generations, both at a global, regional and local scale (the social dimension)."

[2] This definition differs from OECD's definition of the Copenhagen metropolitan region, which consists of the city of Copenhagen, the city of Frederiksberg as well as the five former counties surrounding them, totalling 2.4 million inhabitants (OECD, 2009).

Gentofte, Høje Taastrup, Ishøj, Vallensbæk, Brøndby, Hvidovre, Tårnby, Dragør, Greve, Køge, Lejre, Roskilde, Solrød and Stevns.

Within Copenhagen Metropolitan Area, the continuous urbanized area in Copenhagen and surrounding municipalities is referred to by Statistics Denmark as "Hovedstadsområdet" (The Capital Area). Figure 1.2 shows the area covered by the "Hovedstadsområdet" in 2008 as defined by Statistics Denmark (see also figure 1.5 below). Within this area, there was a population in the beginning of 2008 of 1,154,000 inhabitants.

Figure 1.3 shows the area covered by the two central municipalities of Copenhagen and Frederiksberg. These municipalities make up the most densely developed part of the continuous urban area. In the beginning of 2009, these two municipalities had together 613,000 inhabitants. The municipality of Frederiksberg is completely surrounded by the municipality of Copenhagen. In the analyses in Chapter 2 of population and workplace density development, we have therefore used combined data for Frederiksberg and Copenhagen as an indicator of the development within the core part of the region, as distinct from using data for only Copenhagen as the core municipality.

Figure 1.1: Copenhagen Metropolitan Area as defined in the Danish Planning Act. Scale 1/1.5 million. Source: Aalborg University's Spatial Data Library

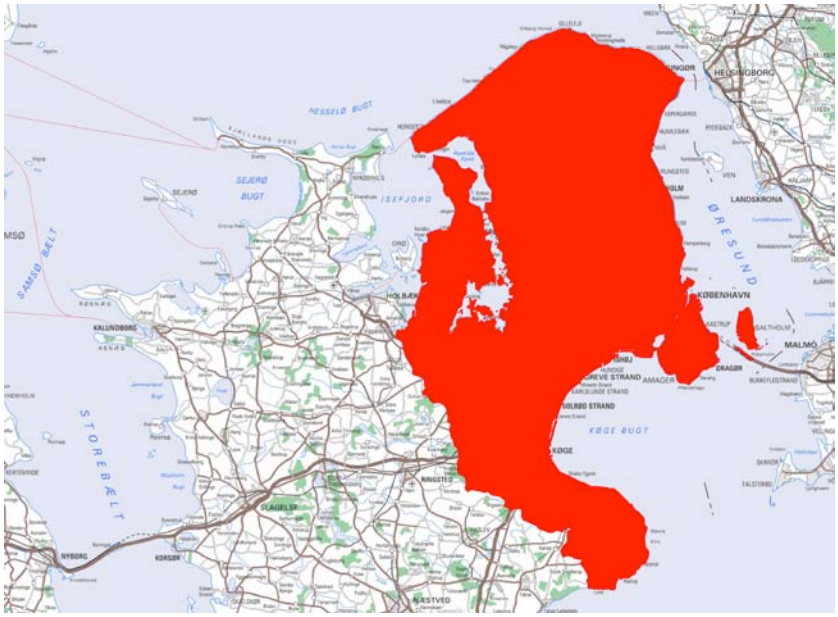


Figure 1.2: The continuous urbanized area in Copenhagen and surrounding municipalities ("Hovedstadsområdet") in 2008 as defined by Statistics Denmark. Scale 1/1.5 million. Source: Aalborg University's Spatial Data Library and Statistics Denmark

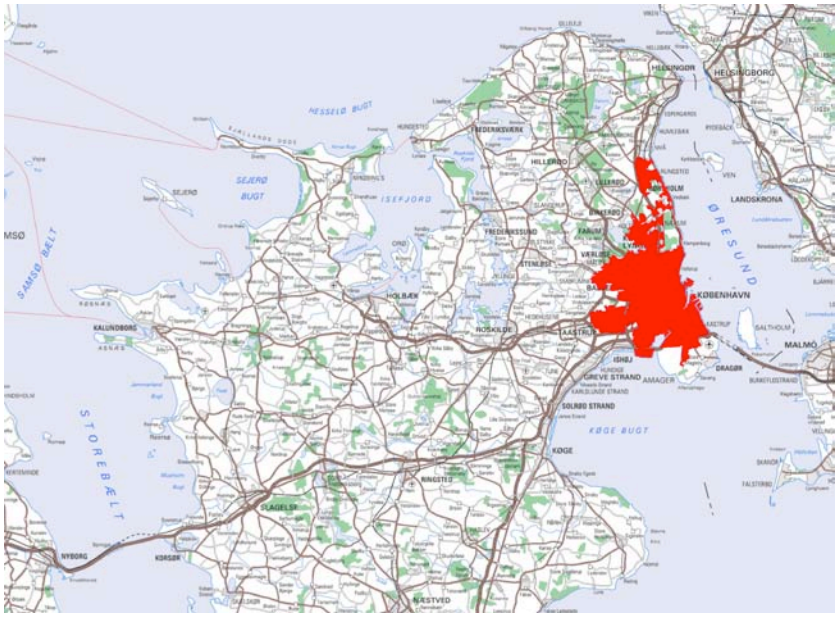


Figure 1.3: The area covered by the municipalities of Copenhagen and Frederiksberg. Scale 1/1.5 million. Source: Aalborg University's Spatial Data Library.

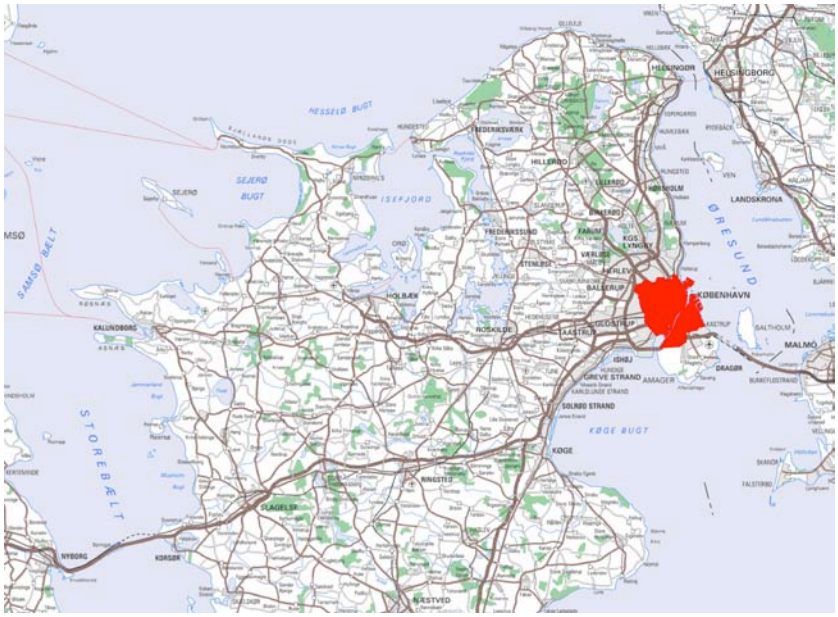


Figure 1.4 shows main land uses within Copenhagen Metropolitan Area. Based on the Eurostat *Corine* land cover classification, Figure 1.5 shows actual land cover within parts of the metropolitan area as of the year 2000. A demarcation of the continuous urban area in Copenhagen and surrounding municipalities is shown with a bold black line.

Figure 1.4: Main land uses within Copenhagen Metropolitan Area. Urban areas (existing as well as urban zones set aside in adopted land use plans) are shown in orange. Summerhouse areas are shown in yellow and regional outdoor recreation areas and wedges in green. The map also shows main existing (black) and planned (gray) roads and rail lines, as well as the airports of Kastrup and Roskilde (in gray). Source: Hovedstadens Udviklingsråd (2003).

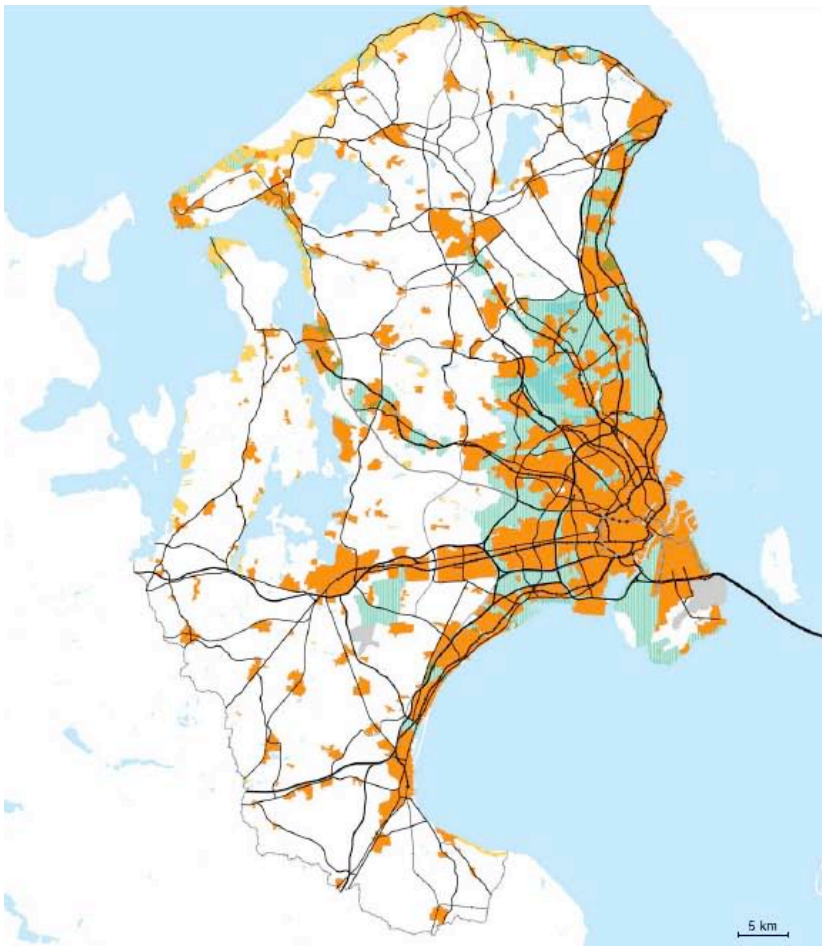
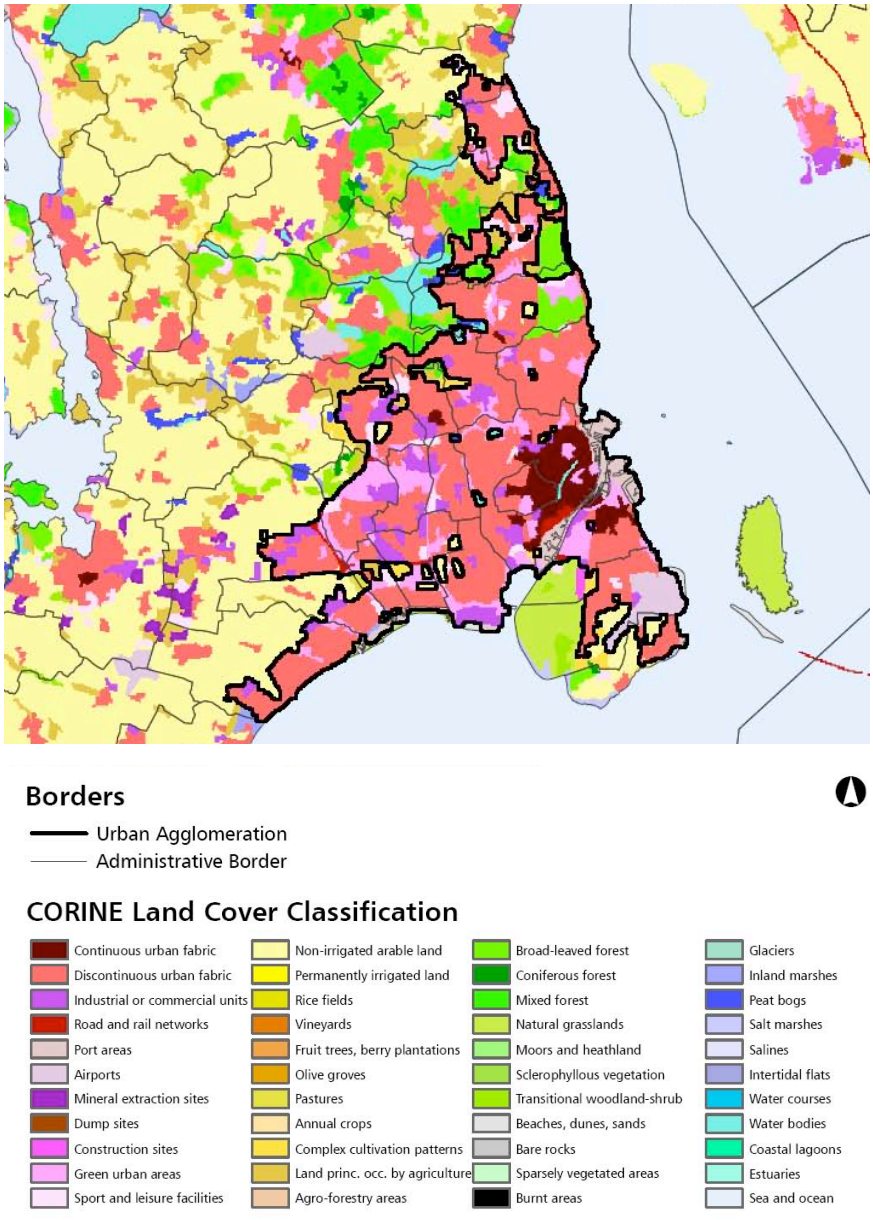


Figure 1.5: Land cover according to the Eurostat Corine classification within a part of Copenhagen Metropolitan Area. A demarcation of the continuous urban area of Greater Copenhagen is shown as a bold black line. Source: The SUME research project and Österreichisces Institut für Raumplanung, 2009. Copyright EEA, Copenhagen, 2007, http://www.eea.europa.eu/ and Eurostat.



1.2 Research questions

The main research questions of the entire comparative study are the following:

1. What are the main differences and similarities in the ways the selected city regions in Norway (Oslo), Denmark (Copenhagen) and the Chinese Zhejiang province (Hangzhou) have acted on the challenges of a sustainable urban development in the fields of land use, transport infrastructure and mobility, and what are the causes of these differences and similarities?
2. What are the main differences and similarities between the national discourses on sustainable urban development in the fields of land use and transport infrastructure in the three countries, what are the causes of these differences and similarities, and to what extent have these discourses influenced the actual built structures?

The aim of the project is to explain similarities and differences in urban development by identifying causal mechanisms influencing urban structures. In each case city, it is therefore necessary to investigate key characteristics of the urban development that has taken place and explain why the development has followed this particular trajectory. For the Copenhagen case study, this leads to the following research questions:

1. How has the spatial urban structure (in terms of built environment, land use and transport infrastructure) developed since the 1990s, and how well does this development comply with criteria for urban development conducive to sustainable mobility?
2. How has the challenge of sustainable mobility been dealt with in relevant land use and transportation infrastructure plans?
3. How has the general concept of sustainable development been interpreted by different groups of actors, including the professions of urban and transport planners?
4. What kinds of principles, measures and spatial/physical solutions have been advocated by land use and transportation planners as favorable to a sustainable urban development, and to which extent have these principles, measures and solutions gained political support and been implemented?

5. To what extent can sustainability-relevant features of land use and transport infrastructure development in Copenhagen Metropolitan Area be explained by natural-geographic conditions, social structural conditions, cultural conditions and influential social actors?

These questions have been elaborated into a number of detailed sub-questions around which the empirical analyses presented in the next chapters have been structured.

1.3 An interdisciplinary approach

Our aim is to explain similarities and differences in urban development by identifying causal mechanisms influencing urban structures. The actions of various social agents make up one category of such influences. These actions are, however, themselves facilitated, modified or constrained by structural conditions, where the latter include the natural environment, the existing man-made urban structure, as well as other structural and cultural properties of society.

The dominating ideas held by urban planners (including land use planners as well as transport infrastructure planners) are of particular interest in our study. Apart from their likely impacts on the actual urban development, we consider it interesting in its own right to compare the way such ideas have evolved in the three countries. In some cases, planners' ideas may converge into doctrines about urban development (Faludi and van der Valk 1994). A doctrine comes close to what is often termed as a "hegemonic discourse" within a field of society (Hajer, 1995). The discourses among planners dealing with topics of urban land use and infrastructure development is therefore an important potential explanatory factor to be examined in the project.

Due to the complexity of conditions influencing urban development, theories focusing on different aspects of reality need to be combined in order to throw light on the research questions. The project has therefore taken a clearly interdisciplinary approach, attempting to integrate contributions from theories covering different fields. Theories of economic development may illuminate the very different backgrounds against which urban development has proceeded during the investigated period. Theories of spatial development and transformation of cities may also contribute to explaining the strategies followed in a particular city in a given period. Theories of path dependency may illuminate the importance of previous strategic decisions on urban spatial and infrastructure development to current

planning and decision-making. Theories of political economy may point at the economic interests of local elites as a major driving force for an urban development where governmental authority is utilized to attract growth-inducing investments within its own territory. Discourse theories may illuminate the importance of power, legitimacy, and authority on decision-making about urban development. The importance and credibility attached to different types of knowledge may be influenced by power relations and is therefore often contested. Normative theories on sustainable urban development and mobility may be important points of reference for some participants in discourses on urban development. Such theories combine preferred values with substantive theories on the environmental consequences of various land use and transport infrastructure solutions in cities.

Since land-use and public investments are usually under public control via legal measures and public funding, we may assume that the public decision-making processes are important factors in explaining the actual outcome. However, there may not be a direct link between the observed land use and infrastructure and the preceding public decision-making system and discourse. We must also seek explanations in market forces and social and cultural changes in civil society. The discourse on sustainability may have informed decision making, but knowledge may also be used only symbolically because the cost of implementing a policy may be considered too high.

1.4 Methods

Fairly similar research methods have been followed in each of the three city case studies, yet allowing for adaptation to local contexts and data availability. Empirically, the study has taken a bottom-up approach by first observing the urban development that has actually taken place in the case cities, and then tracing the main actors and mechanisms behind these events. Such a research design is sometimes called a ‘backward mapping approach’ (Elmore, 1985). When taking this approach we may, for example, find that decisions outside the government structure are as important as those within. The study is problem-driven rather than theory-driven: the cases and research methodology have not been chosen in order to test a particular, prefixed theory. Instead, there has been a back-and-forth pendulum movement between theory and empirical observations in order to throw light on driving forces behind physical changes in urban structures and on the actions of various actors influencing urban

change, as well as to guide the specification of the main research question (see above) into more detailed and theme-specific questions. As mentioned above, several theories appeared to be relevant the outset, but the emphasis to be laid on each of them became clear during the research process.

The following description applies to the Copenhagen case study.

Due to time and resource limitations, the description of the overall urban development has been limited to the strategic level, focusing on key indicators such as changes in the number of inhabitants and workplaces, changes in the amount of urbanized land, changes in population and workplace density, location of new development relative to the city center and public transport nodes, and the development of major transport infrastructure (urban highway and main public transport services).

In order to answer the research questions, information from previous research studies as well as new empirical data have been utilized. We have chosen to concentrate on the following empirical data sources:

Plans and policy documents:

- Municipal master land use plans and relevant regional plans: The Municipal Plans for the municipality of Copenhagen adopted in 2005 and 2009, the Region plan for Copenhagen Metropolitan Area adopted in 2005, and the national-government-adopted Finger Plan 2007 for Copenhagen Metropolitan Area adopted in 2007.
- A strategic transport plan: The Infrastructure Commission's report (2008).
- Two Governmental White Papers communicating general national goals and visions for spatial development (2001 and 2006).

Articles in professional journals: In order to throw light on the Danish professional discourse on sustainable urban development in the fields of land use and transport infrastructure, 114 articles in the journal *Byplan* have been investigated. The articles cover the period from 1993 to 2006.

Interviews: Twelve in-depth, semi-structured interviews were carried out with land use and transportation planners and policy-makers, some politicians, a manager of a property development company and a representative from a non-governmental environmental organization.

Several efforts have been made to secure a high validity and reliability of the research. The interviews were semi-structured and were aided by interview guides. All interviews were tape-recorded and transcribed. "Interpretation schemes" were developed to aid the interpretation of interviews and documents, in order to facilitate a linking of the research questions and theoretical concepts of the study with the relevant parts of the transcribed interviews and investigated documents. Similar interpretation schemes were developed and used for the analyses of plans and policy documents and articles in the professional journal *Byplan*.

Obtaining reliable data for changes in the spatial extension of the urbanized area proved to pose particular challenges. We originally purchased data from the Danish National Survey and Cadastre (KMS) including so-called 'urban polygons' for the years 2000, 2006 and 2008. The urban polygons included, according to KMS (2009), the urbanized land of urban settlements with more than 200 inhabitants, plus summerhouse areas. However, the demarcation criteria applied were different in 2006 and 2008 than in 2000, as a large number of small settlements with less than 200 inhabitants (often only a few houses) were included in the two latter years but not in 2000. Moreover, some large districts of urbanized land had been erroneously left out in some of the data sets, thus making comparison across years of the size of the urbanized land highly unreliable. The incorrect data for the growth in the spatial extension of the urbanized land were unfortunately included in the first edition of this report, published in August 2009. After having been notified about these errors, we have inspected each of the urban polygons within Copenhagen Metropolitan Area for each of the three data sets, comparing them with aerial photograps (orto-photo) for the corresponding years. Based on aerial photographs from 1999, 2006 and 2008 we have identified all areas in which physical urban development resulting in extension of the urbanized land has taken place during the period 1999 - 2008.[3] In total, urban expansion was found to have taken place in 55 of a total of 247 urban polygons for settlements with 200 inhabitants or

[3] We considered the possibility of measuring the amount of spatial urban expansion from cadastre statistics on the spatial extension of land properties containing or not containing buildings for urban purposes. However, such a measurement may not be very accurate. For example, if a small corner of a plot of 10 hectares has been built on with three or four single-family houses, the entire ten-hectare property will be classified as built-up. We therefore considered the method based on comparison of aerial photographs at different times as at least as accurate as the cadastre-based method. It was also easier to implement with the data available at Aalborg University.

more[4]. This thorough inspection of aerial photographs shows that the spatial urban expansion within Copenhagen Metropolitan Area has been dramatically smaller than indicated by the KMS data. Whereas the KMS data showed a growth in urbanized land of 109 km^2 from 2000 to 2008, the inspection of aerial photographs indicates that the urbanized land has only increased by 16 km^2 from 1999 to 2008. We consider the data on the spatial urban development presented in this edition of the report to provide a realistic and reasonably accurate picture of the spatial expansion of the urbanized land in Copenhagen Metropolitan Area.

In order to calculate population densities, we of course had to know the size of the urbanized land at the beginning of the period and not only the growth in urbanized land from 1999 to 2008. Here, we have, in spite of the considerable inaccuracy of these data, used the area size data for the urban polygons in 2000, with subtraction of the estimated growth in urbanized land from 1999 to 2000[5]. Summerhouse areas and urban polygons smaller than 15 hectares (corresponding to the approximate size of a neighborhood of some 150 – 200 inhabitants in single-family houses) were excluded in this calculation. A considerable undeveloped area of 9 km^2 in Ørestaden was also subtracted from the urban polygon of the municipality of Copenhagen. Moreover, several urbanized areas that had been omitted in the 2000 urban polygons[6] (but included in the urban polygons of 2006 and/or 2008) were included. Thus calculated, the urbanized land within Copenhagen Metropolitan Area covered 629 km^2 in 1999, of which 80 km^2 within the municipalities of Copenhagen and Frederiksberg, 192 km^2 within the remaining parts of the continuous urbanized area of Copenhagen, and 357 km^2 in the parts of the metropolitan areas located outside the continuous urbanized area of Copenhagen. We consider the estimated size of the urbanized land in Copenhagen and Frederiksberg as well as in the the remaining parts of the continuous urbanized area of Copenhagen to be fairly well in accordance with the

[4] Some development has also taken place in settlements with less than 200 inhabitants. But judged from the population statistics as well as from the aerial photographs of smaller settlements, such development has been very moderate during the period 1999 - 2008.

[5] Aerial photographs and urban polygons referring to the same year were not available for the years at the beginning of the period. We therefore had to use aerial photographs from 1999 and urban polygons for 2000. In order to adjust the 2000 figure for the size of the urbanized land back to the 1999 situation, a growth in urbanized land from 1999 to 2000 similar to the annual average during the period 1999-2006 was assumed.

[6] Some of these were of a considerable size, with the urban polygons of Hørsholm (18 km^2), Farum (8 km^2) and Trørød (5 km^2) as the largest ones.

Nordic definition of urbanized land referred to in chapter 2.2. For the parts of the metropolitan area located outside the continuous urbanized area of Copenhagen, the size of the urbanized land is probably somewhat overestimated, as the demarcations of many of the urban polygons for smaller villages were drawn in such a way that farmland and other non-urban land uses were incorrectly included to some extent.[7] The urban population densities in these parts of the metropolitan area are therefore most likely somewhat underestimated. This underestimation also translates into a certain underestimation of the density figures for the metropolitan area as a whole, albeit not to the same extent as for its outer parts. However, the purpose of the analyses of urbanized land and densities has not been to assess the absolute population and workplace densities within the region, but instead to estimate and discuss how these parameters have developed over time and what the causes of this development may be. For this purpose, a moderate and constant underestimation of urban population densities in the outer parts of the region for all the investigated years is not so important.

[7] We considered it too laborious to draw new demarcations for all these polygons on our own and measure are sizes based on such improved demarcations – this is a task that KMS receives public funding for doing.

2 Actual spatial development

2.1 Introduction

According to several authors, metropolitan-level decentralization of workplaces and residences is a strong and more or less general tendency in Europe. For example, Breheny (1995:87) holds that decentralization is the inevitable outcome of the expressed location preferences of people and firms. According to Sieverts (1999), new development in German urban regions typically takes place in the 'Zwischenstadt', i.e. in the areas between the cities, and not within or immediately adjacent to the cities. In Sieverts' view, cities can no longer be fitted into a hierarchic system according to central place theory. Instead, they should be understood as a network of nodes, where there is a spatially more or less equal, scattered distribution of labor with spatial-functional specializations. Such net-shaped cities or city regions have polycentric instead of monocentric or hierarchic center structures, and constitute larger, fragmented and very complex territories.

Empirical data show that population densities were reduced between 1980 and 1990 in a number of large European cities (Newman & Kenworthy, 1999). In the post-communist East European countries, urban sprawl is proceeding 'at a pace which leaves anything experienced in the west far behind' (Schwedler, 1999). However, actual urban developmental trends in Europe are far more nuanced than what has been claimed by the most 'decentralization-deterministic' debaters. In some EU countries, including Denmark, Spain and the UK, the tendency of sprawl is more moderate and combined with considerable inner-city regeneration and densification (UN/ECE, 1998; Damsgaard & Olesen 2000; EEA, 2006). In Sweden and Norway, a long period of spatial urban expansion since the 1950s has been succeeded by a trend of reurbanization during the latest

couple of decades (Statistics Sweden 1992, 2002; Statistics Norway, 2009).

2.2 Population density development

In this and the following sub-chapter (2.3), we shall present an overview of how urban population and job densities[8] have developed within Copenhagen Metropolitan Area as a whole as well as between different parts of this region, with a particular focus on the period since 1999. Needless to say, the reliability of population and job density measurements depends heavily on an accurate measurement of the areas within which the densities are calculated. As mentioned in Chapter 1.4, the original data from the The Danish National Survey and Cadastre (KMS) on the size of urbanized land within Copenhagen Metropolitan Area at different times included a number of serious errors. Considerable corrections have therefore been made. The KMS data were only used – after considerable corrections, cf. chapter 1.4 – to assess the size of urbanized land in 1999, whereas the growth in urbanized land during subsequent years was identified from aerial photographs and then measured.

The calculations show that the urbanized land within the metropolitan area has grown by 15.9 km^2 during the period 1999-2008. Of this, 0.6 km^2 has taken place within the municipalities of Copenhagen and Frederiksberg, 0.9 km^2 within the remaining parts of the continuous urban area of Copenhagen (i.e. the area referred to by Statistics Denmark as 'Hovedstadsområdet'), and 14.4 km^2 within the parts of the metropolitan area located outside the continuous urban area of Copenhagen.

[8] By urban population density we refer to the number of inhabitants per area unit of urbanized land. Correspondingly, urban job density is the number of jobs per area unit of urbanized land. Urbanized land is defined as areas within the demarcations of urban settlements. The term urban settlement as used in this report is based on a common Nordic definition of urban settlements, described, among others, by Statistics Norway (1992, 2009) and Statistics Sweden (1992, 2002). According to this definition, an urban settlement is an agglomeration of built-up areas where the largest built-up area has at least 200 inhabitants. A built-up area is defined as a set of buildings and other constructions, except cottages and buildings for agriculture, with distances between the constructions (buildings) normally not exceeding 50 meters. Distances between buildings may exceed 50 meters if the areas in between cannot be built on (e.g. rivers) or are set aside as parks, sports grounds, industrial sites etc. Such unbuilt land shut in between built-up areas, is included as a part of the urban settlement. In addition, uilt-up areas naturally belonging to the urban settlement are included up to a distance of 400 meters away from the core built-up area.

Table 2.1 shows the areas in which expansion of the urban area has taken place during the period 1999-2008. In addition to this development, there has been considerable urban development within existing urban area demarcations. Much of this has taken place in the form of transformation and redevelopment of old industrial, defense or harbor areas, but there has also been some development on intra-urban green areas. Whereas the latter implies a conversion of nondeveloped land into built-up areas, it does not involve expansion of the urbanized land as defined in the Nordic definition of urban settlements.

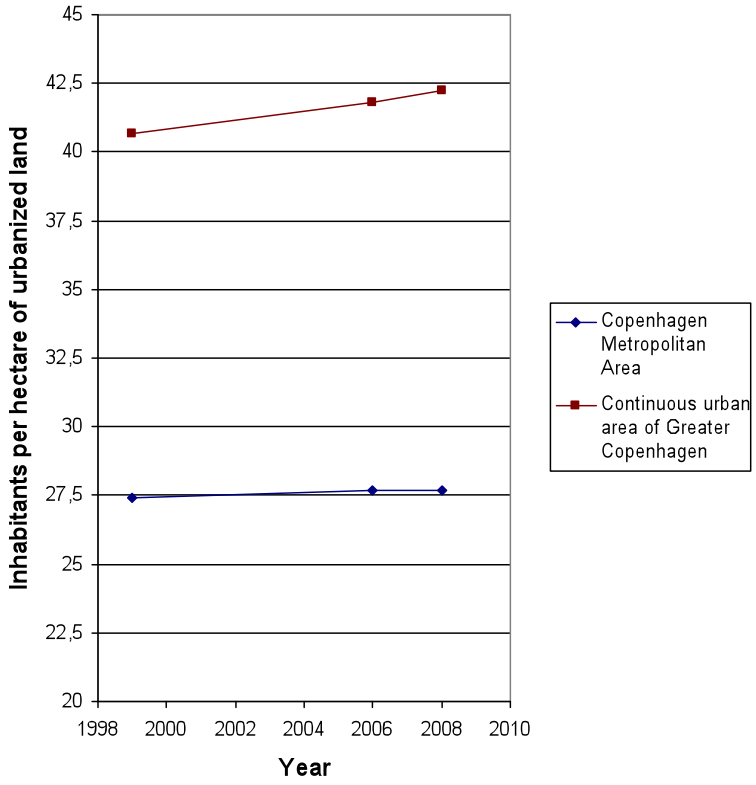
Table 2.1: Urban spatial expansion 1999-2008 (km^2) at different locations within Copenhagen Metropolitan Area. The names of the locations refer to the names of the urban polygons of the KMS database.

Location	**1999-2006**	**2006-2008**	**1999-2008**
Greve Strand	2.81	0.06	2.87
Roskilde	1.04	0.87	1.91
Hillerød	0.91	0.56	1.47
Køge	0.71	0.39	1.10
Dragør	0	0.60	0.60
Ørestaden	0.30	0.30	0.60
Frederikssund	0.17	0.41	0.58
Jægerspris	0.25	0.19	0.44
Skibby	0.39	0.02	0.41
Kirke Hyllinge	0.41	0	0.41
Tårnby	0	0.34	0.34
Bjæverskov	0.23	0.09	0.32
Ølstykke	0.24	0.08	0.32
Slangerup	0.30	0	0.30
Fredensborg	0.29	0	0.29
Kirke Hvalsø	0.20	0.08	0.28
Smørumnedre	0.26	0	0.26
Gadstrup	0.04	0.21	0.25
Værløse	0.23	0	0.23
Store Heddinge	0.13	0.10	0.23
Lillerød	0	0.21	0.21
Græsted	0	0.20	0.20
Hårlev	0.14	0.04	0.18
Svogerslev	0.09	0.07	0.16
Grundsømagle	0	0.15	0.15
Ejby v. Vemmedrup	0.05	0.1	0.15
Havdrup	0,11	0,01	0,12
Øm	0,11	0,01	0,12
Gevinge	0,02	0,1	0,12
Rødvig	0,08	0,04	0,12
Gørløse	0,07	0,04	0,11

Ganløse	0,06	0,05	0,11
Osted	0,08	0,02	0,10
Lellinge	0,08	0	0,08
Skærød	0	0,08	0,08
Alsønderup	0,07	0	0,07
Slaglunde	0,07	0	0,07
Lille Skensved	0,04	0,03	0,07
Ejby v. Kirke Hyllinge	0,05	0,01	0,06
Vemmedrup	0,03	0,02	0,05
Borup	0,05	0	0,05
Hellested	0,05	0	0,05
Humlebæk	0,04	0	0,04
Uvelse	0,03	0,01	0,04
Nødebo	0,03	0	0,03
Skuldelev	0,01	0,02	0,03
Valløby	0	0,03	0,03
Ågerup	0,02	0	0,02
Klippinge	0,02	0	0,02
Jyllinge	0,01	0,01	0,02
Torkildstrup	0,01	0	0,01
Snoldelev	0,01	0	0,01
Lyndrup	0,01	0	0,01
Tulstrup	0,01	0	0,01
Store Rørbæk	0,01	0	0,01
Sum	*10,37*	*5,55*	*15,92*

Figure 2.1 shows how urban population densities have developed within the entire Copenhagen Metropolitan Area (below) and within the continuous urbanized area in Copenhagen and surrounding municipalities (above) during the period from 1999 until 2008.

Figure 2.1: Population densities 1999 - 2008 within the urbanized land of Copenhagen Metropolitan Area (below) and within the continuous urban area in Copenhagen and surrounding municipalities (above). Persons per hectare of urbanized land. Source: Statistics Denmark, 2009a, The Danish National Survey and Cadastre, 2009, and Aalborg University's Spatial Data Library.



Within Copenhagen Metropolitan Area (as defined in the Danish Planning Act) the urban population increased from 1,724,000 to 1,784,000 during these nine years, whereas the size of the urbanized land increased from 629 to 645 square kilometers during the same period. Virtually all of this urban spatial expansion took place outside the two central municipalities (Copenhagen and Frederiksberg), where all urban development took place within already urbanized land except some 60 hectares of 'greenfield' urban expansion in Ørestaden. The continuous urbanized area outside these two municipalities increased from 192 to 193 km^2 between 2000 and 2009, whereas the urbanized land within the parts of Copenhagen Metropolitan Area situated outside continuous urbanized area in Copenhagen and surrounding municipalities increased from 357 to 372 km^2. Thus, most

of the spatial urban expansion during the period took place in the outer part of Copenhagen Metropolitan Area. The total urban expansion was, however, moderate compared to, e.g., the period from 1960 to 1980.

The urban population density within the entire metropolitan area increased slightly from 27.4 persons per hectare of urbanized land to 27.7 persons per hectare between 1999 and 2008, i.e. an increase by 0.9 %. For the continuous urban area in Copenhagen and surrounding municipalities, the population increased from 1,105,000 in 1999 to 1,154,000 in 2008, while the urban area expanded from 271.5 to 273 square kilometers. The population density within the urban area thus increased from 40.7 to 42.3 persons per hectare between 1999 and 2008, i.e. by 3.8 %.

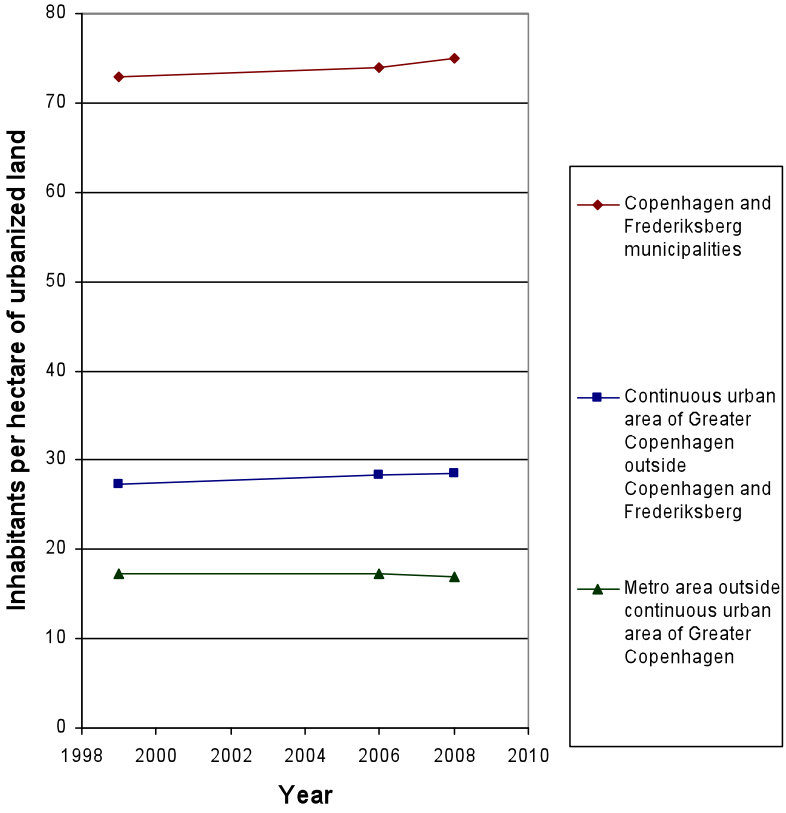
Within the municipalities of Copenhagen and Frederiksberg, which make up the central part of the continuous urban area of Greater Copenhagen covering 29 % of the urban area and including 52 % of the population, the urban population density increased from 72.8 persons per hectare in 1999 to 74.0 persons per hectare in 2006 and 75.0 persons per hectare in 2008, i.e. by 3.0 % over the nine years (Figure 2.2, upper curve). This reflects an increase in the urban population from 581,000 in 1999 to 603,000 in 2008, while the urban area increased only slightly from 79.8 to 80.4 square kilometers during this period.

Within the parts of the continuous urban area of Greater Copenhagen situated outside the municipalities of Copenhagen and Frederiksberg, the population density increased from 27.3 to 28.6 persons per hectare over the period 1999 – 2008, i.e. by 4.6 % (Figure 2.2, curve in the middle).[9] Within the urban settlements outside the continuous urban

[9] There is some uncertainty associated with the population density figures for the continuous urbanized area in Copenhagen and surrounding municipalities, compared to the figures for the part of the metropolitan area situated outside this continuous urbanized area. This is mainly due to the fact that Statistics Denmark's population figures for 2000 and 2006 are based on the polygons from the Danish National Survey and Cadastre, which are encumbered with considerable errors. In addition, there have been changes during the investigated period in the ways in which Statistics Denmark have classified residents as living inside or outside the demarcation of "Hovedstadsområdet". We have tried to correct for these circumstances, but we do not claim that the resulting distributions of population densities between, respectively, the continuous urbanized area in Copenhagen and surrounding municipalities and urbanized areas in the rest of the metropolitan areas are very accurate. For the metropolitan area as a whole, however, the density development figures are probably fairly accurate. The same applies to the figures for the two core municipalities of Copenhagen and Frederiksberg.

area, population density was reduced in the same period from 17.3 to 16.9 persons per hectare, i.e. by 2.1 %. The increase in population density within the continuous urban area of Copenhagen and the reduction in population density in the remaining parts of the metropolitan area have been relatively stable over these nine years.

Figure 2.2: Population densities 2000 - 2008 within the urbanized land of the municipalities of Copenhagen and Frederiksberg (above), within the parts of the continuous urbanized area of Greater Copenhagen situated outside those two core municipalities (middle), and within the urbanized land in the parts of Copenhagen Metropolitan Area situated outside the continuous urban area in Copenhagen and surrounding municipalities (below). Persons per hectare of urbanized land. Source: Statistics Denmark, 2009a, The Danish National Survey and Cadastre, 2009, and Aalborg University's Spatial Data Library.



The population density development within Copenhagen Metropolitan Area since 1999 has thus been characterized by two different trends:

A continual low-density urban spatial expansion in the outer urban settlements leading to a stronger increase in urbanized land than in the population of these areas, and densification within the continuous urban area of Copenhagen on already urbanized land. In the latest decade, this densification has outweighed the outer-area density reduction.

Statistics for population density development in the period before 1999 are unfortunately poor. The available land use statistics show how the size of the legally defined 'urban zones' has developed over time, but these 'urban zones' include existing urbanized land as well as land set aside for future urban development in municipal plans. Because many of the municipalities of Copenhagen Metropolitan Area have all the time since 1970 had very large reserves of non-developed urban zones[10] (Gaardmand, 1993; Primdahl et al., 2006), considerable urban spatial expansion may have taken place without any recorded increase in the sixe of the 'urban zones'. However, there is little doubt that there was a considerable reduction in urban population densities within Copenhagen Metropolitan Area in the decades from the 1950s to the early 1990s, following the general trend in Danish cities and towns.

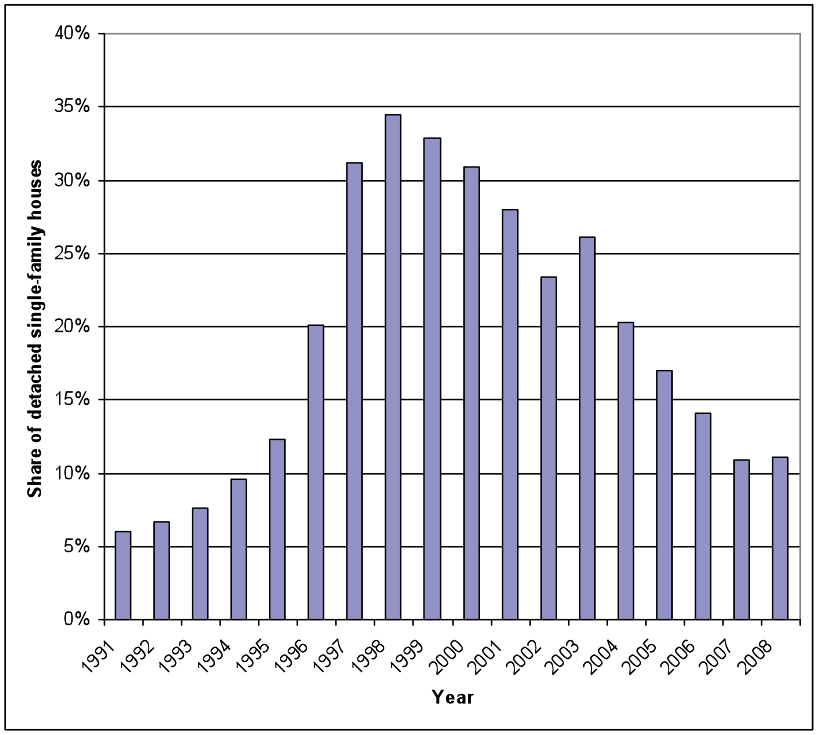
According to data from the European Environmental Agency (2006, p. 34), Copenhagen Metropolitan Area has during 'recent years' had the fourth highest 'sprawl impacts on agricultural land' among 24 investigated European metropolitan areas. The spatial expansion of the urban area in the Copenhagen region has, however, slowed down in the latest decades, compared to the first three decades after World War II. According to the European Environmental Agency (2006, p. 12) the annual growth in built-up areas in Copenhagen Metropolitan Area was about 1.8 % in the 1950s – 1960s, while the pace had been reduced to 0.8 % annually in the period from the 1980s to the 1990s. In spite of this reduced pace of spatial urban expansion, Copenhagen Metropolitan Area had the 9th highest percentage of annual growth in built-up areas in the period from the mid 1980s to the late 1990s (1997/1998) among the 24 investigated metropolitan areas (ibid., pp. 12 and 51). This has happened during a period when there was no or

[10] According to Nielsen (1977), quoted from Primdahl et al. (2006), large areas designated as so-called 'medium zones' were included as urban zones when the zone classification was changed in 1970. Prior to 1970, the main land use zones were urban zones, medium zones, rural zones and summerhouse zones. In the 1970 reform, the medium zones were abolished. The inclusion of large parts of the previous medium zones among the urban zones was made in order for the municipalities to avoid having to pay compensation to land owners. The latter might have become an issue if the medium zones had instead been designated as rural zones.

only very low growth in the urban population. The number of inhabitants within Copenhagen Metropolitan Area as a whole was reduced during the 1970s as well as in the 1980s (from 1.77 million in 1971 to 1.72 million in 1990), with some growth again in the 1990s (reaching 1.81 million inhabitants in 2000). Especially in the 1970s and 1980s, there was a substantial out-migration from the two central municipalities of Copenhagen and Frederiksberg to the suburban municipalities, accompanied with low-density residential development in the latter and a sharp decline in population densities within Copenhagen and Frederiksberg. The population in the municipalities of Copenhagen and Frederiksberg was thus reduced from 728,000 in 1971 to 551,000 in 1991, while the size of the urbanized land in these municipalities remained virtually the same.

The fact that urban density was reduced in the years prior to 2000 is illustrated by the fact that detached single-family houses made up a fairly high share of residential development within Copenhagen Metropolitan Area in the second half of the 1990s, with 1998 as the top year for the entire period 1991 – 2008 (see Figure 2.3). On average for this entire period, detached single-family houses account for 18 % of all new residences. During a few years in the early 1990s, detached single-family houses made up a very low proportion of the new residences. In the preceding decades, detached single-family houses accounted for percentages similar to those of the late 1990s (Ministry of the Environment, 2007).

Figure 2.3: Proportion of detached single-family houses among completed new residences 1991 - 2008 within Copenhagen Metropolitan Area. Source: Statistics Denmark, 2009b.



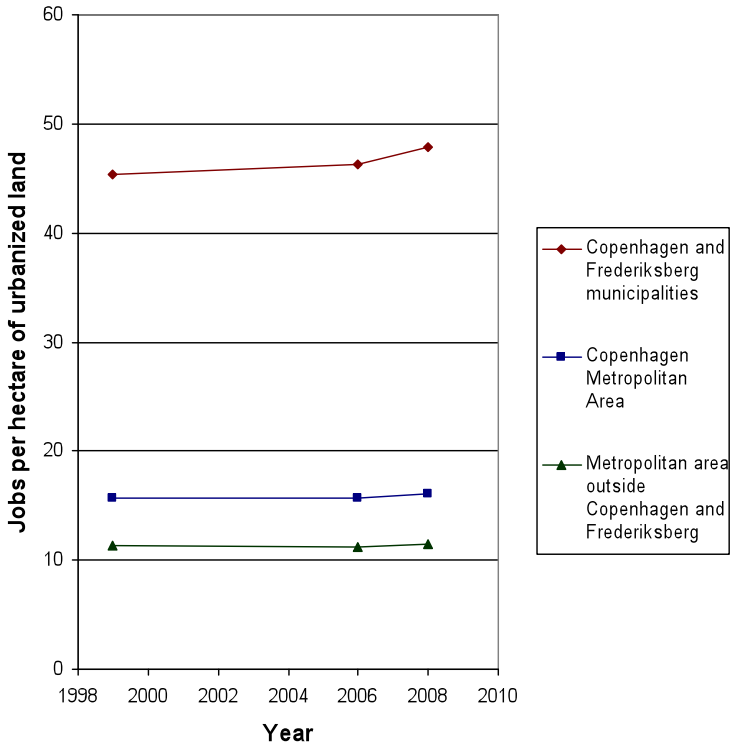
According to Gaardmand (ibid.), there was an 'excessive growth' in developed areas (buildings as well as infrastructure) during the period from the late 1950s to the time at which his book on urban planning history in Denmark was published (1993), and 'an over-consumption of land has doubtlessly taken place in this period' (ibid., p. 278). While the growth in urbanized land in Danish cities dropped from 49 square kilometers annually in the period 1965-1982 to 30 square kilometers annually during the next 13 years up to 1995, the conversion of nonurban land into built-up areas in Denmark was again increasing in the late 1990s (Damsgaard & Olesen 2000).

2.3 Job density development

Figure 2.4 shows how job densities have developed from 1999 until 2008 within the entire urbanized land of the Copenhagen Metropolitan Area (middle), within the urbanized land within the municipalities of Copenhagen and Frederiksberg (above), and within the urbanized

parts of the metropolitan area situated outside the municipalities of Copenhagen and Frederiksberg (below).

Figure 2.4: Job densities 1999 - 2008 within the entire urbanized land of the Copenhagen Metropolitan Area (middle), within the urbanized land within the municipalities of Copenhagen and Frederiksberg (above), and within the urbanized parts of the metropolitan area situated outside the municipalities of Copenhagen and Frederiksberg (below). Persons per hectare of urbanized land[11]. Source: Statistics Denmark, 2009c,the Danish National Survey and Cadastre, 2009, and Aalborg University's Spatial Data Library.



As can be seen, urban job density in Copenhagen Metropolitan Area as a whole has increased during the period from 15.6 persons per

[11] The figures are not quite exact, because the statistics on the number of jobs do not distinguish between urban (i.e. within urban settlements) and rural job locations. However, as the size limit for a settlement to be classified as urban is very low (200 inhabitants), we assume that jobs located outside urban settlements do not represent any important source of error. The number of such jobs within the region has hardly changed much during the period. Within the two central municipalities, all workplaces are within the urbanized zone.

hectare in 2000 to 16.0 in 2008, i.e. by 2.4 %. The density increase has first and foremost taken place within the municipalities of Copenhagen and Frederiksberg, where the number of jobs per hectare increased from 45.4 to 47.9 jobs per hectare, i.e. by 5.6 %. The urban job density increased also in the metropolitan area outside the municipalities of Copenhagen and Frederiksberg, but here the increase was much more moderate (from 11.3 to 11.5 jobs per hectare, or by 1.4 % in the period 1999-2008.

The job density increase within the two core municipalities has been particularly pronounced during the latest few years. In the period 1999 - 2006, there was a slight increase (from 45.4 to 46.3) in the number of jobs per hectare. From 2006 to 2008, however, there was a quite substantial increase from 46.3 to 47.9 jobs per hectare. Almost all this job growth occurred in the muncipality of Copenhagen. Actually, the increase in job densities occurred already in 2004, as the number of workplaces in the two core municipalities was then at its lowest level since 1999 and has later increased with only a very small spatial urban expansion taking place in these two municipalities.

New workplaces have been established in the central parts of the metropolitan area as well as in the suburbs, but at the same time many old workplaces have been closed down. The municipalities of Copenhagen and Frederiksberg have for a long period had a fairly constant share (about 37 %) of the total metropolitan number of workplaces. During the period 1999-2008, 47 % of the growth in the number of workplaces took place in the two core municipalities. These municipalities therefore increased their share of the metropolitan area's total number of jobs from 36.9 to 37.3 %.

2.4 Location of workplaces and residences

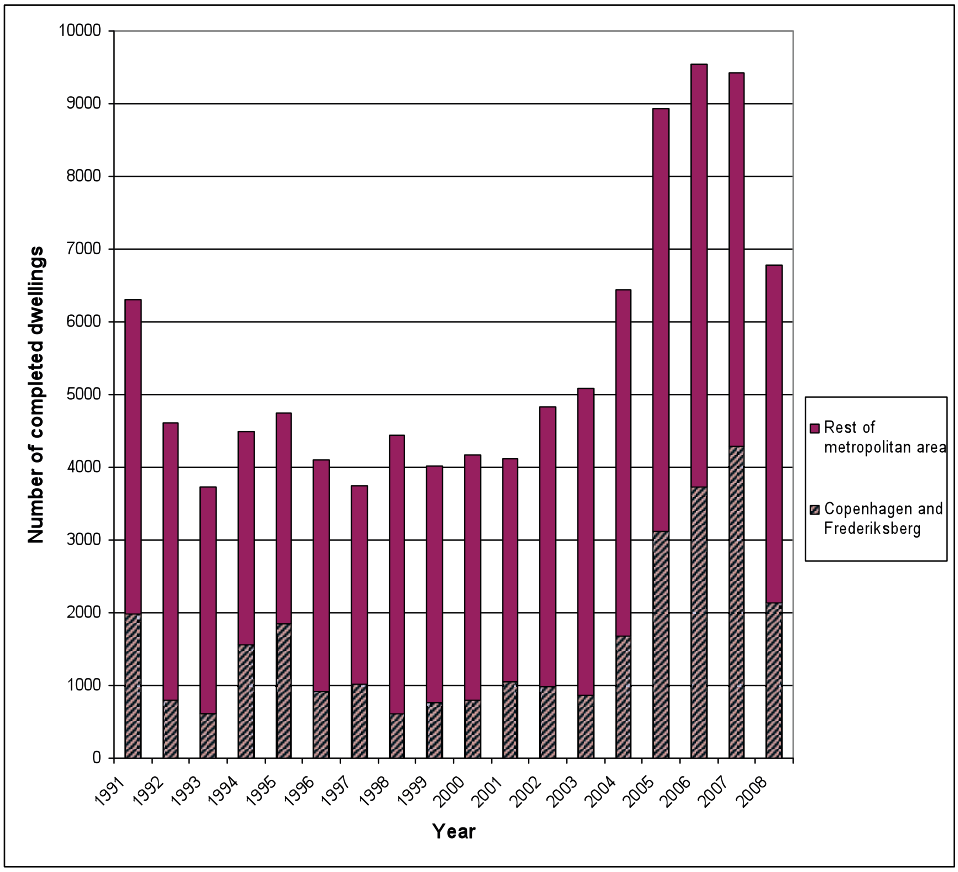
Regional-scale location of residential development
In spite of some population growth in the municipalities of Copenhagen and Frederiksberg (from 586,000 to 603,000 inhabitants during the period 2000 – 2008), the share of the urban population of the entire Copenhagen Metropolitan Area living within the borders of the two core municipalities ha remained fairly constant at about 34 % . (Statistics Denmark, 2009a.) Over the entire period 1990 – 2006, the population within the metropolitan area increased by 6.9 %, with a growth of 5.5 % in the inner urban area (inside Motorway Ring 3, i.e. within approx. 6 km from the city center), 3.7 % in the inner parts of

the fingers, 9.7 % in the outer parts of the fingers, and 13.8 % in parts of the region outside the finger structure (Hartoft-Nielsen, 2009).

Compared to the 1970's, when new dwellings were built at a distance from the city center of Copenhagen of on average 23 km, residential development in the 1990s took place on average 20 km from the city center (Hartoft-Nielsen, 2002). The growth in the number of workplaces during the period 1990-2002 took place mainly within the distance belts from 5 to 15 km from the city center of Copenhagen, but also in the distance belts from 15 to 35 km, where the growth was smaller in absolute figures but relatively high when measured in percentages (Larsen, 2008). The high share of population growth as well as job growth taking place in the two core municipalities during the period 1999-2008 shows that the trend of more concentrated residential development has continued also in the latest decade while the decentralization trend for workplaces seems to have been reversed.

The population development in the various parts of the region reflect the distribution of housing construction between the different municipalities. As can be seen in Figure 2.5, most of the new residences in Copenhagen Metropolitan Area since 1991 have been constructed outside the two core municipalities. On average for the period 1991 – 2008, 29 % of new dwellings have been constructed within the municipalities of Copenhagen and Frederiksberg and 71 % in the rest of the metropolitan area. These shares have, however, fluctuated considerably, with higher-than average percentages in the two core municipalities in some of the years in the first half of the 1990s and 2005 – 2008, and very low shares in most of the period 1996 – 2003. It is worth noticing that the total number of dwellings

Figure 2.5: Completed new residences 1991 - 2008 within the municipalities of Copenhagen and Frederiksberg (blue, diagonal pattern) and within the rest of Copenhagen Metropolitan Area (red).
Source: Statistics Denmark, 2009b.



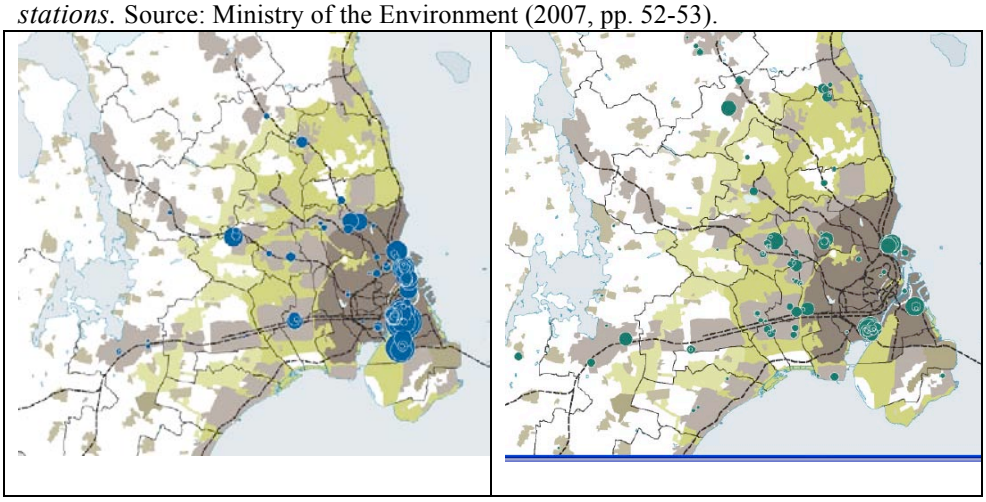
built annually has also been high since 2005, and together with the high percentages built in the municipalities of Copenhagen and Frederiksberg these years this is an immediate explanation of the population density increase experienced in the core municipalities during the most recent few years.

To some extent, residential as well as commercial development has taken place close to urban rail stations. To a considerable extent this is the case within the municipalities of Copenhagen and Frederiksberg, where 77 % of new office workplaces during the years 2000 – 2004 have been located less than 500 m from an urban rail station or less than 1000 m from a major public transport node. Outside the two central municipalities the proportion located close to stations is only

38 %. For Copenhagen Metropolitan Area altogether, about 60 % of new office development has still been located in accordance with the principle of proximity to stations (Ministry of the Environment, 2007).

Figure 2.6 shows the amount of office development in Copenhagen Metropolitan Area during the period 2000 – 2004 that has taken place in accordance with (to the left) or in conflict with (to the right) the principle of proximity to stations.

Figure 2.6: Office development 2000 – 2004 in accordance with (to the left) and violating (to the right) the principle of proximity to stations. Source: Ministry of the Environment (2007, pp. 52-53).



As can be seen, a considerable part of office development during these years has taken place in areas with poorer accessibility by public transport than presupposed in the national policy guidelines first issued in 1989. This also applies to the 1990s. In particular, a high proportion of the office buildings constructed outside the two core municipalities have been located to areas not meeting the criteria of the principle of proximity to stations. (Ministry of the Environment, 2007, pp. 36-37)

Between 1990 and 2006, the number of workplaces within Copenhagen Metropolitan Area increased by 10.9 %, with a growth of 8.7 % inside Motorway Ring 3, 10.8 % in the inner parts of the fingers, 19.1 % in the outer parts of the fingers, and 11.6 % in parts of the region outside the finger structure. Within the green wedges there was a growth in the number of workplace by as much as 39 %. In 2006, the greeen wedges included 1.3 % of the region's total number jobs (Hartoft-Nielsen, 2009).

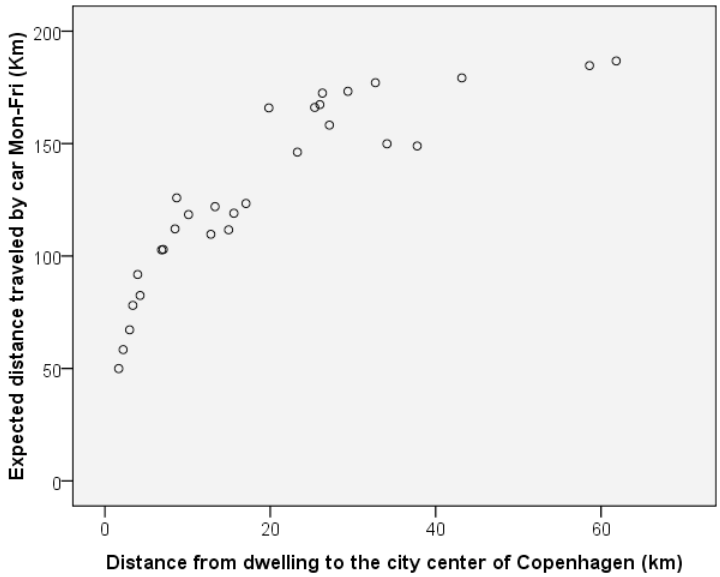
As can be seen from the preceding paragraphs, residential as well as commercial development has during most of the investigated period taken place predominantly at suburban locations. However, during the latest four or five years, a higher share of new dwellings and offices has been built in the central municipalities of Copenhagen and Frederiksberg than in the previous decades. The two core municipalities have also increased their share of the total metropolitan population. A shift from suburbanization to reurbanization thus seems to be underway in Copenhagen Metropolitan Area.

2.5 Consequences in terms of motorized travel

The relatively high proportion of residential as well as workplace development taking place in the inner parts of the metropolitan area, and the fairly high densities at which this development has taken place, compared to development at the urban fringe, imply that the resulting needs for transport are lower than what would have been the case if a higher share of urban development had taken place in the peripheral parts of Copenhagen Metropolitan Area. Still, a relatively high share of the new suburban dwellings and jobs have been located to areas far away from urban rail stations, usually with too low densities to provide a sufficient population base for good bus services. The suburban expansion of the metropolitan area that has proceeded alongside with the predominant tendency of densification has therefore contributed to a high car dependency among employees and residents of some of the new urban districts.

Based on data from 2001, Figure 2.7 shows how the average weekly distance traveled by car varies among survey respondents living in residential areas located at different distances from the city center of Copenhagen, controlling for socioeconomic variables, demographic variables and residential preferences.

Figure 2.7: Average expected travel distances by car (km) over the five weekdays for each of the 29 investigated areas. The graph is based on the respondents' actual values on each of the urban structural variables of the regression model, and with socioeconomic variables, demographic variables and residential preferences kept constant at mean values. N = 1564 respondents. Level of significance 0.0000. Source: Næss (2009a).



As Figure 2.7 shows, residents living in the outer parts of the metropolitan area[12] tend to travel considerably longer by car than their inner-city counterparts[13]. We also see that there are some differences in average expected traveling distances between residential areas located at similar distance from the city center of Copenhagen. For example, two areas located about 35 km away from downtown Copenhagen have shorter expected traveling distances by car than the areas located slightly closer to or slightly further away from the city center of Copenhagen. These two residential areas are situated close to the local town centers of Hillerød and Køge, and their lower expected amount of car travel reflects the possibility of some of the residents to

[12] The investigation included some residential areas located outside Copenhagen Metropolitan Area as defined in this report. These areas are still included in the functional urban region shown in Figure 1.2.

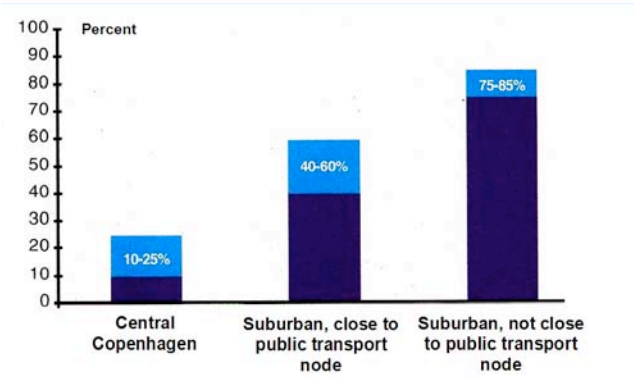
[13] The relationships illustrated in Figures 2.6 are in line with findings in a number of other cities, including Bergen (Duun et al., 1994), Helsinki (Lahti, 1995), Paris (Fouchier, 1997), Aalborg (Nielsen, 2002), Frederikshavn (Næss & Jensen, 2004), Copenhagen (Næss, 2006, 2009a), Santiago de Chile (Zegras, 2006) and Hangzhou (Næss, 2009b). These urban areas span from 35.000 inhabitants (Frederikshavn) to more than 4 million inhabitants (Hangzhou).

find work opportunities and use other facilities in these second-order centers rather than using facilities in the inner and central parts of the metropolitan area. Respondents living close to the local centers found around urban rail stations also tend to travel somewhat less by car than their counterparts living far away from such local service and public transport facilities. For most respondents, the location of the dwelling relative to the main concentration of facilities found in inner areas is still what matters most to their amount of car traveling.

The location of a high proportion of the new workplaces in Copenhagen Metropolitan Area to inner-area locations has contributed to making employees less likely to use their cars for journeys to work. In a study of 52 offices in Copenhagen Metropolitan Area, Hartoft-Nielsen (2001) shows that the proportion of employees commuting by car tends to increase from 40-45 % at downtown workplaces to 80 % when the distance between the workplace and downtown is 30 km (ibid., p. 36). In addition, Hartoft-Nielsen has found a clear effect of proximity to urban rail stations. Thus, among the inner-city workplaces located closest to main urban rail stations, the proportions of car commuters was only 10-25 % (see Figure 2.8).[14] In the outer areas, proximity to a junction urban rail station typically reduced the proportion of car commuters from 75-85 % to 40-60 % (ibid., p. 31). Commuting distances to office workplaces are also somewhat longer in the suburbs. Average daily traveling distances by car to and from work therefore vary from 3-12 km in the inner city close to a main urban rail station, 19-25 km in the suburbs close to a junction urban rail station, and 30-45 km at other suburban locations (Hartoft-Nielsen, 2001).

[14] These findings about the travel and energy impacts of workplace location are in line with results from studies in a number of other cities, including Copenhagen and Danish provincial cities (Hartoft-Nielsen, 2001), Trondheim (Strømmen, 2001; Meland, 2005) and Finnish urban areas (Martamo, 1995). In smaller cities, the differences in travel behavior between employees at central and peripheral workplaces are smaller than in the largest cities, probably due to the lower congestion levels in the central areas of smaller cities and the lower provision of public transport services in these cities.

Figure 2.8: Typical proportions of employees commuting by car to workplaces at different locations in Copenhagen Metropolitan Area.
Source: Hartoft-Nielsen (2001), p. 31.



For manufacturing, warehousing and other 'blue-collar' workplaces, suburban locations are not necessarily leading to increased car transport. For one thing, area-demanding businesses should not occupy the most central sites in competition with urban functions with a higher density of employees or visitors. Many of the area-demanding businesses also generate much freight transport that it would not be environmentally favorable to lead through the streets of the inner city. For these reasons, the Dutch so-called ABC principle for environmentally friendly workplace location recommends such workplaces to be located in the suburbs close to major traffic arteries. Workplaces servicing the local neighborhood, such as primary schools, kindergartens and grocery shops, should of course also be interspersed among residential areas rather than being centralized to the inner city. Investigations in Copenhagen Metropolitan Area also suggest that the environmental benefits of a central location in terms of commuting distances and travel modes apply primary to office and specialized retail workplaces. For blue-collar workplaces and more local service facilities, average commuting distances are somewhat shorter when the workplace is located in the suburbs than in the city center, and there are no clear differences in travel modes (Næss, 2007). It is therefore mainly decentralization of office workplaces and the establishment of out-of-town retail that represents an unfavorable development, seen from the perspective of sustainable mobility. As can be seen from Figure 2.6 and the generally high share of job growth located to the core municipalities of Copenhagen and Frederiksberg, job growth during the latest decade has only to a limited extent been characterized by such environmentally unfavorable locations. Having said that, it should also be noted that

the low density characterizing much of the development of other suburban workplaces has contributed to the outward urban expansion evident in the outer parts of the region and also made it difficult to serve these workplace districts by high-standard public transport.

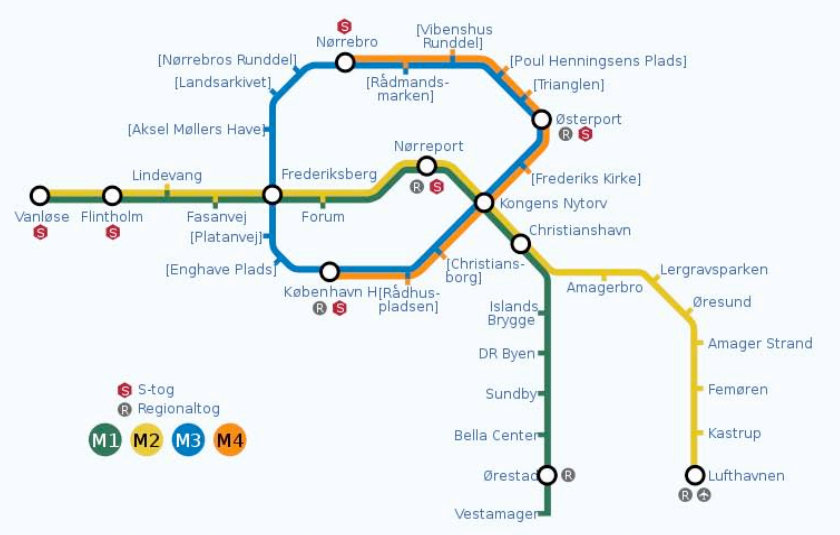
2.6 Transport infrastructure development

Copenhagen Metropolitan Area had already long before the investigation period of this project established a number of urban rail lines (the so-called S-train lines), a network of radial and ring urban motorways, and an extensive network of bike paths. Since the 1990s, the most important transport infrastructure investments have been the extension of some of the existing motorways with more lanes (from four lanes to six, eight and in one case even ten lanes), construction of new motorway links, and the establishment of a Metro in Copenhagen.

The Metro

The first decision to establish urban rail lines from the inner city of Copenhagen to the new urban development areas in Ørestaden and Kastrup airport on island of Amager was made in 1992. The first branch of the metro – from Vanløse to Vestamager – was opened in 2002. Five years later, an eastern branch to Kastrup airport was opened. These two lines are the only ones completed so far. In 2008, they carried on average 149,000 passengers daily. In 2005, it was decided to extend the metro with a City-ring line expected to be completed in 2018. Figure 2.9 shows the planned structure of the metro lines after completion of the City-ring.

Figure 2.9: Copenhagen's existing (Vanløse – Vestamager and Vanløse – Lufthavnen) and planned future metro lines (the City-ring).
Source: Wikipedia (2009)



The Metro represents an important improvement of the public transport system and is well connected to the pre-existing urban rail lines (the S-trains). However, critics have pointed to the fact that the metro covers parts of the city where the passengers will be previous bicyclists and bus riders rather than motorists. Spending the invested money on light rail lines or other improvements of the public transport system would, according to the critics, have been a more effective way to make car drivers shift to public transport. Distinct from streetcars and light rail running on separate lanes, the metro runs underground and thus does not occupy street space now available for car traffic. The fact that the metro does not create 'nuisances for car traffic' was in fact one of the arguments emphasized in the decision to choose a metro solution rather than light rail lines (Wikipedia, 2009).

The motorway development

During the period 1991 – 2008, the length of the total Danish system of motorways increased from 653 to 1062 km (Vejdirektoratet, 2009a). A considerable part of the motorway development has taken place in Copenhagen Metropolitan Area, but rather in the form of extension of the number of lanes on existing roads than as construction of completely new road links. During the period 1991 – 2008, the total length of the motorways within Copenhagen Metropolitan Area thus increased only by 12 % from 140 to 156 km

(Statistics Denmark, 2009d) . Measured in kilometers of motorway lanes, the increase has been considerably higher (although no such statistics are available).

Since 2000, the following major motorway projects have been completed in Copenhagen Metropolitan Area:

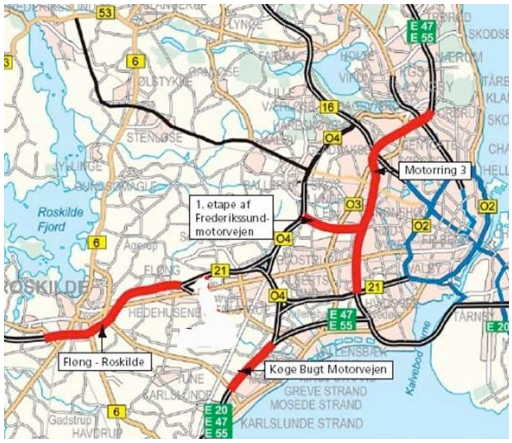
- Extension of the M 3 ring road (Motorring 3) to from four to six lanes (17 km)

- Extensions of the Køge Bugt motorway (in the southward corridor from Copenhagen) from four to six, eight and for one section of the road ten lanes (in total 8 km). Figure 2.10 shows an aerial photograph of the ten-lane part of the extended road.

Figure 2.10: Aerial photograph of the ten-lane part of the extended Køge Bugt motorway between Hundige and Greve Syd. Source: Vejdirektoratet (2009).

Figure 2.11 shows the location of the above-mentioned roads as well as some motorway extensions and new links currently under construction: The Fløng – Roskilde link (extension from four to six and eight lanes) and the first stage of the Frederikssund motorway.

Figure 2.11: Map showing the Motorring 3, the extended parts of the Køge Bugt motorway, the first stage of the Frederikssund motorway and the road link Fløng-Roskilde (the two latter links currently under construction).



The establishment of the Copenhagen metro and some other public transport improvements (notably the express buses along the ring roads) have probably contributed to some reduction in the growth in car traffic, although the proportion of metro passengers who are previous car travelers is probably not very high. However, due to the substantial road capacity increases that have also taken place, the effect of public transport improvements has to a high extent been offset and outweighed. In congested urban areas, better-flowing traffic tends to induce a number of people to travel by car who have previously left their car in the garage because of congestion. By and large, the roads will fill up again, but the proportion of car drivers will then be higher, and the number of transit passengers (and ticket revenues for the transit companies) will be lower (Strand et al., 2009).

Based on a study of travel modes for journeys to work among employees at four workplaces in Copenhagen's downtown area, Figure 2.12 shows how the likelihood of commuting by car varies with varying ratios of door-to-door travel times by car and transit (Næss & Møller, 2004).

Figure 2.12: Probabilities of commuting by car at varying ratios of door-to-door travel times by car and by public transport. Multivariate logistic regression. Probabilities refer to male respondents with high education, good parking conditions at the workplace, access to a private car on the investigated day, and mean value age (44 years). N = 292 employees working at five different workplaces in the inner and central part of Copenhagen. Sig. = 0.000. Source: Næss & Møller (2004).

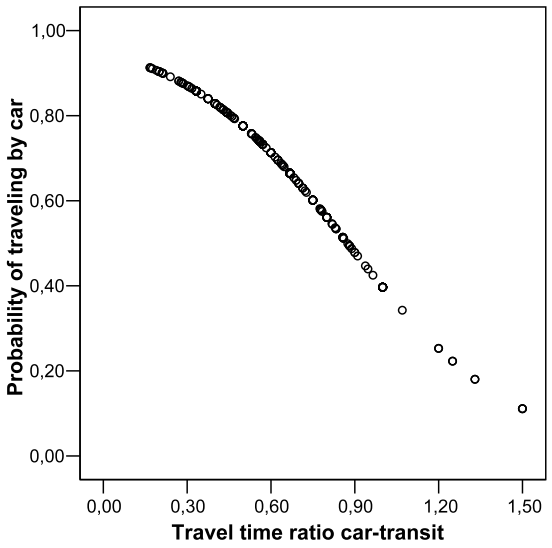
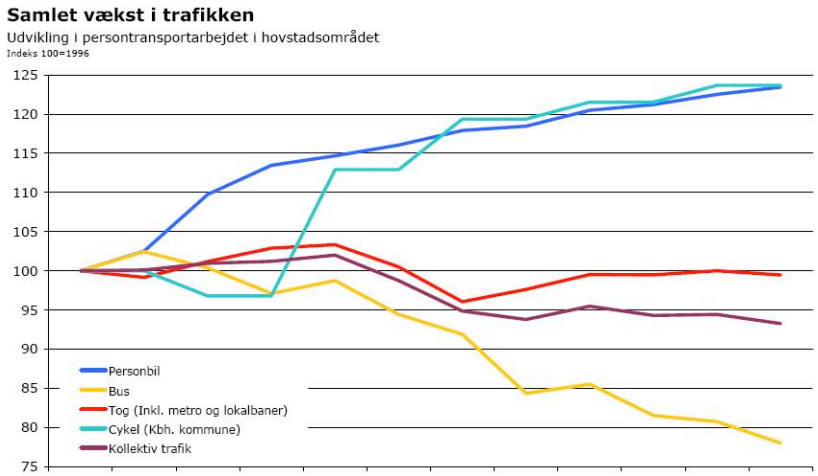


Figure 2.13 shows how travel by different modes has developed within the functional Copenhagen region during the period 1995-2007. Over these years, the amount of passenger transport carried out by car (measured in person kilometers) increased by 24 %. Adjusted for population growth, this corresponds to a traffic growth of 23 %. In the same period the amount of transport carried out by public transport was reduced by 7 %. Train travel overall did not change much, as the increase in rail traffic induced by the new metro was offset by a decrease in other train passengers. For bus transport, , there was a decrease of as much as 22 %. The only positive trait of development, seen from the perspective of sustainable mobility, is an impressing increase in bike travel by 24 % (Region Hovedstaden, 2009). Since the number of passengers per cars has for a long time shown a steady decrease, the 24 % growth in the number of passenger km by car probably reflects a slightly higher growth in vehicle km. Statistics for traffic growth along key motorways illustrate this. On Motorring 3, traffic grew by 32 % between 1996 and 2004, on Motorring 4 by 20 % and on the Køge Bugt motorway by 25 %. Over the entire period 1991 – 2007, traffic growth on these three motorways was 53 %, 51 % and 54 %, respectively. (Statistics Denmark, 2009e.)

Figure 2.13: Development of passenger transport by modes 1996-2007 within Copenhagen Metropolitan Area). Index values, the level in 1996 = 100 for all modes. Passenger kilometers. Blue: private car, yellow: bus, red: train (including metro and local lines), green: bike, violet; public transport in total. Source: Region Hovedstaden, 2009, based on data from Statistics Denmark and the Ministry of Transport.



Copenhagen Metropolitan Area has a network of bike paths that must be considered to be of a high standard compared to most other European urban regions. Especially within the municipality of Copenhagen, the development of the bike paths has been an important contribution to environmentally friendly mobility. Arguably, Copenhagen is the major European city with the best network of bike paths. Most of this infrastructure was established prior to the period investigated in this project, but some extensions have been carried out also in the 1990s and after 2000. Between 1995 and 2006, the total length of bike paths within the municipality of Copenhagen increased from 293 to 332 km, and the inhabitants increased their travel by bike (measured in person km) by as much as 44 %. (Information, 2008.)

In addition to the improvements of the bike path networks, the recent closure of one of the main access roads to Copenhagen' inner city (Nørrebrogade) for through traffic by car should also be mentioned. The closure was introduced in 2008 as a trial and has later been recommended by the The Technical and Environmental Committee of the Municipality of Copenhagen to become a permanent solution. However, no final decision had yet been made when this report was completed (July 2009).

2.7 Concluding remarks

Although low-density urban development typical for the period 1950-1980 has continued to some extent in the outer parts of the metropolitan area also in the period 1999-2008, this has been outweighed by density increases within the continuous urban area of Copenhagen. For Copenhagen Metropolitan Area as a whole, there has thus been a slight increase in urban density, measured in inhabitants per hectare of urbanized land as well as in job density within these areas.

For the entire metropolitan area, the population density within the built-up areas thus increased by 0.9 % from 1999 to 2008. Within the municipalities of Copenhagen and Frederiksberg, the population density at the same time increased by 3.0 % during the same period, and within the remaining parts of the continuous urban area of Copenhagen there was a population density increase of 4.6 %. On the other hand, the outer part of the metropolitan area experienced a reduction in population density. Outside the continuous urban area of Copenhagen, the urbanized land increased from 357 to 372 km^2, accompanied by a population growth from 619,000 to 630,000

inhabitants. This implies a decrease in urban population density of 2.1 % during the nine-year period within the parts of the metropolitan area not belonging to the contunuous urban area of Copenhagen. There was still a slight increase in job density within these parts of the metropolitan area (1.4 %).

The spatial development of Copenhagen Metropolitan Area during recent years can be characterized as a combination of inner-city densification and low-density outward expansion, where the former tendency has during the recent decade outweighed the latter. Seen in isolation, this has led to a less transport-demanding urban structure than what would have been the case if grenfield development in the outskirts of the metropolitan area had continued at the same pace as in the preceding decades. In particular, the increasing share of residential as well as workplace development taking place in the central parts of the region must be emphasized as a positive trait. On the other hand, a number of new suburban and exurban residential and workplace areas there have still been developed with too low population density to make good public transport provision feasible.

Copenhagen has made considerable investments in a new Metro, but considerable road capacity increases have also taken place. Together with some low-density outer-area development counteracting the dominating tendency of densification in the inner parts of the region, this has contributed to a steady growth in car traffic.. Over the period 1995-2007, the increase in the amount of passenger transport carried out by car within Copenhagen Metropolitan Area was 23 % when adjusted for population growth.

In summary, although land use has taken important steps toward a less car-dependent urban development, extensive road development has pulled in the opposite direction. The combined impact of land use and transport infrastructure development has therefore not contributed to bringing Copenhagen Metropolitan Area closer to the goal of sustainable mobility. On the positive side, Copenhagen’s excellent and continually improving network of bike paths must be emphasized. The new Metro has also contributed positively, although its ability to shift travelers from car to public transport may be limited, compared to the size of the investments.

3 Investigated land use and transport infrastructure plans

3.1 Introduction

This chapter presents a synthesizing analysis of seven investigated plans and policy documents dealing with land use and transport planning. Our focus will be on the ways in which the investigated documents interpret and formulate strategies in relation to the challenges of sustainable mobility in urban development. The presentation is structured around 16 detailed research questions. The synthesizing analysis is based on short (four to eight pages each) analyses of the individual plans and policy documents investigated. The seven investigated documents are the following:[15]

- The 2005 Municipal Plan for Copenhagen
- The 2009 Municipal Plan for Copenhagen
- The Finger Plan 2007 (a national planning directive for the entire functional urban region)

[15] Due to time and budgetary constraints, the investigation of plans and policy documents was limited to these seven documents. It would obviously have been an advantage to include more documents, notably older Municipal Plans for Copenhagen (e.g. the 2001 plan), Municipal Plans for a suburban municipality such as Ishøj or Herlev, and an older Regional plan, e.g. the one from 2001. We admit that the investigation of only seven planning documents reduces the possibility of drawing firm and general colclusions about the focus and priorities in land use and infrastructure planning in the investiagted period. The information provided from the analysis of plans must, however, be seen in combination with the information given in the qualitative interviews with planners and policy-makers (cf. chapter 5).

- The 2005 Regional Plan for the entire functional urban region
- The Infrastructure Commission's report (2008)
- The 2000 National Planning Statement (Landsplanredegørelse)[16]
- The 2006 National Planning Statement (Landsplanredegørelse)

Each plan and policy document was first analyzed, using a common checklist. These interpretations of individual documents are documented in an unpublished English-language working paper (Nicolaisen, 2009).

3.2 Sustainability as an explicit concept in the investigated plans and policy documents

The extent to which the concept of sustainable development is explicitly mentioned in the plans and planning documents does of course not in itself imply that the strategies and measures promoted in the plan or policy document will actually enhance sustainability. Whether or not this concept is addressed and referred to, can still be one – among several – indications of the political and professional attention directed toward the concept.

The concept of sustainable development is articulated quite frequently in the two Municipal Plans of Copenhagen and the Regional Plan, and to some extent also in the National Planning Statements, especially in the one from 2000. In the Finger Plan 2007, the notion of sustainability is explicitly mentioned only once and very briefly. However, a key issue of environmental sustainability, notably 'environmentally correct location' of traffic-generating urban functions, is discussed at quite some length in this plan. In the Infrastructure Commission's report, sustainability is addressed much more sparsely

In Copenhagen's Municipal Plan 2005 and Municipal Plan 2009, the notion of sustainable development is referred to quite frequently

[16] According to Østergaard (2007, personal communication), a *Landsplanredegørelse* corresponds to what in the EU is considered as a White Paper.

throughout both documents, although it is not always completely clear whether it is used to describe economic, social or environmental sustainability. However, a sizeable amount of text is specifically aimed at describing the environmental sustainability concepts in both documents.

Sustainable development in the sense of environmental protection is mentioned but once in the Finger Plan 2007, where an "environmentally sustainable transport pattern" is listed as one of the goals for the plan. Apart from this mentioning there is no further references to the issue of sustainability in the document. Although environmental sustainability is probably an important underlying motivation for the policy of 'environmentally correct location', the articulated prime justification of this policy is to reduce the congestion problems in the metropolitan area (Finger Plan, p. 18).

In the 2005 Regional Plan, Sustainable development as a term is frequently used throughout the document in relation to environmental, social and economic sustainability. Of these three it is clear that economic sustainability is the primary concern of the document.

Sustainable development is mentioned less than ten times throughout the more than 300 pages that make up the report from the Infrastructure Commission, and more than half of these are references to sustainability goals from other plan documents or foreign projects. Sustainable development is not included in the main tasks for the commission, but it is noted that the secondary effects of transport should be taken into consideration including noise, particle emissions and CO2. The concept of environment is mentioned on many more occasions than the concept of sustainability, although still not receiving any large degree of attention in the report which is primarily focused on solving problems of future transport demand and congestion through capacity expansions.

The 2000 as well as the 2006 National Planning Statement (NPS 2000 and NPS 2006) include the concept of sustainable development throughout the various chapters and in all aspects of planning described within the documents. In addition to this, the National Planning Statement 2000 has a separate appendix which briefly covers environmental impacts in different aspects of planning.

3.3 Interpretations of sustainability

The level of reflection on the content of the concept of sustainable development varies much between the different types of plans, and the way the concept is interpreted also differs considerably. The concept is elaborated on to the highest extent in the Copenhagen Municipal Plans and in the National Planning Statement 2000, to a lesser extent in the Regional Plan and the National Planning Statement 2006, and to the least extent in the Finger Plan and the report from the Infrastructure Commission. In Copenhagen's plans, the concept is interpreted mainly in terms of environmental sustainability; the same also largely applies to the National Planning Statement 2000. In the Regional Plan and the National Planning Statement 2006, the concept is used in relation to environmental, social as well as economic sustainability, with an emphasis on the latter. In the Finger Plan and in the Infrastructure Commission's report, sustainable development is less clearly described but seems to be used as a combined environmental and economic concept, with an emphasis on the economic dimension, especially in the Infrastructure Commission's report. Again, it should be remembered that a plan's sustainability rhetoric does not necessarily correspond to the sustainability content of its actual policy measures. As will be discussed later in this chapter, the Finger Plan 2007 includes important land use measures aiming at reducing the amount of car traffic in the region, and its sustainability content thus differs considerably from the Infrastructure Commision's report.

The differences in the elaboration and interpretation of sustainability in the plans are interesting when considering the political orientation of the decision-makers in charge of the various plans. The municipal plans of Copenhagen as well as the National Planning Statement 2000 were adopted by political majorities consisting of the Social Democrats backed by the left wing (Socialist People's Party and the Red-Green Alliance) and the Social Liberal Party. The political majority in charge of the remaining plans was a coalition between Denmark's Liberal Party and the Conservatives, backed by the right-wing nationalist Danish People's Party. The way the rhetorics of sustainable development is used in Regional Plan 2005, the report from the Infrastructure Commission, the Finger Plan and the National Planning Statement 2000 reflects to a higher extent than in the other plans a neoliberal redefinition of the sustainability concept of the UN World Commission on Environment and Development (1987).

The concept of sustainability is very similar in the 2005 and the 2009 Municipal Plan for Copenhagen, but has perhaps seen a slightly higher level of detail in the later version in which a "sustainability toolbox" has been included to be used in the internal work of the municipality. The primary sustainability concerns are related to reducing the volume of motorized transport (cars in particular), ensuring green areas within the city and a sufficient water supply.

In the 2005 Regional Plan, no clear definition of sustainability is given. The term is used in relation to environmental, social as well as economic sustainability. Of these three it is clear that economic sustainability is the primary concern of the document, which is evident from the focus on the international business competitiveness of the region throughout the initial section on visions titled "A strong and sustainable metropolitan region" (Regional Plan 2005, pp. 12-). It seems to be used as an umbrella term for any development that does not hinder economic growth, does not cause social inequity or does not pollute the environment above threshold values (such threshold values are only mentioned in relation to ground water though). The closest the visions come to defining a goal for environmental sustainability is through the focus on recreational landscapes of which the most important are the so-called green wedges between the infrastructure corridors outlined in the Finger Plan. However, sustainability is not an overarching goal of the recreational landscapes which are seen as "an increasing prerequisite for attracting businesses and qualified workforce" (Regional Plan 2005, p. 16). Protection of the green wedges is thus seen as an instrument for ensuring economic growth in the region just as much as being an environmental concern in itself.

As sustainable development is hardly addressed by the Infrastructure Commission, the report does not communicate any clear definition of the concept. However, when referring to the environmental effects of transport it focuses on improving traffic safety and reducing noise levels as well as particle and CO_2 emission. As regards sustainability goals, the report refers to the Danish Planning Act (Planloven) and does not go into further detail on how to achieve these goals.

No clear definition is given of the concept of sustainable development in either the 2000 or the 2006 National Planning Statement, but it seems as if the interpretation of the concept differs a bit between these two policy documents. In terms of physical planning and issues of sustainability NPS 2000 continuously emphasizes that the current structure should be sufficient for our future needs (especially in regard to transport infrastructure) and thus focuses on efficiency within the

system rather than expansion of its physical structure. In NPS 2006 this focus is no longer present, and reducing the environmental impacts of growth seems to be the general interpretation of the sustainability concept here.

3.4 Status of sustainability goals

Sustainability is placed high on the agenda in the two Municipal Plans of Copenhagen and also in Regional Plan 2005. In the latter, however, the focus is on economic rather than environmental sustainability. In the remaining plans and policy documents, sustainability has a less prominent position, although 'economic sustainability'- in the way this is interpreted in the Regional Plan, is a main concern also in the remaining plans (yet not so often articulated in the vocabulary of sustainability).

While sustainability is not the only goal in the 2005 and 2009 Municipal Plans for Copenhagen, it is clearly placed fairly high on the agenda. The 2005 Municipal Plan sketches out a vision of a sustainable urban region with proposed ideas on how to achieve the goals in that vision, and this vision is expanded in the 2009 version which also includes more thorough descriptions of which tools could facilitate required changes.

That being said, the concept of sustainability is obviously conflicting the ever present need for 'economic sustainability' in such documents, which is bound to inflate the demand on consumption of various goods and services. While not dedicating themselves to the grandeur of decoupling economic growth and environmental impacts, both documents do in fact propose ideas on how to promote non-motorized modes of transport, including better conditions for pedestrians – a group of travelers who are often overlooked in analyses of commuting.

In the Finger Plan 2007 sustainability is, as indicated above, stated as desirable in the final outcome, but apart from the indirect environmental effect of a more efficient transport system there is no clear strategy for how to achieve sustainability and it is also not included among the main goals in the document. Although not articulating the notion of sustainability to any great extent, the actual policy measures introduced in the Finger Plan 2007 imply increased protection of farmland and natural areas and a restraint on car-dependent locations of new development, compared to the Regional Plan 2005.

As indicated in Chapter 3.3, economic sustainability seems to be the main priority of the planning strategy described in the 2005 Regional Plan. Environmental sustainability is seen as an issue to which the main priorities have to be adapted to and possibly as a way to contribute to economic growth.

As mentioned above, the concept of sustainability is hardly addressed in the Infrastructure Commission's report and it was not included among the main tasks of the commission. Whenever environmental issues are discussed, they are solely mentioned as an adverse effect of transport that should be limited as much as possible when trying to solve the 'core' problems of congestion and capacity. The main concern seems to be the economic feasibility of investments and maintaining high accessibility and competitiveness of the infrastructure.

Neither in the 2000 nor in the 2006 National Planning Statement is sustainable development an overarching goal. Instead, both these policy documents seem to be focused towards ensuring a continuation of Denmark's leading position in regard to international competitiveness. The 2000 National Planning Statement describes a need to reduce the required transport associated with further economic growth, but is mainly addressing the need to incorporate the local identity into new planning projects. The 2006 National Planning Statement describes a need to reduce the environmental impacts of forecasted transport activity, but is mainly addressing the need to focus planning around the two main metropolitan regions in Denmark (Eastern Jutland and Copenhagen). Sustainability in both documents is thus largely a vague umbrella term for anything that attempts to reduce the potential environmental degradation that new planning projects could cause, but an absolute reduction of total environmental impact is not the goal in any of them.

3.5 Main sustainability issues addressed

The plans differ widely in terms of how directly or indirectly they discuss sustainability problems/issues as well as what kinds of issues are highlighted. In the Municipal Plans of Copenhagen, sustainability issues are addressed directly, with a main focus on transport-related environmental problems and strategies to counteract them. In the Infrastructure Commission's report, the sustainability issue addressed is how to reduce the negative impacts of a presupposed steadily growing traffic volume. In the Regional Plan 2005, sustainability is

interpreted in terms of sustained economic growth and competitiveness, with infrastructure development as a main tool discussed for this purpose. The National Planning Statements and even more so the Finger Plan 2007 are quite vague as regards sustainability challenges and goals. While not articulating sustainability as an overall *leitmotif*, The Finger Plan still includes several regulations that are likely to push the development of land use and transport in a more sustainable direction, compared to the previous plans.

In the 2005 Municipal Plan for Copenhagen, the primary focus seems to be directed at achieving an efficient public transport system in the Ørestad region, and in general the document indicates a concern with the adverse environmental effects of transport. This concern is continued in the 2009 plan with greater focus on public transport, biking and walking as well as sustainable energy solutions (not only for transport but also heating). However, in both documents it is clearly the forecasted increase in transport demand that is the major source of concern in regard to long term environmental sustainability.

Due to the vague definition of sustainability in the Finger Plan 2007, there is no real identification or ranking of related problems. The only clear definition of sustainability is found in the appendix (p. 92) but is related to sustainability of the economic management of public transport and its running costs. The concept of 'environmentally correct location' is an attempt to reduce traffic volumes without affecting mobility[17] and can thus act in support of a reduction of emissions from the transport sector.

In the 2005 Regional Plan, continued economic growth and the competitiveness of the metropolitan region are clearly the most important issues. The region is labeled "the economic locomotive of Denmark" (Regional Plan 2005, pp. 14) and especially the accessibility for citizens to commute to and from work is seen as one of the pinnacles in maintaining international competitiveness. This is implicitly tied up to increasing transport loads as a prerequisite for economic activity to expand and as such expansion of highways and public transport facilities are prioritized in the document.

[17] The principle does not address the location of new development relative to the main concentrations of workplaces and service facilities in the region and will therefore mainly affect the shares of public transport and car travel rather than the overall amount of motoried travel. The principle may still reduce traveling distances to local service facilities, and – for (the relatively few) residents working at local suburban workplaces – also commuting distances.

As mentioned earlier, sustainability is not given much attention in the Infrastructure Commission's report, but protection of the environment is mentioned mainly as a matter of improving the share of public transport and increasing energy efficiency in the transport sector through better fuel effectiveness and use of ITS. Sustainable development seems to be implicitly defined in the context of *ecological modernization* (Barry & Matthews, 2003).

No specific sustainability issues are identified in either of the two National Planning Statements. The 2000 Statement is mainly focused on using the existing structures more efficiently, while NPS 2006 is mainly concerned with the vertical hierarchy being better at supervising individual projects (and following intervention from the Department of the Environment if national guidelines are not adhered to).

3.6 Policy measures to promote a sustainable urban development

The two Municipal Plans of Copenhagen as well as the Regional Plan 2005, the Finger Plan 2007 and the National Planning Statement 2000 promote urban densification and development close to public transport nodes. These urban development principles are expressed and related to sustainability goals most clearly in the municipal plans of Copenhagen, where also improved conditions for bike travel and measures to reduce car travel in the city center are included. In the Infrastructure Commission's report, the focus is instead mainly on technological solutions for traffic management and vehicle design. Both the Infrastructure Commission and the National Planning Statement 2006 recommend considerable expansion of the infrastructure (especially roads), a strategy which is rooted in the focus of these policy documents on 'economic sustainability'.

In the 2005 as well as the 2009 Municipal Plan for Copenhagen there are clear strategies for placing facilities that generate a great deal of passenger transport in close proximity of the public transport nodes (in line with the Finger Plan). An effective public transport system is considered the backbone of a sustainable transport system, which again is seen as the key focus area for improving sustainable development. This also includes a denser and more compact urban structure around these nodes which is exemplified by a variety of projects to explore the possibilities of sustainable urban regions (such

projects include the old brewery site for Carlsberg in Valby as well as the Nordhavn harbor area).

Better conditions for bicyclists and pedestrians are also a key goal in both documents but perhaps most notably in 2009 Municipal Plan. Concrete policy measures to facilitate such conditional change includes fewer parking spaces in the city centre, safer bike paths and easier access to recreational areas for non motorized modes of transport. The 2009 Municipal Plan has divided these areas into the categories of green and blue, which denote either park-like areas or waterfront locations.

The overall approach of the Finger Plan 2007 is to keep the urban structure as a hand with the palm representing the centre of Copenhagen and fingers stretching out to the north, west and south representing the main transport corridors. The principle of locating urban development close to urban rail stations has been strengthened in Finger Plan 2007. This is conducive to goals of environmental sustainablility such as reduction of greenhouse gas emissions from traffic and reducing the encroachments of urban development on natural and agricultural areas. The main arguments in the plan for the policy of 'environmentally correct location' refer, however, to the merits of this policy as a response to the increasing problems of congestion in Copenhagen Metropolitan Area. The sustainability motivations for the location policy are less explicitly expressed, although it is stated that the traffic system and the spatial urban structure should be coordinated in order to, among other things, limit resource consumption and reduce the environmental impacts of traffic.

The Finger Plan 2007 is closely related to the 2005 Regional Plan document, and locating office and residential facilities close to public transport nodes plays a vital role in the sustainability strategy for both documents. In Regional Plan 2005, the future development is split into different areas depending on in which part of the "hand" they are located, with new construction taking place around existing transport nodes and corridors (primarily in the fingers) or where these can be expanded outwards to new developmental areas.

In the Finger Plan 2007, however, these policies have been considerably strengthened. Firstly, measures have been taken in order to prevent urban sprawl outside the 'finger structure'. Notably, regionally oriented urban functions (i.e. facilities attracting visitors from a regional as distinct from a predominantly local catchment area) can no longer be located outside the finger structure. In Regional Plan 2005, such functions could be located in 17 municipal centers outside

the Finger structure, but this is no longer possible with the regulations of Finger Plan 2007. Secondly, the prioritization of transformation of existing urban areas instead of outward urban expansion has been stated more clearly. Thirdly, the principle of locating urban development close to urban rail stations has been tightened with a focus on the impacts on transport and the environment.

In the Infrastructure Commission's report, the following strategies are suggested as measures to achieve a reduction in the adverse environmental effects of transport:

- Fast implementation of alternative fuels.
- Common European effort to promote development of more 'environmentally friendly' vehicles.
- Initiatives for a smoother and more efficient traffic handling.
- Creation of encouragement to use non car-based modes of transport through improvements to the facilities for such modes.
- Increased levels of information and education about the environmental effects of different modes transport.

As mentioned earlier, the 2000 National Planning Statement advocates better use of existing physical structures to avoid expanding them unless necessary. This also involves changes in the way we think and engage in transport related activities, where the establishment of urban environmental zones, reduction of available parking space and densification in the urban areas are just some of the proposed measures to reach a more sustainable development (pp. 74-).

The 2006 National Planning Statement is in direct contrast to this non-expansive philosophy, and directly advocates an expansion of the existing infrastructure network (e.g. p. 47). It does however also make notice of the limitations associated with capacity increases and advocates a need to reduce transport demand by locating destinations more appropriate (mainly relating to the Finger Plan's proximity principle).

3.7 Positions on the compact city model

None of the investigated plans and policy documents are in opposition to the compact city model, but their support of this model varies somewhat and is most clearly expressed in the two municipal plans for

Copenhagen. In the Finger Plan 2007 and the Regional Plan 2005, densification around public transport nodes is a main spatial strategy, but these plans at the same time open up for a considerable decentralization of workplaces and residences as long as the development takes place in areas close to existing or planned urban rail stations. The Infrastructure Commission's report gives verbal support of compact urban development, but includes no measures for implementing such a strategy. Rather, the extensive road development proposed in this report is likely to facilitate continued outward urban expansion. The National Planning Statements are generally supportive of a more compact urban development, and especially the 2000 document calls for a better utilization of existing built-up areas and infrastructure.

As is the case with Regional Plan 2005 and Finger Plan 2007, the compact city model is indirectly supported in the two municipal plans of Copenhagen through the concept of proximity to public transport nodes. However, unlike these documents the 2005 and especially the 2009 Municipal Plan for Copenhagen further elaborate on the densification strategies, which also play a vital role in some of the previously mentioned projects for sustainable urban regions. The municipal plans clearly support the compact city model and while such a strategy is partly based on economic considerations there are indeed arguments included for more sustainable development through such densification strategies.

The Finger Plan 2007 and the 2005 Regional Plan both advocate a densification of both commercial and residential facilities around the public transport nodes, and thus support the compact city model. This strategy aims at increasing the share of commuters who choose to use public transport rather than a car to get to their job, and argues that distance from workplace to nearest node is negatively correlated with the share of workers using public transport to get to work. The strategy could thus be viewed as move towards a more sustainable transport system due to the expected environmental benefits from a modal switch towards more public transport.

Apart from a desire to have a more compact structure around the public transport nodes there are, however, not very strong indications of compact city adaptation in the Finger Plan 2007. The promotion of more dense building projects near these nodes seems – at least judged from the motivations explicitly expressed in the plan – to be a response to a growing concern with congestion in the metropolitan area and based on past experiences from a tradition of locating core facilities in close proximity of public transport nodes. The potential

benefits of densification are not discussed beyond that of encouraging a modal switch.

On the other hand, the downplaying of sustainability rhetorics in the Finger Plan 2007 (and maybe in other plans too) may reflect tactical considerations by those professionals who have prepared the documents: if they knew that a strong focus on environmental sustainability would not be popular in political circles, they might prefer to make plans promoting more sustainability without expressing this too explicitly. As mentioned by one of our interviewees (cf. Chapter 5), at a certain time it was 'almost forbidden to say CO_2 in the ministry'.

Be that as it may, in the 2005 Regional Plan, too, the primary motivation behind the approach seems to be to ensure accessibility in the region while maintaining recreational space to attract a workforce much like what Richard Florida (2002) would define as "the creative class". The strategy is apparently to ensure competitiveness of the metropolitan region compared to similar regions internationally. The compact city model is not clearly defined as a vision in the document, and the compact city elements included are not based on sustainability concerns (at least not explicitly) but are rather considered as instruments to reduce congestion to avoid reaching the levels of traffic jam seen in similar metropolitan regions elsewhere.

In the Infrastructure Commission's report, the role of spatial planning is mentioned several times throughout the report and mainly in relation to the concept of urban densification as a way of promoting public transport and bicycle use. The densification strategy is mainly connected with benefits in terms of reduced car use, congestion and job accessibility and is thus only indirectly based on sustainability arguments, although it is mentioned that densification could also lead to positive side effects for the environment. The report recommends that densification is considered in most central urban areas and that areas which are central in plan strategies for future development are reserved for local authorities to be able to coordinate their planning accordingly. It should be noted though that land use planning is not a main concern in the Infrastructure Commission's report.

None of the two National Planning Statements is opposed to the compact city model, but their use of compact city planning ideas differ a bit (e.g. in regard to expanding the infrastructure). Common to both documents is that the motivation behind including compact city ideas seems to be partly rooted in sustainability arguments, or at least the acknowledgement that such a spatial strategy will reduce the impact of

transport on the environment. It is however also largely motivated by a desire to solve the growing problems of congestion in the inner urban areas.

3.8 Assumptions about relationships between land use and transport

All the investigated plans and policy documents include or recommend land use strategies that are clearly based on some of the research that has been carried out about relationships between urban structures and travel, but in most cases these theories and research results are not explicitly mentioned. The documents also vary as to how comprehensively the influences of urban structure on travel are taken into consideration. Mostly, the plans focus on how the use of public transport is influenced by how far away from urban rail stations workplaces and residences are located, whereas the transport-wise more important impacts of residential and workplace location relative to the main city center is taken into consideration to a much lesser extent.

As mentioned earlier, many similarities exist between the Copenhagen Municipal Plans and the Finger Plan in regard to the compact city model, and this is also true for the relationship between land use and transport. While no actual references to research in the field are presented in either document it is clear that the overall approach to land use planning is influenced by contemporary planning theory.

In the Finger Plan 2007, causal influences are related to how locating commercial and residential facilities will impact on accessibility within the region, which is seen as a necessary prerequisite for development and competitiveness. The underlying aim of the plan is to provide accessibility without being dependent on a high level of automobility. It is assumed that densification around the public transport nodes will encourage more public transport, which it is hoped will relieve some of the increasing congestion problems in the region and allow for faster and more reliable transportation for users of public as well as private transport. Apart from this, there are few references to causal relations between land use and transport. The Finger Plan does not mention induced traffic, the ways in which densification strategies influence transport growth, or the influence of expected increase in road capacity on the possibility of realizing the densification strategies. It can thus be said that rather than denying contemporary planning research on causal relations between

infrastructure development and travel behavior, many of these relationships are instead just ignored. The land use priorities are more in line with state-of-the-art knowledge about relationships between urban spatial development and travel, although the importance of residential and workplace location relative to the main ceter of the metropolitan area is downplayed. The causal relationships between land use and travel are, however, not expressed explicitly, but are rather tacitly and implicitly assumed.

The 2005 Regional Plan is very similar to the Finger Plan 2007 as to its assumptions about influences of land use on travel. The plan gives quite specific recommendations regarding how workplaces and services with many employees or customers per area unit should be located relative to the public transport system, but it does not mention the theories or research on which these recommendations are based.

The Infrastructure Commission's report mentions causal influences of land use on transport primarily as regards modal split, and argues that urban sprawl results in increased car usage while densification strategies promote public transport solutions. The assumptions seem to be in line with results from contemporary research on relationships between urban structures and travel.

Both the 2000 and 2006 National Planning Statement hint at a relationship between the location of key facilities (institutions, residence and workplace for example) and resulting transport demands. No clear references to theories or research showing such causality are presented, but it seems clear that strategies for proximity are supposed to reduce the necessary travel distance as well as the need to travel by car.

3.9 Transport policy priorities

The two municipal plans of Copenhagen and the 2000 National Planning Statement all support public transport improvements as well as restrictions on car travel in cities, and the latter policy document is also in favor of limiting road capacity increase. The remaining investigated plans and policy documents support public transport improvements as well as road capacity increases (the latter especially strongly advocated in the Infrastructure Commission's report), but do not mention restrictions on urban motoring. Similar to the interpretation of sustainability (cf. chapter 3.3), the above-mentioned differences may reflect different political constellations in charge of the plans and policy documents. The Finger Plan, the 2005 Regional

Plan, the 2006 National Planning Statement as well as the Infrastructure Commission's report have been produced under the leadership of liberalist-conservative politicians, whereas the Copenhagen municipal plans and the 2000 National Planning Statement have been put forth by politicians from the center and the left.

The 2005 and 2009 Municipal Plans for Copenhagen include improved public transport services, better biking facilities as well as restrictions on urban motoring. In particular, the 2009 plan focuses on measures to regulate transport demand. Parking space in the city center has been reduced and is scheduled for further reduction in the near future, and the remaining parking facilities are rather expensive to use. Such measures are to be considered in combination with the improvements of public transport services and better conditions for non motorized means of transport to ensure that both push and pull mechanics are in place.

Some critique has nevertheless been directed toward the documents, and the 2005 Municipal Plan was directly accused of promoting a capacity increasing approach in regard to the Nordhavn area, as well as of only catering the needs of car owners in what was supposed to be an example of sustainable urban form. The 2005 Municipal Plan had plans for public transport connections to Nordhavn, but while intentions where good (seen from the perspective of sustainable mobility) there was a tendency to focus on construction of parking lots near many of the new facilities in the area.

The Finger Plan 2007 includes a range of planned capacity increases for both road and rail (30 and 11 projects respectively), with highway extension in either width or length making up most of these projects. There is no mentioning of restrictive regulation towards the use of cars, and improving the attractiveness of the public transport system is viewed as a sufficient method for encouraging a modal switch.

Similarly, the 2005 Regional Plan promotes road capacity increases as well as investments in public transport services, but no restrictions on car use in urban areas. The trend of increasing transport demand is seen as a consequence of economic growth and as such both road based and public transport are seen as demand driven in the sense that they should be able to facilitate expected increases in transport in the future. ITS as well as park-and-ride options are mentioned as possible means of assisting capacity increase with managing this increased demand, but no regulatory instruments to influence demand are mentioned.

In the Infrastructure Commission's report, capacity increase on the road network seems to be the primary concern and is motivated by a desire to reduce congestion and maintain a high economic competitiveness. Much of the initial parts of the report is concerned with presenting Denmark as having one of the best (road) infrastructure systems in the world, and that forecasted development in transport demand calls for large capacity expansions to meet this demand. Restrictions on car use in urban areas are largely avoided as a topic and the terms of reference for the commission's work explicitly state that the Commission was not supposed to address issues of organization and layout of the transport sector. This has been interpreted by the commission's chairman as a ban against recommendations for any kind of fiscal instruments in the work of the commission.

Investments in public transport services are not a concern of the Infrastructure Commission on the same level as investments in road infrastructure, and a strengthening of public transport through indirect effects is expected instead. An example of this could be densification strategies and increased use of ICT (passenger information, travel plans and intelligent traffic lights) which are both expected to increase the share of public transport. The lack of attention to actual investments in public transport infrastructure is also evident in the transport models used to produce the forecasts for transport demand in the report. There are separate models for road and rail development, there is no crossover effect included, meaning that an increase in rail transport would not result in a lower forecast for road transport. Furthermore, the calculations for road transport assumes unrestricted capacity on the road network (only likely if major capacity expansions are indeed carried out) while the calculations for rail transport assume no improvements whatsoever to the rail network (only likely if no capacity expansions are carried out).

The 2000 National Planning Statement is clearly more in favor of restrictions on both road capacity increase and use of cars, as well as improving the public transport systems than the 2006 document. The 2006 National Planning Statement is more reluctant in discussing restrictions and seems to focus mainly on promoting better conditions for non-car users. Such 'carrot' instruments are also present in NPS 2000, but it is made clear that 'stick' instruments are necessary to enforce a modal switch and a reduction of the current dominance of car based transport systems.

3.10 Assumptions about influences of transport infrastructure investments on travel

None of the investigated plans and policy documents actively denies that transport infrastructure investments may cause changes in the amount of transport and the shares of different travel modes. But in several of the documents these relationships are not mentioned, and policies are being justified by arguments that would only be valid if these relationships did not exist. So rather than being denied, induced traffic and other effects of transport infrastructure investments on travel behavior are more or less actively ignored in some of the documents. There are, however, variations between the different plans and policy documents. Again, the two municipal plans of Copenhagen and the 2000 National Planning Statement differ somewhat from the remaining documents, in this case by avoiding the type of argumentation that implicitly presupposes the non-existence of induced traffic.

Yet, in the 2005 and 2009 Municipal Plans for Copenhagen, no clear relationship between infrastructure investments and transport volume is defined. There nevertheless seems to be an underlying acknowledgement of the problems associated with a strict predict and provide approach to transport planning. This is also evident in the phrasing used in both Municipal Plan 2005 and 2009 to describe transport-related problems, where a distinction is often made between different types of traffic. In both plans, there is an emphasis on ensuring accessibility for all groups of society rather than just motorized transport, which has often been the focal point in other documents (Region Plan 2005, Finger Plan 2007 and the report from the Infrastructure Commission).

The Finger Plan 2007 does not engage in a discussion of the causal influences of investments of this kind, but it does seem likely that causal effects between investments, capacity and volume of transport are not based on state-of-the-art transport research, but rather fits into a predict-and-provide paradigm. Again, no denial is evident in the document. The approach and the rationale behind it seems to be black-boxed through tradition, as the plan – with its combination of road capacity increases and improvements of the public transport system – is a continuation of a plan that came into play shortly after World War II and has since been refined multiple times.

The 2005 Regional Plan neither denies nor supports the existence of any influences of transportation infrastructure investments on travel behavior, as it does not really engage in any discussion on causality of neither land use nor infrastructure investments. However, the lack of such a discussion, together with the general approach to transport demand in the document indicating a traditional predict-and-provide paradigm, might suggest that state-of-the art research on induced traffic is not taken into account.

The Infrastructure Commission's report does not mention any connections between capacity increases and generated traffic, nor does it indicate any particular awareness of such causal relationships. It is stated specifically in the road forecasts on which the report bases its recommendations (Fosgerau et al., 2007) that the forecasts are conducted with no regard to capacity limitations, but that forecasted values are expected to be higher than actual development as congestion will cause people to seek alternative means of transport once the traffic volume reaches around 70% capacity or more. This awareness is, however, more related to a modal switch than actual traffic generation and is not mentioned in the rest of the report.

None of the two National Planning Statements denies the relationship between investments and transport, but where the 2000 National Planning Statement mentions the traffic inducing effects of urban sprawl development and the need to avoid it, no such concern is found in the 2006 statement, in which capacity increases are suggested as a possible way to grow the transport system out of its problems.

3.11 Spatial content of urban development discussed without referring to sustainability

In the two municipal plans of Copenhagen, policy instruments influencing the spatial content of urban development are to a high extent discussed or incorporated in a sustainability context. In the other investigated plans, this is the case to a much lesser extent. Partly, policy instruments compatible with and supportive of sustainable urban mobility are justified by other arguments than sustainability, which is not mentioned as the reason for pursuing the policy. And partly, the sustainability impacts of policy instruments contributing to increased transport and higher shares of car travel are not discussed.

Both the 2005 and the 2009 Municipal Plan for Copenhagen display a desire to achieve a combined planning approach for the region that covers the challenges of sustainability in relation to challenges in other areas, such as accessibility within the city, quality of public space and mixed building use. These are not all discussed in relation to sustainability, although adhering to principles of sustainability is often encouraged. Sustainability is certainly not tucked away in some corner of these documents, but is rather an all-encompassing issue which permeates most of the policy measures within the documents in addition to the parts that are devoted to actual sustainability developments. Moreover, the 2005 and 2009 Municipal Plans for Copenhagen are the first of their kind to be accompanied by a strategic environmental assessment (SEA). SEAs are not required for these types of documents, but in the plans they are included as an additional instrument for ensuring sustainable development. In principle, some caution ought to be displayed when a public institution evaluates its own plans, but the intention is noble nonetheless and the SEAs did manage to point out critical aspects of both the 2005 and the 2009 plan (such as a proposed highway to a new urban transformation area in the Northern Harbor).

Many of the policy measures described in the Finger Plan 2007 as well as in the 2005 Regional Plan are responding to the challenges of sustainability in one way or another, but most are not discussed in relation to these challenges. Instead, they relate to the aforementioned issues of congestion reduction and ensuring international competitiveness of the metropolitan region. For example a denser urban form seems more economically feasible from a public transport perspective due to a large user base, just as locating transport heavy facilities near transport nodes and corridors imposes less transport into a congestion plagued infrastructure system.

In the Infrastructure Commission's report, densification strategies are mainly discussed as a way of reducing transport demand, and while this indirectly implies less environmental impact of transport, land use strategies are primarily discussed in the context of congestion. Reduced transport demand frees up capacity on the existing infrastructure network and thus provides time savings to the benefit of society at large. Furthermore, densification is viewed as a strengthening of public transport's competitiveness along with that of walking and biking. The main argument is that a dense urban structure results in a larger user-base for public transport which makes it economically feasible to invest in more and better public transport facilities.

More importantly, the negative impacts to environmental sustainability from facilitating the expected traffic growth of 70 per cent within 2030 are discussed in an overly optimistic way, where it is assumed that technological improvements can compensate for any negative impacts of such traffic growth.

The 2000 National Planning Statement generally devotes attention towards the need to utilize the local strengths of each region and to consider the available human resources when new business projects are located, to avoid a mismatch of required and available workforce in a region. While this could actually benefit sustainable development by reducing the need for long distance commuting, this is not the motivation behind this policy, which should rather be seen as a way of enhancing regional and national competitiveness. The 2006 National Planning Statement mentions expanding the infrastructure and regulating traffic flows as means of achieving a modal switch, but sustainable development does not seem to be a main motivation either. Solving congestion for peak hour traffic is the key concern here.

3.12 Barriers to a sustainable urban development

The investigated plans and policy documents do only to a very limited extent, if at all, point explicitly at barriers to the achievement of a more sustainable urban development. At least, this is the case as regards implementation of sustainability-motivated strategies promoted by the plans and policy documents. To some extent, driving forces that may counteract proposed environmental strategies are mentioned, but usually these traits of development or circumstances are not articulated as causes of lack of goal-achievement in a sustainability context. In some documents, the environmental acceptability of the proposed strategies relies on assumptions of future technological innovations, and if these anticipated improvements do not after all come widely into use, lack of technological fixes could be considered a barrier preventing the pursued strategies from being environmentally sustainable.

None of the plans and policy documents point at any political or economic-structural barriers to sustainability.

Both the 2005 and the 2009 Municipal Plan for Copenhagen mention the challenges of increasing population and transport demand within the region in the coming years, and acknowledge the necessity for

further improvements to sustainable solutions to meet these challenges. At the same time there is a concern with Copenhagen's inability to reach similar growth rates as the other Scandinavian capitals, and efforts to strengthen growth are likely to counteract some of the proposed sustainability solutions.

As sustainability is not a primary concern in the Finger Plan 2007, there are no references to barriers for such goals either. The need to encourage a modal shift is an economic decision rather than an environmental, and the primary sustainability aspect of the document is to protect green areas within the urban region.

Also in the 2005 Regional Plan, no barriers are clearly identified due to the lack of attention that environmental sustainability receives throughout the document. Sustainability in regards to environmental issues is largely formulated as a secondary goal that should be adhered to when possible. No clear sustainability goals are formulated and thus no clear strategy or barriers to reach such goals can be formulated either. However, the densification approach that is advocated in this document (in line with the Finger Plan stucture) has had some problems of actually achieving a modal shift towards more sustainable types of transport. The limited effect could partly be due to the lack of rail based transport between the 'fingers', which could be considered a barrier to the success of the recommended land use strategy. As the 'fingers' start stretching further and further there is a lack of incentive for commuters to travel all the way to the 'palm' and instead they may try to find a closer workplace in one of the other 'fingers'. They will then have to commute across the fingers. When no rail based transport is available this will have to happen by road based means of transport (primarily by car).

As mentioned earlier, the Infrastructure Commission's report includes no direct references to any sustainable development goals and no barriers are identified either, apart from the fact that the expected increase in traffic obviously is associated with increasing levels of environmental strain if no decoupling between traffic and its adverse environmental effects is actually achieved.

The two National Planning Statements say very little about barriers or causes of lack of goal-achievement as regards sustainability objectives, apart from an acknowledgement of the traffic inducing effects that transport infrastructure expansion can lead to.

3.13 Growth – an assumed good?

The plans and policy documents generally assume a somewhat higher population growth rate in Copenhagen Metropolitan Area than the national Danish average, but the forecasted growth rates in Copenhagen Metropolitan area are still moderate compared to other large Scandinavian urban regions. Population growth is seen as positive and seems to be considered as an indicator of the prosperousness and attractiveness of the region. Forecasts for growth in the building stock are mentioned in the municipal plans of Copenhagen and the 2005 Regional Plan, but are to a much lesser extent, if at all, addressed in the remaining documents. Per capita growth in the building stock is taken more or less as a given fact, the desirability of which is not made subject to discussion.

We have only been able to identify vague estimates for expected growth rates in the 2005 and 2009 Municipal Plans for Copenhagen, but they hint at a population increase towards 2020 of around 45,000 citizens in addition to the 510,000 in 2008. This would imply a growth rate fairly similar to the rest of the Copenhagen Metropolitan Area, which is somewhat above the national average. Growth in building stock has increased rapidly in the last couple of years, with new construction peaking in 2007 at around four times the average rate during the period from 1990 to 2003. Reflecting the recent financial crisis, the new construction dropped significantly in 2008, where the number of completed new dwellings was reduced by 50 % in the municipality of Copenhagen and 28 % in the metropolitan area as a whole, compared to the 2007 level (Statistics Denmark, 2009b).

The Finger Plan 2007 includes few references to expectations about population growth, but as the document deals with Copenhagen Metropolitan Area a higher growth than the national average is likely to be assumed. This is somewhat indicated through the list of challenges, which includes competition with foreign metropolitan areas, the growing population of the Oresund region and the increased traffic problems in Copenhagen. The capital region is seen as the ‘safest card on our hand’ when discussing international competitiveness in terms of growth potential.

In the 2005 Regional Plan, the population growth is expected to be around 2.7 % towards 2017 which is slightly above the national average. Growth in building stock is expected to continue as usual, with 8-9 % growth over the 12 year period. New construction of residential facilities is primarily planned as multifamily housing around the main transport corridors.

The Infrastructure Commission's report mentions that the metropolitan area around Copenhagen is the part of Denmark expected to have the highest population increase in the period towards 2030, followed by the eastern parts of Jutland, while the northern and southern parts of Jutland are expected to experience a population decrease. A similar development is true for the building stock as companies and workplaces are expected to locate in metropolitan areas, and as a result the population is expected to become even more concentrated around these areas as people move there for job opportunities.

Similarly, in the 2006 National Planning Statement, population growth is expected to be higher in the metropolitan areas than elsewhere in Denmark. Especially the two largest urban regions (Eastern Jutland and Zealand) are expected to experience a higher growth than the national average. It should still be noted that the forecasted national-scale population growth is low, and even in the urban regions quite modest population growth is expected.

3.14 Measures for implementation

The municipal plans of Copenhagen provide – through their demarcation between urban zones and rural zones – a legally binding protection of areas in the rural zone against most types of construction activity. (In addition, local plans provide additional protection against undesired development on green areas within the urban zone, as well as a specification of the types of development allowed in areas set aside for development.) The Regional Plan 2005 identifies a number of specific areas that the municipalities might transfer from rural to urban zoning. Although the administration of the rural zone regulations has since 2003 been a responsibility of the municipalities, the responsibility for deciding on the demarcation lines between rural and urban zones still lies with higher-levell authorities (in the case of the Regional Plan 2005: the now abolished Greater Copenhagen Authority). The plan therefore included good formal possibilities to implement its land use strategies. The fact that many of the suburban municipalities – at least in the outer part of the region – had excessibely large undeveloped areas already designated as urban zone still represented a certain limitation to the possibility of implementing the Region Plan's preferred land use strategy.

The possibilities for implementing the policy of Finger Plan 2007 of locating urban development close to urban rail stations would also

normally have been limited, due to the large non-developed areas already set aside as urban zones in the municipal plans of the affected municipalities. Often these reserves of urban zones are located far away from any urban rail station. However, in the Finger Plan 2007 a new instrument to cope with this has been introduced: a regulation of the order according to which the urban zone areas are to be developed. These regulations of the scheduling of development are to be incorporated in the municipal plans after a dialog between each municipality and the state, taking into consideration municipal as well as national concerns (Finger Plan 2007, p. 18). The regulations of the Finger Plan (which has the status of a National Planning Directive and therefore implies that the municipalities are obliged to adhere to its regulations) state that the scheduling of developmental areas within the Finger structure shall give first priority to areas that are located close to urban rail stations and well-integrated in the urban structure (ibid., p. 56, 59). Outside the Finger structure, the scheduling of developmental areas shall ensure that the development is of a solely local character, takes place in connection with other urban areas, and contributes to maintain a clear demarcation between urban and rural areas (ibid., p. 60). Although a scheduling of developmental areas was also presupposed in the Regional Plan 2005, the binding character of this scheduling has been tightened in the Finger Plan 2007.

In the Infrastructure Commission's report, links to any implementation instruments are vague and usually formulated as 'increased focus', 'intensified efforts' or 'further initiatives' (Infrastrukturkommissionen, 2008, p. 302). The lack of concrete implementation measures in this report is quite natural, as it is a document that is supposed to make a basis for future decisions on transport infrastructure investments, not a plan.

Similarly, there are few concrete examples in the National Planning Statements of how to implement ideals such as the compact city in actual planning practice. Such implementation measures are perhaps not to be expected from these documents, due to their intention as national guidelines.

3.15 Institutional frameworks

The plans partly discuss, and are partly also the results of, processes of vertical as well horizontal coordination. For example, the municipal plans of Copenhagen place some emphasis on discussing the

development of Copenhagen in relation to national policies as well as the development in the surrounding municipalities.

The Finger Plan and the Regional Plan are themselves instruments for horizontal coordination (between the affected municipalities) and vertical coordination (inclusion of national goals in the frameworks and guidelines for subsequent municipal planning). To some extent, the plans also discuss needs for improved vertical and/or horizontal coordination.

The plans and policy documents to some extent discuss stakeholder influence but also display how different stakeholders have made their imprints on the documents. In some cases the composition of stakeholders influencing the documents has been contested, as in the case of the Infrastructure Commission's report (see below). Through their content, the plans and policy documents sometimes also hint at the influence of planning vs. market forces on the chosen spatial solutions, where a strategy of responding to and boosting (local) market agents rather than counteracting the efforts of these agents seems to increasingly be a part of the planning concept.

There is a strong degree of both horizontal and vertical coordination in the 2005 Municipal Plan for Copenhagen as well as in the 2009 Municipal Plan. Connections with other planning documents (such as the Finger Plan and the Regional Plan) are directly addressed in the documents along with the required interplay with surrounding municipalities. The 2009 Municipal Plan also includes a list of partnerships with a variety of interest groups that represent different innovative projects, including energy suppliers, universities transport operators, civil groups, etc.

The Finger Plan 2007 mentions that vertical coordination is important in the planning process, and that the different local municipalities should engage in discussion with the state to ensure that long term planning goals are achieved to the best of their potential. During the creation of the planning document these municipalities were invited to give their view on specifics about the future planning in Copenhagen Metropolitan Area, and the issues which were put up from the state as important topics were partly related to ensuring that key areas were set aside for long term urban development and transport services, and partly to ensuring that development would not take place outside the prioritized areas.

Hierarchically, the government controls the decision making process, although it is clearly indicated in the Finger plan that ensuring a competitive market is a key concern. Whether market actors have

played any part in the planning process is unclear, but a main concern of the plan is to make the transport system a facilitator of growth and development.

A market dominated ideology also seems to permeate the 2005 Regional Plan. This is evident from the types of planning problems presented in it. Congestion in particular is seen as a threat to the long term economic growth potential of the region and many of the apparently proactive planning instruments in the document, such as promoting better public transport, could also be seen as a reactive planning approach to increasing problems of keeping up growth levels. The prevailing planning culture among urban planners in the Copenhagen Metropolitan Area is reflected in the Regional Plan in its emphasis on following the ideas of the original Finger Plan, which is a planning doctrine for the Copenhagen Metropolitan Area that has been refined over more than half a century.

The Infrastructure Commission was composed of a wide range of different actors in the Danish transport debate and is a mix of representatives from the universities, businesses and interest organizations. This could be perceived as intent to reach a good horizontal coordination, although some criticism has been voiced in regard to the final composition of the commission, claiming that it is proposed mainly of people with an economic interest in more highways and higher traffic volumes. One analogy has been that of "allowing the tobacco industry to decide the smoking policy of our society" (Rådet for Bæredygtig Trafik), and the report does indeed focus on the expansion of road capacity as a main solution to the increased levels of congestion, which is the main concern for the commission.

In relation to vertical coordination, the report mentions the tight collaboration between state and municipal road authorities to ensure smooth transitions between the different sections of infrastructure in spite of administrative differences. Apart from the mentioning of a few projects that lack a sufficient decision basis for funding to be granted (new connections over Randers Fjord and Limfjorden for example) there are no real indications of disputes in the vertical coordination. Member of the commission and professor at Aalborg University Bent Flyvbjerg mentions the radical differences between the different regions and their efforts to influence both the commission and transport policy in general, which have led to the more vocal regions getting more attention (Vestenbæk et al., 2008).

While not explicitly stated in the report it seems clear that the report is made with a market orientated strategy in mind, not wishing to interfere too much with actual regulations of transport. Instead, incentives should be made for moving people to public transport by increasing speed and reliability and thus making it more attractive. As mentioned before, the commission was prohibited from investigating the effects of road pricing and other fiscal regulation instruments. The roles of cultural traditions and governance were not discussed in the report either.

Among the National Planning Statements, horizontal coordination seems particularly evident in the 2000 document, with its large focus on utilizing the local and regional strengths in future planning. In the 2006 National Planning Statement this focus seems to have shifted towards the vertical coordination, with an emphasis on ministerial control to ensure that individual regions adhere to the sustainable development goals of the Ministry of the Environment. Both documents express a desire to let market forces handle both congestion and environmental impacts of planning and transport in general, but acknowledge the need to structure a policy framework that will pave the way for sustainable solutions (e.g. through taxation and subsidy systems).

3.16 Proposals for institutional changes

The latest municipal plan of Copenhagen describes some recent changes in institutional frameworks aiming at more transparent and environmentally aware planning process. In the National Planning Statements some recommendations of future institutional reforms are given. The remaining documents do not address such issues.

The 2009 Municipal Plan for Copenhagen includes a description of a new structure for planning processes which is intended to make each phase of a planning process more transparent to both contractors and the public. As mentioned previously the document also includes a new ‘sustainability toolbox’ which is included to ensure the inclusion of sustainability concepts throughout the entire planning process. Whether these new ideas will offer any improvements to existing planning processes remain to be seen, but they indicate a reflective approach to the institutional frameworks with a desire to improve and the will to act for change.

The 2000 as well as the 2006 National Planning Statement include recommendations for changes in institutional frameworks, which are

primarily orientated towards a better coordination of the various stakeholders in the planning process (ministries, municipalities, business, citizens, etc.).

3.17 The role of economic driving forces

The challenges presented to the prosperity of cities by economic globalization are a main issue, if not *the* main issue, in all the investigated plans and policy documents. Increasing the economic competitiveness of the Copenhagen region and stimulating economic growth is thus a fundamental concern in all documents. Policy measures are thus selected among those that are believed to be supportive to, or at least compatible with, this end. In this sense, the driving forces of the market economy are important as they form the basis for screening out policy alternatives deemed incompatible with the growth objectives.

Compared to the overall, macro-level growth imperative, economic driving forces at a micro level, such as the wishes of individual developers and land owners to locate at places profitable for themselves but unfavorable from a social perspective, are addressed to a much lesser extent. The regulation instruments of the plans aim, however, at counteracting such land use and are thus based on an implicit understanding of these mechanisms. Contrary to the land use plans, which attempt to suppress individual land use actions detrimental for society as a whole, the transportation investment strategies are to a much higher extent based on an acceptance of and adaptation to the market behavior of individual agents, notably car drivers.

Copenhagen's competitiveness in relation to the other Scandinavian capitals is an important issue in both the 2005 and the 2009 Municipal Plan for Copenhagen. Concern is expressed towards the lack of growth that Copenhagen has experienced over the last couple of years when comparing with these. The suggested instruments for attracting growth are centered around the creative class doctrine that focuses on sustainability and quality of life in the city centre. However, the inherent conflict that exists between the concepts of growth and sustainability obviously means that using sustainability as a growth promoting instrument is somewhat detrimental to its underlying ideology.

Economic growth seems to be the primary driving force of urban development as it is reflected in the Finger Plan 2007. The urban form

is meant to facilitate a transport system enabling more and faster economic activity to take place while limiting its negative environmental impacts. In the document, the increased economic activity does not appear to conflict in any noticeable way with the sustainability goals, but largely this is because the goals are vaguely formulated and modest in terms of environmental protection.

In the 2005 Regional Plan, economic growth seems to be a primary driving force of the urban development. In the document, facilitating mobility and competitiveness are indicated to be the primary goals of urban planning, which is not directly in conflict with any sustainability goals as some of the suggested planning instruments are also likely to promote a more sustainable development, even if they are not clearly formulated with such development in mind. However, the document does not explicitly address any environmental sustainability issues and it is thus unclear how current as well as future challenges in this area will be dealt with. Another problem of the document in terms of sustainability is the lack of attention towards demand management, since the planning approach mainly revolves around reactive adjustments to the demands of market forces.

Economic diving forces of mobility are essential to the Infrastructure Commission's report, which is primarily concerned with congestion as a barrier for economic growth. This is reflected both in the recommendations and the forecasting methods used, where time savings are the main benefits from increasing capacity in the transport infrastructure. The need for an expansion of the infrastructure network is motivated with a need to ensure accessibility and competitiveness for business and workforce.

The two National Planning Statements make no exceptions from this pattern. Economic considerations are a primary concern in both documents, and ensuring competitiveness and growth are among the highest priorities. Issues of sustainability are not seen to be conflicting with such priorities but could rather aid the 'green' branding that Scandinavian and Nordic countries already benefit from. An obvious consequence of this is that sustainability is subordinated to other goals, and the planner's role thus becomes that of best implementing sustainable solutions that will allow growth to continue.

4 The discourse on sustainable urban development in the professional journal *Byplan*

4.1 Introduction

This chapter presents a synthesizing analysis of a number of articles in the journal *Byplan* that may throw light on the Danish professional discourse on sustainable urban development in the fields of land use and transport infrastructure. The presentation below is structured around 14 topics, each reflecting one of the detailed research questions of the analysis. For the majority of these questions, the focus of the analysis is limited to the frequency by which different views are expressed or topics dealt with, possibly with some assessment of changes over time. For a few of the research questions, we go deeper into the material by referring more in detail the messages and opinions expressed by various participants in the debates. Such more in-depth accounts are given for the following issues:

- the existence and importance of relationships between land use and travel
- standpoints in favor of or against the compact city model
- standpoints to transport infrastructure priorities
- barriers to sustainable development
- whether growth in the building stock is being questioned
- the influence of institutional frameworks in promoting or counteracting a sustainable urban development
- the role of structural economic forces.

The reason for going deeper into these particular issues than for the remaining issues is partly that some of these issues have been subject

to more contestation and debate than the remaining issues. In addition, we have chosen to look more in detail into the arguments of the authors covering some issues that may, apart from the contributions of these few authors, be considered 'blind spots' in the sustainability debate among Danish planners.

The investigated articles cover the journal volumes from 1993 through 2005, with one issue of the 2006 volume in addition.[18] Among the total number of published articles, only those dealing with relevant issues (i.e. urban land use and/or transport infrastructure planning, sustainable development and/or the combination of these topics) were included in the analysis. Among a total number of some 600 articles published in the journal during the period, 114 were selected for further inspection. These articles are fairly evenly distributed over the period, with 52 from the years 1993 – 1998 and 62 from the period 1999 – 2006. (Subdividing the articles into the same periods as for the articles in the Norwegian journal *Plan*, there are 68 from the period before 2000 and 46 from the period 2000 and later.)

The articles investigated do not refer solely to Copenhagen Metropolitan Area, but are examples of professional planning discourses in a general Danish context. The national discourses make up important contexts and frames of reference for professionals in a given region, including those who try to find spatial solutions for the development of the Copenhagen Metropolitan Area. As mentioned in Chapter 1.2, the purpose of the research project has been not only to describe and propose possible explanations of the actual spatial development of the investigated metropolitan areas, but also to shed light on differences and similarities in the national planning discoures and changes in these over time. For this latter purpose, also more recent articles are relevant, notwithstanding the fact that these articles have obviously not been able to influence the actual urban development during the investigated period.

The following synthesizing analysis is based on short (usually one third to a half page each) analyses of the individual papers investigated. Each article was first analyzed, using a common checklist. These interpretations of individual articles are documented in a Danish-language working paper (Næss, 2009c).

[18] Originally, the intention was to cover entire period from 1990 on, but within the available time it was only possible to cover the 14 year period 1993-2006. We still think this provides a good base for interpreting the professional discourse among Danish planners on urban planning and sustainability in the 1990s and after the turn of the millennium.

4.2 Sustainability as an explicit concept in sustainability-relevant articles

Although only articles dealing with urban land use and/or transport infrastructure planning, sustainable development and/or the combination of these topics) were included in the analysis, the majority among the 114 investigated articles makes no explicit reference to the concept of sustainable development. Less than one third of the investigated articles address the issue of sustainable development in one way or another, yet with considerable variation in the depth of this discussion. The proportion of articles mentioning sustainability has, however, increased during the period. Among the investigated articles published before 2000, only 24% mentioned the term 'sustainable development', compared to 37% of the articles published later. However, several of the articles *not* mentioning sustainability also deal with issues of a high relevance to sustainable urban development. The fact that an article does not mention sustainability explicitly does not necessarily imply that the author is ignorant about or indifferent to sustainability challenges. For example, among 34 articles supporting the compact city model based on what could reasonably be characterized as sustainability arguments, only 11 actually mention the concept of sustainable development, whereas the remaining 23 refer to needs to reduce energy use for transport, carbon dioxide emissions or urban motoring in general without justifying these priorities by referring to the concept of sustainable development. The frequency of arguing for the compact city by using sustainability-relevant argument without referring tot the concept of sustainable development itself has remained stable during the whole investigated period.

4.3 Interpretations of the concept of sustainable development

Among the 35 articles referring to the concept of sustainable development, two out of five do not specify or concretize the concept. Among the remaining 21 articles, twelve refer mainly or solely to the environmental/ecological dimension, whereas five articles refer to a combination of environmental, social and/or economic aspects. One article conceives sustainable development to be mostly about social concerns and one article refers to it as mainly an economic issue. Finally, two articles interpret sustainability to be predominantly about local environmental qualities.

The quite frequent interpretation of sustainable development as being first and foremost an environmental challenge does not necessarily mean that social aspects are disregarded. This interpretation may, however, reflect a stronger emphasis on the social distribution of burden and benefits between rich and poor countries than on the domestic social distributional issues. Within such a view, significantly reducing the 'ecological footprints' of the inhabitants of rich countries, e.g. in term of greenhouse gas emissions per capita, is important in order to allow for economic growth and rising material standards in poor countries without bringing the total global environmental load above defensible levels. The World Commission on Environment and Development (the Brundtland Commission) itself attaches a strong emphasis on this way of thinking, in particular in the energy chapter (chapter 7).

The interpretation and specification of the concept of sustainable development has changed quite dramatically over time. For example, eleven out of the twelve articles interpreting sustainable development mainly as an environmental/ecological challenge were published before 2000, with only one article representing this interpretation being published 2000 or later. On the other hand, ten out of the fourteen articles referring to the concept of sustainable development without concretizing its content were published in the latter period. One might of course explain this as being the result of the concept of sustainable development gradually having become so well-known that no explanation of its content was any longer necessary after 2000. However, an alternative, and arguably equally plausible explanation is that the prevailing interpretation of sustainability in the Danish policy discourse has gradually drifted away from its original emphasis on environmental responsibility toward a focus on collaborative consensus-making (the new interpretation of the social dimension) and strengthened local/regional competitiveness (the new interpretation of the economic dimension). This move away from the Brundtland Commission's emphasis on a need of reducing energy use and consumption of natural resources as the main sustainability challenge in wealthy countries, toward the 'triple bottom line' and a balanced trade-off between economic growth, social cohesion and environmental protection as an increasingly widespread interpretation of the concept of sustainable development[19] coincides with the increasing neoliberal imprint on the Danish political discourse,

[19] Cf. also the World Bank's 'Friend Model', which in many ways deviates from the understanding of sustainable development expressed by the Brundtland Commisssion

especially after the election of Fogh Rasmussen as prime minister in November 2001.

4.4 Aspects of sustainability dealt with

Nearly one half of the articles explicitly mentioning sustainable development have their main focus on the spatial content of urban development. However, among the articles not mentioning sustainable development, the proportion focusing on the spatial content of urban development is even higher (two thirds). On the other hand, the proportion of articles addressing a combination of issues (usually the spatial content in combination with policy measures or institutional frameworks) is somewhat higher among the articles dealing explicitly with sustainability. In line with the interdisciplinary nature of the concept of sustainable development, this may imply proneness among those authors discussing urban development in a sustainability context to preferring more holistic approaches. Most of the articles with such a combined view were published before 2000. Comparable much fewer of the articles mentioning sustainable development have their main focus on policy measures, the influence of actors, or institutional frameworks. However, there has been some increase over time in the frequency of sustainability-explicit articles addressing policy measures, as only one out of 18 investigated articles mentioning sustainability from the period before 2000 had such a focus, compared to four out of 17 in the period from 2000 – 2007. The proportion addressing policy measures among the articles not mentioning sustainability has remained stable and low during the whole period. Among the total sample of 114 articles, only eight address policy measures, compared to 69 with a focus mainly on the spatial content of urban development and 29 with a combined focus.

4.5 Geographical scale

A clear majority (nearly three out of four) of the total number of investigated articles have the city or the metropolitan area as their geographical level of attention. One fifth of the papers focus on the local (neighborhood/urban district) scale, whereas only one out of fifteen deals with the regional distribution of population and growth between cities, towns and rural areas. The distribution of articles addressing these different geographic scales has not changed to any extent worth mentioning during the investigated period.

Among the articles dealing explicitly with sustainable development, the distribution between articles focusing on different geographical scales is almost identical to the distribution among the articles not addressing sustainability.

4.6 Focus of spatial content

Most commonly, the articles dealing in one way or another with the spatial content of urban development focus on the building stock. For the period as a whole, this applies to more than four out of ten articles, with a higher proportion after 2000 than in the preceding period. The propensity of focusing mainly on the building stock does not differ between articles addressing sustainability explicitly and articles without an explicit focus on sustainable development. Moreover, about one third of the total number of articles focuses on a combination of spatial issues, i.e. with several spatial aspects in the same article. This proportion is not very different among the articles addressing and not addressing sustainability. In fact, contrary to what one might expect, the proportion of articles with a more holistic spatial view is slightly lower among the articles explicitly mentioning sustainability than among the articles not mentioning sustainability have such a combined focus. The sustainable development agenda in Denmark thus does not seem to have encouraged a more holistic perspective on urban development among the authors of *Byplan* articles.

Interestingly, articles dealing with transport infrastructure as the sole spatial topic are much less common within the group addressing sustainability than in the group where sustainability is not mentioned. Or to put it differently: although one third of all the investigated articles explicitly refer to the concept of sustainable development, this is the case among only one sixth of the articles dealing with transport infrastructure as the single spatial aspect. Apparently, the sustainability agenda has penetrated the discourse among transportation planners and researchers to a lesser extent than among land use planners and urban designers. At least, rhetoric of sustainability is less common within the transportation planning and research segment. This difference seems to have remained fairly constant during the whole investigated period.

4.7 Main issues identified as responses to the challenge of sustainable urban development

Among the 35 articles in which the concept of sustainable development is addressed, nine focus on a combination of challenges (e.g. on sustainable mobility as well as urban green structure). Another nine articles referring to sustainability have sustainable mobility as their main or only focus. Seven articles focus on "urban metabolism" with the countryside and/or closed loops of substances. This issue is also addressed in a few of the articles with a combined perspective on spatial sustainability topics. Six articles have a rather unclear focus as regards substantive sustainability challenges. Only one article has the urban green structure as its main focus. Three articles focus on other topics.

The distribution between sustainability addressed by the authors referring explicitly to sustainable development does not seem to have changed much over time.

4.8 Relationships between land use and transport as an issue

Maybe a bit surprisingly, seen in relation to the not-so-strong support of the compact city model in the Danish planning discourse (see below), more than one fifth of the total number of investigated articles have a strong focus on relationships between urban land use and transport emphasizing the traffic-reducing effects of dense and concentrated urban development. This proportion was higher in the period before 2000 (24%) than after 2000 (15%). Articles focusing on the traffic-reducing merits of dense and concentrated urban development appear about equally frequently within the group explicitly addressing sustainability as in the group of papers in which sustainability is not mentioned.

In addition to the articles referring to or bringing new evidence of influences of urban form on transport, a smaller group of articles deny or raise doubt about these relationships. This applies to a total of seven articles, compared to 23 articles showing or referring to the traffic-reducing influences of dense and concentrated urban development. There is not any clear difference over time in the frequency of appearance of such skeptical articles. There is, however,

a clear difference in terms of whether or not sustainability is addressed in these articles. Six out of seven among the articles expressing skepticism about land use-travel relationship do not mention the concept of sustainable development, whereas only one of these articles makes reference to sustainability.

Among the 30 articles focusing explicitly on relationships between land use and transport, 23 thus demonstrate or refer to the existence of such relationships. Most of the authors of the latter articles consider these relationships as important in the context of an environmentally friendly urban land use planning.

Among the 23 articles demonstrating or referring explicitly to the existence of relationships between land use and travel, seven articles present research studies carried out by the authors themselves. A few researchers are involved as authors of several of these articles. Hartoft-Nielsen (1997b, 2001b) presents results from his own studies of how the location of workplaces and residences relative to the city center of Copenhagen and urban rail stations influences travel behavior among employees and residents, respectively. Similarly, using the small town of Frederikshavn and Copenhagen Metropolitan Area as cases, Næss (2001, 2003) presents results from studies combining qualitative and quantitative methods of the influence of residential location relative to the urban center structures on travel, carried out by himself and a colleague (O. B. Jensen). Næss & Møller (2000) show results from a study of workplaces location and travel in Aalborg, supporting the findings of Hartoft-Nielsen on the same issue. In addition to the above five studies, Ege (1996) presents results from a small study of the influence of proximity to urban rail stations (and the access design of such stations) on travel behavior. Post (1995) shows that the intra-urban distribution of residences and workplaces is of little importance (15 %) in a small town like Skive compared to the inhabitants' total amount of commuting. He does, however, not say anything about the distribution of residences and workplaces between the core town and the surrounding satellite villages.

In addition to the articles written by authors presenting their own research, sixteen other articles refer to influences of land use on travel and emphasize the importance of such influences (Hartoft-Nielsen, 1993; Jørgensen, 1993; Christensen, 1994; Krag, 1994; Larsen, 1994; Nielsen, 1994, Jørgensen, 1995; Illeris, 1996; Lund, 1996; Brynitz et al., 1999; Carlsen et al., 1999; Hartoft-Nielsen, 1999; Lund, 2001 a and b; Hartoft-Nielsen, 2002). The contents of these articles are to a high extent consistent with the conclusions of the above-mentioned

research articles and sometimes elaborate on other related topics as well. For example, Lund (1996, 2001 a, 2001b) in several articles emphasizes that co-location of workplaces and residences in the suburbs most likely will contribute to increase the amount transport and the share of car travel.

There are also a some articles denying or attempting to raise doubt about the existence of relationships between land use and travel. Three articles published in the same issue of *Byplan* in 1994 (Bunde, 1994; Lindberg & Sørensen, 1994 and Svendsen, 1994) about transport- and environment planning in the cities of Århus, Odense and Vejle all state that the amount of transport and its related emissions are almost entirely influenced by circumstances beyond the reach of municipal planning and decision-making. Implicitly, these authors say that land use (as well as other instruments like parking provision) does not have any effect worth mentioning on travel. One of these three articles Lindberg & Sørensen, ibid.) refers to an impact analysis made by the consultancy firm COWI as the source of the statement that the growth in (car) traffic is caused by circumstances beyond the influence of municipal planning. Since the arguments are nearly identical in the other two articles, it is tempting to assume that these statements all stem from COWI analyses based on the same assumptions. Poulsen (1997) claims that locating the growth in office workplaces to the suburbs of Copenhagen Metropolitan Area 'where most of the employees live' will reduce the amount of travel. He also raises doubt as to whether location of new offices close to stations will enhance commuting by public transport. Poulsen does not, however, bring any new empirical results nor any evidence whatsoever for his claims. Green & Kock (2000) write that there is weak documentation as to 'the effect of urban densification and co-location of dwellings and workplaces on local and regional needs for transport'. However, the authors, who are both staff members of the Association of Danish Municipalities, do not provide any empirical evidence or theoretical reasons in support of these claims. Holst & Frank (2003) write that urban densification and transformation will, other things being equal, contribute to increased travel in cities. Seen in the light of what the authors write elsewhere in the same article, this statement seems to be an inadvertent result of a sloppy formulation. Literally, still, the statement rejects the existing knowledge about relationships between land use and travel. According to Jørgensen (2005), cities – especially in Central Europe but also in Copenhagen Metropolitan Area – have become polycentric, borderless and with a blurred disticnction between urban and rural areas. In his view, planning must therefore abandon ideas of hierarchically ordered urban systems. Implicitly,

Jørgensen rejects the influence on travel from the location of dwellings and workplaces relative to the center of an urban region. He does, however, not bring any evidence in support of the claim that cities no longer have any main centers.

Although 'land use-travel skeptics' are represented in about one fourth of the total number of *Byplan* articles dealing with these issues, their coverage of relationships (or non-relationships) between land use and travel is less extensive than in most of the articles demonstrating or referring in a confirming way to such relationships. Like among the articles addressing these issues in the Norwegian journal *Plan*, this is partly due to the fact that 'land use-travel skepticism' often makes up only a part of the issues addressed in these authors' articles.

4.9 Positions on the compact city model

Among the 98 articles dealing with the spatial content of urban development alone or in combination, 31 do not express any standpoint for or against the compact city model. Among the remaining 67 articles, 32 support this model based on sustainability arguments, two articles support the compact city model without referring to environmental aspects, whereas one article is supportive only with some reservations.

The fact that almost all articles promoting compact urban development refer to what can be characterized as sustainability arguments does, however, not imply that all these articles mention the concept of sustainable development. On the contrary, only ten among the 32 articles using sustainability arguments actually refer to the concept of sustainable development. Apparently, the concept of sustainable development has not penetrated the Danish discourse among urban planners, although some of the sustainability challenges (notably reduction of climate gas emissions and reducing (the growth in) car traffic in urban areas) are widely referred to.

On the other hand, a considerable number of articles (20) express skepticism or outright opposition against the compact city model or clearly express preference for a kind of urban development not compatible with this model. Nearly three fourths of these articles do not mention the concept of sustainable development. In particular, a correlation between skepticism against the compact city model and non-mentioning of sustainability can be seen before 2000.

Moreover, a few (4) articles argue for a particular version of suburban densification according to which a considerable proportion of urban development (including workplace locations) should take place close to suburban rail stations. Interestingly, none of the articles addressing sustainable development explicitly promote this model of 'mixed-use, decentralized concentration'. On the other hand, three articles not mentioning sustainability argue explicitly against suburban mixed use, pointing to a large extent of car-based criss-cross commuting as the likely result of such workplace decentralization.

The fact that 32 out of 34 articles supporting the compact city model refer to sustainability arguments shows a clear difference between the discussion in *Byplan* and in the Norwegian journal *Plan*, where almost half of the articles supporting the compact city model do not refer to its merits in term of sustainability. The two *Byplan* articles supporting the compact city without using sustainability arguments are from 1994 and 2003. Larsen (1994) communicates the Dutch ABC principle for workplace location to the readers of *Byplan*, but without connecting this to wider concerns of urban sustainability. According to Mogensen (2003) it is commonly recognized that the issues to be dealt with in contemporary urban planning have shifted from suburban greenfield expansion to transformation of existing urban areas. This renaissance of the dense city reflects a change in urban ideals from light, air and bird singing to urbanity, urban life and urban qualities.

Among the remaining 32 compact-supporting articles a few authors have repeatedly written about dense and concentrated urban development in the context of environmental sustainability. Peter Hartoft-Nielsen, who has been working partly as a researcher at Denmark's Technical University (DTU, previously DTH) and partly as a consultant in the Agency for Spatial and Environmental Planning (an agency under the Ministry of the Environment) has written five of these articles. Gertrud Jørgensen (research director in the Forest and Landscape institute, now a part of Copenhagen University but earlier a sector research institute under the Ministry of the Environment) accounts for three of these articles. In two articles Hartoft-Nielsen (1997b, 2001b) presents results from his own research showing that location of workplaces as well as residences close to the city center (and also close to main urban rail stations) contributes to less car travel. He thus communicates knowledge that makes up key arguments underpinning the compact city model. In line with this he points to undesirable transport consequences of urban sprawl, recommending instead compact city development and location of new buildings close to urban rail stations (Hartoft-Nielsen, 2002). In

another article (Hartoft-Nielsen 2001a) he states that dense urban development is a key principle in EU policy documents as well as in national policy documents in countries such as England, Germany, France and the Netherlands. In an article from the early 1990s, Hartoft-Nielsen (1993) frames urban densification and development close to station more clearly within a perspective of ecological modernization, where such urban developmental principles are seen as ways to avoid that promotion of business and trade results in conflicts with global environmental objectives.

Referring to the recommendations in the 1990 EU Green Paper on the Environment, Jørgensen (1993) supports urban densification instead of urban spatial expansion. She recommends a revitalization of city centers as residential areas, protection and renewal of old mixed-use urban districts, re-use of old industrial sites and the establishing of some new facilities in the suburbs. However, she also suggests that some suburban areas should by and large be phased out. The latter proposal is repeated in an article a couple of years later (Jørgensen, 1995), where she writes that the possibility that some of the transport-wise least favorably located single-family home areas should be demolished instead of being renovated when time is due for a possible renovation. She is generally skeptical to extensive in-fill development in the single-family home areas, because this would pull a large proportion of the construction of new buildings away from the transport-wise much more favorable inner-city areas. While repeating the general positive attitude toward urban transformation as an alternative to spatial urban expansion, Jørgensen's skepticism towards densification in remote suburban areas is also expressed in an article co-authored with H.-J- Møller (Møller & Jørgensen, 1998), where transformation and densification of old industrial sites far away from urban rail stations is advised against.

The editor of *Byplan*, Dennis Lund, has also written several articles (some of them editorials) supporting the compact city model more or less clearly. This applies, among others, to Lund (2001a), where he expresses general support to compact city development as a sustainable strategy, the principle of locating development close to urban rail stations, and specifically supports a governmental committee on Industrial and Urban Policy in their conclusion that the areas set aside for industrial and trade development in Danish municipalities are excessively large and could preferentially be transformed to other purposes. In other articles, Lund has not written so much about the compact city model per se, but instead argued against decentralization of workplaces to suburban locations

interspersed with residences. In one of these articles, he criticizes the proposals in an idea competition on the renewal of suburbia for generally being naïve about the consequences of mixing residences and workplaces in the suburbs, especially in terms of the ensuing traveling patterns (Lund, 2001b). Similar criticism is raised in an earlier article evaluating the plan for the suburban residential area Egebjerggård, which has been praised as experimenting and innovative, for being based on unrealistic ideas about integration of workplaces in residential areas. According to Lund, "mixed use" at the urban fringe will unavoidably result in increased commuting by car and is thus incompatible with regional objectives about transport and workplace location (Lund, 1996).

Supporting compact city development in general as more sustainable than urban sprawl, three articles by Næss bring research results showing the merits of a central location of residences and workplaces in terms of reduced car travel and lower amounts of transportation in general (Møller & Næss, 2000; Næss, 2001; Næss, 2003). These results corroborate the above-mentioned conclusions by Hartoft-Nielsen. Based on a study of residential location and travel in Copenhagen Metropolitan Area Næss (2003) recommends a concentration of as much as possible of future residential development close to the city center of Copenhagen, combined with high-density development close to urban rail stations within some 15 – 20 km from downtown Copenhagen and close to the town centers of the five relatively independent towns of Køge, Roskilde, Frederikssund, Hillerød and Helsingør. According to Næss, such concentrated urban development will also be beneficial to a broader specter of sustainability goals.

As mentioned above, a governmental committee on Industrial and Urban Policy expressed concerns about the amount of land set aside for industrial development in Danish cities. Prior to the launching of the committee's report a National Planning Elucidation (Landsplanredegørelse) recommended to introduce limits on the size of areas set aside for industrial and commercial development, which were supported in an article by Søholt (1999). Maskell (2001) holds that urban densification will generally result in better and more coherent cities than urban sprawl, and will also be less costly for the municipalities. Both he and Jensen et al. (2001) recommend increased efforts and legislation to re-use old industrial areas and better possibilities for re-designating superfluous urban zone areas to rural zone. The latter was also proposed some years ealier by K. Jørgensen (1996). After the shift of government from Labour to Liberalist-

Conservative at the end of 2001, Sørensen (2001) warns against the consequences of a change in the planning act proposed by the new government in terms of scattered residential and workplace development on farms around the cities.

More general support to urban densification and reduced land take for urban development can be found in articles by, among others, Kiib & Marling (1996), Jacobsen (1998), Skousbøll (1998), Møller (1999), Mahncke (2000) and Gade (2001). Some articles bring examples from compact urban developmental ideas and strategies from other countries, e.g. Daugaard (1999), Christensen & Frank (2003) from Amsterdam, Holst & Frank (2003) from Oslo and Stockholm. A group of articles present student proposals for urban development in Århus, based on cooperation between the municipality and Denmark's Technical University. Most of these proposals are more or less clearly favoring compact urban development (Brynitz et al., 1999, Carlsen et al., 1999; Haastrup & Folkmann, 1999; see also Jensen, 1999 for an overview). One article (Hvidtfeldt et al., 2000) is largely positive to compact urban development, but the authors also focus on negative impacts of densification and propose strategies to counteract such negative consequences.

Four articles are especially giving support to the principle of locating development close to urban rail stations, which has been promoted in Governmental planning policy documents since 1989. General support of such decentralized concentration is expressed by Ege (1996), Bisgaard & Jørgensen (1998) and Olsen (1998), whereas Illeris (1996) and Hartoft-Nielsen (1997a) criticize the fact that most decentralizing of jobs during the 1990s has resulted in workplace locations poorly accessible by public transport. The authors supporting the principle of locating development close to urban rail stations do not necessarily prefer decentralized concentration to inner-city densification. Rather, their support of decentralized concentration may reflect an assumption that only a part of the development will take in the inner municipalities, and that it anyway is necessary to have a strategy for how new dwellings and workplaces in the outer parts of the region can be located in a less car-dependent way.

Some other articles, while generally fairly positive to urban containment, advocate interspersion of workplaces with residences in suburban areas (Møller, 1993; Nyrop, 1995; Poulsen, 1997; Ege, 2006). According to state-of-the art research, such decentralization of workplaces is likely to lead to a higher share of commuting by car and hardly any reduction of commuting distances, especially if the

workplaces in question require special skills. In one of these articles (Møller, 1993) the recommendation of suburban mixed-use is primarily based on a wish to avoid segregated and dull suburban districts without public space. The remaining three articles use some kind of transport arguments. Ege (2006) points to the fact that a balance between inward and outward commuting between Copenhagen and the suburbs will make possible a higher utilization of peak period public transport capacity in both directions. Nyrop (1995) and Poulsen (1997) argue from a belief that suburban workplaces will to a high extent recruit their employees locally. In their view, increasing the jobs/housing rate in the suburbs will therefore contribute to reduce commuting distances.

Finally, 20 articles express opposition against the compact city model or a clear preference for – or at least acceptance of – developmental patterns incompatible with this model. A considerable number of authors appear to take suburban low-density development as a more or less given premise that it is not necessary to discuss or state reasons for. Magnussen (1993) and Olsen (1993) discuss the detailed layout of some selected suburban residential areas, but do not question the suburban model of urban development. In the case of Magnussen's article, the underlying premise is that the existing urban fabric should be made less dense instead of having its density increased. This premise is not being questioned.

A so-called Danish Charter For Urban Planning prepared as input to a proposed common planning concept of the European Council of Town Planners is presented by Knudstrup (1995). The charter includes more that 50 goals related to different aspects of urban planning. Seen together, these goals pull in the direction of spatial urban expansion rather than urban densification, although urban development along public transport lines is recommended. To the extent that environmental concerns have been incorporated, the perspective is 'ecology within the city', but not 'the city within the ecology'. One of the general recommendations explicitly states that 'urban ecology and sustainable development must not alone be used as arguments for densification in the city centers'.

Gade (1999) acknowledges that single-family home areas entail a high consumption of resources, but the kinds of resources mentioned are confined to electricity, heating, water and waste, whereas car dependency and the conversion of natural areas and farmland into building sites is not mentioned. Gade does not take any explicit standpoint to whether or not new single-family home areas should be

developed, but he seems to take the existing as well as the addition of single family houses as a given point of departure, where the challenge lies in making these area as good as possible, seen from a sustainability perspective. In a similar vein, Severin et al. (1999) propose a higher degree of landscape adaptation in an already planned low-density suburban development in the outskirts of Århus, with a clearer demarcation between urban and rural zones than what has characterized such areas during recent decades. The continued development of new single-family home areas is, however, not being questioned. Maegaard-Nielsen (2002) shows an example of a local development plan for low-density urban expansion area in a province town, where much emphasis has been laid on meeting individual preferences for housing types while giving the future residents contact with nature and ample common and public local recreation areas. Maegaard-Nielsen emphasizes certain "urban ecological" elements incorporated in this plan (grey water treatment, and the incorporation of a meadow for grazing cattle and horses between the houses), but the consequences of this type of low-density development in a wider urban planning context, e.g. in terms of its transport implications, are not discussed. Yet another example where low-density urban expansion is more or less taken for granted is an article by Ahrendtsen et al. (2001) in a special issue of *Byplan* focusing on "urban ecology". Like all the other articles in this special issue, Ahrendtsen et al. focus on the local scale (in this case a developmental area consisting of 200 dwellings characterized as "ecological housing"). The focus is on local schemes for resource saving and closed-loops solutions for water and waste, whereas the location of the area and the composition of housing types is taken as a given fact and is not being discussed. The same applies to the other articles in the special issue, where all examples are from low-density areas with predominantly single-family houses or one-storey row houses.

Some other articles take a structure of polycentric cites for a more or less granted point of departure. Jørgensen (2005) depicts mono- or hierarchical-centric cities and high urban densities as something belonging to the past. He refers – without much critical distance, but rather in an applauding way – to the French theoretician Franscois Ascher, who claims that the problem issues to be addressed in polycentric urban regions should 'not necessarily entail a return to visions about the European dense city. Instead, urban planning and policy must deal with design of – and in – disjointed cities characterized by low densities'. In two other articles, the polycentric urban ideal is translated into the context of the Danish 'triangle city' (Vejle-Kolding-Fredericia). Nielsen & Sørensen (1997) actively

promote the idea of the Triangle area as one polycentric city. Although they recommend that a high proportion of residential development within this region takes place close to the centers of each town, the authors do not problematize the high and increasing mobility on which the 'Triangle City' concept is based. According to Sandgaard & Kristoffersen (2004), a number of principles for sustainable housing have been incorporated into the strategic plan for "The Green and Open Major City" (a common strategic plan for eight municipalities in the Triangle area. It is stated that workplace location is planned to take place according to the Dutch ABC principle. One may, however, question whether there are at all any locations within the Triangle area that could be characterized as 'A areas', given the low accessibility by car and the low parking provision presupposed in such areas according to the Dutch model.

In two articles, Agergård (1996 and 1996) argues for the establishment of out-of-town shopping centers. According to Agergård, this is necessary in order to relieve the city centers from being dominated by large, new types of shops which, if located in the urban core, would destroy the architectural scale of the old city center and result in an increase in rents that would oust several cultural facilities out of the cities. He is therefore an opponent of the regulations of the size and location of shopping centers introduced in the Planning Act in the late 1990s.

A number of other articles argue against national-government policy objectives and regulations aiming at more dense urban development. Such regulations are said to hamper growth and development – at least in suburban and rural municipalities. Green & Koch (2000), who are employees of the staff of the Association of Danish Municipalities, oppose what they term 'central directives' about densification, limits on land take, etc. They consider it 'problematic to focus one-sidedly on urban densification' and claim that 'the impact of urban densification in terms of reducing local and regional needs for transport is only weakly substantiated'. They also question the reasonableness of including protection of natural and rural landscapes among the key sustainability criteria. Jensen & Jacobsen (2001) write that there is not much space available for location of new jobs within the demarcated areas close to stations in the municipalities to the west of Copenhagen. They therefore think the principle of proximity to stations will hamper business development in these municipalities. They point to the fact that many companies prefer sites with ample parking areas and vacant space for possible extensions, and these requirements are generally not met in areas close to stations. Bjørstorp

(2003), who is the mayor of one of the suburban municipalities of Copenhagen Metropolitan Area and the chairman of an inter-municipal cooperation including eight municipalities in the western part of this region, writes in favor of relaxing the policy of locating workplaces and residences close to urban rail stations. Instead of 'close to stations' he wants the recommended areas for location redefined to 'close to public transport'. He also wants the demarcation to be relaxed from 'circles' (i.e. location within a given distance from the station) to more amoeba-like demarcations. According to Bjørstorp, the existing principle of proximity to stations implies a risk of stagnation and development of slums in the industrial areas in the western part of Copenhagen Metropolitan Area. Nilas (2004b), who was at that time Director of the Copenhagen Region Development Council, writes that the Council is discussing a possible relaxation of the principle of proximity to stations and the criteria for transforming old manufacturing buildings into offices.

In another article, Nilas (2004a) argues for a revision of the traditional regional planning policies of economizing on land through strict control of the conversion of undeveloped land into areas for urban development. According to Nilas, limitation on the amount of land set aside for residential development within Copenhagen Metropolitan Area will not necessarily prevent urban sprawl. Instead, people who want to live in single-family houses will then settle even further away from the central parts of the region. In the introductory heading of the article, Nilas writes that a strengthening of the region relative to its European competitors requires a 180 degrees turn away from traditional planning thought. It shines through – not the least from the above-mentioned initial heading – that Nilas himself considers it desirable to facilitate increased construction of single-family houses. In his view, relaxation of the existing principle of location new development close to stations is a way of making the urban settlements of the region more attractive for internationally oriented knowledge-based companies. Similar thoughts are expressed by Boye (2001), who argues that urban densification should not be pursued as a general strategy. In some cities and towns the aim should rather be density reduction, or a combination of densification and outward spatial expansion. According to Boye, premises for manufacture production still make up a high proportion of the need for construction of commercial buildings in the cities. Moreover, much of the vacant areas focused on by the governmental committee on Industrial and Urban Policy are expansion areas, the reservation of which has been paid by companies.

Finally, a few articles explicitly defend dispersed cities as more desirable from architectural or housing quality criteria. Andresen et al. (2006) argue for locating new dwellings to natural and rural areas ('dwellings with a view', 'hobby farm plots' and 'forest dwellings'), also in areas relatively close to the largest Danish cities. Since most of the rural inhabitants already have their workplaces in cities, opportunities for rural living should, according to the authors, be offered to a higher number of those who presently live and work in the cities. The article contains no mentioning of the impacts of such development in terms of traffic and energy use. Nilas (2003) holds that growth in the 'dense city' (i.e. the 'palm' of the Finger Plan, mainly the municipalities of Copenhagen and Frederiksberg) implies a risk for severe congestion problems, unacceptable pollution nuisances and poor access to green areas for inner-city dwellers. Thorlund (2003) attacks the intentions of the Planning Act zoning regulations of a distinct demarcation between city and countryside. Instead, he advocates the dispersed city. According to Thorlund, contemporary urban landscapes must be understood as a field including various degrees of density, 'where the city and the open land are intermeshed in a common figure, where the horizontal characteristics, the extensiveness and the infiniteness are more dominating than the verticality'.

Summarizing, although the number of articles supporting compact and concentrated development is higher than the number of articles opposing this way of urban development, the spokespersons of dispersed urban development are still quite articulate in the Danish professional debate. A considerable part of the articles supporting compact urban development have been written by researchers, spatial planners working with developmental patterns at city-level or metropolitan scale, transport planners, and employees of governmental agencies. Nearly all these authors use sustainability arguments in support of compact city development, especially the merits of dense cities in terms of sustainable mobility. There is less focus on the lower encroachments on nature resulting from an area-saving urban development. Possibly, this is due to the fact that the urban fringe in many Danish cities borders to farmland rather than forests. Since farmland is not considered a scarce resource in Denmark, there has been less worry about the conversion of undeveloped areas into urban land in Denmark than, for example, in Norway. Hardly any one of the articles supporting dense urban development mention the lower energy needs for space heating in apartment buildings than in single-family houses as part of their arguments for preferring urban densification.

It is worth noticing that the two most active supporters of the compact city among the *Byplan* authors (measured by the number of articles) were and are both affiliated close to the Ministry of the Environment. They could therefore be expected to exert quite some influence on the Danish state-level planning policy. Hartoft-Nielsen was also the key author of the recent National Policy Directive *Finger Plan 2007,* where, among others, the principle of locating workplaces and residential development in the Copenhagen region close to urban rail stations was tightened after a period where this principle had been gradually watered out. On the other hand, the authors who argue for more area-intensive and dispersed urban development are often municipal planners in suburbs of Copenhagen or in smaller cities, representatives of the Association of Danish Municipalities, and in some cases also architects and landscape architects working mainly with planning at a local neighborhood scale. The Director of the Copenhagen Region Development Council also stands out as a clear skeptic of compact urban development. Thus, some conflicts between tiers of government (national government vs. municipalities) as well as between groups of professionals (land use and transport planners vs. landscape architects) can be seen. The frontiers are still blurred; for example, planners from the municipality of Copenhagen usually take densification as an obvious strategy.

Moreover, it is worth noticing that the Danish supporters of a more compact urban development have not so much focused on densification within the monocentric core city as on decentralized concentration around urban rail stations. Although such development close to stations counteracts urban expansion into the 'green wedges' between the urban 'fingers' of Copenhagen Metropolitan Area and facilitates the use of public transport, its merits in terms of sustainable mobility are less good than those of inner-city densification and transformation. The focus on development around suburban rail stations has, however, very long traditions in the Copenhagen region, as this form of urban development was a key tenet in the first Finger Plan adopted in 1949, and it has also been re-emphasized in national policy directives and guidelines since 1989.

The increasingly pronounced criticism in the first years of the present millennium against the principle of locating development close to urban stations shows that even this somewhat weak version of the compact city strategy has far from obtained hegemonic status. This applies to politicians as well as planning professionals. Among the *Byplan* articles, there is a quite strong counter-discourse advocating

dispersed, low-density urban development. Partly, this is considered to be best in line with residential preferences among the population. Partly, offering ample areas for commercial development in rural and natural surroundings is seen as a way of attracting international companies to the region.

4.10 Transport policy priorities

Among the 98 articles dealing with the spatial content of urban development, 69 do not at all express any priorities as regards transport infrastructure[20] development. Obviously, this in part reflects the fact that several articles focus on the design of the built environment at a local city scale. Thus, among the 18 articles focusing on the local scale, only one addresses transport infrastructure issues (in this case better local public transport services).

Among the 74 articles focusing on the city/metropolitan level, comparatively fewer (48) are silent about transport infrastructure priorities. Typically, these articles focus on the building stock or (to a much lesser extent) on the green structure of cities. Most of the remaining 26 articles give strong priority to transport infrastructure development aiming to facilitate alternatives to the private car. Ten articles advocate public transport improvements as the main transport priority, whereas another ten articles recommend restrictions on car use (parking restrictions, road pricing) and/or actively reject road capacity increases in urban areas. Usually, this group of articles also favors improvements in the public transport system. One article addresses improved cross-city bike paths as its main priority.

Four articles (i.e. one sixth among those expressing any transport policy priorities at the city/metropolitan scale) go for road capacity increases. Among these, one article advocates urban highway construction as its main priority, while the remaining four recommend road construction in combination with public transport improvement.

Only two among the six articles dealing with spatial conditions at a regional scale express any transport policy priorities. One of these articles recommends road building while the other one goes for public transport improvement.

[20] Here, transport infrastructure does not only refer to physical infrastructure, but also to public transport routes (rail lines as well as buses) and the scheduling and standard of these services.

Less than one third of the total number of articles taking a standpoint on transport infrastructure issues explicitly refer to sustainable development. There is, however, no tendency that these articles prioritize in a more sustainability-oriented way than the articles not mentioning sustainability. Actually, road construction (admittedly in combination with public transport improvement) is slightly overrepresented among the articles in which sustainability is referred to, compared to the remaining articles.

Among the 20 articles expressing transport policy priorities without referring to the concept of sustainable development, 18 recommend a prioritization of other modes of travel than the private car (i.e. they recommend public transport improvement and extensions of the bike path network, often in combination with restrictions on car usage). Only two of these articles go for road capacity increases, and one of these two articles only does so if the public transport system is simultaneously improved. As can be seen, a large majority among the articles not mentioning sustainability go for strategies that most observers would describe as highly compatible with a sustainable urban development. Why then do these articles so seldom refer to the concept of sustainability? The community of planners and researchers within the field of transportation has apparently not adopted the sustainability rhetoric when arguing for environmentally oriented policy measures. This is, however, not unique to transportation planners. In the *Byplan* articles, such absence of explicit references to sustainability is equally common among land use planners, even among those land use planners who base their support of the compact city on global environmental considerations.

The transport policy actually implemented in Copenhagen metropolitan area is a combination of road development and public transport improvement. In the light of this, the fact that only four articles express support of such a combined facilitation of private and public transport may seem surprising. However, given the considerable support of car traffic facilitation among voters[21], it is maybe not so strange that debaters in a planning journal express different opinions than the populist interpretation of the situation. Moreover, a study of the professional debate in a more dedicated road sector journal (e.g. *Dansk Vejtidsskrift*) would probably have shown different priorities.

[21] From the perspective of individuals driving on congested roads, increased road capacity may easily be perceived as the obvious solution to congestion, in spite of the fact that from a system point of view, wider roads may just lead to more traffic and repeated build-up of congestion.

The four articles recommending road construction as the sole transport policy measure or a combination of road construction and public transport improvements are written by municipal traffic planners (Bunde, 1994; Svendsen, 1994) or more generalist planners working at a regional scale (Sandgaard & Kristoffersen, 2004; Nilas, 2004b). It is worth noticing that the Director of the Copenhagen Region Development Council, Claes Nilas, is one among the few *Byplan* authors who actively support motorway construction as a way to solve congestion problems.

Most of the remaining articles are written by spatial planners, planning researchers and transport researchers representing research institutes, universities, municipal planning agencies and professional organizations. It is worth noticing that the Danish Association of Architects, the Danish Laboratory for Urban Planning and the Association of Danish Urban Planners in a common statement call for restrictions on auto usage in the cities (see below).

Improved public transport in cities has for a long time been a key topic in the national and international discourse on sustainable and environmentally friendly mobility. Some of the articles advocating better public transport mention the need such a prioritizing quite briefly and without munch specification about the type of improvement (Christensen, 1994; Hvidtfeldt, 1994; Skousbøll, 1998; Thorson & Thomsen, 2005). The same applies to the mentioning of public transport in the Danish Urban Planning Charter (Knudstrup, 1995). A few articles propose public transport improvements in urban areas outside the Copenhagen region: Hartoft-Nielsen (1999) proposes to build an extensive network of light rail lines in Århus, and Nielsen & Sørensen (1997) argue for improved public transport connections between the cities of the "Triangle Area" in East Jutland. Half of the *Byplan* articles that advocate improvements in the public transport system are, however, focusing on particular corridors within Copenhagen Metropolitan Area. In a debate with a critic (Arne Gaardmand) who accuses the planning of Ørestaden for being unsustainable and solely growth-oriented, Hartoft-Nielsen (1993) supports the coordinated transport (including a new metro line) and land use planning for this part of Copenhagen Metropolitan Area. Four articles (Illeris, 1996; Jacobsen, 1998; Nielsen, 2002 and Ege, 2006) point specifically at a need for public transport ring connections across the present radial urban rail lines along the developed corridors of the Finger Plan. The three latter among these articles argue that these ring connections should be rail lines, not only bus connections.

Moreover, Bisgaard & Jørgensen (1998) advocate the construction of an additional rail line between Roskilde and Høje Taastrup in order to relieve the present line from capacity overload. Finally, Ege (1996) writes in favor of micro-scale improvements at the urban rail stations in order to make them more accessible, e.g. by adding more entrances.

Among the 15 articles arguing more or less clearly in favor of restrictive measures against car traffic, only five mention reduced or halted road construction (i.e. a breakage with the 'predict and provide' paradigm for road supply) as such a measure. Two of these articles are written by Arne Gaardmand, a planning historian and veteran civil servant of the agency later known as the Agency for Spatial and Environmental Planning. In an article from 1993, Gaardmand expressed a critical opinion about motorway construction as well as the general the quest for economic growth. Similar ideas were expressed by Gaardmand three years later, where he criticized much contemporary planning for being based on primitive and obsolete ideas. Mortorway construction and the large bridge projects (e.g. across Great Belt and Øresund) were mentioned as examples. (Gaardmand, 1993 and 1996). In a prize-awarded essay originally written for a competition among young people organized by the Ministry of Housing and Cities in 2000, Mahncke (2000) advocates 'reduced transport investments'. Focusing at a more detailed scale (the Ørestaden district), Skousbøll supports reduced norms for road and parking capacity. Hartoft-Nielsen (2005) criticizes two planned new motorways in the inner part of Copenhagen. These two roads (the Easter Harbor Tunnel and the Copenhagener Tunnel) will, according to Hartoft-Nielsen, together with a number of planned slip roads imply that the city center of Copenhagen will in the future be 'attacked' by car traffic also from the eastern side.

While opposition against road capacity increases is not very widespread among the *Byplan* articles, parking policy (both in terms of increased fees and reduced parking capacity) is mentioned by a larger number of authors (Christensen, 1994; Grell, 1994; Hvidtfeldt, 1994; Krag, 1994; Olsen, 1998; Thornæs, 1998; Skousbøll, 1998; Thorson & Thomsen, 2005). It is worth noticing that most of the articles advocating a reduction of parking capacity are from the beginning of the investigated period. In the more recent article, the focus is more often on parking fees, although some of the later articles also mention reduced parking norms. The context of the articles mentioning parking policy as a measure to reduce car traffic is in all cases city centers or (in the case of Ørestaden) a new urban district relatively close to the city center of Copenhagen. The positive

environmental impacts from the proposed parking policies may, however, reach beyond the local scale if they encourage commuters and shoppers to use other travel modes than the private car. In addition to pointing at parking policies, a few articles also advocate pedestrianization of areas in the city centers and the establishment of 'environmental zones' where heavy vehicles are not allowed to enter (Olsen, 1998; Gade, 2001). The effects of these instruments are likely to be predominantly local. Interestingly, road pricing is mentioned as a relevant instrument in only three articles (Christensen, 1994; Olsen, 1998; Thornæs, 1998).

In addition to the above-mentioned articles focusing on specific restrictive measures (including non-building of roads), two articles address the need to halt the growth in urban motoring in a more general way. In a common statement about the European Spatial Development Perspective (ESDP), the Danish Association of Architects, the Danish Laboratory for Urban Planning and the Association of Danish Urban Planners criticize the ESDP for glossing over the contradiction between two of its objectives: the goal of increased commodity exchange and higher accessibility between cities, and the goal of a sustainable development. The statement criticizes the assumption that increasing the usage of some modes of travel (notably public transport) will be sufficient to reduce car travel. According to the statement, such increases will only result in a higher total mobility. The statement calls for concrete policy measures to reduce traffic, especially in cities and the most populated regions. (DAL, DB & FAB, 1998.) In a comment on the governmental transport policy document *Trafik 2005*, Jacobsen (1994) highlights and supports a formulation in this document saying that the point of departure must be the limits for resource consumption and environmental load. The transport system must be redesigned in such a way that the necessary mobility can be obtained within these limits. Jacobsen also applauds the fact that the government in the Trafik 2005 document recognizes that 'sustainable' implies policy interventions to influence the demand for transport.

As can be seen from the above, there have been some changes over time in the transport policy priorities expressed in the articles in *Byplan*. Notably, there has been a change in the relative prioritization between road construction and restrictions on car usage. Among the investigated articles from the 1990s, restrictions on care usage and/or active rejection of urban highway construction was prioritized five times as often as road construction (alone or in combination with public transport improvement). Among the articles published 2000 or

later, these two groups of articles are almost equally large. Of course, the total number of articles addressing these issues is limited (twelve before 2000 and six from 2000 and on), so one should be careful not to draw too wide conclusions from this change. Yet, the reduction of articles recommending restrictions on car usage from ten before 2000 to three in 2000 and later might have to do with changes in what has been perceived to be politically realistic. For example, the conservative market-liberal national government that has been in position since the end of 2001 has legally prohibited the introduction of road pricing, in spite of the fact that the Municipality of Copenhagen and some of its surrounding municipalities are in favor of such fees.

4.11 Spatial content of urban development discussed without referring to sustainability

Among the 98 articles focusing on the spatial content of urban development solely or in combination with other issues, 16 address the issue of sustainable development while 82 do not. There has been some increase in the share of articles addressing sustainability since 2000, but even in this latest period, three out of four articles dealing with the spatial content of urban development do not mention the concept of sustainable development.

Although making up a minority of the total number of articles, articles referring to the concept of sustainable development make up the majority of articles with ‘no’ or ‘other’ spatial focus (i.e. other than building stock, transport infrastructure or green structure). One fifth of all articles in which sustainability is mentioned has ‘loops/metabolism/material resource consumption’ as their main focus. To a relatively high extent, the articles dealing explicitly with sustainability focus on individual lifestyles that can hardly be influenced by land use or transport planning (e.g. water consumption, energy requirement in refrigerators), or deal with topics that *can* be influenced by land use planning (e.g. energy requirement in buildings) without referring to the land use principles that may influence this consumption. Instead, the focus is often on the design of the individual building and its appliances, or on the lifestyles of individual households. Thus, one may get the impression that the sustainability discourse, even as it appears in a journal for planning professionals and academics, has concentrated to a high extent on other issues than

those that may be influenced through land use and transport infrastructure planning.

4.12 Barriers to a desirable urban development

Among the investigated 114 articles, one third mentions some sorts of barriers to a sustainable (or otherwise desirable) urban development. The absence of references to barriers in the remaining articles does not necessarily imply that these authors consider that there are no barriers to the achievement of sustainability goals. For many articles, the focus is not on implementation conditions but on the spatial content itself (cf. question 2 above). The choice of such a focus does not imply that the authors are unaware of implementation conditions and barriers – in fact several of the authors of articles focusing on spatial content have focused on barriers against sustainability in other publications. The fact that one third of the investigated articles explicitly refer to barriers must therefore be taken as a fairly high awareness of obstacles against a sustainable/desired development among the authors of *Byplan* articles on urban land use and/or transport infrastructure planning, sustainable development and/or the combination of these topics.

The frequency by which barriers are referred to seem to be relatively independent of the geographical scale focused on, whether or not the concept of sustainability is explicitly mentioned, and the main sustainability issue focused on. Also, there are only small variations according to the aspects of the spatial content focused on. Yet, among articles expressing transport policy priorities, barriers are mentioned more frequently among those articles recommending restrictions on car traffic and/or advice against road capacity increases than among those recommending improved public transport without opposing facilitation for car traffic. There is also a slight tendency that articles interpreting sustainable development mainly as an environmental challenge mention barriers more frequently than articles not mentioning or concretizing the concept of sustainability.

Surprisingly, barriers are mentioned more frequently in the pre-2000 articles than in the articles published 2000 or later. Given the lower priority given to environmental and sustainability issues by the post-2001 government, one might expect barriers to sustainability to be mentioned more frequently in the most recent period. Instead, an adjustment to the new political climate seems to have taken place, manifest partly in avoidance of some controversial topics (cf. the

above-mentioned change in the interpretation of sustainability) and partly in a resignation regarding the possibility of removing barriers to sustainability: if there is anyway no political willingness to remove these barriers, it may be considered futile to emphasize such barriers in articles targeting an audience consisting mainly of planning practitioners.

The strongest focus on barriers is among articles dealing with the influence of institutional frameworks in promoting or counteracting a sustainable urban development. Among the 21 articles focusing on the role of institutional frameworks, barriers are mentioned two and a half times as frequently as among the remaining articles. Any such tendency is, however, not found among the very few articles having institutional frameworks as their *main* focus.

The few (3) articles questioning the sustainability and/or desirability of growth-oriented policies all mention barriers to sustainable development. This is different from the corresponding articles in the Norwegian journal *Plan*, where none of the growth-critical articles mentioned any barriers to sustainability.

Among the 38 articles mentioning barriers to a desired development, six articles (Bunde, 1994; Poulsen, 1997; Agergård, 1999; Green & Kock, 2000; Jensen & Jacobsen, 2001; Bjørstorp, 2003) point at barriers to an urban development which, according to state-of-the-art knowledge, will not contribute to environmental sustainability, but most likely the opposite. The barriers identified by these authors (notably the principle of locating development close to rail stations, central-government limits on the amount of land converted to urban zones, and the retail regulations of the Planning Act) may therefore be considered as conditions that actually contribute to a higher degree of environmental sustainability in urban development. Moreover, a few articles refer to the existence of barriers without any specification about what these barriers might be. There are also a few articles addressing barriers to policies that have little or nothing to do with the pursuit of sustainable mobility through urban planning. Below, we will concentrate on the remaining 28 articles addressing barriers to sustainable urban development.

Some articles point at market mechanisms as barriers to sustainable development. This is expressed most pronouncedly in a common statement by DAL, DB & FAB (1998) on the European Spatial Development Perspective. In their statement, DAL, DB and FAB identify dismantling of planning and increased influence from

unbridled market mechanisms as contributory causes of severe social, traffic-related and environmental problems in most major European cities. Grell (1994) points at sharpened competition between cities as something that pushes environmental aspects of urban development lower on the political agenda. According to Skousbøll (1998), powerful agents who fear that intervention into market mechanisms will bring growth to a halt represent a threat or barrier to a continuation of Copenhagen's policies to limit car traffic. Nilas (2004a) mentions 'market blockings' (e.g. problems in the social housing sector, taxation of private rental housing, the cost level of multistorey construction etc.) as factors that have limited the demand for other housing types than single-family homes. These blockings are seen as barriers against increased residential development as densification and transformation of derelict sites within existing urban areas. Looking at the implementation of the plans for the Køge bay area, Plesner (1993) mentions pressure from low-price retail consortia and municipal politicians yielding to such pressure as causes of a more car-based development than presupposed in the plans.

Other authors point to a corporatist style of decision-making (Gaardmand, 1993) and negotiation-based planning (Kiib & Marling, 1996) as barriers against sustainable urban development. Gaardmand (1996) also points to 'growth-oriented and obsolete values on which planning is based' as an obstacle to sustainability-oriented urban planning. Such predominant values may be among the reasons why lack of political willingness is identified by some *Byplan* authors (Jacobsen, 1994; Larsen, 1994) as a barrier to sustainability-oriented policies. Related to this is the conception of culturally predominant ideas (Jørgensen, 1994) and mental barriers (Maskell, 2001) as obstacles. Lund (2001) considers that the focus of many politicians on symbol policies and PR stunts instead of long-term policy measures with real and positive environmental consequences is a major problem. Lack of (uncontested) knowledge about the impacts of policy measures aiming at sustainability (Grell, 1994; Thierry, 1996) are also mentioned as barriers making it possible for myths and unclear assertions to exert undue influence on decision-making. A particular barrier mentioned in this context is non-transparent traffic model simulations and secrecy about the inherent assumptions of the models (Jacobsen, 1998).

Other authors point at lack of coordination between national and local public authorities as a hindrance. Especially, the possibility for local authorities to neglect national-government planning policies is mentioned as a problem (Thierry, 1996; Sjøholt, 1999). This problem

is aggravated because of a lack of effective regional-scale planning (Holst & Frank, 2003) and a taxation system making it economically profitable for suburban municipalities to attract middle-class residents (Hvidtfeldt, 1998).

Other articles point to barriers at a more practical level, such as the plentiful areas set aside for outward urban expansion in already approved municipal plans (Hartoft-Nielsen, 1997 and 1999); lack of legal possibilities to regulate the supply of private parking places (Hvidtfeldt, 1994; Krag, 1994); and problems in terms of property rights and the distribution of costs (notably for pollution in the ground) in connection with urban transformation projects (Møller-Jensen & Jørgensen, 1998; Hvidtfeldt et al., 2000; Jensen et al., 2001).

The fact that the taxation on gasoline has increased at a lower rate than the fares of public transport is mentioned by Lindberg & Sørensen (1994) as a barrier to a more sustainable distribution between transport modes. (During the 15 years that have passed since they wrote this, the gap has widened even more.) Finally, Lund (1999) points at some driving forces behind the continuing demand for single-family houses which, in a situation where a limitation on the construction of such dwellings was on the agenda, would present barriers: increased private motoring, taxation rules favoring homeownership, decentralization of workplaces and shopping facilities, and a continual, subsidized level of public services in the suburban municipalities.

It is worth noticing that none of the investigated *Byplan* articles mention lack of coordination between different sectors or ministries (e.g. the Ministry of the Environment and the Ministry of Transport) as a barrier against sustainability.

4.13 Growth – an assumed good?

None of the 114 articles express criticism or doubt about per capita increase in housing consumption. Three articles express growth skepticism or criticism in a more general way. The growth criticism of two of these articles is probably confined to a criticism against population growth in the municipality of Copenhagen and/or Copenhagen metropolitan area. None of the three articles makes any clear statements indicating that they are critical to economic growth in general or to the growth in floor area per capita in particular. Yet, they are generally critical to policies aiming to increase the

competitiveness of the local municipality/region for growth-inducing investments at the cost of social and environmental objectives.

In an article written for the jubilee of the Danish Laboratory for Urban Planning, Gaardmand (1996) calls for a new value foundation for urban planning – 'a value foundation shifting the focus from growth to sustainability'. He characterizes the prevailing growth-oriented value foundation as obsolete and an obstacle for a desired urban development. In a previous article, Gaardmand criticizes the intentions of the 'growth optimists' in the planning of Ørestaden (Gaardmand, 1993). In a review of the agendas of Nordic planning research, Kiib & Marling (1996) express some criticism of 'the material growth paradigm'.

Needless to say, the fact that only three articles (two of which authored by the same person) question the desirability of growth does not mean that the remaining authors are all pro-growth. Many of the articles deal with topics where it would be a bit awkward and out of scope to bring the question of whether or not continual growth in the building stock is desirable. Rather, the low number of articles discussing the growth issue indicates that this is a topic that has not been an important part of the agenda among Danish planners. In this sense one may say that growth in the building stock is something that in most cases has been taken for granted, whether or not the authors are personally in favor of this growth. Having said this, it is also obvious that some articles are quite enthusiastic about growth, especially those who emphasize the positioning of Danish cities in the global competition for investments, but also articles considering the development of new urban districts (e.g. residential areas) as an opportunity to create something that has a higher quality than the old ones.

4.14 Institutional frameworks

Only two among the 114 articles have institutional frameworks as their main focus, but 22 articles address such frameworks to some extent. The frequency of addressing institutional frameworks does not appear to be related to whether or not sustainability is explicitly addressed in the article or the spatial focused on. However, institutional frameworks are addressed more often (twice as frequently) in the period 2000 and later than in the 1990s.

As much as one third of the articles addressing institutional frameworks discuss the main legal framework within which spatial public planning operates, i.e. the Planning Act. Since the roles of different administrative tiers in making plans is stated in this law, the articles focusing on the Planning Act include some articles that are mainly preoccupied with horizontal and vertical coordination and how well such coordination is secured by the Planning Act. Yet, compared to the discussion in the Norwegian journal *Plan*, the issues of horizontal and vertical coordination is present to a lesser degree in the *Byplan* articles.

In the mid 1990s, Gaardmand (1996) characterized the existing Planning Act as 'good enough' to promote sustainable development – what was lacking was political prioritization, or 'the value fundament' for planning, as Gaardmand expressed it. Some other authors find shortcomings in the planning legislation as regards regulation of architectural quality and neighborhood-scale 'urban ecology' measures (Ahrendtzen et al., 2001), lack of coordination with the Act on Pollution as regards the re-use of contaminated sites (Møller-Jensen & Jørgensen, 1998) or call for a strengthened role of 'urban district plans' (Poulsen, 1997). Hvidtfeldt et al (2000) considers that the requirement for Strategic Environmental Assessment of municipal plans introduced around the turn of the century will contribute to make such plans more environmentally friendly.

After the liberalist-conservative government came in position towards the end of 2001, several changes have been made in the planning legislation as well as in the division of Denmark into administrative territories. Sørensen (2002) criticizes the changes in the planning legislation in 2002, where, among other things, the authority to decide on the demarcation between urban and rural zones was transferred from the counties to the municipalities. According to Sørensen, the changes in the Planning Act will contribute to urban sprawl by opening up for extensive construction of dwellings and commercial buildings on farmland around the cities and in the 'green wedges' of Copenhagen Metropolitan Area. Lund (2005) criticizes a subsequent change in the Planning Act for downplaying the role of the national government in land use policy and virtually phase out the regional tier in spatial planning. He still admits that Copenhagen Metropolitan Area represents an exception, since the text of the Act includes a list of several goals and considerations to be observed when planning for this area. On the other hand, Thorlund (2003) is not much worried about the relaxed national and regional control over the demarcation between rural and urban land. The regulations between rural and urban

zones are not ‘his favorite baby’, and he would rather prefer these regulations to be abolished. Similarly, Agergaard (1999) attacks the retail regulations of the Planning Act, which he sees as a threat against diversity in the city centers.

Thierry (1996) and Søholt (1999) both call for better vertical coordination. According to Thierry, lack of higher-level priorities on which local urban renewal projects can be based prevents such projects from contributing to real environmental progress . Søholt criticizes the lack of implementation measures to follow up governmental objectives stated in the National Planning Elucidations (Landsplanredegørelser). She finds it unfavorable for the reputation of the entire political system that the National Planning Elucidations express priorities which most people know are not meant to be taken seriously. As an example she mentions a formulation in the 1999 National Planning Elucidation saying that there should not be made any further investments in traffic infrastructure. Nilas (2004b) indirectly says something about how vertical coordination often takes place in practice. According to Nilas, Copenhagen Region Development Council had, after dialog with the suburban municipalities in the western part of Copenhagen Metropolitan Area, ‘let itself inspire to open up for a more flexible use of the principle of proximity to stations and the use of vacant industrial premises’. In other words, vertical coordination is obtained in that the regional level yields to the wishes of the municipalities, not the other way round.

Addressing the supranational level, DAL, DB & FAB (1998) discuss the role of the European Spatial Development Perspective as a framework for planning in the member states. The three organizations advise against creating a joint EU planning that equalizes the distinctive properties of the different countries and regions.

Some other authors call for better horizontal coordination between different municipalities within a region. According to Hvidtfeldt, the present, geographically divided management of land use and location policies in urban regions make up, together with taxation legislation (also mentioned by Maegaard-Nielsen, 2002), incentives for suburban municipalities to attract new middle-class inhabitants. This often leads to land use priorities that are not desirable seen from a regional perspective (also mentioned by Holst & Frank, 2001). Maskell (2001) also calls for more cooperation between municipalities about the location of enterprises. Much could be achieved by identifying and developing a few, favorably located areas for commercial

development instead of letting each municipality spend resources on establishing developmental areas for all possible types of enterprises.

Finally, a number of articles address the changing institutional frameworks due to the change from traditional hierarchical political-administrative government to network-based governance. Kiib & Marling (1996) are critical to this change and characterize governance-style, negotiation-based planning as being 'incompatible with a democratic and environmentally sound development of the cities'. Hartoft Nielsen (2002) is less sure and thinks we know too little about driving forces of urban development as well as the interplay between plan and market and between different administrative tiers of planning. Lund (2001a) finds some advantages in public-private partnership on the funding of infrastructure, but he also thinks there is a risk that public-private companies may jeopardize the integrity of the planning system. Mogensen (2003) holds that urban transformation and densification requires a much higher degree of inter-sectoral and dialog-oriented planning than what is the case for traditional greenfield development. According to Mogensen, there is a need for establishing inter-sectoral teams composed of representatives from the public sector, business life as well as civil society, working in a holistic way with a focus on specific local areas. Gram-Hansen & Kristiansen (2002) discuss government, governance, physical planning and 'urban policy' in a sustainability perspective. In their view, the physical (i.e. land use and infrastructure) planning operates within a system where national sustainability goals can be maintained all the way down to the local planning levels. On the other hand, 'urban policy', which is more governance-oriented, can include broader topics – also broader aspects of sustainability – but this mode of planning is not able to secure that sustainability goals will be maintained in the communicative process.

Summarizing, the *Byplan* discussion on institutional frameworks for planning concentrates to a high extent on the legal frameworks (especially the Planning Act) and the way this legislation allocates authority to different tiers of administration. Several authors focus on the impacts of the changes in the Planning Act as well as in the territorial demarcations and tasks of municipalities and counties implemented in the first years of this millennium. Generally, these reforms have led to greater local autonomy, whereas the role of the regional level in spatial planning has been substantially diminished. Those authors who are concerned about environmental sustainability tend to regret these changes, while some other authors see this

decentralization of power as a possibility to stimulate the competitiveness of municipalities and regions.

A number of authors have dealt with the challenges arising from the change from traditional, hierarchical government control to network-based governance involving stakeholders form the private sector and civil society to a higher extent. Many authors consider these changes to imply a weakening of the possibility to promote public goals (such as sustainability) through land use planning. On the other hand, it has been pointed to the fact that urban densification and transformation, which is commonly held to be a key strategy in sustainable urban development, requires a higher stakeholder involvement than traditional greenfield development if it is to be successfully implemented. Regional and city-level plans forcing local authorities to focus on densification instead of spatial urban expansion (like the Marka border in Greater Oslo) combined with a more governance-style planning of the individual transformation areas could be a way of reconciling these concerns. In Denmark, the possibility for establishing higher-level limits on the conversion of undeveloped land into urban land has been weakened during recent years, as commented on in some of the above-mentioned articles. Nevertheless, for a municipality that wants to promote densification instead of outward urban expansion, there are still possibilities in the Planning Act to channel development to areas within the existing urban fabric.

4.15 The role of economic driving forces

Only ten out of the 114 investigated articles mention economic, structural forces of urban development. These articles occur with the same frequency in the periods before and after 2000. Articles explicitly mentioning sustainability tend to mention economic driving forces somewhat more frequently than the articles not mentioning sustainability. Articles skeptical to compact city development are overrepresented among those articles referring to economic-structural forces of urban development. The number of compact-skeptical articles mentioning economic driving forces is still quite low (4), so there is considerable scope for coincidence. The frequency of economic driving forces being mentioned does not seem to be related to the type of transport policy priorities expressed.

In some of the ten *Byplan* articles addressing this issue, concrete examples of how economic-structural driving forces contribute to shape urban developmental patterns are shown. Illeris (1996) states

that good accessibility by car and sufficiently large sites and premises have become more important to the service trades than short distances to business contacts. Hartot-Nielsen (1997b) points at similar market-related reasons for why office workplaces in Copenhagen Metropolitan Area have to a considerable extent been located far away from urban rail stations. In an article attacking the principle of proximity to stations, Jensen & Jacobsen (2001) implicitly show some clear conflicts between planning principles aiming at sustainable urban development and the market-based location criteria of private enterprises. Agergaard (1999) highlights the power of capital-strong retail consortiums to oust smaller shops out of city centers. Møller-Jensen & Jørgensen (1998) point to the fact that if there is a general trend of business stagnation in the region, there will be a low demand for areas for commercial development, and hence also more difficult to find investors for re-use of derelict urban land.

Speaking more in general terms, DAL, DB & FAB (1998) emphasize the negative social and environmental impacts resulting from unbridled market mechanisms.

In the more recent years, there has been an increasing focus on the challenges cities are faced with in the globalized economy. The first time this problematic appears among the investigated *Byplan* articles is in an article referring the contents of a new Charter adopted by the European association of town planners (ECTP) (Thornæs ,1998). Here, promotion of cities' economic competitiveness is mention as an important item on the urban agenda. Later, several *Byplan* authors have addressed this issue. According to Holst & Frank (2003), globalization and the increasing international competition imply that businesses locate where their competitive conditions are best. This is, they write, of decisive importance to patterns of settlement and the future of the individual municipalities. Nilas (2004 a and b) depicts globalization and the international competition between cities as something that necessitates a shift to a different approach in regional planning than previously. Among others, he considers that infrastructure development in order to support higher mobility will be a necessary response.

As can be seen from the above, the articles pointing at negative impacts of unbridled market forces, and the need to check these forces by means of spatial planning, stem mostly from the first part of the investigated period. In the most recent years, the articles mentioning economic structural driving forces at all have predominantly argued that planning has to change its form and priorities in order to adapt to

the increased international competition between cities. This may reflect that cities have actually become more exposed to such competition, but it may also reflect a stronger neoliberal agenda-setting since the beginning of the 21st century.

5 Interviews with key stakeholders in planning and decision-making

5.1 Introduction

As mentioned in Chapter 1, in-depth, semi-structured interviews were carried out with some key participants of the planning and decision-making process on urban development in the Copenhagen region. The interviewees included:

- key municipal politicians: Bente Frost (Denmark's Liberal Party, Mayor of Building and Techniques in the Municipality of Copenhagen 1994-1998); Gunna Starck (Left Wing Socialists, City Planning Mayor in the Municipality of Copenhagen 1986-1989); Jens Kramer Mikkelsen (Social Democrats, Director of CPH City & Port Development, former Lord Mayor of the Municipality of Copenhagen 1989-2004); Ole Bjørstorp (Social Democrats, Mayor of the Municipality of Ishøj and Chairman of the Cooperation of Municipalities West of Copenhagen)
- key bureaucrats at municipal and regional level: Jan Christiansen (City Architect in the Municipality of Copenhagen); Jens Ole Nielsen (Director (Fagdirektør), Centre for Urban Design in the Municipality of Copenhagen); Ole Møller, (former Chief Secretary and Daily Leader in the Transport Council (1993-1997), now Technical Director in the Municipality of Roskilde); Hans Ege Jørgensen (planner in Copenhagen Metropolitan Area Public Transport Authority)

- national-level bureaucrats: Niels Østergaard (Personal Adviser in the Agency for Spatial and Environmental Planning, former Director General in the former National Spatial Planning Department); Peter Hartoft-Nielsen (planner in the Agency for Spatial and Environmental Planning); Birgitte Henriksen (project manager in the Danish Road Directorate)
- a representative of a non-governmental organization: Ivan Lund Pedersen (NOAH (Danish member of Friends of the Earth), Traffic group).

It should be noted that some of the interviewees have or have had roles overlapping the above categorizations. For example, Kramer Mikkelsen, who was previous Lord Mayor of Copenhagen, is now the head of a property development agency (owned 45 % by the State and 55 % by the City of Copenhagen) in charge of large urban development projects in Copenhagen. Similarly, Ole Møller, who is now a municipal civil servant, earlier was the administrative manager of the Transport Council (Transportrådet), which was an advisory body for the government on transportation issues as well as a main funding source for transport research in Denmark. Generally, those interviewees who are civil cervants speak as individual professionals and do not necessarily express the opinion of the public agencies to which they belong.

Each interview was first analyzed, using a common checklist. Thereupon a synthesizing analysis was made, on which the present chapter is based. The raw synthesizing is documented in an unpublished English-language working paper (Næss, T., 2009).

In the following, we will first present the interviewees' opinions about the actual spatial development that has been going on in Copenhagen Metropolitan Area since the 1990s. Thereupon, the interviewees' conceptions of the term of sustainable development will be addressed, along with their opinions about any challenges to urban development posed by sustainability goals. Next, the interviewees' own prioritizations as to spatial urban development and transport policy in Copenhagen Metropolitan Area will be presented, followed by a section on their opinions about the influences of various stakeholder groups on the urban development in this urban region. Finally, their views on any barriers to a desirable urban development and the influences of institutional, administrative and economic-structural conditions in promoting or counteracting a sustainable urban development will be addressed.

5.2 Opinions about land use development since the 1990s

Most of the interviewees describe urban development in Copenhagen Metropolian Area during the latest couple of decades as one dominated by outward urban expansion which to a high extent has taken place in areas poorly served by public transportation. The interviewees almost unanimously talk negatively about this kind of development. The Finger Plan has good intentions, the interviewees seem to agree. However, too much development has taken place outside the fingers, the development of dwellings and workplaces has to a much smaller extent than expected taken place close to the urban rail stations and the plot ratios have not been as high as expected. The city seems to be planned for car driving and new roads are planned for that will be bad for sustainability.

Some of the interviewees talk about the *sprawl* in the Copenhagen Metropolitan area. For instance, Niels Østergård (Director in The Agency for Spatial and Environmental Planning in the Ministry of the Environment) agrees that Copenhagen has more sprawl than Oslo and Stockholm. He does not know whether this is due to the development of the prices of dwellings in Copenhagen (the workplaces are not spread out in the same way as the dwellings, Østergård says). Especially younger families move to the outskirts of the city and to cities outside Copenhagen Metropolitan area. The reasons, Østergård thinks, are the tradition of living in detached single family houses – which people think is better for families with children – and the much cheaper prices of dwellings outside Copenhagen Metropolitan area. This explanation is also mentioned by Ole Møller (former Chief Secretary and administrative manager in The Transport Council, now Technical Director in the Municipality of Roskilde), Gunna Starck (former City Planning Mayor of Copenhagen Municipality for the Left Wing Socialists) and Peter Hartoft-Nielsen (Planner in The Agency for Spatial and Environmental Planning in the Ministry of the Environment). In Hartoft-Nielsen's opinion, the newly built detached single family houses take up quite some land and even the development of row houses and terraced houses has not been as dense as it could.

Whether 'Suburbia' is detrimental to sustainability aims is in no way an issue in the current debate, Starck states. In the 1990s building detached single family houses was not discussed with regards to environmental sustainability. Nor is it now. The discussion normally takes as its point of departure the nature of these neighborhoods,

Starck says. Starck, on her side, talks more about the social sustainability in Copenhagen. She thinks the big apartment building projects in for instance Ishøj and Mjølnerparken were mistakes because they contain only residents and no business life. These residential areas thus turned into ghettoes.

According to Jens Ole Nielsen (Director in The Centre for Urban Design, Municipality of Copenhagen), until 5-7 years ago more building stock was built for business than for housing (perhaps 200,000 m2 for business and 100,000 for housing). Too few dwellings have been built in regard to the demand, Nielsen says.

Hans Ege Jørgensen, (Planner in MOVIA, the Copenhagen Metropolitan Area Public Transport Authority) talks about how equality ideals were high on the agenda during the 1970s and 1980s. The state wanted to develop different parts of the country 'fairly' which in some places resulted in sprawl. Such decentralizing ideas have even longer traditions. The idea of the Finger Plan (which was first adopted in 1947) was originally to move dwellings out of the inner city, Nielsen states. For a long time it was important for the state to move people from the inner city. For example, in the 1970s the state wanted the plot ratio in these areas to be only 110 (between one third and half of what it had been even earlier). Thus the state used to not support densification.

The state also wanted decentralization of workplaces in order to move the workplaces to the places where people lived. According to Jens Kramer Mikkelsen (Director of 'CPH City & Port Development' and former Lord Mayor of Copenhagen Municipality), this was romantic and misconceived and a thing which cannot be realized in a modern capitalist society. Nielsen gives an example of how this decentralization led to a higher amount of transport in private cars: 10% of the employees at the insurance company Baltica, which moved to Ballerup, bought a car during the first 9 months after the moving. This experience was one of the things leading to the development of the principle of locating close to urban rail stations in the Finger Plan, Nielsen says.

More interviewees say that the principles of the Finger Plan have not been followed with consequence (Ege Jørgensen, Nielsen, Hartoft-Nielsen, Kramer Mikkelsen). Nielsen describes how the decentralization of workplaces to areas close to urban rail stations failed. Almost no workplaces were located close to the urban rail stations, Nielsen says, as these areas were filled up with dwellings. Thus the development of new workplaces outside the inner city could

not observe the principle of locating close to the urban rail stations. First the industry was located far from the stations, then also the office buildings. Thus the decentralization of workplaces meant car dependency.

Hartoft-Nielsen also states that the metropolitan urban structure is very car dependent. The counties around Copenhagen have failed to administer the principle of locating close to urban rail stations properly. Sprawl has developed as there has been much development outside the fingers and not enough political will to control it. Møller notes how a lot of the urban development takes place in isolation. A single municipality or a single land owner takes land into use and develops new dwellings or workplace premises without talking to anyone who will develop infrastructure – and according to Møller this results in sprawl. Møller also states that the principle of locating close to urban rail stations was earlier interpreted in a rather liberal way. He thinks, however, that this has now been stopped. According to Møller, Roskilde has observed the Finger Plan rather strictly. Roskilde is now trying, in cooperation with the Ministry of the Environment, to extend the Roskilde-finger.

Ege Jørgensen and Nielsen also doubt that the Finger Plan has resulted in a more sustainable city. The plan makes Copenhagen a very open city with long distances which almost makes it the opposite of sustainable, Ege Jørgensen says. The fingers have grown to become 30-50 kilometers. Concentrating the building stock close to the stations gives a high public transport rate, Ege Jørgensen says. On the other hand, following the Finger Plan has resulted in very large distances and problems with covering the city with public transport services. Ivan Lund Pedersen (NOAH (Danish member of Friends of the Earth), Traffic group) thinks that the principle of building close to urban rail stations is sympathetic but says that most of the development during the last 20-30 years has not respected the principle. Figures presented in the Finger Plan 2007 show how problematic the development has been. According to Hartoft-Nielsen, only 40 % of new office workplace building stock constructed since 1990 outside the central municipalities (Copenhagen and Frederiksberg) has been located close to urban rail stations. However, more than one half of the construction of office buildings has taken place in the two central municipalities, most of which close to stations.

Kramer Mikkelsen also agrees that unsustainable decisions might have been taken in terms of locating transport-intensive businesses in the

wrong places (businesses requiring heavy loads of goods situated in the inner city or office buildings situated in the suburbs).

Nilsen describes how The Greater Copenhagen Council allowed for workplaces to be situated in the suburbs which led to a 'workplace surplus' with distant location and a 'workplace deficit' in the city. Nielsen says this meant more traffic lines between the fingers and transport patterns that could not be covered by public transport services. This again has led to more car traffic and congestion.

According to Ege Jørgensen, many office buildings have been built along the expanded Helsingør motorway without giving a thought to the public transport services in that area. In Sydhavnen (where for instance Ericsson and Nokia are located) there is no urban rail station but lots of parking space and easy connection to the motorway. Thus, according to Nielsen, the transport patterns in Sydhavnen are less sustainable than in the inner city but still more sustainable than further out in the region.

As shown above, the interviewees give a quite coherent picture of a metropolitan area where outward urban expansion has been the dominant trend. In Denmark, the issue of *densification* was put on the agenda quite late compared to other countries, Møller says. The interviewees are also quite unanimous in their view that this has been a transport-wise unfavorable development. However, several interviewees also say that the outward expansion has been, at least to some extent, counterweighed by inner-city densification during the more recent years.

According to Nielsen, the new national goal of promoting growth in Copenhagen in order to strengthen Denmark's international competitive power has made it easier for the planners in Copenhagen to propose high-density development. For the first time it is now possible to set standards for plot ratio, amounts of open space, sunlight conditions, parking provision etc. adapted to high-density development. Five years ago, Nielsen says, these standards could not have been set.

Ege Jørgensen as well as Kramer Mikkelsen Østergård and Bente Frost (the latter a former Mayor of Building and Techniques for Denmark's Liberal Party in the Municipality of Copenhagen) describe how Copenhagen and other cities are currently being densified. Ege Jørgensen says that this is due to changed priorities in planning, but also has to do with the newest trends where cities should look like cities. This means that the inner parts of the Municipality of Copenhagen have started growing again. Harbor areas and former

industrial areas are being developed, residences are built and the numbers of citizens and workplaces are rising. People have begun to see the big cities as locomotives, Ege Jørgensen says, 'drawing their countries forward'. The drawback of this is if these 'locomotive' cities are developed on conditions which mostly benefit business life – for instance if citizens are being 'pushed out' of the city to make way for shops and parking space, which is what for instance Starck says is happening in Copenhagen. Starck is especially interested in social sustainability in the sense of equality and in her opinion the municipality has not been fair to people who are not wealthy. Copenhagen has become too expensive for ordinary people to live in – and the social life is based on the idea of a so-called 'party zone', Starck says, with almost non-stop amusement for citizens and tourists. The municipality also uses the phrases 'sustainability' and 'green' when they talk about letting people with jobs move into apartments in the publicly run building stock even though unemployed persons are first in line, Starck says. She also thinks that too few of the traffic areas in Copenhagen (parking lots and excessively wide roads) have been transformed to, for instance, recreational areas.

Jan Christiansen (City Architect of the Municipality of Copenhagen) and Kramer Mikkelsen seem to be quite proud of *Ørestaden* (the new neighbourhood on Amager which has been planned and developed with much regard to sustainability). As Kramer Mikkelsen is the director of the project organization developing Ørestaden and Christiansen is the City Architect this is of course not especially surprising. First the Metro stations were built and then the building stock was situated very close to the stations, they say. According to Christiansen, Ørestaden is very dense and few parking lots have been built here. Kramer Mikkelsen adds to this that the parking space per square meter of floor area is quite small, forcing people to use the public transport services instead of the car. The 'City and Port Development' is responsible for the parking space development and have from the beginning taken care that people do not get used to driving to and from Ørestaden, Kramer Mikkelsen says. Also Hartoft-Nielsen mentions Ørestaden as a positive example of a reasonable modal split and adds to this that the public transport services in the area are good.

Only two interviewees talk about locating shopping-, service and leisure facilities. Birgitte Henriksen (Project Manager in the Danish Road Directorate) describes how the metro in Ørestaden was built before the residential buildings, which was a reasonable decision. Then, however, the politicians allowed a big shopping center, Fields, to be built (many times bigger than originally allowed in the

legislation), the nearby motorway became crowded and more slip roads were built.

Nielsen talks about how maintaining small and middle-sized shops in the city is important for the city life and thus for minimizing transport. The shopping centers in the suburbs have taken away shoppers from the inner city. On the other hand, the two big shopping centers in the inner city might have brought them back, Nielsen says. Another possibility is that the many shopping centers altogether have made people go further in order to do their shopping.

Some of the Copenhagen interviewees talk about how the very *planning of spatial development* in the Copenhagen Metropolitan area has led quite an unsettled life and how long-term planning has not been on the agenda. The Greater Copenhagen Council was closed down in 1989. Then the regional planning was managed by Copenhagen, Frederiksborg and Roskilde counties and the municipalities of Copenhagen and Frederiksberg and then 'Hovedstadens Udvikling Råd' (Greater Copenhagen Authority) was reintroduced in 2001. Later the same year, a new liberal-conservative government gained power. The principle of locating workplaces and housing close to urban rail stations was then weakened and new limits were introduced. Now new building stock could be placed further than 1000 meters from an urban rail station. Recently the regional planning has been moved partly to state level and partly to the new regional council.

According to Østergård, the unsettled planning has resulted in haphazardness as to road building and improvements on the rail system and a lack of public debate in connection with decisions about development. Henriksen states how the Municipality of Copenhagen has sometimes planned for residential areas without enough regard to the transport infrastructure. Henriksen as well as Ege Jørgensen emphasize that one should coordinate the planning for land use and transport. This has been done in Køge Bugt and in Ørestaden. On the contrary, the building stock in Nordhavnen has been planned very quickly and without enough consideration for transport in this area. The municipality has forced the building process because the revenues from selling land in Nordhavnen are paying the next part of the Metro. The harbor area, which is for the time being developed with new residential areas, has therefore become the most recent example of an area where Henriksen is not sure the infrastructure will be developed successfully.

Summarizing: All in all, and in spite of positive development in some areas during the latest years, the Copenhagen interviewees draw a picture of a city where several things have worked and are working against a more sustainable development. Parts of the Finger Plan have either functioned or been interpreted in a way that has resulted in a higher use of private cars. Congestion is taking place on the motorways to the city. For years decentralization has taken place instead of centralization and densification. No one authority has had the power to create and defend plans for a more sustainable development.

5.3 Opinions about transport infrastructure development and transport policies since the 1990s

Although considerable investments in public transport (mainly the new Metro) have been made during the period, several of the interviewees agree that the public transport is exposed to too much competition by improved possibilities for car driving. Yet, only a few of the interviewees emphasize road building as a problem, but several have opinions on the parking policy. The latter opinions, and also the description of what development has actually taken place as regards parking provision are, however, somewhat diverging.

As to the *public transport services,* Østergård, Frost and Henriksen emphasize positive traits of development. More subways and a new metro have been built, Frost says, and more are planned for. Henriksen states that for instance in Frederikssund corridor, the public transport has been improved as an extra S-train rail has been built. Østergård characterizes the Metro as ‘extremely important’ for the transition in Copenhagen. The ring metro will make it possible to charge car driving in the city and thus ’restructure’ car driving, Østergård says, and calls the many new stations ‘an investment’.

On the other hand, Ege Jørgensen points to the fact that as the fingers of the Finger Plan are being extended, the traffic between the fingers grows, too. Hartoft-Nielsen’s investigation into home-workplace journeys shows that people are living in the fingers but that most of the journeys go between the fingers where the public transport services are bad.

One of the problems is that most of the public transport lines go towards the city centre. The poor connections between the fingers

(primarily the poor public transport service connections) constitute the weakness of the Finger Plan, Hartoft-Nielsen says. A modern Finger Plan also presupposes rail services across the urban fingers. If commuter traveling modes are to be substantially changed from car to public transport, a generally better coverage of workplaces with rail transport are required, for example by establishing new light rail lines in the the 'outer palm' (the outer parts of the inner urban area), Hartoft-Nielsen says. A positive thing, though, has been the ring rail line which links all of the five fingers in the outer limit of the central municipalities.

According to Starck and Ege Jørgensen, building the Metro has not been an improvement in regards to sustainability aims. It only covers the inner city and thus moves passengers from the buses, bike riding or walking to the metro. If some of the metro-lines had connected neighborhoods further from the inner city (for instance Nordhavnen) the car drivers might have been potential metro passengers, Ege Jørgensen says. According to Starck, on Amager the Metro runs where people do not have to go and there is no Metro where people live. The Metro was built for bringing people to the airport and to Ørestaden and not for the people actually living on Amager, Starck says. Kramer Mikkelsen, on the other hand, explains how the Metro lines run where people *are going* to live, whereas the neighborhoods where people *already* live are covered by other public transport services.

As to *pedestrians and bike riders,* Frost mentions the expansion of the number of square meters pedestrian streets and 300 km cycle paths as some of the successes from her time as a mayor. Ege Jørgensen also talks about the bike traffic which, according to him, for many years has been regarded as a kind of 'amusement'. Actually the bike traffic covers quite a lot of the total amount of traffic, but it is, Ege Jørgensen says, as if a totally different perspective is taken when it comes to investing in bike traffic. Motorways and metros are easily granted billions of DKK. Bike lanes on the other hand have difficulties getting as small amounts as for instance DKK 4 million. On the other hand, Ege Jørgensen says, the bike traffic is now being taken into consideration more seriously, especially in Copenhagen inner city and on Frederiksberg. Different parts of the city are being connected by bike lanes. Ege Jørgensen stresses that these lanes send signals about modernity and quality.

Only a few interviewees (Ege Jørgensen, Lund Pedersen and Hartoft-Nielsen) problematize the *urban highway development* that has taken place in Copenhagen Metropolitan Area during the period. According to Ege Jørgensen, it is very shortsighted when the Danish state builds

roads or extra lanes to help solve road capacity problems. After only 4 years these road stretches will have congestion problems in the new lanes or roads as well. Ege Jørgensen thus has a critical opinion about the fact that the bypass road 'motorring 3' is currently being expanded from 4 to 6 lanes. According to Ege Jørgensen, the public transport share on these road stretches is extremely low.

Lund Pedersen and Hartoft-Nielsen explain that Copenhagen Municipality has agreed with the state to build a new motorway from the Lyngby motorway to Nordhavnen. According to Hartoft-Nielsen this is a very unfavorable decision. In his opinion, Copenhagen is a good city for living because it, until now, has been possible to 'attack' it by cars only from an angle of 150-180º.

New road infrastructure and parking space are also being built for neighborhoods close to the inner city. The *parking policy* in Copenhagen has attracted more car riders and the park-and-ride opportunities do not seem to impress Ege Jørgensen. Park-and-ride in the Copenhagen metropolitan area is used mostly by people who are going to the inner city where it is difficult to find parking space. Even though it is fully possible to use park-and-ride also if one is going to one of the suburban municipalities almost no one does so, as there is no congestion on the road stretches and enough parking space in these parts of the metropolitan area. Frost, on the other hand, mentions forcing the cars out of parts of the inner city and closing parking lots on the central public squares in Copenhagen as a positive development. Starck does not agree and says that too many parking lots were kept or built during the 1990s even though one knew that 'parking space is to cars what sugar is to flies'. The Municipality of Copenhagen has never limited car traffic, Starck says. They have always tried to solve the traffic problems by moving traffic around, which has resulted in more traffic.

According to Ege Jørgensen, the parking policy in Copenhagen has been developed to give the customers access to shopping and not to decrease the amount of car traffic. The turnover of cars parked has increased and thus the policy has contributed to increased use of private cars. On the other hand, according to Christiansen, Copenhagen has a policy for limiting the number of parking lots. Few new parking lots are built and in the inner city parking space is closed down. Distinct from this, the parking space built in 'Tuborg Havn' is, in Christiansen's view, a catastrophe in regards to sustainability. One parking lot per 25 square meters is built here. This is the Municipality of Gentofte and not Copenhagen, Christiansen says.

Some investors want to establish more parking space in connection to new building projects than the Municipality of Copenhagen would like to approve of. If the authority insists on only one parking lot per 200 square meters, Nielsen says, the investor might threaten to build in a suburban municipality instead.

The Municipality of Copenhagen also wants to increase the amount of parking lots available at new buildings that include workplaces, Lund Pedersen says. According to Lund Pedersen, a whole new culture has developed in the group of white collar people: Parking lots in connection with workplaces are now a 'must'. This has enormous consequences to sustainability, Lund Pedersen says. A large number of commuter parking lots are demanded even where development is actually taking place close to urban rail stations. Within a distance of 500 meters from Copenhagen Main Station 2000 commuter parking lots are now established, Lund Pedersen states. This will make people chose the car instead of the train. In Lyngby Cowi has built new offices on the station area. However the offices were followed by almost one parking lot per employee (3 parking lots per 100 square meter floor area). Cowi has not thought of sustainability at all, Lund Pedersen says. When developing Sydhavnen, one parking lot has been built per 50 square meter floor area. The demand for 1/100 was conceived as a minimum which has resulted in 10,000 parking lots in this area together with the area of Nordhavnen and Østerbro.

As can be seen above, the interviewees are quite concerned about how parking policies have been carried out in Copenhagen during the recent decade or two and draw more attention to this issue than towards urban highway construction. The 'stories' of the parking policies, however, do not support each other as some interviewees think there has been a decline in the amount of parking space while other state that the amount has been rising.

5.4 Interpretations of sustainable development

The concept of sustainable development

Since the report from the UN World Commission on Environment and Development (the Brundtland Commission) was published in 1987, the concept of sustainable development has become a mandatory part of the vocabulary of politicians, administrators and planners. It has become virtually politically impossible not to be a supporter of a

sustainable development. Given this, there is no surprise that interpretations of the concept vary among our interviewees.

To three of the interviewees, Jørgensen, Hartoft-Nielsen and Møller, sustainability is a concept mostly connected with environmental matters. The focus is on long term protection of nature and environment and utilizing resources in a way that leaves enough resources for future generations. These interviewees talk about issues such as how the word 'sustainability' is being used too broadly, how few of the things we do in the Danish society are really sustainable and how the concept of sustainability is to a high degree used to defend a blind adjustment to the global competition and to 'green wash' opinions on matters which have basically nothing to do with sustainability.

Ege Jørgensen, Hartoft-Nielsen and Møller are professionals for whom sustainability is as a more or less integrated part of their daily work-life, whether they represent an institution (like Hartoft-Nielsen represents the Ministry of the Environment) which is profoundly dedicated to sustainability, or they represent institutions (Ege Jørgensen representing a public transport company and Møller a municipality) which have to consider sustainability issues in some of their work. It might be worth noticing that, according to Møller, neither The Transport Council nor Roskilde Municipality has ever defined sustainability.

Five of the Copenhagen interviewees talk about environmental as well as social and economical dimensions of the concept of sustainability. Østergård, Nielsen, Henriksen, Christiansen and Kramer Mikkelsen talk about lifestyle, the 'attractiveness of the city' and about 'the good life'. Here it is noted that sustainability, strain and resources are elastic concepts and that, when discussing sustainability, one should talk about personal and economical resources as well as natural resources. A wide specter of things are not measurable, Christiansen says, and thus one has to prioritize. Christiansen and Henriksen also agree that lifestyle and transport are connected. Transportation, Henriksen says, is often a precondition for 'the good life'. When The Road Directorate assesses road projects the local perspective is in focus, for instance regarding noise and pollution. The global levels of pollution are not mentioned by Henriksen. The Road Directorate does not give special consideration to the concept of social sustainability - except in connection to accessibility. Road pricing could create social inequality, Henriksen states, as single mothers might not be able to afford the travelling between their home and workplace.

Nielsen says that different people will consider sustainability in different ways. On the one hand he himself says things in support of the original/traditional conception of sustainable development like 'one has to consider the whole life cycle of a product'. On the other hand Nielsen is himself an example of bending the concept when he says that economical resources are as important as natural resources and that traffic barriers can be strains on the environment.

Kramer Mikkelsen talks about how different interests influence on the conception of sustainability. He gives an example of how differences in interests might occur between the urban and the rural population. The urban population can benefit from sustainable urban development in the shape of densification and good public transport services, while the rural population might take an interest in having more building stock and workplaces in the rural areas.

These five interviewees who talk about environmental as well as social and economical sustainability are the representatives of the 'broad view' on sustainability. They do consider both people in other countries and future generations but they speak about sustainability in such broad terms that it can be difficult to assess the consequences of different policies and infrastructure projects. On the one hand these interviewees thus seem to be aware of the original use of the concept of sustainability. On the other hand they might be under the influence of structural conditions and trends in the modern society which benefit from widening the interpretation of the original concept. These five interviewees hold positions where they have to be careful not to take sides. They all work in institutions that make or carry out political decisions.

Only one of the Copenhagen interviewees focuses mostly on the economical dimension of sustainability. Reflecting his position as a mayor of a suburban municipality and champion for more development in his part of the region, Bjørstorps interprets the concept of sustainable development as 'being able to handle a modern development'. According to Bjørstorp the authorities in the municipalities must be able to secure the necessary development in a modern municipality in regards to the business aspects, the social aspects and the educational aspects. All together Bjørstorps' interpretation of sustainability is a rather 'practical' one – aimed at making the Danish municipalities function well. Bjørstorp is the only interviewee who emphasizes that development in general is more important than ensuring environmental sustainability. The terminology Bjørstorp uses shows us how modern politicians are partly 'shopkeepers' – forced to put financing on top of their agenda.

Economical sustainability is a precondition if the municipalities want to preserve their independency, Bjørstorp says. Thus Bjørstorp can to a high degree be said to represent growth perspectives and the interests of the Danish municipalities.

Three of the Copenhagen interviewees, Lund Pedersen, Frost and Starck, are either uneager to define the concept or talk about sustainability in other terms than the ones used by the other interviewees. It is not that these three seem to be unaware of the different dimensions or the common definitions of sustainability. Their special interests or positions in politics and society, though, seem to make them prone to elaborate on limited areas of sustainability. Thus Lund Pedersen is mostly interested in traffic issues, Frost talks mostly about the aestethic dimensions of urban development and Starck is eager to describe the social problems in Copenhagen Municipality and the misuse of the phrases 'green' and 'sustainable'.

The dominant interpretation of the concept of sustainability in the Copenhagen case must be said to be the broad one. Five of the twelve interviewees think that sustainability is many things and that it is difficult to define, prioritize and assess the different issues and dimensions of sustainability.

The interpretation that differs the most from the other is that of Bjørstorp, the Mayor of Ishøj Municipality. In his opinion sustainability is mostly about securing the economy of the municipality. However, Bjørstorp is the only mayor of a local municipality in the Danish as well as the Norwegian part of the research project and as such it it not surprising that he has different perspectives than the other interviewees.

The global dimension of sustainability is mentioned by some of the interviewees, however only briefly. The social dimension is touched upon by some of the interviewees, however in rather different perspectives. The interviewees mentioning the economical dimension focus on resources as well as welfare, competitiveness and growth.

Sustainability challenges and goals

The interviewees express diverging views as regards what elements of urban development are most important to address (e.g. the building stock, the transport infrastructure, or the green structure) in response to sustainability challenges and which goals should be given priority.

Seven of the Copenhagen interviewees, Møller, Hartoft-Nielsen, Ege Jørgensen, Kramer Mikkelsen, Nielsen, Christiansen and Østergård, focus on both the building stock and the transport infrastructure as main issues to address in a more sustainable urban spatial development. They all agree to the importance of reducing the CO2 emissions from transportation by limiting the consumption of urban land. As Kramer Mikkelsen puts it: concentrating the city and developing high-class public transport services are each other's conditions. Another question is that of building detached single family houses, which on the one hand lead to a land-consuming and transport-dependent urban developmental pattern, whereas on the other hand a stop in the construction of such houses in the semi-peripheral suburbs might, according to some interviewees, make people move to locations at even more peripheral parts of the region. A third question is that of the level of mobility required. Two interviewees, Nielsen and Østergård, talk about a 'robust' urban development and transport infrastructure that can give way to transformation. Østergård has a different perspective as he finds it important and inseparable to solve the challenge of transport and to *decouple*. In a big city many trips must be undertaken, Østergård says. He does not talk about limiting the amount of traffic and he does not want to explain how to decouple, though.

None of the interviewees focuses only on the building stock and none of them talks much about the green structure. Only one interviewee, Lund Pedersen, talks solely about the transport infrastructure. According to Lund Pedersen, restricting the use of land for car traffic is the most important issue to address in urban spatial development in response to the challenge of a sustainable development.

As in the question of defining sustainability, the suburban mayor Bjørstorp has a different perspective than the rest of the interviewees. Good infrastructure connections to the different neighborhoods is more important than densifying, he says, and using urban land use for influencing traffic requires building more dwellings and new roads to connect these dwellings to bigger roads. As to energy use Bjørstorp states that Ishøj Municipality has many roads and is forced to increase road capacity even more. Again, Bjørstorp emphasizes *economic* sustainability.

An opinion which is apparantly in total opposition to this is that of Starck who thinks that the city should be car free. Starck is very interested in social sustainability and she also talks about how people who are not wealthy can no longer afford to live in the city. Thus Bjørstorp and Starck are each other's counterparts, talking about

economical versus social sustainability. Their positions, however, explain much of this: being a former sector mayor in Copenhagen respectively a present mayor of a local municipality and talking about very different surroundings: the inner city of Copenhagen and Ishøj Municipality.

It might be added that Østergård has a third opinion on the issue of social sustainability and urban development. The biggest problem in some cities in the world is the social and economical inequality, he says. Østergård does not think this is a problem in Denmark, though, since the Danish society is more equal than many others.

As to the consequences of the urban development few of the interviewees mention noise, outdoor life, aestethic qualities and historical values as important issues to consider. Energy use and reduction of climate gas emissions are the issues that most of the interviewees are preoccupied with.

Hartoft-Nielsen distinguishes between local and global sustainability. Developing workplaces centrally is more problematic than developing dwellings because the former will attract workers from a wide area, Hartoft-Nielsen says. Thus he is worried about the consequences of developing too many workplaces in for instance Nordhavnen. Regarding the contribution of transport to global warming this will mean a lower amount of car driving, but locally the area with the workplaces might be 'overwhelmed' by car driving employees which would result in for instance more noise and local pollution.

Several of the Copenhagen interviewees talk about changing modal split and limiting car driving. Some of them mention prioritizing bike traffic. Only three, however, (Møller, Kramer Mikkelsen and Ege Jørgensen) go into details about this. We have to preserve the 'unique biking culture of Denmark', Møller states.

The interviewees differ much in their descriptions of car driving. From Starck, who wants a car free city and Lund Pedersen, who talks a lot about the damages from car driving, over Østergård and Nielsen, who are 'both sides' representatives (Nielsen being the only interviewee to mention the importance of considering shopping facilities), to Bjørstorp who defends building more roads.

Thus different perspectives are represented among the Copenhagen interviewees: a 'growing, competing, surviving' perspective represented by the local mayor; a 'modern, neutral, pragmatic' perspective represented by some of the professionals and with some of these also defending an 'environmentalist' perspective, where the

interest of citizens with no access to cars and citizens who worry about the pollution from the cars are represented. The environmentalists describe how some politicians, authorities, business people (the 'car lobby') and people living in rural areas represent the opposite opinion: prioritizing car driving and developing rural areas.

5.5 Land use priorities

Given the widespread criticism expressed by the interviewees against the outward urban expansion that has taken place in the metropolitan area during recent decades, it is hardly any surprise that most interviewees state more or less clearly that they prefer densification rather than urban sprawl. Seven of the Copenhagen interviewees explicitly say they support densification (Østergård, Christiansen, Kramer Mikkelsen, Hartoft-Nielsen, Frost, Lund Pedersen and Ege Jørgensen). The rest of the interviewees do not claim to be against densification. Likewise, half the interviewees talk in positive terms about the Finger Plan, while only one interviewee expresses clear objections against its key principles. The remaining interviewees do not state any clear opinions for or against the land use strategy of the Finger Plan.

Inner-city densification

A big majority of the Copenhagen interviewees support densification close to the city centers. According to Østergård, it would be possible to stop taking new land for building and instead increase densities within already urbanized areas to meet the need for new dwellings. In his view, new building stock must be located in the central municipalities, and a new traffic structure should be built. He supports the many new metro stations and says they will mean a bigger demand for housing and workplaces. Christiansen says that the only sustainable way of living is actually in the city and that people living in the city do not need cars. The challenge for the architects, Christiansen says, is to find out how dense the city can be. Copenhagen is trying out plot ratios of 400% on the Carlsberg area.

Especially the planners, Hartoft-Nielsen, Ege Jørgensen, Møller, Nielsen, Christiansen, Henriksen and Østergård – as well as Kramer Mikkelsen, regard densification close to the city center as important in order to meet sustainability requirements. Ege Jørgensen, Kramer Mikkelsen and Christiansen think densification is an important response to the challenge of a sustainable development, in particular because it is good for minimizing transport. Lund Pedersen would like

the centrally located harbor development area Nordhavnen to be a ’demonstratorium’ for a more sustainable urban development. Kramer Mikkelsen thinks it is necessary to provide more affordable dwellings in the city and he supports the rule that developers are forced to make 15-20 % of the new dwellings supported tenement buildings and to mix privately owned dwellings with tenement houses. Hartoft-Nielsen, on the other hand, is worried about the plans of the present Lord Mayor Ritt Bjerregaard for building cheap dwellings on green areas close to the city center.

Frost is rather satisfied with the present plans for building new residential areas on the former harbor area. She emphasizes the need to preserve the green and blue areas as recreational areas. Frost initially says that only the surrounding municipalities can do something about urban sprawl. She prefers a clear line between rural and urban areas and supports the principle of locating office and housing development close to urban rail stations. She also has a positive view on the increase in urban densification in Copenhagen. As a lot of citizens in the central parts of Copenhagen do not own cars the city should have shopping centers close to urban rail stations, Frost says. She is also afraid too many shopping centers in the suburbs will make the city lose it’s ‘life’.

According to Nielsen, it is necessary to develop new standards. New interpretations of already existing concepts such as plot ratio, norms for outdoor public space and norms for parking supply are needed. Nielsen himself recommends a plot ratio/development density of 250 which is remarkably higher than the ones used earlier. He also wants the present areas for development (in Sydhavnen, the Carlsberg area and Grønttorvet) to be finished before new projects are developed.

Kramer Mikkelsen, on the other hand, illustrates the fact that a wish for flexibility in order to be able to meet future needs for centrally located development may conflict the wish for high immediate densities in urban redevelopment areas. Instead of building expensive dwellings on every square meter of the harbor area some areas in the city should be left unused for future generations to decide about, Kramer Mikkelsen says.

Mixed-use is only mentioned explicitly by two interviewees, Nielsen and Kramer Mikkelsen, who support mixed-use. The municipality of Copenhagen wants mixed use, Nielsen says. The developers like to separate business and housing in different neighborhoods but Nielsen finds it useful to have business functions at the ground floor and housing on top of that. Copenhagen has not succeeded in this, Nielsen

says, as the municipality is dependent on the developers to buy and develop land. Kramer Mikkelsen also thinks the best urban development is one with mixed use and mixed kinds of dwellings.

Decentralized concentration

The fact that the Copenhagen interviewees emphasize the importance of locating and densifying close to city centers does not mean that they do not support locating and densifying close to public transport nodes and in the transport corridors in the suburbs. Most of the interviewees mention this as well. Christiansen is still the only Copenhagen interviewee who says that he prefers a polycentric city with 'partially very high density' close to public transport stations.

Møller has a more radical view on 'decentralized concentration'. In Møller's opinion, Denmark should develop a few really big cities. We keep developing a lot of building stock and people keep moving from the countryside to the big cities, he says. The reasonable thing to do would be to create a few 'New York-ish' cities. If we did that we would have the opportunity of creating an infrastructure system with easy, cheap and environmentally friendly transport.

As mentioned earlier, half the interviewees say they support the *Finger Plan*. Hartoft-Nielsen, Frost, Ege Jørgensen, Kramer Mikkelsen, Møller and Østergård all talk about the plan in positive terms. Bjørstorp claims to support the plan. However, he has many objections to it.

Ege Jørgensen and Kramer Mikkelsen want to preserve the Finger city principle and – along with Østergård – they want to focus the growth in the building stock to the central parts of the Copenhagen Metropolitan area. Ege Jørgensen states that although the 'fingers' in the Finger Plan are covered by public transport services the fact that the fingers are being extended makes the traffic between the fingers grow, too. Hartoft-Nielsen too favors inner-city residential development. However, Hartoft-Nielsen thinks that developing workplaces in the Northern Harbor area is more problematic than developing dwellings because this will attract workers from a wide area. Hartoft-Nielsen seems to be of the opinion that for the metropolitan as a whole this will mean less car driving but locally the area with the workplaces might be 'overwhelmed' by car driving employees. Hartoft-Nielsen agrees that some development should take place in the Northern Harbor area, preferentially close to the Nordhavn rail station, but he thinks densification and inner-city development should rather take place in other relatively central areas such as Valby, Ørestaden and along the Ring rail line.

As Møller is now a representative of the Munciplity of Roskilde, he states that it would be okay to extend the fingers and to develop more building stock in them if one still observes the principle of building close to urban rail stations. According to Møller, new connections between the fingers should be built close to the fingertips and should consist of both roads and public transport systems. This development of infrastructure should not be followed by development of new built-up areas between the fingers. However, this is a difficult issue (balance), Møller says.

From a somewhat different angle than those who argue for development close to already existing public transport nodes, Henriksen states that the densification has to be 'in the right places' in terms of accessibility, which means places with 'capacity' for either roads or public transport.

Suburban growth strategies

Bjørstorp is the only interviewee not satisfied with the new Finger Plan 2007. In his perspective the Finger Plan is to some extent blocking the development of business and residences and does not fulfill the needs of the municipalities west of Copenhagen. The municipalities want development, for instance in the many worn-out industrial areas, and they want to have a bigger say as to what to do with these areas. In Bjørstorp's opinion, the form of the business development should not be restricted and it would be okay to build dwellings in the former industrial areas. He regards this as a less favorable solution, though, as this would perhaps create new problems and force the municipality to build more roads, schools and so on. Bjørstorp is contradicting himself in this case – as he had nothing against building schools in the smaller towns in the municipality. Bjørstorps' 'problem' is assumingly that he wants more workplaces in the municipality – to 'keep the city alive' – but that he is unwilling to say this in clear words as he understands the implications for sustainability.

In opposition to Møller (cf. above), the Cooperation of Municipalities West of Copenhagen, of which Bjørstorp is the chairman, thinks the new Finger Plan includes areas too far from Copenhagen (the 'fingertips'). At the same time the Finger Plan 'forgets' the areas in the palm of the hand. The cooperation also wants development between the fingers.

According to Bjørstorp, the principle of developing within 600 meters from an urban rail stations is too strict. 'One should not be so afraid of an extension around the stations. We are much too restrictive in

Denmark around this', Bjørstorp puts it. As the only interviewee, Bjørstorp also supports locating new workplaces and dwellings to areas further than 1000 meters from an urban rail station. This is perhaps not surprising, though, as Bjørstorp is the only interviewee responsible for the 'survival' of a local municipality and dependent of income from taxes.

Bjørstorp recommends that the government think of the Finger Plan as guidelines (for instance in regard to the border between open land and land to develop) and let the municipalities themselves decide the details. The content of the guidelines should evolve around the services that people demand: traffic (no congestion – by building more roads), business development (more liberal than today) and urban development (more development of dwellings – also west of Copenhagen).

In the eyes of Bjørstorp, Ishøj and the other municipalities west of Copenhagen could be an 'independent pole' compared to Copenhagen. The cooperation between Copenhagen and Malmø is reasonable, Bjørstorp thinks, but many people have moved to the west of Copenhagen and this area should have the same possibilities as the areas north of Copenhagen have had. Ishøj would like to develop the smaller villages within the municipality as well as the municipality centre. At present more than 200 new dwellings outside in the smaller towns are to be planned for. In Ishøj itself around 600 new dwellings are already planned for.

Housing types

As regards developing *detached single family houses*, Frost says that it is difficult to avoid urban sprawl in Denmark because the dream of every Dane is to own his/her own house. Frost herself believe in people' s 'right to choose' - at the same time as she wishes for the rural districts to be protected against sprawl. In line with this, Bjørstorp would like a more liberal interpretation of the Finger Plan to make it easier to build detached single family houses, 1-2 floor row houses or two family houses between the 'fingers'.

Frost and Bjørstorp are supported by Ege Jørgensen who thinks that people should 'be allowed' to own single family houses and gardens. At the same time, Ege Jørgensen thinks enough land has been set aside for development already. The 'Organization of City Planners' has found out that enough land has been set aside to cover the need for new dwellings and industrial building for many years. So Ege Jørgensen is surprised more land is still taken. Ege Jørgensen seems to think that this problem can to a certain degree solve itself as many

people would leave the areas with single family houses if the compact cities were more attractive. Actually, many people want to live in the city because they like this way of life, he says. Also, Ege Jørgensen thinks the possibilities for densifying single family house areas are good.

Møller gives an example of someone working against the development of sprawl. In the new municipality, where Roskilde is situated, the planners have stopped some old plans for building detached single family houses (in Viby) as they want the politicians to reconsider the plans and instead densify the area and build a new station there.

As the only interviewee Christiansen says that it would be ok to legislate in order to restrict the rising amount of detached single family houses – as it is totally absurd that the Danes insist on living a kind of rural life in the city.

5.6 Transport policy priorities

Modal split, technology and the level of mobility

Most of the talk about the *problems* one faces when dealing with the wish for a more sustainable urban development is about road development and car driving.

Henriksen mentions health and access, air pollution, noise, time savings, nature, water and cultural environment as sustainability issues in regards to transport and mobility. These are issues that the Road Directorate, which Henriksen represents, considers when they work out their economic analysis, Henriksen says. Along with Frost, Henriksen want people to be able to choose freely between public and private transportation modes - taking their individual conditions into consideration. On the one hand The Road Directorate agrees with the Finger Plan. This logically implies that the directorate is of the opinion that transport can cause problems and should be dealt with. On the other hand, Henriksen does not express any worry about the growth in transport. Henriksen says that transportation is necessary, a part of 'the good life' and also part of globalization. As the opportunity to choose to a very low degree stops people from choosing the unsustainable solutions, this might be interpreted as supporting more mobility.

However, most of the interviewees support a change in modal split – for different reasons. Østergård thinks that one should try to make

people change transport modes from private to public. Starck wants to slowly push the cars out of the city. Ege Jørgensen says that people should have 'good mobility', but this does not necessarily mean increasing the amount of transport and giving people opportunity to travel further and further. Kramer Mikkelsen says that it is not necessary to minimize transport if the actual transport is undertaken in a sustainable way.

Thus the right wing politician and the interviewee from The Road Directorate do not want to interfere too much with 'the free choice' of the individual, whilst the left wing politician wants to force the cars out of the inner city. The remaining interviewees want to change the modal split towards a lower share of car travel, partly by improving the public transport services and the conditions for biking, but also by discouraging car travel without banning their use in the inner city.

A change in modal split implies a wish for limiting traffic growth, but whether it can also be interpreted as a wish for limiting the growth in mobility is more uncertain. To the extent that modal change implies higher shares of non-motorized transport, such change will probably also contribute to counteract the growth in mobility, since pedestrians and bicyclists usually do not accept as long traveling distances as do motorized travelers. Modal change from car to public transport is less likely to involve reduced mobility unless the change makes people get rid of their cars (see below). In the latter case, a change in modal split for everyday travel would trigger a reduction in car ownership that would subsequently probably result in fewer and shorter intra-metropolitan leisure trips.

Technical solutions are mentioned by five Copenhagen interviewees. Henriksen is the Copenhagen interviewee who relies the most on technical solutions. Henriksen thinks that traffic can grow 2-3% a year without grave impacts on the environment as the implementation of new technology such as 'environmentally friendly engines' will lead to high cuts in pollution. Frost wants the EU to see to it that less polluting cars are produced and this is where Frost supposes the biggest environmental profit is to be taken out. On the other hand Frost does not believe in electric cars.

Møller is more skeptical as to whether technology can be a sufficient solution to pollution. He does not say that technical fixes are impossible. He says, however, that we have not seen a breakthrough in this area yet.

Whereas Henriksen and Frost point at new vehicle technology, Nielsen and Kramer Mikkelsen focus on technological measures for

traffic management. Nielsen supports developing new technology to manage the whole road network of Copenhagen in order to improve traffic flow. This would relieve congestion and 'driving around', he states. Kramer Mikkelsen supports regulating traffic flow as a means to limit car traffic.

Lund Pedersen is the only interviewee who says that he believes in decreasing consumption instead of technological fixes. As transport is an important field of consumption, this could be interpreted as a standpoint in favor of *reduced mobility*, but probably Lund Pedersen is thinking first and foremost of a reduction in car traffic. Neither Lund Pedersen nor any of the other Copenhagen interviewees states explicitly that people should have lower (or higher) mobility. It still seems that none of the interviewees is able to imagine a society with less transportation than today. Admittedly, Møller mentions that The Transport Council – before it was closed down in 2002 – supported the reduction of the need for transport and wanted to change and improve the transport system instead of increasing the road capacity. Reducing the *need* for transport is, however, not the same as reducing the actual amount of transport.

Instead, a large majority of the Copenhagen interviewees emphasize a change in modal split. Two of the Copenhagen interviewees are quite strong proponents of technical solutions for vehicles, two other interviewees mention development of new technology for managing traffic flow, while one interviewee does not believe in 'technological fixes' at all. The rest talk mostly about changing modal split.

Promoting environmentally friendly modes of transport

A majority of the Copenhagen interviewees support increased investments in public transport services. According to Kramer Mikkelsen, the most important thing is to increase the public transport services. Commuting must to a higher degree take place through the use of public transport services, Kramer Mikkelsen says. He wants a public transport connection around Copenhagen – for instance a light rail – and he also wants more Metro.

Henriksen thinks the most challenging task is to bring the public transport up to date in regards to regularity and comfort. Especially, the bus services must be improved, she says. In Henriksen's view, extending the roads is not enough to solve future transport challenges. The public transport must be improved as well. She mentions sailing buses and more metro as possibilities for coping with the extra need for transport. Bjørstorp, on the other hand, thinks the price of using the public transport services is more important than the fastness and

the quality of the public transport services. The prices have risen every year for some years now and this is a problem. Cutting off half the price would help make people choose public instead of private transport, according to Bjørstorp.

In Lund Pedersen's opinion, much more money should be allocated to public transport. Christiansen thinks it is important have public transport on separate lanes instead of being delayed by congestion. He therefore recommends building rail and transport infrastructure especially for the public transport services.

Ege Jørgensen, Møller, Hartoft-Nielsen and Bjørstorp all think that one has to see to it that more of the traffic between the fingers can be carried out by means of public transport. Hartoft-Nielsen says that although there is a true need for high class public transport services further out in the region, the public transport services between the fingers are more important to develop. Bjørstorp and his colleagues would like a light rail connection between the fingers. Møller supports 'ring connections' in the area closest to the fingertips and says that car driving should be restricted. On the other hand, Møller and Bjørstorp both advocate for private as well as public transport solutions between the fingers.

Starck did not want the Metro. In her view, the Metro mostly covers only those parts of the city where people might as well walk or ride bikes. She thinks the money for the metro would have been much better spent on light rail inside Copenhagen and out of the city in those 'fingers' that do not have an S-train line.

Hartoft-Nielsen, too, would have preferred light rail to Metro. Much more light rail than metro could have been built for the same amount of money and it would have been ok with him if the light rail took away space from the cars. Hartoft-Nielsen reports that the Finger Plan 2007 has consciously relaxed the principle of building close to urban rail stations in order to support the passenger base for a light rail in Ring 3. The eight industrial/business areas along Ring 3, which are being reorganized, are given the same status as the areas close to urban rail stations.

As to public transport services a holistic view on this is needed, Ege Jørgensen says. The division in many companies is contra productive. One should – like in Vienna – set some superior goals and go for them. The public transport services in Vienna are now gaining market shares by using busses in different sizes, metro, S-trains, regional train lines and so on – which covers the whole city in a good way. The need

to use different means of transportation is even bigger in Copenhagen because it has more sprawl.

Ege Jørgensen, Frost, Christiansen, Hartoft-Nielsen, Starck, Kramer Mikkelsen and Møller all emphasize the importance of a proper *bicycle* (and pedestrian) policy. According to Kramer Mikkelsen the bikes' share of the total amount of transport has to be sustained and preferably expanded. Thus the facilities for bike-riding must be improved further. At the same time, Kramer Mikkelsen points to the fact that the bike is the prime transport means competing with public transport services. Public transport has quite a small part of the total amount of transport, but this is because many people ride their bikes to and from work. Østergård agrees that bike riding is an important mode of transport in Copenhagen. He says it is impressive what Copenhagen Municipality has done for bike riding and he explains it by the symbiosis that has occurred with the policy of health. Also, in a well functioning city many people walk – which is perhaps underestimated, Østergård says.

Road construction – solution or part of the problem?

Several of the interviewees agree that more roads will necessarily generate more traffic. In spite of that, several also support expanding the existing or building new roads to some extent.

Three Copenhagen interviewees, Bjørstorp, Frost and Henriksen, explicitly support road capacity increases. According to Bjørstorp, Ishøj has many roads and is forced to expand the roads and/or build new ones. Bjørstorp is quite worried about congestion and thinks an increase in road capacity between the fingers will solve that problem. These crossroads will not be congested for the first 50 years, Bjørstorp thinks. Ishøj Municipality would like a new road, called 'ring 5' or 'Sydvej', to be built around Copenhagen and into Lyngby or Gladsaxe.

Frost also argues that more motorways should be built to help avoid congestion. She feels that motorways mean less traffic on local roads. In line with this, Frost has for many years supported the building of a tunnel beneath the harbor area which she expects would remove 30,000 cars from the central part of Copenhagen. Frost recognizes that such a tunnel will generate more use of cars but she doubts that one 'in any way can stop car traffic'. Her solution is to redirect the car traffic to places where there is enough space for it.

Henriksen agrees to this. Increased road capacity will move cars from the minor roads to the major ones, she says. More roads will not

necessarily generate more traffic, Henriksen thinks. For instance a new Frederikssund motorway does not lead to more traffic in the inner city, she says.

Four other Copenhagen interviewees, Nielsen, Møller, Kramer Mikkelsen and Ege Jørgensen, are rather ambivalent about road building. They all seem to realize that that building new or expanding existing motorways is a problem for sustainability and basically they do not believe that we can pave our way out of the problems. Kramer Mikkelsen states that many people think that leading the cars underground is a good solution but they forget that the cars return to above ground somewhere. Ege Jørgensen says that new motorways will have new congestion in no time and they provide more traffic which cannot be dealt with in Copenhagen city.

On the other hand these four talk about 'strategically' expanding the road capacity and how new areas cannot be developed without increasing road capacity. Kramer Mikkelsen says that road expansion and road building must solve more problems than they create. He finds it necessary to build a road connection between Nordhavnen and Lyngbyvej and 'something to relieve Østerbro and the inner city'. No matter which connection will be decided on, the idea is to lead the traffic past the city without leading it through. Ege Jørgensen also thinks some kind of road expansion might be needed and is not negative to establishing new road connections north and south of the city. Neither Kramer Mikkelsen nor Ege Jørgensen find it necessary to build a tunnel under the harbor area. The same applies to Christiansen. Contrary to Frost, who thinks the proposed tunnel will remove 30,000 cars from the city center, Christiansen says it would generate far too much car traffic in the inner city, since different interest groups would probably have their way and access roads would be built to the tunnel.

According to Østergård expanding the roads means more cars. Starck and Lund Pedersen agree to this. It is not possible to build a structure of roads that is attractive for travelling between home and work, Østergård says. Copenhagen would start to look like Los Angeles if we tried to. However, Østergård is interested in building a 'robust' system where one can 'switch over' between different modes of transport, and he does not support only public transport. According to Østergård, a well functioning city has many trips and not all of them can be undertaken by means of public transport.

Hartoft-Nielsen does not support road capacity increases. He supports the statements from the Würtzen commission in 1989 which said that the overall road net towards the central municipalities should not be

extended further. On the other hand, people own cars, Hartoft-Nielsen says, and so you have to offer some kind of road services. Local access roads to the dwellings will be enough, though, for instance in Nordhavnen. Hartoft-Nielsen is worried about the development of major roads.

Starck does not support urban highway development and was a strong opponent to such projects when she was a City Planning Mayor. Lund Pedersen is also very much opposed to road capacity increases and supports limiting the extension of the roads. So did The Transport Council which has now been closed down.

Restrictions on car use?

As the only interviewee, Starck wants to slowly push the cars out of the city. Lund Pedersen too underlines and supports limiting the use of cars. Starck and Lund Pedersen are partly supported by Kramer Mikkelsen, who thinks that one must reduce accessibility by car.

Christiansen is aware that the use of cars in urban areas is detrimental for sustainability and he is no supporter of private cars. He does not speak much about restricting the use of cars, though. It seems he would like to design the city in such a way that people voluntarily choose public transport instead of private cars.

Ege Jørgensen, Nielsen and Kramer Mikkelsen talk about the importance of decreasing the amount of *parking* space. In Ørestaden, the municipality has introduced a parking lot rate much lower than before. This rule ought to be exported to other areas, for instance Nordhavnen, Ege Jørgensen says. The parking space in Copenhagen must be restricted and it will be, Kramer Mikkelsen states. Nielsen describes how Copenhagen has restricted parking possibilities. Some parking space is reserved for residents, which makes it harder for people living outside and working inside Copenhagen to find parking space. One parking lot per 100 square meters of residential floor area is a minimum demand that the municipalities can insist on. In a few places the municipalities have implemented maximum parking space demands instead, Nielsen says. If 10 million square meters of building stock is built during the coming 20 years, as Nielsen expects it to (the same amount per year as in the recent years) and the parking space ratio should be 1 parking lot per 100 square meters, 100,000 parking lots would be built. Even if the space for this could be found, the road system would not be able to handle this number of cars, Nielsen says, and thus the politicians must accept new standards for parking with maximum limits. He is supported by Lund Pedersen. Nielsen thinks the Municipality of Copenhagen should consider reducing the parking

lot ratio even more in new areas for development. The municipality would then be forced to guarantee alternative transport facilities – pedestrian and bike path systems.

Nielsen states, however, that the demand for 1 parking lot per 100 square meters building stock might have to be maintained in some neighborhoods (for instance the disticts closest to the inner city – 'brokvarterene') as these neighborhoods already suffer from 'parking-lot-deficit' (not enough parking space to facilitate the inhabitants).

Frost on the one hand wants the cars out of the inner city and states that the two most important measures in order to do that are to expand the subway/Metro and to establish the tunnel beneath the harbor. In her time as a politician she supported the following measures to get the cars away from the inner city: an increase of square meters of pedestrian streets, the closing down of parking zones on different central squares, environmental zones for goods transport, more bicycle paths, subways and metro lines. Frost still supports all of these measures. On the other hand, in her time as a mayor Frost collected 40 million DKK for a car park underneath Kongens Nytorv – a measure that will certainly not contribute to getting the cars out of the city. Frost sees that the number of parking lots has a vast influence on people's choice when it comes to using private cars or public transportation. In spite of this she supports the building of new parking spaces.

Nielsen and Kramer Mikkelsen are skeptical towards *congestion charges* as it may become expensive for employees and companies located inside the area of congestion charges and difficult for companies to hold on to qualified workforce. Together with Møller and Frost, however, they support *road pricing*. The Transport Council was strongly promoting road pricing, Møller says. He tells that Roskilde has started a road pricing project with Copenhagen. Møller is a member of a working group that is developing a common model for road pricing. Møller and Ege Jørgensen both emphasize that road pricing is controversial and that measure have been taken to avoid discussing this. Ege Jørgensen says that it is rather peculiar that the government does not support road pricing, since this is a quite liberal way of limiting the amount of traffic.

Lund Pedersen supports increased fuel prices and car taxation in order to bring down the use of cars. Yet, he seems to be of the opinion that these measures would not be enough to make a real difference.

Although not expressing explicitly any negative attitude against road pricing, Frost and Henriksen both think people must have the

opportunity to choose between private and public transportation, taking their individual conditions into consideration. 'A family with 3 children experiences a nightmare every morning if they have no car. Both parents can not go to work if the family does not have one or two cars,' Frost says.

Summarizing

Three Copenhagen interviewees are skeptical towards increased road construction. Four are ambivalent and three support road capacity increases. Three mention reducing parking facilities – one supports increasing them. Four mention road pricing as effective means. Two are worried about congestion charges.

A majority of the interviewees support investments in public transport services. Eight of the interviewees emphasize sustaining or improving the facilities for bike riders and/or pedestrians. Four think it should be easier to travel between the 'fingers'. However, while Bjørstorp supports increasing the road capacity between the fingers as well as the public transport services, Hartoft-Nielsen and Møller think there is no need for more car driving in those areas.

5.7 Stakeholder influence

Several actors are mentioned by the Copenhagen interviewees as having influenced the development in a more or less sustainable direction. Below, we shall take a look at the roles of the following groups in supporting or counteracting a transport-reducing and less car-based urban development: commercial agents, local authorities, sector authorities within public administration, environmental organizations, other lobby organizations, political parties and voters. Examples of coalition formation, tactics and exclusion will also be given. The influence of state-level policy instruments will be addressed in the last section of this sub-chapter.

Commercial agents

Some of the *developers* are interested in densification and reorganization of areas in the inner city, Hartoft-Nielsen says, but he, Nielsen and Starck agree that private investors can be promoters of traits of development in conflict with sustainability concerns. The big *banks* who finance new development insist on planning for much parking space. According to Nielsen and Starck, the Municipality of Copenhagen listens carefully to the demands from investors in order to reach some of their own goals.

Interestingly, none of the interviewees mention examples of pressure from individual developers resulting in different spatial solutions than those preferred by the public authorities at the outset. Among the interviewees of the parallel case study of Oslo metropolitan area, several such examples were mentioned. One possible, albeit speculative explanation could be that the Danish municipalities have to a higher extent 'internalized' market responsiveness in their spatial strategies, thus making it unnecessary for developers to lobby for changing the original public plans. As shown below, commercial agents have through their organizations acted as lobbyists to a considerable extent. Their inputs and influence thus seems to have taken place at a strategic planning level rather than in connection with individual projects.

Local authorities

Østergård several times mentions the competition between the many municipalities in the region. The reform of the municipal structure in Denmark has now solved many of the problems, Østergård says. He is of the opinion that if 5-6 small municipalities are turned into one big municipality the competition ceases, which is good for sustainability. (Østergård does not mention the possibility that the new, merged municipalities may be more able to compete than the previous, smaller municipalities and that the the municipal reform may result in increasing instead of decreasing competition.) However, the Copenhagen Metropolitan Area still consists of 34 municipalities – even after the latest reform of the municipal structure of Denmark.

Hartoft-Nielsen characterizes the now abolished Greater Copenhagen Authority (HUR) as kind of a 'club for mayors'. All they agreed in was to keep out of each others businesses. What Hartoft-Nielsen has experienced himself is that the political pressure for less sustainable solutions comes from the mayors and the municipalities towards the ministers.

According to Lund Pedersen, the municipalities are eager to locate big business buildings in their area. Lund Pedersen calls the Greater Copenhagen Authority an extremely big villain in the regional planning. Claes Nilas, the Chief Executive Officer of the Greater Copenhagen Authority from 2000-2004, was responsible for the environmentally very unfavorable Traffic Plan 2003 where roads were promoted. According to Lund Pedersen, Nilas did not want more public transport and thus did not work out scenarios with different forms of transport. Also Nilas' reporting of the statements from different organizations wrongly stated that more roads were wanted,

Lund Pedersen says. The whole planning was based on a false assumption about a very rapid raise in the amount of traffic.

Some politicians, Ege Jørgensen states, have tried to break the Finger Plan down piece by piece. They have been calling it 'developing' the Finger Plan but actually they have been planning for more use of land for building. Local politicians from the outer parts of the Greater Copenhagen Authority territory, for instance, were afraid that Copenhagen would get all the development. Thus, they wanted development also in the municipalities without train stations and partly succeeded in having the principle of building close to urban rail stations redefined. The same politicians also wanted to use the land along the motorways for building, which they did not achieve according to Ege Jørgensen.

Henriksen too notices that local politicians try to influence national politicians.

The above examples show how local politicians sometimes have interests that go against overall sustainability goals – and sometimes succeed in sabotaging the sustainability measures.

Ishøj is one of Copenhagens neighbor municipalities which would like some 'better possibilities of developing close to urban rail stations', partly because they have had some competition from municipalities further away from Copenhagen, Bjørstorp says. This probably means that when Ishøj is not allowed to build outside the radius of 600 meters from the station, the people who move to the countryside have to choose locations further out on Zealand. However, the people in those areas have to spend much time in rush hour congestion, Bjørstorp says.

Only the Agencey for Spatial and Environmental Planning is against building offices in Ishøj, Bjørstorp says. He has not met any local stakeholders who were against expanding the industry and business area.

From the way Bjørstorp presents the different actors and stakeholders, it seems that the local politicians in the municipalities are perhaps not unwilling to promote sustainability – but they have not been put in positions where they were compelled to do this. Instead their – often difficult – task has been to handle their municipalities on market terms but without having the right to regulate their own incomes through regulating taxes.

Lund Pedersen, on the other hand, is amazed by the fact that the municipalities in the outskirts of Copenhagen do not take action against the 'traffic hell' in their areas. Rødovre Municipality actually protested against having part of the Frederikssund motorway in their area as well as against the establishment of more parking space in Copenhagen because this will lead to more cars in Rødovre. According to Lund Pedersen, however, no other municipalities have seen this connection between motorways, parking space and the amount of cars.

Sector authorities within public administration

Some interviewees point at somewhat different roles played by the land use planning authorities and the transport authorities.

The *Ministry of Transport* was afraid road pricing was too controversial and would get them in trouble, Møller states. The ministry was also afraid the technology would be too expensive to develop. As ministers and their staff, according to Møller, are always afraid of putting controversial things on the agenda, Møller is probably referring to both ministers of social democratic and liberal-conservative opinions.

Lund Pedersen describes former transport minister Sonja Mikkelsen as a politician with a vision who wanted to try something differently. Mikkelsen was, according to Lund Pedersen, 'beat up' by the professionals in the ministry and also by people outside. The transport minister who succeeded Mikkelsen was Jacob Buksti. He wanted to double the amount of motorways and was therefore not pushed out by the professionals and lobbyists. Lund Pedersen thinks that sometimes the different public authorities are 'self supplying' in regards to recruiting professionals of the same opinion as the politicians or the already engaged professionals. He says that there is a special 'car loving culture' in the area of traffic policy and quotes the former head of department, Ole Zacchi, for having said: 'We love cars. Car is mans' best friend. You cannot work in The Ministry of Traffic without being a car-lover".

With Connie Hedegaard, the attitude of the *environmental minister* towards planning has totally changed, Hartoft-Nielsen says. When the agreement on the administrative structure in connection with the municipal reform was negotiated, the principle of overall planning in the Copenhagen area was in a fragile position. However, the government decided that there had to be a higher-level planning of urban development and recreational interests etc. in the Capital Area across municipal borders. A separate chapter on planning in the

Copenhagen Metropolitan Area was therefore added in the Planning Act, stating overall principles for urban development, recreational concerns, etc. Moreover, the Planning Act decided that the Minister of the Environment was to specify these principles in a National Planning Directive. This happened for the first time with the adoption of the Finger Plan 2007, Hartoft-Nielsen says.

As regards public authorities such as the Road Directorate, Henriksen denies that this can be regarded a stakeholder. The just deliver the material on the grounds of which the politicians decide, she says. According to Lund Pedersen, however, the politicians who are in favor of building roads get extremely good help from The Road Directorate while there is no equivalent as to public transport services. In Lund Pedersen's opinion, the employees in The Road Directorate create the problems that they themselves are subsequently given the task to solve. When expanding a motorway in one road stretch the need for further expansion will surely occur in a little while – and then the directorate will have new tasks to handle. The Road Directorate works out the basic material for promoting new roads, Lund Pedersen says. He quotes the former, for 25 years, director of The Road Directorate, Per Milner, for saying: 'We had all the proposals for new roads in our drawer. And we got what we wanted'.

Environmental organizations

Ege Jørgensen says that the 'green' organizations, for instance NOAH-traffic, are clearly aware of the rise in the amount of traffic which follows many traffic investments. According to Ege Jørgensen as well as Frost, Hartoft-Nielsen and Lund Pedersen (who is himself a representative for NOAH), these groups are not being listened to or taken seriously. The NGO organizations can work out statements when public hearings are held and NOAH has written many such statements. However, The NGOs are never heard, Lund Pedersen says. For instance NOAH tries to direct public attention towards The Road Directorates' disproportionately great influence on road building but never succeeds. Henriksen, on the other hand, says that 'Green Traffic in the City Circle' and NOAH Traffic are very active and important actors and she thinks these organizations actually have some influence.

Henriksen has herself had representatives from the organizations in a special reference group, where they came up with proposals during the analysis of the coming Frederikssund Motorway. Several compensating initiatives have been decided to protect the environment – once the road is coming.

As to land use development, Lund Pedersen describes how the NGOs like NOAH do not have enough resources to comment on every local plan in the region. Add to this the commenting they actually do is never being used in the municipalities. Thus the development is hardly being debated, Lund Pedersen says. This may, of course, be due to a generally low interest among the population to engage in debates on land use and infrastrucure development.

Frost has an explanation for the 'failure' of the green organizations. In her time as a mayor the municipality started presenting the draft plans to citizens affected by local area planning. Meetings were held and work groups were established. As the partakers of the work groups did not want to discuss politics and to look at environmental issues from a political perspective, this led to the 'unemployment' of many NGOs, Frost thinks.

Several of the other environmental organizations, Hartoft-Nielsen says, have focused on building houses of straw and living closer to nature. They have given only little support to the thoughts of the ministry on how to densify the cities. The Organization for Preserving the Danish Nature has been criticizing the 2007 Finger Plan for 'selling out' natural values. The organization used to have visions for the development of traffic and publish information on location principles in agreement with the perspectives of The Danish Forest and Nature Agency, Hartoft-Nielsen says, but these topics seem to have been dowplayed during recent years.

Other lobby organizations

Henriksen, Østergård and Møller all say that different *trade unions and business organizations* (such as Danish Industry and CO Metal) are actors who want to build more roads and parking space. They sometimes protest against the principle of developing close to urban rail stations, and in some cases they argue that it is environmentally friendly to re-use empty factory buildings for offices even if these buildings are located at a distance from the closest station. In such cases it is difficult for the politicians and professionals in the municipalities to refuse new workplaces.

If 'the car lobby' lobbies, it is probably towards the political parties in the government, Hartoft-Nielsen says. Perhaps, for instance, the retail business has tried to influence the land use, as commissions have several times been established to work on the retail structure in Copenhagen.

According to Ege Jørgensen, three different actors (Realdania, A.P. Møller and an architect's office) have offered to build a bridge for walking and biking to the new opera house on Holmen. The former two actors have offered to do this at no costs for the municipality. However, Realdania's offer is conditioned on the premise that a subterranean garage is to be built at the end of the bridge – this too for free. At the time of the interview, the municipality had still insisted not to accept the offer from Realdania to finance the bridge in return for new parking lots.

'The whole decision making system is tailor-made for deciding on new roads', Lund Pedersen says, and calls the main road construction entrepreneurs and consultancy companies together with the car industry, the organization for motor vehicle owners and others who work in the field of road development and building *'the car lobby'*. According to Lund Pedersen this lobby has been quite successful in it's lobbying for new roads.

Earlier, professionals would protest against proposals for new roads, Lund Pedersen says. This, however, does not happen so frequently anymore.

Nielsen mentions pressure from Pehr Gyllenhammar (the general director of Volvo for many years) as an example of lobbyism is in connection with the building of the Øresund Bridge (which has already been built) and Fehmern Bridge (which the Danish parliament has just decided to build). The international changing conditions played a part in the decision to build the bridges, Nielsen says, but another important factor was pressure from Gyllenhammar through the Scanlink-reports.

Lund Pedersen also describes how, when some of the road administration was moved from the state to the regional level, The Organization of Danish Motor vehicle Owners, (FDM), and Danish Road Society, (Dansk Vejforening) disliked it very much. Now the funding for roads would be part of a budget where also social and health expenditures would be prioritized. Lund Pedersen says that these organizations have now had their way: the counties are closed down and the road funding is again in the hands of the state.

The NGOs' have not got the money to pay for independent consultancy companies. Cowi on the other hand is a member of Danish Road Society and as such part of the lobby organization as well as allegedly independent consultant. 'They take part in all of the food chain', Lund Pedersen says. From analyzing needs to conducting

the VVM assessment in cooperation with The Road Directorate, and finally to take part in the actual construction process.

The Transport Council was strongly promoting road pricing and the idea that one should pay for ones' own pollution, Møller says. In opposition to that The Organization of Danish Motor vehicle Owners and the business life were almost religiously against road pricing – allegedly for the reason of surveillance.

Political parties

According to our interviewees, the question of whether further urban development should take place as densification or outward urban expansion has not been an issue of debate between the political parties. No-one goes/went against the building of detached single family homes, Starck says. Even the left wing does/did not question it. Starck thinks this is partly due to the fact that most Danes dream of owning their own house. There has also been a widespread attitude across political parties that the inner city of Copenhagen should not be too dense. According to Starck, this must be seen in the light of urban renewal projects in districts like Nørrebro and Vesterbro in the 1970s and 1980s, where a main aim was to reduce densities and provide more open space.

According to Nielsen, there is currently a debate in Copenhagen about the construction of tall buildings. Møller mentions that there has been a lot of resistance from the civil society against such projects. Nielsen says that the Social Democrats and the Danish Social-Liberal Party (Radikale Venstre) are supporters and for instance the Red-Green Alliance is against. All of them are probably interested in the aesthetics and in Copenhagen's 'image' as much as in sustainability.

From her time in the city council of Copenhagen, Frost states that a majority in the city council supported the plan for locating office and housing development close to urban rail stations.

In the 1980s the political parties on the left wing started developing ideas about limiting the use of private cars to improve the environment. There was, however, not much political support for this, Frost says. Neither the Social Democrats, the Conservative Party nor the Danish Liberal Party were delighted. Politicians from these three big parties wanted the citizens to be able to drive their cars all the way to their working place in the inner city – '.. almost to the top of the desk.' Frost says. This changed, however. The politicians began to realize that part of the population actually wanted limitations on the use of private cars.

Although Frost was very much involved in the organization 'Car Free Cities' she also, in her time as a mayor, collected 40 million DKK for at car park underneath Kongens Nytorv. A majority in the city council, however, did not want this car park. As it is a well known fact that parking spaces attract more cars to an area, the rejection of the car park almost certainly has led to the prevention of having even more cars in the inner city, though.

In the 1990s a group was formed to promote building on 'Refshaleøen'. Another group wanted to build a tunnel under the harbor area. Especially the people in the harbor tunnel group were aggressive and had much money, Starck says. The Social Democrat Jens Kramer Mikkelsen, who was the Lord Mayor at that time, was against both projects. Kramer Mikkelsen had the responsibility for developing Ørestaden, and building on Refshaleøen would be detrimental to this aim.

Apart from being one of the architects behind the 'party zone' (cf. chapter 5.2), the present Mayor for Environment in Copenhagen, Klaus Bondam, did a good thing when he wanted to reduce car traffic and thus set higher prices for parking, Ege Jørgensen and Starck agree. However, when the local business life and some citizens protested the prices were lowered again, Starck says.

The Red-Green Alliance, Socialist People's Party and partly the Social Democrats (the ones from Copenhagen) are the ones to go against building for instance the Køge Bugt motorway. 'They know that the cars end up in the city,' Starck says.

Møller and Lund Pedersen mention the fact that as Anders Fogh Rasmussen's conservative-liberal government was formed in 2001 several councils that the new government did not like, were closed down. The Transport Council was one of these councils. The politicians in the new government did not want experts to contradict them in their policy decisions and this was what The Transport Council did and would do as some of the research funded by them was clearly concluding something else than what the government held for true.

In addition, Starck mentions the 'road mafia' – a few members of the Parliament (Folketinget) elected in Jutland who see to it that their constituencies get big road projects built. Their efforts may actually have detracted some road funding away from Copenhagen Metropolitan Area.

Popular opinions

Frost and Starch have sociological explanations for why they think a big number of individuals in the population add up to an informal institution: 'all those men who cannot exist without their cars - who feel that the car is an extension of their own body', Frost says, and Starck adds to this: 'The car is a symbol of freedom and many people are in favor of freedom and "the right to choose". Starck has heard several women declare that they value their time in the car because this is the only time they have to themselves. Thus the car becomes difficult to oppose.

Starck also describes how the citizens of Copenhagen are no longer interested in the general city plan. 'During the 80s', Starck says, 'everyone knew what was city planning and how to oppose the suggestions from the municipality. Today people do not know anything about this and the architects are only interested in their individual, spectacular (often virtual) projects'.

Christiansen and Starck both consider that many citizens are 'guilty' of unsustainable behavior. In the Nordic countries, Christiansen says, people want to own their own piece of land, and Starck adds that no-one goes against the building of detached single family homes. Thus, they are afraid big parts of the population will be negative towards important sustainability means such as densification. On the other hand, Christiansen thinks that young academics are a group of citizens who want to live in the dense city with all its cultural activities.

Coalition formation, tactics and exclusion

As mentioned earlier, Lund Pedersen tells that the Road Directorate works out the basic material for promoting new roads. The local politicians then use this material for promoting roads in their area. According to Lund Pedersen, these politicians claim that the local region will lose the competition with other regions and become poor and under-developed unless they have a 'suitable' amount of new roads. The directorate has established six local centers all over the country. These centers host meetings with the local business life regarding the need for local roads and the local business life thereby has disproportionally great influence on the building of new and expansion of existing roads.

According to Kramer Mikkelsen, the new sustainable neighborhood *Ørestaden* could prevent development in the suburbs and thereby sprawl. In favor of Ørestaden were the Municipality of Copenhagen, especially the Social Democrats with Kramer Mikkelsen himself as

the Lord Mayor as well as the right wing parties and The Social Democrats in the national parliament. Against were the left wing parties, The Danish Society for Nature Conservation, the developers and entrepreneurs who owned land in other places and the real estate agents who already had thousand of square meters of office buildings to sell. The planners were also against the project, Kramer Mikkelsen says, whereas they are very much in favor today.

As an example of symbolic or lip-service policy responses to traffic problems, Ege Jørgensen tells about 'The Commuter Office'. The introduction, in the Traffic plan for Copenhagen, of a congestion charge and a more restrictive parking policy as means to meet the rising use of private cars resulted in the 'popping up' of the concepts of mobility management and park-and-ride. After that a mobility management office was established and given the name 'The Commuter Office'. This office worked with transport plans, campaigns, letting out bicycles to groups in connection with the campaigns and other minor things, Ege Jørgensen states. For 3 or 4 years it was functioning and then it was closed down. Thus this office was actually an alibi for not working with road pricing or congestion charges. In Stockholm congestion charges have led to a decrease in the road traffic on 22%. What 'The Commuter Office' achieved is not worth mentioning compared to this, Ege Jørgensen says.

The examples above show how trends, politicians and professional staff sometimes work together to help each other avoid serious precautions necessary for increased sustainability.

Normally commissions and committees on infrastructure include very few representatives for public transport, Lund Pedersen says. According to Lund Pedersen, however, the members of the Infrastructure Commission were, with a few exceptions, 'roads supporters'. The commission had many members from industry and business life. At first, 'Dansk Industri' (The Confederation of Danish Industry - which is the premier lobbying organization for Danish business on national and international issues) was not invited to take part in the commission. However, as soon as they expressed the wish, they were invited. In opposition to NOAH and Danish Union for Bike Riders (Dansk Cyklist Forbund), who were refused partaking in the commission. The dominance of road supporters in the organizations is not new, Lund Pedersen says.

State-level policy instruments

Several interviewees mention state-level policy instruments that have influenced land use and transport policies in Copenhagen

Metropolitan Area during recent decades. Some interviewees also point to the *lack* of such instruments within policy fields where national coordination, control or funding could have contributed to a more sustainable development.

Nielsen and Kramer Mikkelsen mention how the state supported the *decentralization of workplaces* with the aim of locating workplaces closer to the employees. Much of the national and regional planning during the 1970s and 1980s and up to the mid 1990s was influenced by a belief held by many that Copenhagen had grown too big, that most of the development in the future should happen outside Copenhagen and that workplaces should be decentralized. For many years, Kramer Mikkelsen says, Copenhagen had to observe regulations from the state which made it hard for the city to develop service industry. Such workplaces were instead located in the surrounding municipalities and the industrial areas in Copenhagen were kept while the politicians waited for the 'old' kind of industry to emerge again. The result was sprawl and increased transportation, which was unfavorable for sustainability. If Copenhagen had been allowed to locate more workplaces in the inner city this increase in the amount of transport would not have happened, but the state prevented that.

As a second state policy six of the Copenhagen interviewees talk about *the principle of locating close to urban rail stations* as having contributed to a more sustainable development than would have been the case if the authorities had been allowed to work without such restrictions. It was a requirement of the national government to The Greater Copenhagen Council that this principle was to be incorporated in the Regional Plan 1989, which later – after the abolishment of The Greater Copenhagen Council – gained status as a National Planning Directive. Møller, Hartoft-Nielsen, Ege Jørgensen, Christiansen, Kramer Mikkelsen and Lund Pedersen think the Finger Plan has prevented the municipalities in the outer parts of Copenhagen Metropolitan area from using too much land for development outside the cities and along the motorways.

Bjørstorp confirms this, as he thinks the state-level policy is too strict and that his and other municipalities would like it to be more liberal.

According to Østergård, the principle of locating close to urban rail stations has to a high degree been observed within the municipality of Copenhagen. However, the (other) municipalities try to widen the limits all the time. The answer to the question of whether the Finger Plan is sustainable depends on the decisions to be made in the area of

transport and will not be answered until in 10-20-30 years, Østergård states.

A third state-level (and municipal) policy that has contributed to reduce car travel is that Copenhagen Municipality and the state (represented by the 'City and Port Development') have insisted on being in control of the amount of *parking space in Ørestaden*. If not, Kramer Mikkelsen says, they would not be able to control the parking.

Some of the Copenhagen interviewees give examples of situations in which state policies could to a higher degree have contributed to a different urban and mobility development. Henriksen thinks that the Municipality of Copenhagen on some occasions has planned for housing development without giving enough consideration to the transport problems the new dwellings could lead to. In Henriksen's view, state-level policy instruments could have secured a more coordinated land use and transport planning.

Starck too thinks that state-level policy instruments could have contributed to a better urban and mobility development had these policy instruments been stronger. The Copenhagen authorities and developers defined the principle of building close to urban rail stations in a way which made the pressure for allowance to build on cheap pieces of land stronger, Starck says. The Finger Plan is weak as the fingers are not very well defined. Instead of building Metro in the inner city, Starck says, the authorities should have seen to it that public transport corridors were built between the fingers.

Ege Jørgensen describes how the state has refused to help finance light rail connections and to help the municipalities develop the public transport services. This meant that the Municipality of Copenhagen invented a new 'construction' where new land use was to finance new infrastructure and public transport. Thus the location of the Metro line is due to the fact that the development of 'Ørestaden' had to finance it and the 'Øresund Bridge' was supposed to finance itself.

There is a great need for light rail in Copenhagen, Ege Jørgensen says. Up till now, however, the state has refused to help finance light rail connections. Everywhere else in Europe, Ege Jørgensen says, the national authorities support public transport services like light rail. However, the present Danish government has so far been unwilling to do that. The Ministry of Finance plays a part in this. A possibility of changing this decision is now seen in Århus, where the government is now planning an environmental assessment of a light rail connection.

5.8 Barriers to sustainable urban development

The interviewees point at several barriers against what they consider to be a more sustainable urban development. Below, we shall in particular focus on barriers resulting from lack of coordination between different authorities, lack of political willingness, and contestation about knowledge claims.

Lack of coordination

Within the fields of land use and transport planning, Møller describes how the cooperation between the urban land use planners, the Ministry of the Environment, DSB, Banedanmark and the Road Directorate is insufficient. According to Østergård, the municipalities might not have the will to follow up the aims of national decisions. However, the national decisions might not be sustainable either. For instance the report of the Infrastructure Commission is not supposed to take the environment into consideration.

During the time where Frost was a mayor in Copenhagen the local politicians felt that the municipalities could not do much about the climate, Frost says. This indicates that the national politicians perhaps did not handle environmental questions in an 'integrating' way. Perhaps the politicians on the national level did not see to it that it was made possible or easy for the local politicians to act with serious regard to sustainability issues. Statements from Henriksen support this as she claims that traffic policies are made on the basics of political deals - and apparently not with the national goals as a point of departure.

Most of the Copenhagen interviewees (Bjørstorp, Frost, Ege Jørgensen, Nielsen, Starck, Christiansen, Kramer Mikkelsen, Østergård and Hartoft-Nielsen) mention the lack of an overall coordinated regional plan and express a wish for more *regional planning*.

According to Kramer Mikkelsen, many people have thought that Copenhagen Municipality was too big. He himself has always thought the municipality was too small. The city council has not had the authority to make decisions about the urban development for the area which was 'the natural city'. In addition, Copenhagen did not have a strong management and The Greater Copenhagen Council, which was supposed to coordinate the planning of the municipalities in

Copenhagen Metropolitan area and protect the interests of the environment, was closed down in 1989.

Østergård states that the regional plan from 1989 made by The Greater Copenhagen Council included a considerably stronger management of the development of the capital than today. Then there was only one authority and it had the power to implement much more. Since then the regional management of the development has been weakened and the individual municipalities have been strengthened which leads to a more chaotic situation. 34 municipalities in the area covered by the Finger Plan (28 of which in the administrative Capital Region and six in the new region of Zealand) have been given more independence in their land use planning after the new municipal reform. The Danish planning system up till 2003 meant that a land use change in the municipalities had to await a change in the regional planning. Now, however, the municipalities have taken over most of the authority for transforming rural land to urban land use 'which has weakened it'. Back in the late 1960s, changing the concept of rural-, in-between- and urban zones to the present categories (cf. chapter 2.2) led to an abundant amount of urban land because of the competition between the municipalities for new inhabitants, Østergård says.

According to Ege Jørgensen, if an area is defined as 'urban' it has been difficult for the planning authority on the regional level to interfere. Regional planning is almost closed down now, Ege Jørgensen says. The politicians in the Copenhagen Municipality often believe that regional planning is something that goes on outside the municipality. What goes on in Copenhagen, these politicians think, is local planning.

According to Østergård competing is compulsory according to the EU legislation, but competing is actually not the way to create sustainable cities. To do this – and Østergård stresses that this is not political reality – one should have strengthened the regional planning.

Competition takes place between Copenhagen Municipality and the municipalities around Copenhagen. According to Kramer Mikkelsen Copenhagen does not fight the surrounding municipalities as they believe it is more effective to elaborate the common interests. For instance Copenhagen Municipality could have been more insisting on observing the principle of building close to urban rail stations, Kramer Mikkelsen says. The municipality did not, however, want to take part in conflicts with the neighboring municipalities which lead to sprawl instead of densification.

Frost also talks about different interests and power structures as determining for the spatial planning in Copenhagen. During the discussions in the regional council the Copenhagen city council wanted offices to be built centrally, but the surrounding municipalities saw to it that the new buildings were situated in their areas. The question in this case was not the sustainability but the economic effects of the location.

On the other hand, Kramer Mikkelsen gives a historical example showing that the possibility to coordinate land use within a greater territory does not necessarily prevent sprawl. According to Kramer Mikkelsen, the answer to why Copenhagen has had so much sprawl lies in the past. In 1901-02 a number of parishes and neighbor towns were 'administratively moved' to Copenhagen Municipality and Copenhagen bought some areas itself – to solve sanitary problems and to increase the possibilities of developing. Kramer Mikkelsen thinks this gave Copenhagen Municipality the opportunity to solve its problems through building in the outskirts of the town.

Nielsen describes how formerly The Greater Copenhagen Council and the Greater Copenhagen Authority were the institutions responsible for the regional environmental planning and had to coordinate the interests of the municipalities in the region. As the municipalities had different interests and were in several ways competitors it is no surprise that planning and coordinating were difficult for these organizations and that they were not well functioning in regard to planning for a sustainable development. The Greater Copenhagen Council and the Greater Copenhagen Authority were closed down. To Copenhagen Municipality this was an advantage as the majority of the representatives wanted to decentralize workplaces.

Hartoft-Nielsen says none of these organizations have had the authority to collect taxes and none of them have been chosen through direct elections. The main part of what they were to regulate through land use planning was in fact not their responsibility. According to Hartoft-Nielsen the Greater Copenhagen Authority was kind of a 'club for mayors'. All they agreed in was to keep out of each others businesses. Starck calls them a clique where the members traded their votes. The same thing is happening in the new regional councils now, Starck says. The municipality representatives in the regional councils have to agree on things they have no possibility of agreeing about. For instance the politicians in rural and urban areas have very different wishes as to bus transport. Also, according to Starck, the new regional councils have almost no power and no means. Their job is mostly to give different kinds of statements.

As a professional Ege Jørgensen would prefer an administrative construction like the counties (which have resently been replaced by the regional councils). They should have direct elections and taxation authority which would give the politicians the opportunity to implement their politics. This way the municipalities would not compete as much internally, the authority would be in a better position to plan for the land use and transport and it would be easier for the authority to reject the change of land from rural to urban area.

Møller thinks there is a need for a coordinating organization in the field of planning in Copenhagen Metropolitan area if the municipalities are to be prevented from building anywhere they want. The urban development ought to be managed more efficiently, preferably by a regional authority, both he and Hartoft-Nielsen say. Add to this Hartoft-Nielsen would want the capital area administratively to be extended to all of Zealand.

As can be seen, there is a widespread opinion among the interviewees that the coordination across municipal borders is too weak in Copenhagen Metropolitan Area. Nine interviewees point more or less explicitly to the lack of a common plan for the metropolitan area. On the other hand, some are not really interested in such coordination. None of the municipalities liked it when the Greater Copenhagen Authority was responsible for the regional planning, Bjørstorp says and describes how the municipalities west of Copenhagen have now worked out common objections to the Finger Plan. Bjørstorp is looking forward to and expecting the municipalities to have more influence in the future – according to the new division of administrative tasks between the state, the regions and the municipalities.

As can be seen, many interviewees are concerned with horizontal coordination across municipal borders. To some extent, this also implies a concern about the degree of vertical coordination, as the uncoordinated competition between municipalities tends to lead to non-implementation of national goals for spatial development. Some also point at lack of coordination across sectors, in particular between the authorities responsible for, respectively, land use and transport planning.

According to Østergård, the present environment- and sustainability program from the Danish government lacks coordination. It includes issues such as energy, transport, environment and water – but it does not describe the connection between these issues. Østergård instead wants an interdisciplinary way of thinking.

Hartoft-Nielsen thinks that the counties around Copenhagen have failed to administer the principle of locating close to urban rail stations properly. Things that should not have been built have been developed without protest from the counties. Thus Hartoft-Nielsen thinks it might be a good thing that the state now talks with the municipalities about planning. The state has not done this before as the opinions of the state used to pass through the Greater Copenhagen Authority or the counties before reaching the municipalities. Hartoft-Nielsen seems to think that 'the political ownership' of the principle of locating close to urban rail stations will in this way be strengthened. Hartoft-Nielsen, supported by Møller, still talks about how the state as the overall planning authority is not an optimal construction. The Finger Plan must be modernized, preserved and observed closely and there is a need for a coordinating organization for urban development at the regional scale, he says.

As to the relationship between the Ministry of the Environment and the Ministry of Transport one minister takes care of transport, another minister takes care of climate issues and urban land use matters – and there is no coordination, Møller says. According to Hartoft-Nielsen the ministries have no tradition for cooperating and they have different traditions for making decisions. Even though all of the ministers of environment and transport in the years 2001-2007 were conservatives there is no close cooperation and no good relationship between the Ministry of Transport and the Ministry of the Environment, neither on the level of departments nor on the ministerial level. Some of the interviewees tell us that the Ministry of Transport was heavily influenced by the 'traffic mafia' and they are suffering from not having a department for planning. They work 'from case to case' and are not used to other ministries having influence on their policy area. For instance the support from the Ministry of Transport for the principle of locating close to urban rail stations is rather half-hearted. The professionals know their (changing) ministers are not going to defend this principle. Also, the Ministry of Transport is to a high degree influenced by the Ministry of Finance because of the expensive construction costs. The decision making processes then become more political and 'ad hoc'. According to Nielsen, the Ministry of the Environment has not been strong enough to go against the Ministry of Finance in order to preserve the intentions of the Finger Plan.

Whereas the interviewees seem to be particularly concerned about the lack of coordinated land use planning and/or its coordination with transportation planning, a few interviewees also criticize transportation planning itself for being too weakly coordinated.

According to Møller, nothing has ever worked out well in the area of transport in Denmark. Things have been suggested and refused and there has been too much competition. The financial support for road development is determined by which administrative and political level is responsible, Lund Pedersen states. When some of the roads were the responsibility of the counties they had to share the financial means with the social sector and the health sector. Actually, in the mid 1990s, where the counties took over the administration of 2000 kilometers of road from the state, this 'competition' was one reason to hand over the responsibility. Now these roads are again being administered by the state which means they no longer have to compete for money with other areas.

Lund Pedersen also describes how the car based traffic has better conditions than public transport. Every year, The Road Directorate reports on potential road projects, which gives the road supporters an excellent opportunity to speak in favor of more roads. No such organization stands behind public transport. Thus Lund Pedersen finds it important to build a whole new planning structure. He wants a 'Council for Sustainable Traffic' to be an overall planning authority in the area of transport. The Road Directorate should only be in charge of maintaining roads and giving information about the traffic on the roads.

Another example of lack of coordination – or one might say 'political competition' – is mentioned by Østergaard, who points to the fact that th Municipality of Copenhagen wants to introduce congestion charging whereas the national government prohibits this.

Ege Jørgensen addresses a different aspect of coordination when he states that the opportunities for public authorities to regulate the existing city have been few. To a high extent, this has to do with coordination between individual land owners in order to promote the public good. Ege Jørgensen here touches upon the limits for public infringement on property rights.

Lack of political willingness

Political lack of willingness to adopt the solutions that from a professional or scientific point of view are believed to be the most sustainable may be a barrier to sustainable urban development. The interviewees give a few examples of this.

Frost, as a politician, has some difficulties with the professional staff, she says. In her opinion, the advice given by the professional staff is sometimes influenced by the fact that they have to make a living out

of this. The advice is always about spending more money, Frost thinks. As to city planners and traffic planners, Frost would like to know their opinions on politics in order to filter their advice. Some technicians are behaving in a clearly political way, Frost says.

Looking at the relationship from the other side, Ege Jørgensen describes serious differences in opinions between politicians and professionals. The regional planners believe very strongly in the 'finger city' and they have held on to the principles of this, whereas politicians (especially local politicians) have tried to break down this model. Some politicians pretend to follow the guidelines but at the same time do the opposite – try to plan for new land use in opposition to the principles of the Finger Plan, Ege Jørgensen says.

Hartoft-Nielsen thinks that ministers and not professionals are important to the perspective on sustainable urban development. He describes how different ministers (although from the same government) have had very different opinions on environmental issues as well as different ways of managing the ministry. (At a certain time '.. it was almost forbidden to say CO_2 in the ministry' Hartoft-Nielsen says.) Apart from the Prime Minister, the two strong ministers in the government of Anders Fogh Rasmussen in the beginning of this century were the Minister of Finance, Thor Petersen, and the Minister of the Interior, Lars Løkke Rasmussen, who were both fundamentally skeptical toward too strict top-down control over planning. When he was the mayor of Helsinge Kommune, Petersen had big plans for growth in Helsinge and was skepticalt to a regional planning that sought to limit the possibilities for growth. As mayor of the county of Fredensborg Løkke Rasmussen was responsible for the regional planning there.

Løkke Rasmussen had several conflicts with the Social Democrat minister of the environment Svend Auken about a number of concrete planning issues, and on that bacground he was skeptical toward too wide national-government power in planning. On that background Hartoft-Nielsen is impressed by what the (by then) Minister of Environment Connie Hedegaard from the Conservative Party has achieved: a Finger Plan which is probably going to change the urban development.

Within the transportation sector there seems to be less disagreement between planners and politicians. Lack of prioritization of environmentally sustainable policies is thus a result of a combined political and professional unwillingness, rather than sheer political resistance.

According to Henriksen, there is no disagreement between professionals and politicians since the professionals work out 'neutral analyses' and the politicians make the political decisions. As to for instance road pricing, the directorate is waiting for the politicians to decide this before they analyze it. The directorate is not a political agency, Henriksen says, and even though it is a professional institution, the employees do not work out analysis on their own initiative. So even though Henriksen claims that the directorate is not political it is in a way rather political because it does not do analysis of means and projects that the present minister/government does not support.

Lund Pedersen has quite a different perspective on the issue of disagreement. The professionals and the politicians develop a common culture, he says, and the professionals have extremely high influence within the transport area. Lund Pedersen has experienced how he and his colleagues are the only critical individuals at meetings and conferences. None of the professionals want to be in opposition to the common understanding as they all want to have a career in the field of transport, Lund Pedersen says. Lund Pedersen even refers to incidents where consultancy firms have been told to draw certain conclusions when assessing the impact of new roads.

According to Lund Pedersen, some politicians would make other decisions if they got different advice from the professionals. Lund Pedersen gives an example of how poorly prepared the politicians are: a mayor in Copenhagen responsible for techniques and environment thought that the number of parking lots was regulated by law.

Lund Pedersen assumes that the politicians' influence on the professionals happens in an indirect way. The professionals restrict themselves, Lund Pedersen thinks, on the basis of imagining what the politicians want.

Møller's observations of disagreement between civil servants and researchers may throw light on the close cooperation between planners and politicians within the transport sector on policies leading to more car traffic. According to Møller, the members of the Transport Council on the one side and the politicians in The Ministry of Transport and their professional staff on the other did not agree. The researchers provided the politicians and civil servants with relevant material, but the politicians and civil servants only used the knowledge and research that fitted into their policies and opinions. The civil servants Møller talks about are heads of offices in the ministry, heads of departments and social scientists (mostly

economists and lawyers). He describes them as professional policymakers not familiar with the technicalities. Their task is to help the politicians in a system with a rather shortsighted agenda, to stop controversies and to help the politicians to stay popular.

Møller also talks about citizens and politicians and how he thinks many people and organizations are reserved when it comes to taxes and tolls and want free movement. 'The Dane is a free man with his own car and he does not want any bother'. Talking about sustainability is difficult, Møller says. The politicians talk about environmental policy and energy policy only on special occasions as they are afraid to tell people how to live. People are getting wealthier and thus buy bigger cars, travel more and so on. The Transport Council had the same understanding, Møller says.

Contestation about knowledge claims

Contestation about whether or not a proposed policy measure is likely to bring about the assumed effect may be a barrier against implementing this measure. If the politicians believe that a land use or transport infrastructure strategy proposed by the planners will have no effect at all or the opposite effect of what is claimed, their willingness to support this strategy may be low, especially if the strategy is for other reasons controversial. If the knowledge on which the proposal is based can be characterized as uncertain or contested, the mere existence of such counter-claims creates a sort of cognitive incongruity that may favor inaction.

According to Møller, the politicians and civil servants only use the knowledge and research that fits into their policies and opinions. Knowledge about climate is troublesome and longsighted, and the present conservative-liberal government has oppressed the knowledge about environmental issues and even hired people to contradict it, Møller says.

In Ege Jørgensen's view, politics and not contested or uncertain knowledge is the real problem. The knowledge on sustainability is not especially uncertain anymore but the politicians like to use the results of the calculations made by the planners only if they are favorable to the politicians´ own policies. Politicians think of election periods and no longer than to next year's budget and thus they often look only at the short time effects of policy interventions.

This is supported by Østergård, who says that the problem is not so much that the knowledge is contested or uncertain. The real problem is that the politicians do not feel like acting on the knowledge. For

instance, the Dutch ABC-principle is well known and respected but sometimes companies have to locate only once in their lifetime; the decision makers want to give people a choice between private and public transport; and therefore the companies get permission to build parking space.

On the other hand, some interviewees (Nielsen, Hartoft-Nielsen and Frost) mention how both the politicians and the professional staff were wrong as to the effect of moving companies to the suburbs. An example of this is the insurance company Baltica which moved to Ballerup west of Copenhagen. It was expected that this would lead to less private transportation as the employees were either expected to settle close to the company or were already living there and would then be able to get to work quicker and less car based. The result was the exactly opposite. After half a year the employees drove far more in their private cars.

Ege Jørgensen describes how politicians do not listen to the professionals even if they prove how building new transport infrastructure normally leads to more traffic. The problem is not only that transport policy decisions are taken late at night after negotiations where 'every one has to have a little something'. The problem might also be that the politicians do not believe in the facts which the professionals present to them – or that they pretend not to hear or understand.

Ege Jørgensen talks about how the traffic models often do not show the sudden rises in the amount of traffic. This leads to difficulties for the planners to convince the politicians about this. The planners feel they have to use the traffic models in order to get a comprehensive view of all the different factors influencing traffic development, Ege Jørgensen says, and the models seem to be the only tool for this. According to Ege Jørgensen numbers are important in order to seem trustworthy and have an impact.

Henriksen and Bjørstorp themselves contest the fact that road expansion leads to more cars using the roads. Bjørstorp, for instance, argues that constructing a light rail across the fingers at the same time as building a new motorway along the same line will make more people use public transport. Henriksen on the one hand says that more roads can easily lead to more traffic. On the other hand she states that a new Frederikssund motorway does not lead to more traffic in the inner city. The latter statement is not in line with state-of-the art research-based knowledge, nor is Bjørstorp's claim. On the contrary

they are based on some myths that have been produced by actors who contest the academically most credible knowledge.

According to Lund Pedersen, the Road Directorate uses flawed cost-benefit models – with time as the determining factor - for calculating the benefits of new roads. With these false models the directorate predicts the number of cars in the future and the aggregate time of delay for these cars. Then they recommend building more roads in order not to let the whole society slow down and stop. However, the benefit from one road stretch, Lund Pedersen says, will be the cost of another. This is not part of the models of the directorate. The calculations of the traffic flows are also wrong as are the expectations as to passenger rates per car (1.05 person in each car in 2030). The Road Directorate raises the alleged prices of delays on motorways but at the same time does not change the prices of delays for other traffic users. The politicians believe in these scams, Lund Pedersen says, and increased public transport is not presented to the politicians as an alternative choice. This gives the decision makers a totally biased picture of transport prices.

Lund Pedersen also states that The Infrastructure Commission used false predictions. They came to the conclusion that without new roads in some years it will take 5 hours to get from the north of Zealand to Copenhagen. This is a totally unrealistic scenario since these car drivers would by then have chosen different means of transportation, Lund Pedersen says.

Finally Lund Pedersen describes how ’further investigation’ is sometimes used as a means to prolong a planning process with the aim of avoiding a certain political means. An example of this is how an extra rail tracks between Copenhagen and Ringsted was almost decided on, when the Danish government, led by The Liberal Party (Venstre), decided they wanted more investigation into the choice between this track and an ekstra track to Roskilde.

Concluding remarks

As can be seen from the above, a high number of interviewees think that the coordination of land use planning across municipal borders is too weak in Copenhagen Metropolitan Area, and that this contributes to a more sprawling and car-dependent pattern of development. There is also some concern about low degree of coordination between the land use planning authorities and the transport authorities, and between national and local land use planning authorities.

None of the interviewees talks explicitly about uneven power relations as a cause of lack of coordination. However, what might appear to be a coordination problem may on closer inspection sometimes be interpreted as a reflection of the powerlessness of the Ministry of the Environment. As will be discussed in chapter 6, the traffic-inducing policies pursued by the transportation authorities as well as municipalities competing for inward investment are backed by powerful ministries such as the Ministry of Finance and the Ministry of Economic and Business Affairs, which are in their turn supported by powerful vested interests.

The interviewees also show some examples where knowledge about the impacts of land use strategies and transport infrastructure development has been contested, downplayed or ignored. Such 'knowledge filtering' reflects the fact that the measures held by the scientific community to be the most relevant responses to sustainability challenges may be in lack of political support.

5.9 Plan, market and economic driving forces

The land use development that has taken place in Copenhagen Metropolitan Area is to a high extent in accordance with municipal land use plans as well as national policy documents. The extent to which adopted land use plans actually shape the spatial development or are mere formalizations of a development that would anyway have produced by market forces is of course a matter that can be disputed. Especially this is a relevant question given the ample reserves of land for urban development set aside in connection with the planning law reform in 1970, which even today provide a high degree of flexibility for developers to locate within these zones. We therefore asked the interviewees about their opinions as to the importance of public planning and the influences on the spatial development exerted by market forces.

Competition for inward investments

Several interviewees point at competition between the municipalities as an economical-structural condition affecting land use. Given today's system where the municipalities have to take care of their own economy and compete with other municipalities about inhabitants, tax-revenues and so on – the municipalities will often choose to act in order to get revenues instead of acting to protect the environment.

Ege Jørgensen states that every mayor wants to 'revive' his part of the city and develop it. The newest trend in politics and in city planning is seeing the cities as locomotives – 'drawing the countries forward'. Also Østergård states that there is a great deal of 'economic thinking' and appraisal of competition. There has to be a 'decent' supply of building opportunities – if not, the local competitiveness will be hampered.

Bjørstorps' interpretation of the concept of sustainable development is 'to be able to handle a modern development' and according to Bjørstorp 'economical sustainability' is a precondition if the municipalities want to preserve their independency. The economic sustainability is secured by cooperating with other municipalities, Bjørstorp says. As examples, Bjørstorp mentions culture and how the municipalities can have financial advantages from cooperating in the area of culture – in order for every municipality to expose itself as special.

The way Bjørstorp speaks is clearly influenced by the fact that the municipalities are to a significant extent managed like private companies – according to the principles of New Public Management. This shows the economical-structural conditions the municipalities are exposed to. The present government has put a limit to how much tax-revenues the municipalities can collect and this makes the municipalities compete about attracting business, well off residents and tourists and to get rid of bad tax-payers and social clients. Even though Bjørstorp is a social democrat, and thus could be expected to be in opposition to the demand of regarding public organizations as private companies and the whole idea of municipalities in different regions being competitors and having to 'be special', he seems to a high extent to have adapted to the terminology of market economy.

According to Hartoft-Nielsen, the municipalities would usually like to take more land into use. They are interested in 'economic sustainability' and in contributing to the growth that 'everyone' thinks we should have. It is often easier to develop empty land than transforming old industrial areas where many land owners with conflicting interests are often involved, says Hartoft-Nielsen. In Lund Pedersen's view, dwellings and office buildings are often located on aesthetic reasons instead of in accordance to the principle of locating close to urban rail stations. The municipalities compete in offering settling companies the most attractive location which is often not close to urban stations.

According to Møller, the politicians in Roskilde have bought lots of land and the municipality is making a lot of money selling this land. Depending on which kind of development this will bring about, it might result in sprawl. Møller thinks the 'entrepreneur-spirit' is also a reason for the municipalities to want development within their own borders - it is nice to be 'part of something new'. However, Møller says, attracting people is no guarantee for wealth. Sometimes a new neighborhood grows so big that a new school or kindergarten has to be built and then the expenditures explode.

The competition between municipalities for inward investments often results in location of new development to municipalities that can offer cheap building sites and ample space. However, according to Møller, the result of this competition or cooperation is not unambiguous. Some of it might in some way result in more density - while other parts might result in the opposite – such as sprawl. Starck shows an example of how the competition may result in a centralization of facililities within leisure and entertainment. According to Starck, Copenhagen City Council is currently trying to turn the inner city into a 'party zone' with many new restaurants, fast food restaurants, bars and dancing places.

Growth-promoting infrastructure projects

Nielsen and Kramer Mikkelsen both tell stories about how the construction of transport infrastructure across Øresund was motivated as an investment to revive economic growth in Copenhagen Metropolitan Area.

According to Nielsen, a debate was started in the beginning of the 1990s (partly as a result of the Würtzen-commission and the Stallknecht-commission reports) on how to get ahead in the competition between the regions in Europe. In 1993 the National Planning Objectives described the aim of making Copenhagen and Øresund the Nordic City Region number 1. Copenhagen was still in a crisis and the politicians (the mayors of Copenhagen and Frederiksberg Municipalities and the mayor of Copenhagen County) were looking for a way out of the crisis. The national politicians supported the idea of making something special out of Copenhagen. The most important suggestion was to build a bridge over Øresund to make a better connection to Malmø in Sweden. In other words an infrastructure project was used to stimulate growth.

Kramer Mikkelsen describes it this way: in the beginning of the 1990'ies different governments and Copenhagen Municipality agreed that big public projects were to be developed in order to help the

economy improve as there was a lack of private investments. Copenhagen was European Capital of Culture 1996 and this was a good opportunity. An untraditional alliance between the state and Copenhagen Municipality was born. These two – until then opponents – agreed to support the building of a bridge from Malmo to Copenhagen – 'Øresundsbroen'. Building the bridge was both at project to fight unemployment (16-17 % at that time) and an attempt to 'kick-start' the economy. According to Kramer Mikkelsen, this was the beginning of a wider range of decisions that led to new growth in Copenhagen. 'No Øresundsbro', Kramer Mikkelsen says, 'no Ørestad'.

Growth promotion and growth management

Nielsen, Frost, Starck and Kramer Mikkelsen all talk about the economical situation in Copenhagen as an important condition for what happened in the urban spatial development during the 1980s and 1990s. Copenhagen was suffering from depression, structural changes for the industry and unemployment, Kramer Mikkelsen says, and it was difficult for the politicians and professionals to refuse locating any kind of business in the city. During the times of crises it was difficult for Copenhagen to observe sustainability requirements, Nielsen also says. People who supported growth had a bigger say at that time.

The question to the politicians during the years of economic crisis was mainly how to attract tax-payers, Frost states. Kramer Mikkelsen describes how these structural changes and the bad economy led to a quick transition for Copenhagen from an industrial city to a post industrial one. An example of this is how the moving of The Royal Navy led to development along the former port area and on 'Holmen'. Nielsen adds to this that when the Copenhagen politicians realized that the industry was not returning they wanted to develop the empty pieces of land but they needed acceptance from The Greater Copenhagen Council and had big difficulties getting this because of the situation of competition between the different municipalities.

Kramer Mikkelsen talks about how the 'City and Port Development' chose to sell the rights to build only half of the dwellings in Ørestaden. They did this partly because they expected a better price next time they would sell building rights - an example of how economical-structural conditions make the authorities think in market terms. The 'City and Port Development' seem to manage the process of developing the city on market terms for the benefit of both the developers and the general public. They are now preparing new areas

for development (for instance in 'Sydhavnen' where 300,000 square meters can be built). Kramer Mikkelsen says that the authorities have to be prepared to sell when the demand arises in 5 or 10 years. In this area the building process will also start around the public transport stations.

Kramer Mikkelsen confirms that he is worried that this form of urban development will only be successful in times of economic prosperity. If the economy changes to the worse, the neighboring municipalities will attract more of the development. On the other hand in a prosperous economy people buy more cars and travel more which could mean that sustainability suffers both in good and in bad times.

Nielsen and the three former politicians, Frost, Starck and Kramer Mikkelsen thus illustrate how economic crisis tends to put growth-promoting policies on the top of the agenda. In periods when the economy is prosperous, policies to reduce negative impacts of the growth get more attention, and environmental sustainability is more often mentioned as an objective. At the same time, the rising levels of consumption in these periods put additional pressures on the environment.

From what Nielsen and Kramer Mikkelsen say it seems that market mechanisms and economical-structural conditions are very important driving forces influencing on the possibilities for sustainability. The economic fluctuations determine when sustainability can be part of the agenda. In times of crisis, growth is the most important goal for the decision makers - and growth and sustainability seem to not be 'compatible' in the minds of the decision makers.

Nielsen also states that it is not possible for the authorities to change everything through urban land use planning. 'Other forces' in society are as important as land use. Important factors influencing transport behavior, Nielsen says, are time and money.

Deindustrialization as a facilitator of densification

An important case in point is that much of the densification that has taken place in Copenhagen has been conditioned on prior out-location of manufacturing industries. Kramer Mikkelsen points to the fact that most of the industry previously located in the municipality of Copenhagen has moved out of the city – to the rest of the country and later to other countries with lower production costs. This meant that land was abandoned. So the economically unfavorable development (which, in Kramer Mikkelsen's view was not sustainable) actually

opened for a more sustainable spatial urban development in Copenhagen.

According to Kramer Mikkelsen, the national decentralization policies preventing Copenhagen from building on derelict areas was an important reason why Copenhagen took such an interest in sustainability. Understanding that densification was part of a sustainability concept, Copenhagen saw a possibility in promoting sustainability, which could be used as a counter-argument against the national decentralization policy.

Affluence, land consumption and mobility

Møller and Nielsen illustrate how the economic development has substantial influence on the spatial planning and transport. The financial situation of the citizens and the prices of transport and dwellings play an important part in the urban development. According to Nielsen, the first Finger Plan in 1947 was calculating on a need to move people out of the inner city. This, together with the building of detached single family houses and the rising prosperity starting in the 1950s and going on until now, made the number of inhabitants in the Municipality of Copenhagen fall from 768,000 in 1950 to 465,000 in the beginning of the 1990s. (In 2009 it had risen somewhat again to 518,000).

This is an example of how economic growth means a demand for bigger houses and more land, which creates a pressure towards sprawl and higher car ownership rates.

Møller puts it this way: the welfare in Denmark and the individualism work against his vision for developing big sustainable cities. We all have our own little piece of land with a hedge around it, Møller says. Another sign of this is how the politicians are very reluctant towards restricting car driving. This would be very unpopular as the car is a symbol of freedom and wealth.

Frost illustrates how an economy where most people are working full time – even young parents – can be a driving force working against sustainability. Frost finds it unavoidable that young families living in the city possess one or two cars and use these instead of the public transportation system.

Residential preferences

Bjørstorp thinks that many people prefer to live outside the centre of Copenhagen. This, combined with the municipalities' hunt for tax-payers gives the state authorities a tougher task if they want densification as a means of securing sustainability. Many people want sprawl, the municipalities want to offer people what they want and the developers want to develop what people want to buy.

Nielsen points to the fact that different things make people move to individually owned houses. It is a symbol of status to own your own house, people think it is better for the children to have more indoor space and a private garden to play in, and other important reasons, according to Nielsen, could be that a house can be an investment object and that the state is subsidizing privately owned houses by giving people tax reductions for the interests.

Several interviewees describe how trends change in accordance with economical fluctuations and fashions in the housing sector. Møller, for instance, states that many people in Denmark want to live in detached single family houses. On the other hand, a growing part of the population wants to live in the city. Frost mentions an example of a planned town development (around a town called Hammersholt) in the northern part of Zealand. No one wanted to live there, Frost says, so the development never took place. Instead, in some places, development takes place without being planned. Christiansen calls the moving to the big cities a 'tendency' and he seems to believe in this as one of the driving forces towards sustainability. He believes in consumers as actors to change the development and to make the city strong and able to compete.

The hope for consumer preferences to guarantee the development towards more sustainable cities is, however, a rather fragile one – as consumer groups can quickly change their preferences.

Housing prices

Ege Jørgensen, Østergård and Henriksen mention how a lot of people have to move to cities outside the Copenhagen Metropolitan area in order to afford a house or an apartment and points to the serious influence this has had on the consumption of transportation. On the one hand, people cannot afford to live in the inner city. On the other hand, they have enough money for buying more cars and fuel.

Starck says that the serious lack of cheap apartments in Copenhagen is due to the fact that the municipality has sold all its residential houses.

Also new legislation about dwellings in housing cooperatives has made it possible for the owners of apartments in these cooperatives to let the prices of their apartments rise excessively. Add to this, the municipality is afraid to interfere in the housing market and is not using its right to force the owners of the private apartment buildings to let out the empty apartments in their buildings to people with social problems. If this right were utilized the prices would quickly fall drastically, Starck says, since the owners do not want people with social problems in their apartments and would then prefer to sell the apartments cheaper to other people.

Market-responsive planning

Kramer Mikkelsen gives several examples of how politicians in order to make decisions that would benefit sustainability have had to convince the public about the personal benefits for the citizens. As for the Metro the members of parliament who were elected in Jutland were happy to be able to assure their constituencies that Copenhagen would pay for this itself – an example of the citizens thinking in market terms: 'What is in it for me' or 'I will not pay for the benefits of the others'.

In the Danish 'modified market economy' where the municipality itself is not allowed to 'compete' with private investors and developers in order to develop new building stock it is important for the politicians and professionals representing the municipality to have good relations to these investors and developers. Thus the planning process is to a rather high degree influenced by the wishes and interests of different private agents. According to Nielsen the municipality tries to observe sustainability requirements. They have to take into consideration what the market and the economy will accept, though. Nielsen talks about how important it is for the municipality not to 'scare away' the investors. Because the municipality is not the only land owner they have to compete with other land owners when selling land – and thus have to make themselves attractive to the developers.

Hartoft-Nielsen adds to this that one of the first things the investors (the banks) ask is whether enough parking space will be built. According to Hartoft-Nielsen, the investors have the biggest say.

Travel costs and transport infrastructure funding

As to public transport services or roads the structure of financing it is very important. In Denmark the policy of the government has since 2001 been that taxes cannot rise. Thus, since public transport is

financed by the municipalities - from the same source as care for the children and the elderly – there have been many cuts during the latest years. The major roads, on the other hand, are financed by the state.

Lund Pedersen also mentions the fuel prices in Denmark, which he considers to be very cheap. Compared to the wages, the fuel in Denmark turned out to be the cheapest in an investigation conducted by the Norwegian Ministry of Finance. Also the magazine 'Bilmagasinet' found out that from 1980 to 1998 the fuel prices had risen so little and the wages so much that the fuel had become 82% cheaper. Compared to the prices of using public transport the price of one litre fuel should today be more than DKK 25 – 2½ times as high as it is today, Lund Pedersen says.

According to Lund Pedersen, the car lobby wants the money that the car drivers pay in taxes for fuel and cars to return to themselves – for instance in the form of expanded roads. This is the 'something-for-something' thinking that has become more and more common during resent years, However, the National Environmental Agency (Miljøstyrelsen) has calculated the costs of the derived negative effects to 33 billion DKK, says Lund Pedersen.

6 Sustainable mobility – a subordinate concern in urban planning and development in Copenhagen Metropolitan Area

6.1 Introduction

The spatial development of Copenhagen Metropolitan Area during recent years can be characterized as a combination of inner-city densification and low-density outward expansion, where the former tendency has during recent years outweighed the latter. During the investigated period, Copenhagen Metropolitan area has begun to increase its overall urban density, measured in inhabitants per hectare of urbanized land as well as in job density within these areas. For the entire Copenhagen Metropolitan Area, the population density within the built-up areas increased from 27.4 persons per hectare of urbanized land to 27.7 persons per hectare between 1999 and 2008, i.e. by 0.9 %. Within the municipalities of Copenhagen and Frederiksberg, the population density increased by 3.0 % during the same period, in particular due to inner-city densification during the latest few years. Within the continuous urban area of Copenhagen outside the two core municipalities there was an even higher population density increase (4.6%), indicating considerable urban densification in the inner suburban municipalities. The parts of the metropolitan region not belonging to the continuous urban area of Copenhagen experienced a certain reduction in population density within the built-up areas, actually by 2.1 % during the nine years.

New workplaces have been established in the central parts of the metropolitan area as well as in the suburbs, but at the same time many old workplaces have been closed down. The municipalities of Copenhagen and Frederiksberg have increased their share of the total metropolitan number of workplaces. Still, the job density within the urbanized areas outside Copenhagen and Frederiksberg increased slightly (by 1.4 %) from 1999 to 2008. Within the two central municipalities, the job density increased by 5.6 %, and almost all this job growth occurred in the muncipality of Copenhagen. For the metropolitan area as a whole, the urban job density increased by 2.4 %.

Copenhagen Metropolitan Area has a long history of spatial urban expansion in the second half of the 20th century, in spite of low and for long periods even negative population growth in the decades prior to 2000. During the latest decade, this tendency has been reversed, at least within the continuous urban area of Copenhagen.

It should be noticed that densities were at the outset not very high in the Copenhagen region outside the two core municipalities. A long period of outward urban expansion since World War 2 has in itself left considerable space for densification. The reserves of plots where urban densification can easily take place have therefore been considerable, also in the suburbs. This may explain why population density increase has been particularly strong in the parts of the continuous urban area of Copenhagen outside the municipalities of Copenhagen and Frederiksberg. There has, however, also been considerable densification in the central parts of the region, notably on superfluous harbor areas and derelict industrial sites in Copenhagen. Due to globalization, manufacturing industries have moved abroad and left large areas vacant for urban transformation. To a high extent, this densification has taken place in the form of new workplaces (which is reflected in the municipality of Copenhagen's high proportion of the metropolitan job growth during the latest decade). The utilization of densification sites in Copenhagen predominantly for commercial rather than residential development may explain why population density has increased just as much in the outer parts of the continuous urban area of Copenhagen as in the two core municipalities, in spite of the densification opportunities on vacant harbor, defense and industrial areas in the municipality if Copenhagen.

In the parts of the metropolitan area located outside the continuous urban area of Copenhagen, development has predominantly taken place as spatial urban expansion. This outward urban growth has

counteracted the densification and concentrated urban development taking place in the inner parts of the metropolitan area. Due to their lack of proximity to concentrations of jobs and workers, the new outer-area residential and workplace areas require a high amount of motorized transport, and they have usually also been developed at too low densities to make good public transport provision feasible. The construction of new housing and commercial areas in the outer parts of the region has thus led to a more car-dependent urban structure than what would otherwise have been the case. Having said this, it must still be emphasized that the considerable density increases that have taken place in Copenhagen and the surrounding municipalities represent an important departure from the dominant trend within the metropolitan are until the 1990s.

In the central parts of the region, Copenhagen has made considerable investments in a new Metro. Extensions have also been made to the already very good network of bike paths. However, considerable road capacity increases have also taken place. Together with the low-density suburban development this has contributed to a steady growth in car traffic. Over the period 1995-2007, the increase in the amount of passenger transport carried out by car within Copenhagen Metropolitan Area was 23 % when adjusted for population growth.

Surely, some of the new main roads have contributed to channel traffic away from residential or central city areas and thus relieved these areas from noise and local air pollution. But there has been an increase in the overall road and parking capacity. The purpose of road capacity increases has been to combat congestion. This 'predict and provide' policy will hardly contribute to achieve transport and environmental policy goals of reducing greenhouse gas emissions and other negative impacts of urban motoring (Strand et al., 2009).

The transport policy of Copenhagen Metropolitan Area seems in many ways to have been based on the ideas of the Buchanan report from the early 1960s of reconciling motor traffic with the protection of urban amenities (UK Ministry of Transport, 1963). The Buchanan report accepted the popularity of the car and attempted to envisage ways of accommodating traffic while protecting residential areas from through traffic and restricting or banning the use of private cars in historic centers. Copenhagen's hierarchy of roads, bike paths, pedestrianized zones, and limitations of parking possibilities in the inner city combined with ample provision of road and parking infrastructure in the suburbs reflect a conception of the environmental problems associated with urban motoring as problems of *concentration* (in terms of congestion, noise and local air pollution) and not problems of

volume (e.g. the amount of energy consumed and greenhouse gases emitted).

The trajectories of land use and transport development observed in Copenhagen Metropolitan Area since the 1990s are the results of the combined effects of a multitude of different causal mechanisms. The popularity of inner-city living has obviously increased during the latest couple of decades. The skyrocketing housing prices in the central and inner parts of the metropolitan area (apart from a decline in the wake of the 2008 financial crisis) bear witness of demand for centrally located dwellings exceeding the supply, thus pressing price levels upward. The increased popularity of inner-city dwellings reflects, among other things, cultural trends (increased interest in 'cafe culture' and 'urban' leisure activities) as well as changes in the household structure (fewer families with children, more one- or two-person households). However, among families with children, the single-family home still holds he position as the dominant ideal (Ærø, 2002).

Obviously, the standard and density of the already existing building stock has also played a role. The combination of a relatively high density in the two core municipalities at the outset, economic recession in the first part of the period and low population growth has limited the possibilities for inner-city densification. In the outer parts of the region, ample vacant 'urban zones' long ago set aside for suburban development, increasing municipal competition for inward investments, and no strong popular pressure for protection of surrounding undeveloped areas against urban expansion, have facilitated outward urban expansion rather than densification.

The impact of the Finger Plan as a planning doctrine through more than 60 years should also not be forgotten. This plan has basically been a plan for decentralized urban development, albeit concentrated along main transport corridors. As new development has taken place in these corridors, traffic has increased, which has in its turn triggered the construction of new or expanded transport infrastructure. The latter has then facilitated further growth in the fingers, which have become longer as well as thicker. The Finger strategy for linear urban expansion along selected corridors has thus to some extent been self-amplifying, leading to positive feedback circles and to some extent path dependency (Barter, 2004; Imran & Low, 2005).

The land-consuming urban development in the outer parts of the metropolitan area has also been encouraged by the fact that outward urban expansion in the Copenhagen region usually requires low

infrastructure costs. Like most of Denmark, the terrain is relatively flat and characterized by loamy, clayey and sandy soils, with almost no solid rock fully exposed. Moreover, farmland is ample in Denmark, and converting some of it into building sites is not considered a serious loss. Thus, no strict policies have been pursued against the conversion of farmland into sites for urban development. Copenhagen Metropolitan Area also has a wide scope for outward urban expansion without conflicting with recreational forests.

The extent to which adopted land use plans actually shape the spatial development or are mere formalizations of a development that would anyway have been produced by market forces is of course a matter that can be disputed. The land use development that has taken place in Copenhagen Metropolitan Area is, however, to a high extent in accordance with municipal land use plans. The local traces of national planning policies are evident in the inner parts of the metropolitan area but less clear in the outer municipalities. The contents of municipal, regional and national plans and policy documents, and the prevailing opinions among the planning profession and other actors in planning and decision-making may throw light on possible causes of the spatial development of Copenhagen Metropolitan Area as well as the region's somewhat ambiguous efforts to improve public transport simultaneously with undermining the competitive power of this mode through urban road capacity increases.

Table 6.1 shows how our different sources of evidence provide answers to research questions concerning the opinions and understandings of different actors on urban sustainability issues, their views regarding actors and driving forces of urban development, barriers to sustainable solutions, as well as their assessment of the institutional and structural conditions under which urban planning in Copenhagen Metropolitan Area operates.

Table 6.1: Overview of the answers provided by different sources of evidence to research questions about interpretations of sustainable development, land use and transport policy priorities, the influence of different actors, barriers, and the role of institutional, economic and other social conditions on the possibility for obtaining a sustainable urban development.

Research questions	*Plans*	*Articles*	*Interviews*
To what extent is the issue of sustainable development addressed in the investigated sources of evidence?	Quite frequently in Copenhagen's Municipal Plans and the Regional Plan, to some extent in the National Planning Statements, only sparsely in the Infrastructure report. In the Finger Plan, sustainability seems to be an important underlying, but barely articulated premise.	It is dealt with only to some extent. Less than one third of the investigated articles address the issue of sustainable development, but in several other articles it is dealt with implicitly. The proportion addressing the issue has increased over time.	As this was a topic of the interview guide, this is obviously touched upon in all interviews.
How do the sources of evidence interpret the concept of sustainable development	In Copenhagen's Municipal Plans and National Planning Statement 2000 mainly as an environmental challenge and objective. In the other documents as a combined environmental, social and economic concept with emphasis on the latter, understood as competitiveness.	Quite often not specified, especially in the recent years. When specified, most often environmental, and in some cases a combination of environmental, social and economic dimensions. Very few write about sustainability only as a social or economic concept.	Mostly either combined environmental, social and economic, or only environmental. One talks about the concept mainly in terms of local/regional competitiveness. Three are reluctant to defining the concept and talk about more confined environmental and social topics.
Is sustainability pointed out as the overarching goal or as something that has to be subordinated to or adapted within the frames of a different, competing goal?	High on the agenda in Copenhagen's Municipal Plans and the Regional Plan, less prominently articulated in the remaining documents, although 'economic sustainability' is a main concern. Environmental sustainability an underlying, but not articulated premise of the Finger Plan	Not specified in that way.	Not said explicitly.

Research questions	*Plans*	*Articles*	*Interviews*
Which sustainability problems/issues do the sources of evidence identify as the most important ones to address?	In Copenhagen's Municipal Plans and the Infrastructure report: transport-related environmental problems. In Regional Plan 2005: sustained economic growth and competitiveness. The National Planning Statements and the Finger Plan: only vague statements.	Sustainable mobility is identified as a main challenge alone or together with other issues in one half of the articles addressing the concept. One fifth of the articles have 'urban metabolism' with the countryside and/or 'closed loops' as their main focus; these issues are also dealt with in a few of the articles with a combined perspective. Only one article has the urban green structure as its main focus.	Energy use and reduction of climate gas emissions are the issues mentioned by most interviewees, with a special focus on urban transport. Social welfare, equality, and ensuring local economy and jobs are mentioned by some. Few of the interviewees mention noise, outdoor life, aesthetic qualities and historical values.
Which among the policy measures mentioned in the sources of evidence are described as responses to the challenge of a sustainable urban development?	In the municipal plans, the Regional Plan, the Finger Plan and National Planning Statement 2000: densification and development close to public transport nodes. In the Infrastructure report: vehicle and traffic technology, and infrastructure expansion. The latter also in National Planning Statement 2006.	Compact city development (two thirds), mainly understood as development close to public transport nodes, improved public transport, and restrictions on urban motoring. One third takes decentralized growth for granted and focus on making single-family home areas more sustainable, bringing jobs to the suburbs or adding infrastructure.	Avoiding urban sprawl by concentrating development close to public transport nodes, improving public transport, improving bike path network. Some also mention restrictions on car use. One interviewee emphasizes infrastructure development.
To what extent do the sources of evidence support the compact city model or are critical to this model?	Generally positive, most so in Copenhagen's Municipal Plans. In the remaining documents the focus is on 'decentralized concentration' around public transport nodes.	52 % of the articles expressing a standpoint to the compact city model are more or less supportive to this model.	Almost all interviewees are against sprawl and most of them support inner-city densification as well as suburban development close to urban rail stations. One interviewee argues against a strict transit-oriented development and supports transformation of vacant peripheral industrial buildings into offices.

Research questions	*Plans*	*Articles*	*Interviews*
Do the sources of evidence make references to any causal influences of land use on transport? Are any of the relationships that exist according to state-of-the art research denied?	All documents include or recommend policies based on such relationships, but the theories and research are usually not mentioned. The focus is mostly on the influence of proximity to urban rail stations. The impacts of location relative to the main city center are seldom mentioned.	One fifth of the articles deal explicitly with land use – transport relationships. About 75 % of the articles dealing with such relationships demonstrate or refer to their existence, whereas 25 % deny them.	All interviewees seem to assume that densification rather than sprawl is preferable in order to reduce car travel, but most of them are not very specific about this. Some also express recognition that a central location of dwellings and offices is favorable, but generally most emphasis is attached to the effect of proximity to urban rail stations.
To what extent do the sources of evidence support road capacity increases, restrictions on the use of cars in urban areas and/or increased investments in public transport services?	Copenhagen's municipal plans and the 2000 National Planning Statement support public transport improvements as well as restrictions on car travel in cities. The latter document is also in favor of limiting road capacity increase. The remaining documents support public transport improvements as well as road capacity increases, but do not mention restrictions on urban motoring.	Two fifths of the articles expressing transport policy priorities at the city/metropolitan scale have transit improvements as their main priority, and another two fifths favor restrictions on car use (especially parking) and/or actively reject road capacity increases (usually in combination with transit improvement). One sixth goes for road capacity increases, this too usually in combination with public transit improvement.	All interviewees support increased public transport investments. Three are clearly positive to road capacity increases, four support this to some extent, three are against and two do not express a clear opinion. Six interviewees support some kind of restrictions on urban motoring, of which three emphasize parking restrictions and four recommend road pricing.
Do the sources of evidence make references to any causal influences of transport infrastructure investments on transport? Are any of the relationships that exist according to state-of-the art research denied?	None of the investigated documents actively denies that transport infrastructure investments may cause changes in travel behavior. But most of the documents do not mention these relationships, and in several documents policies are being justified by arguments that would only be valid if these relationships did not exist.	Several articles implicitly assume that improved public transport may reduce car travel, a few also that road capacity increase induces more car traffic. However, no article explicitly deals with such influences.	Eight interviewees agree that more roads will necessarily generate more traffic. Two oppose this, and the remaining two do not express any clear opinion on the matter. The support of improved public transport expressed by all interviewees is probably based on the assumption that this will attract new passengers, but none of them states this explicitly.

Research questions	*Plans*	*Articles*	*Interviews*
Do the sources of evidence include policy measures influencing the spatial content of urban development that are not discussed in relation to the challenges of sustainability? In case, which measures?	In Copenhagen's municipal plans, policy instruments are to a high extent discussed or incorporated in a sustainability context. In the remaining documents, sustainability impacts of policy instruments contributing to increased transport and higher shares of car travel are usually not discussed.	Less than a third of the articles dealing with urban spatial development discuss this explicitly in relation to sustainability. Several of the remaining articles discuss highly sustainability-relevant issues and 60% of those recommend land use solutions in accordance with widely held sustainability principles.	This question is not relevant to the interviews.
Do the sources of evidence mention any barriers to the achievement of a more sustainable urban development? In case, which barriers?	Barriers to the achievement of a more sustainable urban development are explicitly mentioned to a very little extent. To some extent, driving forces that may counteract proposed environmental strategies are mentioned.	One fourth of the articles mention barriers to an environmentally more sustainable urban development. Lack of coordination (national-local and between municipalities), increasing influence from market forces, and predominant ideas are mentioned. Few, if any, address lack of coordination across sectors or uneven power relations as barriers.	There is a widespread opinion that the coordination across municipal borders is too weak. Many say that land use and transport planning are too weakly coordinated, and some also miss better coordination between public transport and road planning. Also, lack of political willingness and contested knowledge claims are mentioned. Little focus on uneven power relations as a cause of lack of coordination.
Do the sources of evidence indicate an aim at a high or low growth in the metropolitan population and/or building stock? Is the desirability of growth being questioned?	The documents assume modest population growth, albeit above the national average. Population growth is seen as positive and an indicator of regional prosperousness. Per capita growth in the building stock is taken more or less as a given fact.	None of the articles express criticism or doubt about per capita increase in housing consumption. Three articles express growth skepticism or criticism in a more general way.	Although some interviewees show examples of the higher resource consumption associated with growth, none of the interviewees express a critical view on growth in the population and/or the building stock.

Research questions	*Plans*	*Articles*	*Interviews*
To what extent are the sustainability measures mentioned in the *plans and policy documents* linked with measures for implementation?	Apart from the general Planning Act regulations that apply to all the land use plans, the Finger Plan includes a regulation of the order according to which the urban zone areas of municipal plans are to be developed. The Regional Plan 2005, the national planning statements and the Infrastructure report are mainly guidelines and recommendations as regards spatial development.	Not relevant	Not relevant
To what extent do the sources of evidence focus on the influence of institutional frameworks in promoting or counteracting a sustainable urban development?	The Finger Plan and the Regional Plan are themselves instruments for horizontal and vertical coordination. To some extent, the documents discuss needs for improved such coordination. The Infrastructure report was produced through stakeholder involvement mainly from actors who want increased road capacity.	One fifth of the articles deal with institutional frameworks to some extent, many of which focus on the legal frameworks (especially the Planning Act) and the way this legislation allocates authority to different tiers of administration. A few call for better coordination between municipalities, and some are critical to an increasingly network-based style of governance. Culture and civil society is addressed in very few articles.	Several interviewees call for better regional coordination of land use development. Also, the need for better coordination between land use and transport authorities is addressed. Some also call for better coordination between road planning and public transport planning.
Do the sources of evidence include proposals for changes in institutional frameworks, or reflect recent such changes?	The latest Copenhagen municipal plan describes recent changes aiming at a more transparent and environmentally aware planning process. The National Planning Statements give some recommendations of institutional reforms. The remaining documents do not address such issues.	Several articles ask for changes in institutional frameworks, but none of them includes concrete proposals for new solutions.	Some interviewees propose the establishment of an administrative entity covering the entire region (or even all of Zealand), with the authority to adopt binding regional plans.

Research questions	*Plans*	*Articles*	*Interviews*
To which extent do the sources of evidence mention economic, structural driving forces of urban development? If mentioned, how are such driving forces assumed to influence urban development?	The challenges presented to the prosperity of cities by economic globalization are a main issue in all the investigated plans and policy documents. The driving forces of the market economy form the basis for screening out policy alternatives deemed incompatible with growth objectives.	9 % of the articles address this. Among these, many, especially from recent years, argue that globalization and international competition between cities has necessitated a shift to a more market-responsive approach in planning and a stronger focus on infrastructure development.	Several interviewees hold that competition between municipalities for inward investments has contributed to sprawl. Many also think infrastructure development has been prioritized in response to economic crisis. Some also recommend it as a general strategy for competitiveness.

6.2 Interpretations of sustainability

Sustainable development is an issue that is to some extent addressed and discussed in the investigated plans, articles and among the interviewees, but the interpretation of the concept varies considerably. Sustainability was high on the agenda of Danish urban planners in the early 1990s, but then came out of focus for several years. However, plans and articles have quite often included and communicated environmental strategies in urban development without explicitly referring to the concept of sustainable development. The issue of sustainable development has been addressed in the investigated Municipal Plans of Copenhagen, the Regional Plan and to some extent in the National Planning Statements, but hardly in Infrastructure report and the Finger Plan. It may seem as though the use of the concept of sustainable development in national-government documents has been downplayed after the liberal-conservative government came into position in 2001. During the most recent years, sustainability has re-entered the urban planning discourse as an important topic, with a particular focus on the challenges of climate change. Copenhagen's preparation for the international climate conference COP 15 in December 2009 has obviously contributed to push the climate issues higher on the political agenda.

In the Danish planning discourse, the concept of sustainable development was at first interpreted mainly as an environmental concept. This is especially evident in the professional journal articles. The aspects focused most on within the environmental dimension are greenhouse gas emissions and protection of green areas. Some documents and interviewees also include social and economic aspects.

Within the profession of land use planners, the interpretation of sustainable development seems to be fairly well in accordance with the understanding of the concept in the Brundtland commission (World Commission on Environment and Development, 1987). Among transportation planners and politicians, the concept has, however, increasingly been redefined in such a way that the economic dimension has been interpreted as promotion of local competitiveness and traditional economic growth. This illustrates a situation where a hegemonic discourse somehow 'eats up' the new alternative discourse (KoshraviNik, 2006).

Sustainable development has gained a status as some sort of overarching goal in Copenhagen's municipal plans, but has not achieved the same status in neither national land use policy documents, regional land use plans nor within transport planning. In Copenhagen's land use plans, sustainability goals are expressed increasingly prominently in the most recent plans. Environmental sustainability is considered to be beneficial to growth. In transport policy documents, the concept is hardly referred to. Environmental problems resulting from growing car traffic, notably greenhouse gas emissions, is the sustainability challenge most commonly mentioned in our investigated plans and policy documents, articles and among our interviewees. The issue of sustainable mobility has thus had (and has) a quite strong position in the Danish discourse on sustainable urban development, but there has also been an alternative discourse centered on the concept of *city ecology*. In the planning journal articles, there is thus some focus on 'urban metabolism' and 'closed loops'. Some interviewees mention social welfare and equity as important parts of the concept. As mentioned above, there has also been an increasing tendency to consider improved competitiveness as a prerequisite for ensuring local economy and jobs, and thus as an important dimension of sustainability.

6.3 Support of decentralized concentration

The principle of decentralized concentration has a long tradition as a planning ideal in Copenhagen Metropolitan Area. The original Finger Plan of 1947 – sometimes referred to as Denmark's city planning showcase – was based on ideas from town planning in Britain, where there was already a tradition of establishing new Garden Cities around major cities instead of allowing the mother city to grow by adding concentric layers of urbanized land. In Copenhagen Metropolitan Area, urban growth was to take place as tentacles – or fingers –

stretching out from the outskirts of the core city along the commuter railroads and highways toward the closest neighbor towns. Between the fingers, open land was to be preserved as *green wedges*. (Matthiessen, 2008.)

In Copenhagen Metropolitan Area, the Finger Plan has since its adoption had the status of a *doctrine* for urban development (Faludi & van der Valk, 1994). A doctrine comes close to what is often termed as a 'hegemonic discourse' within a field of society (Hajer, 1995). The finger structure of land use has been given legal status through the urban zone legislation of the Planning Act, but according to Matthiessen (2008) its main influence has been promotional. The finger methapor makes the basic ideas of the plan easy to communicate, and the decision-makers were symphatetic toward the overall concept.

The protection of the green wedges has, however, not been as strong as presupposed in the Finger Plan. Similar to the Green Belts around London and other major British towns, the designation of the green wedges as areas for non-development was not backed by strong recreational interests. Most of these areas were farmland, and where forests were included, public access was usually limited to the major paths unless the land was publicly owned. (This is distinct from, e.g. privately owned forests in the other Nordic countries, where everyone can freely pass everywhere on foot or skiing.) The green wedges, like the British Green Belts, were thus to some extent only a sort of voids, without much user value for the urban population (Whyte, 1968, quoted from Laugen, 2000). Throughout the decades, the wedges have therefore been fragmented by ring roads and quite some residential and commercial development (Matthiessen, 2008).

In the investigated plans, policy documents and articles there is strong support of the ideas of the Finger Plan of concentrating development to the finger structure. With a few exceptions, there is a broad consensus that a further fragmentation and urban expansion into the green wedges should not be allowed. Development close to public transport nodes in the finger structure as well as in the 'palm' (the municipalities of Copenhagen and Frederiksberg) is the main land use measures described in our data material (investigated plans, journal articles as well as interviews) as responses to the challenge of a sustainable development. Densification is generally endorsed, but not to the extent that greenfield development is not also seen as part of the desired urban development. Improving public transport is the dominant transport policy measure advocated. Some sources also

emphasize improving conditions for biking, and restrictions on auto use.

There is thus support in the investigated plans and policy documents, articles and among the interviewees of a more compact urban development than what has actually taken place during the recent decades. The Finger Plan 2007 represents a strengthening of implementation measures in order to ensure that urban sprawl outside the 'finger structure' is prevented; that a higher proportion of new development takes place as transformation of existing urban areas instead of outward urban expansion; and that new dwellings, offices and service facilities are located close to urban rail stations.

In the 2005 and 2009 municipal plans of Copenhagen, compact city development is seen as conducive to growth (as is protection of local environmental qualities). This reflects an ecological modernization perspective on urban sustainability (Mol & Spaargaren, 2000; Barry & Paterson, 2003). Among the articles in the professional journal *Byplan*, about one half of the articles expressing a standpoint to the compact city model are more or less supportive to this model. In Copenhagen Metropolitan Area, such development is usually interpreted as a combination of inner-city densification based mainly on transformation of harborfront and derelict industrial areas, and development close to public transport stops along the fingers of the Finger Plan, with the strongest emphasis on the latter. This is also evident from the interviewees' evaluation of the spatial development that has been taking place since the 1990s.

There is still a counter-discourse advocating decentralization of jobs, road infrastructure development, conversion of suburban vacant industrial buildings into offices, and development of more single-family houses in order to avoid that people who prefer such dwellings move to municipalities outside the metropolitan area.

There is a widespread understanding in the investigated plans and policy documents as well as among the interviewees that densification rather than sprawl is preferable in order to reduce car travel. Among the *Byplan* articles, about 75 % of the articles dealing with such relationships demonstrate or refer to their existence, whereas 25 % deny them. A minority of debaters thus express counter-claims to the state-of-the-art knowledge. The existence of these counter-claims may to some extent have weakened the political support of compact urban development, since people are less prone to favor action if there is doubt about the effects of the policies in question (Beder, 1999).

6.4 Ambiguous transport policy

The investigated plans and policy documents, articles as well as the interviews show that there is broad support of public transport improvements in Copenhagen Metropolitan Area. In the plans and policy documents, public transport improvements are, however, combined with road building, mainly in order to reduce or prevent congestion. Road capacity increases have been contested among professionals but supported by most politicians. A slight majority among the interviewees support or accept road capacity increases, but several interviewees are also negative toward urban highway development.

Among the journal articles, relatively few support urban road capacity increases. Different types of restrictions on auto use are advocated by a relatively large minority among journal articles as well as interviewees. In the Danish debate there has for a long time been a quite strong focus on parking policy as a measure to limit traffic especially in thecity centers. During recent years, road pricing has also entered the agenda and is recommended by several interviewees. In Copenhagen Metropolitan Area, the Municipality of Copenhagen currently cooperates with a number of neigboring municipalities in order to introduce road pricing. However, the national government has so far prohibited this from being implemented.

The arguments for public transport improvements as a measure to enhance sustainable mobility implicitly assume that better public transport reduces the growth in car traffic. This assumption is thus a premise in all the investigated plans and policy documents as well as for most of the interviewees, although it is seldom discussed explicitly. The traffic-generating effect of road capacity increases in congested areas is mentioned by several interviewees but not addressed in the plans or policy documents. None of the sources deny the existence of such relationships, but they are often downplayed or ignored, and in several documents policies are being justified by arguments that would only be valid if these relationships did not exist. This knowledge thus seems to have been largely excluded from the dominant discourse. To a higher extent than for relationships between urban structure and travel, the acceptance of knowledge claims about the traffic-inducing influences of road capacity increases in congested areas seems to have been influenced by power relations (cf. Beder, 1999).

6.5 Stakeholder influence

Neither the investigated plans nor the journal articles reviewed say much about actors influencing urban development. But in the interviews, this issue is addressed. National planning and environmental authorities have for a long time pushed for development close to urban rail stations in the fingers of the Finger Plan. They have, however, been less enthusiastic about densification in the municipality of Copenhagen, especially as regards workplaces. The municipality of Copenhagen has pursued a policy of compact urban development and has argued with the regional and national authorities for more jobs to be located within its limits. Copenhagen's densification strategy should, of course, be seen in the light that the land reserves within the municipal borders are small and that dense and compact development is the only away to accommodate any substantial growth in the number of inhabitants and jobs.

Whereas the municipality of Copenhagen has (together with Frederiksberg) pursued compact city development, the outer-area municipalities have promoted low-density development. These municipalities have ample undeveloped areas and have used the possibility to offer spacious sites for development as a competitive advantage in the struggle for inward investments. Such competition for inward investment in regions where the functional city is divided between many municipalities is a well-known phenomenon described in urban theory and political economy literature (e.g. Logan & Molotch, 1996). Among municipal politicians and bureaucrats in Copenhagen Metropolitan Area, economic globalization and increasing influence from neoliberal ideas appear to have led to a quite strong emphasis on competitiveness. Such a prioritization has also been recommended by international agencies like the OECD, most recently in a *territorial review* of the Copenhagen Metropolitan Region (OECD, 2009). Commercial developers have to a high extent oriented themselves toward development opportunities in the suburban municipalities, but in recent years increasingly also toward inner-city urban transformation.

Whereas there is some disagreement between different political parties on transport policy issues (with the left being more negative and the right more positive to road development), disagreement on land use issues follows party divides to a much lesser extent. The development of low-density single-family house areas has hardly been a politicized topic in Copenhagen Metropolitan Area. The higher emphasis of the political right on facilitation for car travel reflects more individualistic

ideologies in general and a higher importance placed on negative liberty than on positive liberty (Berlin, 1969). For those parties, the freedom of car drivers to drive unrestricted (negative liberty) is considered more important than the freedom of affected groups from negative environmental and other impacts of this traffic (positive freedom). Generally, the idea of positive liberty is held to be emphasized to a higher extent by those on the left-wing of the political spectrum, whereas negative liberty is most important for those who lean towards the right.

Different sectors within public administration have also pulled in different directions. The Ministry of the Environment has strongly promoted the principles of the Finger Plan, especially the strategy of locating development close to urban rail stations. Reducing traffic growth has been a main purpose of this policy. The transport authorities, on the other hand, have promoted a higher mobility in general, supporting investments in public transport as well as highways.

These differences between the two ministries may in part reflect different organizational cultures (Sørensen, 2001). Some interviewees characterize the professional culture within the Ministry of Transport and the Road Directorate as being clearly car-oriented. The latter tend to favor economic methods for project evaluation, and the recommendations based on such analyses may sometimes deviate from those based on adopted political goals. In general, cost-benefit analyses of transportation investment projects tend to give priority to projects that can in a short term reduce travel times, rather than projects contributing to other social goals (Næss, 2006b).

According to our interviewees, environmental organizations have not been very active in the discussions about land use development in Copenhagen Metropolitan Area. Some of the environmental organizations have focused on building houses of straw and living closer to nature, and have not been supporters of the idea of increasing urban densities. In Denmark, much of the debate on environmentally friendly housing has evolved around the concept of city ecology, focusing on local self-sufficiency, waste and water management, and closed circuits of substances. The features regulated by the overall physical planning are not given much weight in this strategy (Hoftun, 2002).

6.6 Barriers and conditions for implementation

As mentioned earlier, the planning legislation provides legal possibilities for protection of areas set aside for non-development against the construction of buildings and major technical infrastructure. There are therefore good formal measures to implement the densification policy prescribed by the land use plans. However, due to the very large non-developed areas long ago set aside as urban zones in the municipal plans of the suburban municipalities, this possibility has been somewhat illusory until recently. This is probably an important reason why such a large proportion of workplace development as well as residential development in the outer parts of Copenhagen Metropolitan Area have violated the national and regional policy of locating close to urban rail stations. In the Finger Plan 2007, a sharpened regulation of the scheduling of development within the urban zone areas has been introduced as a remedy to prevent scattered development from taking place all over the oversized areas set aside as urban zones nearly forty years ago. Such scheduling of developmental areas was also presupposed in the preceding Regional Plan 2005, but the binding character of this scheduling has been tightened in the Finger Plan 2007.

The articles and interviews point to some other barriers that may prevent the realization of sustainability goals in urban development. Lack of coordination, especially across municipal borders, is the most often mentioned barrier to sustainable urban development at a metropolitan scale. Such barriers are highlighted in many professional journal articles as well as among interviewees. There is a widespread opinion that the coordination between municipalities is insufficient. Better coordination between central and local authorities is also called for by some articles and interviewees. Some interviewees also say that land use and transport planning are too weakly coordinated, and some also miss better coordination between public transport and road planning.

The lack of coordination is considered by our sources to result in environmentally less sustainable land use and transport infrastructure decisions than what would otherwise be the case. Few explicitly address uneven power relations as a cause of lack of coordination. Some sources point at lack of political willingness (partly reflecting predominant ideas among the population), increasing influence from market forces and contested knowledge claims as additional barriers.

6.7 More is always better...?

In our investigated data material, the desirability of growth in the building stock is generally not questioned. None of the interviewees mention growth in the population and/or the building stock as a problem. Growth in the building stock - in absolute figures as well as in floor area per capita - has generally been taken as an assumed good, questioned by virtually no one. Sustainability efforts in urban spatial development have thus been framed (Kaufman et al., 2003) as a matter of obtaining a (partial) decoupling between growth in the building stock and negative environmental impacts. Growth in transport and mobility has also to a high extent been taken as an unavoidable fact, with sustainability policies aiming at channeling as much as possible of this growth to public transport.

As can be seen from the above, such a partial decoupling has not to any high extent been obtained in the Copenhagen Metropolitan Area. Alongside with on average quite moderate economic growth (OECD, 2009) as well as moderate growth in the building stock during the period, there has been a substantial conversion of natural areas and farmland into urbanized land, and a formidable growth in car traffic.

Moreover, an important case in point is that many of the urban transformation sites where densification has after all taken place have been made available because manufacturing industries have moved from Copenhagen (like most other cities in affluent countries) to poor countries in Asia where labor is cheaper and environmental regulations lax. The partial decoupling between growth in the building stock and negative environmental consequences that has been achieved in cities like Copenhagen has therefore to some extent been conditioned on prior global-scale relocation processes resulting in large encroachments on nature in newly industrialized developing countries. The transport impacts of this development in these countries are also not necessarily favorable, judged against criteria of sustainable mobility.

6.8 Concluding remarks

The spatial development of Copenhagen Metropolitan Area during recent years can be characterized as a combination of inner-city densification and low-density outward expansion, where the latter tendency has hitherto outweighed the former. This has led to a more transport-demanding urban structure, and the new suburban and

exurban residential and workplace areas usually have a too low population density to make good public transport provision feasible. The overall development of land use has therefore not contributed to bringing Copenhagen Metropolitan Area closer to the goal of sustainable mobility. In particular, the development in the outer parts of the region pulls in the opposite direction.

In Copenhagen Metropolitan Area, most municipalities have for a long time had (and still have) such a large surplus of non-built-up areas designated for urban expansion that it has until recently been difficult to stimulate densification through 'negative' measures (i.e. by limiting the possibilities for greenfield development). Moreover, there is a competition for inward investments and in-migration of affluent taxpayers between a large number of suburban municipalities including two thirds of the entire metropolitan population. These circumstances have probably encouraged the municipalities as well as the national planning authorities to follow a negotiating and collaborative planning style in order to achieve their goals of land use planning.

National land use policies have aimed at counteracting urban sprawl, but have not focused very explicitly on densification or compact city development. Instead, the focus has been on *decentralized concentration*, with the guidelines from the Ministry of the Environment recommending new office buildings in the Copenhagen region to be located close to urban rail stations as the most spectacular example. This policy is in line with long-standing ideals in Danish urban planning, where the Finger Plan of Copenhagen Metropolitan Area has through six decades had an almost iconic status.

Planners from the municipality of Copenhagen usually take densification as an obvious strategy. However, the Danish planning discourse also includes voices speaking in favor of a more pronounced decentralised and low-density urban development. Champions of eco-villages and self-sufficient neighborhoods have had some influence in the environmental organizations and on general opinions among the population about sustainable living, but they have to a little extent used professional planning journals as their forum of discussion. In the latter discourse, the main spokespersons for low-density urban development are planners from suburban municipalities or smaller cities, representatives of the Association of Danish Municipalities, and in some cases also architects and landscape architects working mainly with planning at a local neighborhood scale.

Market agents have sometimes also pushed for greenfield development at locations poorly served by public transport in the outer parts of the region. Municipal competition for inward investments has often implied that such demands have been accommodated. There has also been market demand for more intensive land use within existing urban areas in the central parts of the region, but the amount of such development has hitherto not been able to outweigh the pressure for low-density housing and low-rise commercial development with ample parking space.

The most recent Finger Plan implies heightened national ambitions for a coordinated development of land use and transportation infrastructure contributing to the achievement of national goals of environmental sustainability and economic development. There is nevertheless a widespread opinion among planners and policy-makers that the regional coordination of spatial development in Copenhagen Metropolitan Area should be improved.

Copenhagen has made considerable investments in a new Metro, but considerable road capacity increases have also taken place. Together with the low-density suburban development this has contributed to a steady and rapid growth in car traffic. During the period 1995-2007, car traffic within Copenhagen Metropolitan Area increased on average by 24 %, whereas public transport decreased by 7 %. Seen from the perspective of sustainability, the combined, and quite costly, strategy of investing in increased road capacity as well as improved public transport has been similar to stepping on the accelerator and the brake at the same time, with the strongest pressure on the accelerator of car travel. The general level of mobility has been enhanced, but the shares of car drivers and travelers by other modes have changed quite dramatically. Whereas public transport improvement has been backed by broad political consensus, road capacity increases have been contested. In particular, there has been skepticism against urban highway development among land use planners, environmental organizations and politicians to the left. Transport authorities and planners involved in transport infrastructure development in the Copenhagen region have generally considered road development as a measure to combat congestion. During most of the investigated period, road pricing was not on the political agenda, but during the recent years the municipality of Copenhagen has cooperated with nine neighboring municipalities to put pressure on the national government to allow this measure to be implemented.

On average for the period since the early1990s, the Copenhagen region has experienced moderate economic growth as well as

population growth. Within the fields affected by land use and transport planning, there have still been relatively high impacts on nature and the environment during this period. There has hardly been any decoupling between growth in the building stock and negative environmental impacts, at least not when measured in terms of land take and generation of traffic. The land use and transport infrastructure development during the investigated period has not contributed to bringing Copenhagen Metropolitan Area closer to the goal of sustainable mobility.

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