On the Road to Sustainability

Exploring transition and transport planning in Oslo, Norway.

Marius Sandvoll Weschke

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A thesis submitted in partial fulfillment of the requirements of Lund University International Master's Programme in Environmental Studies and Sustainability Science (30hp/credits)

LUCSUS
Lund University Centre for Sustainability Studies

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Supervisor: Henner Busch, LUCSUS, Lund University

Abstract

Achieving climate change mitigation targets requires a drastic cut in emissions from the transport sector – a huge challenge for regions where a heavily road-based mobility is already established, and where emissions have steadily increased for the past 20 years. Expectations of highly efficient, fast and ever-increasing mobility adds to the challenge. Oslo, Norway, is a highly relevant case in this respect. It is a region where problems of air pollution and congestion, as well as a growing population, amplify the need for a transition and new solutions. How the transport plans and visions for the Oslo region see the ever-increasing expectations of faster and more efficient mobility for everyone is a field in need of more research. This paper contributes to this by critically discussing the problems connected to highly mobility-driven societies with the use of hypermobility as the theoretical framework. I collected first-hand information from key people within transport planning, as well as from research and environmental organizations in Oslo through semi-structured interviews. In addition, I conducted desk research on the frameworks and relevant transport plans on a regional and national level. The multi-level perspective (MLP) constituted the analytical framework, with which I mapped out the factors that shape visions and plans – with a focus on the transport planning regime. This helped identify where 'cracks' in the regime might form, opening up for a transition. Findings suggest that the actors see technological developments and behavior changes related to car-sharing, autonomous vehicles and ICT as promising solutions and niches for the future. Electrification and hydrogen vehicles are seen as an important solution to emissions and air pollution, but it is not sufficiently addressing road traffic volumes. Furthermore, the objectives and self-interest among the actors is a challenge in the planning processes, amplified by the organizational structure in which the planning and cooperation takes place. These organizational structures help maintain status quo hindering a transition. Financing infrastructure is a key discussion point among the informants, and despite optimism in the plans, the visions largely still cling on to the concept of a hyper-mobile population and the regime still depend on cars and the technological fixes to "green" them. This might be interpreted as inherently self-contradictory. Having applied the theory of hypermobility and the framework of the MLP to transport planning, this thesis the encourages further research into the role of hypermobility in largely car-based societies, and the possibilities for transitions.

Keywords: transport, planning, hypermobility, Oslo, MLP, transition, sustainability science

Word count: 13609

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Lastly, a big thanks to the friendly and helpful people willing to answer my questions, and help me gain valuable insight needed for this thesis.

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Abbreviations:

ACC –	Akershus County Council
BEV –	Battery Electric Vehicle
ITE –	Institute for Transport Economics
ICT –	Information and Communications Technology
OP –	Oslo package
MLP –	Multi- level perspective
NCA –	National Coastal Administration
NTP –	National Transport Plan
NPRA –	Norwegian Public Roads Administration
NNRA –	Norwegian National Rail Administration
RTLA –	Regional Plan for Land use and Transport in Oslo and Akershus
PHEV –	Plug-in hybrid electric vehicle
ZERO –	Zero Emission Resource Organisation
ZGG –	Zero growth goal

1 Introduction

1.1 Problem formulation

There is an urgent need to decrease emissions from the transport sector – both on a global, as well as on a Norwegian level. The CO^2 emissions and air pollution from the transport sector – especially fossil fuel driven cars – is a substantial health and environmental concern in many cities in Norway (FHI, 2014). It is challenging to find a path leading away from the car as the dominant form of transport. After decades of lock-in to infrastructure, industry, economic policies and cultural beliefs, cars are now a central piece in modern societies (Sheller & Urry, 2000). In the early days of car-based personal mobility, an expectation of increasing speed, efficiency, and seamless travel grew with the number of cars.

The lock-in of a car-based transport system is a central topic in much of the literature on urban transport, mobility, and transition research (Banister, 2011; Geels, 2005; Schwanen, Banister, & Anable, 2011; Sheller & Urry, 2000; Urry, 2004). In addition to often discussed environmental problems of this lock-in, impacts are also evident in the social sphere, as discussed in critical research of 'hypermobility' (Adams, 1999; Cohen & Goessling, 2015). These social issues encompass problems such as inequality, crime, cultural diversity and generally the social life on the street (Adams, 1999; Cohen & Goessling, 2015). Striving for sustainable development also entails addressing social sustainability (World Commission On Environment And Development, 1987). In a highly car-based and hypermobile society a transition to a transport system in which both environmental and social impacts connected to hypermobility are addressed is necessary.

The Norwegian population is expected to grow relatively fast compared to European trends (Tønnessen, Syse and Aase, 2014). This projection is particularly relevant for the region around Norway's capital, Oslo. Connected to population growth is a projected increase in transport and transport related emissions. It is worrying if the trend continues as it has in the EU over the past 30 years. From 1990 until 2009, these emissions grew by 23 % (EEA, 2011). Within the EU nearly one fifth (17.5 %) of all greenhouse gas emissions are attributed to road transport alone (EEA, 2011). In Norway, transport emission surpassed those of Europe, and have gone up 31 % since 1990 (Norwegian Statistics, 2016). These emissions are seen as a substantial problem, and consequently there are numerous plans aiming at reducing the negative environmental footprint while maintaining a well-functioning transport system. I focus mainly on the plans regarding Oslo and Akershus as this is the

region with the highest population growth, but it is also an interesting due to the rapid increase in number of battery electric vehicles (BEVs) over the past few years.

Within traffic planning in the Oslo and Akershus region, actors might envision the future, problems, solutions, and urgency differently. The problem formulation in this thesis is in the intersection between two dominant yet divergent paths within the transport sector. On the one hand, a planning path containing projects that, if implemented, will continue a lock-in to a hypermobile, largely car-based transport system where the supply of mobility is ever-increasing (Tennøy, 2012; Minken, 2016). On the other hand, there are plans towards transitioning the transport sector to "green" and sustainable alternatives.

The transportation system problems (traffic flow, social issues from hypermobility, and the urgency for sustainable solutions towards environmental problems including climate change) all play back to transport planning. It is thus essential to explore these issues further within transport planning. I apply the analytical framework of the multi-level perspective (MLP) in order to situate decision makers and planning that takes place within the transport sector in Oslo. Transition research has previously been used as a basis for looking into large, structural change in socio-technical systems. Together with the theoretical framework of hypermobility, I will analyze if there are cracks and conflicts within the current transport planning regime, which, if present, can open up for a transition.

Addressing potential gaps or conflicts in transport planning could help make the process of planning the future of the transport system more efficient, and potentially better corresponding to a similar vision for how mobility in the greater Oslo region should look like.

I am using hypermobility as a theoretical framework to scrutinize the problem areas through a critical lens. Hypermobility allows for a theoretical view at the transport plans and interview results that to my knowledge has not been applied in the Norwegian/Oslo-based planning context before. When so many actors, plans and visions interact in the transport planning system, applying a critical lens that questions the very core of present mobility paradigms can help identify underlying causes for the current problems. By combining a desk study analysis with qualitative semi-structure interviews with various key actors in the environment and transport sector in the Oslo/Akershus area I aim at answering the following research questions (RQ):

1.2 Research questions

1) What key institutions, actors and characteristics are shaping transport planning in Oslo?
2) What role do socio-technological innovations (BEV, car-sharing, ICT, and autonomous vehicles) play in transport plans for Oslo and the visions for the future?
3) What conflicting interests, visions or other pressures are present in the transport planning regime and what are their implications on enforcing the status quo or opening up for a transition?

The area of transport planning is complex, due to the many actors and institutions on different levels often with diverging interests. RQ 1 therefore aims at mapping the actors, institutions and characteristics of the regime. The BEV growth in Norway far exceeds other countries and this combined with a strong belief in technological innovations allows for an interesting analysis into how this influences visions and plans among the actors. Based on the documents, literature, and data gathered, the third question will analyze whether the transport planning regime is challenged by outside pressures, or if the status quo is maintained.

1.3. Thesis structure

This thesis is structured in eight main chapters. The following section describes the theoretical framework of hypermobility. Methods and contributions to sustainability science are the topics for chapter three, before elaborating on the case background in chapter four. The fourth chapter focuses on Oslo. It will briefly present the relevant transport plans for the region, and give a short, historic overview over the increase in electric vehicles in Norway. Chapter five delves into the analytical framework of the multi-level perspective and describes how this relates to the topics of the thesis. The results of the data collection are combined with the analysis in chapter six. This is where research questions one and two are answered by applying this framework on the case of transport planning in Oslo. The seventh chapter discusses the potential for a transition to occur and thus answers research question three. It also shifts the focus to broader fields of research and attempts at drawing connections to implications outside the scope of this thesis. Finally, the conclusion draws the findings and discussion together and outlines broader implications and future research.

2 Theoretical background – hypermobility

2.1 Defining mobility

The term 'mobility' can have different meanings within different fields of research. John Urry (2007) looks into three different and relevant kinds of 'mobilities' in his book; (a) mobility as the things that are mobile (b) 'social mobility' as the move from one societal "class" to another; and (c) mobility as migration or a movement of a permanent of semi-permanent nature (p. 8). Space and time thus become important points to differentiate and define varying kinds of mobility. Of the three definitions from Urry (2007), this thesis will focus on mobility as movement of people. This is partly to narrow down the scope of the research, but also because this definition of mobility is the predominant one in the literature (Adams, 1999; Khisty & Zetiler, 2001; Urry, 2007). The concept of 'mobility' is treated differently than 'transport' in this thesis. Mobility is the ability to travel/move from one place to another, as described by the first kind of mobility above (Urry, 2007). Transport is seen more as the system supporting the mobility of, in this case people, within this system. Different transport forms include e.g. trains, cars, trams or metro.

2.1.1 From mobility to hypermobility

The mainstreaming of cars, and the development of infrastructure that coincided with it, has resulted in a lock-in of massive areas for infrastructure and resources (Urry, 2004). It has even gotten a grip on the mainstream ideas of mobility as something that should be 'seamless' (Sheller & Urry, 2000) and fulfil a maximization of speed (Khisty & Zeitler, 2001). This efficiency, speed and seamlessness of mobility differs from mobility in its simplest form as movement from A to B. Mobility has been important for human development, with one example being the way nomadic hunter-gathering groups interacted with each other in different places for trade and socializing (Whallon, 2006). With the industrial revolution in the end of the 1800s, mobility changed gears and the means of transport started taking people further and faster. The mainstreaming of the car eventually cemented the transition from human and animal-based modes of transport to one on four wheels with an internal combustion engine (ICE) (Geels, 2005). In the current debate into zero-emission vehicles it is interesting to point out that the ICE properly took over in the automobile market in the early 1900s only after competing against the early developments of the battery-electric vehicle (BEV) (Urry, 2007). With the car, the speed with which one could get around increased dramatically, and the combination of an expectedly fast and seamless journey made it hard for other forms of transport, e.g. public transport, to keep up (Sheller & Urry, 2000). In predictions for transport growth, these ideals are still present and, estimates indicate a substantial growth in transportation. As the OECDs Transport

Outlook suggests, it is expected that surface transport (road and rail) will grow between 120 and 230 % within 2050 (2015, p. 9).

Hypermobility applies a critical lens to mobility, challenging the predominant presumption of mobility as something inherently positive that can continue to grow limitlessly (Adams, 1999; Cohen & Goessling, 2015; Khisty & Zeitler, 2001). C. Jotin Khisty and Ulli Zeitler defined hypermobility as "excessive and imbalanced mobility that is normally detrimental to human and nonhuman welfare and personal freedom" (Khisty & Zeitler, 2001, p. 598). Although exact definitions vary, authors researching hypermobility generally question the positive benefits of an excessive growth in mobility (Adams, 1999; Cohen & Goessling, 2015). The growth in travelled km per individual – largely car based in most countries – has left a substantial footprint on the global climate (IEA, 2009). Energy use from the transport sector currently make up roughly 19 % of global energy consumption – causing almost one fourth of all CO^2 emitted from energy production (IEA, 2009). These emissions are expected to continue to rise if a growing middleclass in currently less developed countries follow the trajectory of more developed countries in the West (OECD, 2015). Adding to the challenge are the relatively small emission cuts that the transport section has seen, compared to that of the electric energy sector, at least in Europe (EC, 2016). The difficulty in cutting emissions can be drawn back to the lock-in of the system itself, where the infrastructure and industry connects the car-based transport system strongly to capitalist interests (Cohen & Goessling, 2015). The connection between economy and mobility has also been illustrated on a more individual level. There is Swedish research arguing that those who travel the most internationally also are generally wealthier (Frändberg & Vilhelmson, 2003). A 'mobility elite' of highly mobile individuals, often with a global corporate network, reinforce the 'glamorization of mobility', according to Cohen & Goessling (2015).

The social and environmental consequences from this excessive mobility has led researchers to coin the term 'hypermobility' (Adams, 1999). A key argument for Adams is that a large part of society cannot take part in this hypermobility due to issues such as age, ability, or financial resources, thereby creating a two-tier system of social differences that are themselves reinforced as time goes by, not to mention environmental consequences (1999). This hypermobility thus ultimately has a 'darker side' (Cohen & Goessling, 2015), and Adams further goes on to identify several indicators showing the social costs in the "business as usual" countries of excessive mobility (1999, p. 96). These countries, he argues, will have a "greater disparity between rich and poor"; "fewer people will know their neighbor"; "less culturally distinctive"; "more crime ridden"; and "the majority will have less influence over the decisions that govern their lives" (Adams, 1999, p. 96). The critique of the excessive and imbalanced

mobility is central to this thesis' understanding and application of hypermobility as the theoretical framework.

3 Methods

The multi-level perspective is used as an analytical framework to answer the research questions. The need for an analytical framework from which to explain transitions can be traced back to sociology, and the realization that explaining technological innovations and how they come about is impossible without also taking into account the social fabric of society (Geels, 2002). I have applied a mixed methods approach, with both desktop research and semi-structured qualitative interviews. This has provided me with a better understanding of the complex problem areas connected to, and springing out of, transport planning in Oslo as well as provided a firm basis from which to perform the analysis of the first-hand information collected.

3.1 Data collection

Through desktop research I gained valuable knowledge into the theoretical and analytical frameworks, as well as the currently active transport plans. There are a number of different plans that shape the visions among the actors in Oslo. I analyzed the National Transportation Plan as it constitutes the basis for other plans and goals. The Oslo Package 3 planning documents are also major contributors to the local and regional planning. To understand the connections and interconnections between Oslo and the surrounding county of Akershus, I studied the newly adopted Regional Plan for Area and Transport for Oslo and Akershus, and the City Council declaration.

These documents and plans make up the 'gray' literature base of the desktop research. To solidify my understanding of transport and mobility I used reports and articles from the Transport Economic Institute who do research related to transport, mobility, economics, and planning in Norway. Academic journal articles and book chapters were used actively as reference points for my theoretical and analytical frameworks and have been key in my definitions and understandings of the key concepts used throughout the thesis.

3.1.1 Interviews

I performed five semi-structured interviews to explore whether the actors interviewed share similar views on the challenges within the transport sector and in the plans. The interviews enhanced my understanding of their visions, reflections and potential conflicts within transport planning. The goal

was to talk to specific people with a wide range of knowledge and I therefore followed a purposive sampling method (Yin, 2011). This meant approaching my sources within transport planning in Oslo Package 3 and the Regional Plan for Area and Transport in Oslo and Akershus directly. See Appendix A for the full list of informants. This particular method of qualitative research makes data collection specific for the topics in question, specific level of knowledge. The guiding questions can be found in the interview guide in Appendix B.

One interviewee was from the Norwegian Public Roads Administration, another from the Akershus County Council. They provided a basis for questions regarding the relationship between the different actors and organization of the planning processes and negotiations. To understand the potential for niche developments, and identify challenging views from outside the direct circles of transport planning, I talked to two environmental organizations (Bellona and ZERO), and a researcher from the Institute of Transport Economics.

3.2 Data analysis

The interviews were in Norwegian, and followed a semi-structured form. They lasted on average an hour, and were recorded and transcribed in Norwegian. One of the interviews was conducted over Skype, as the participant was not available during my time in Norway. To guide my analysis of the information I received, I coded the data based on categories that would help to answer my research questions. The quotes and sections that I have applied in the analysis are my own translations of the interviews. In making the codes for the analysis of the information, I applied a mix between an inductive and deductive method. I found deductive categories in order to see my data through the eyes of the frameworks of the multi-level perspective and hypermobility. The inductive categories provided me with a wider scope in order to analyze potential conflicts, pressures or other aspects challenging the regime. I applied Microsoft Excel as my coding software and matched quotes and information from the transcribed interviews with the categories.

3.4 Limitations

In qualitative research, avoiding bias and staying objective can be challenging. In the process of analyzing qualitative data based on a coding scheme, the researcher is already subject to confirmation bias based on his/her own political, cultural and educational background (Yin, 2011). Although it is a common limitation in qualitative research, I am aware of this limitation. Furthermore, as the interviews were performed in Norwegian, another limitation is that I have myself translated the phrases and information into English. Although this opens up for translation mistakes, I believe the core meaning

of the information and quotes are presented, also taking into account the semi-structured nature of the interview.

3.3 Relevance to sustainability science

This thesis contributes to sustainability science in its attempt to explore complex problems and solutions within the transport sector. Among the "core questions for sustainability" is questions 5; "what systems of incentive structures – including markets, rules, norms and scientific information – can most effectively improve social capacity to guide interactions between nature and society towards more sustainable trajectories?" (Kates et al., 2001, p. 2). In short, sustainability science works "towards an understanding of the human-environment condition with the dual objective of meeting the needs of society while sustaining the life support systems of the planet" (Turner et al., 2003, p. 8074). Sustainability as a term has further been conceptualized by introducing a number of 'pillars' to the explanation (Gibson, 2001). Commonly within the literature is the notion of "the three pillars of sustainability" – social, economic, environmental – as these pillars link closely to the definition of sustainable development from the Brundtland Report (World Commission On Environment And Development, 1987). From the previously mentioned problem formulation, it is clear that the issues found within the transport sector are largely within the field of sustainability science.

The notion of 'systems' is key in the debate regarding lock-in of mobility and also found in discussions regarding sustainability science. In this thesis I mainly talk of 'socio-technical systems' in connection with transitions in the MLP, however in this section the concept of system has a wider reach. In the thesis, it will become evident that there is a need for society as a whole – as a system – to work towards sustainability, and to also include social aspects while doing so. I therefore agree with what Wiek et al., (2012) says about systems coming together; "The scientific and educational system constitutes one domain of society besides the economic, the policy and legal, the technological, and the socially and culturally ordered system, and all of them must contribute to transformations towards sustainability (Wiek, et al., 2012, p. 6). In order to gain a better understanding of the problem of mobility lock-in, hypermobility society, and the challenges in changing the transport system, we have to be able to think in systems.

So far this thesis has established that there are several problems arising from the socio-technical system of the hyper-mobile transport sector. These problems take both environmental and social forms, and need to be addressed to achieve a truly sustainable transport sector. The following sector describes the background information relevant for analyzing Oslo as a case study.

4 Norwegian mobility – background to Oslo as research site

In Norway, one of the central measures for dealing with emissions is defined in the Climate Agreement from 2012 (Ministry of Climate and Environment, 2011-2012). In this agreement, the so-called zero growth goal (ZGG) was adopted, with the objective of making sure "…the growth in passenger transport in urban areas must be absorbed by public transport, cycling and walking" (Ministry of Transport and Communications, 2012-2013b, p. 10). Combined, Oslo and Akershus are the by far largest urban area in Norway, and among the fastest growing regions. When the newly elected Oslo city council formed in 2015 their suggestions presented in a shared political declaration follows up on the ZGG. They aim at reducing all car traffic in Oslo with 20 % by 2020, making the city center car-free by 2019, and to make the larger city center traffic (within Ring-road 3) fossil-free within 2024 (Oslo City Council, 2015). These measures will be further discussed in chapters 6 and 7.

In addition to the Oslo city council declaration, the Oslo package 3 and the Regional Plan for Land use and Transport (RPLT) are significant sources to understand the relationships between actors, perceptions of problems, and suggested solutions. In short, the Oslo package 3 is an investment plan for infrastructure development in the Oslo and Akershus region and runs to 2032. The RPLT is Oslo and Akershus' common plan for how combined land-use and transport challenges best should be tackled in the planning period towards 2030. For politicians, achieving lower local air pollution and emission from the transport sector is important, especially considering the ruling from the European Free Trade Association (EFTA) court, when Norway was sentenced for violating the EUs clean air act (EFTA Court, 2015). The next section elaborates on the plans and goals mentioned. Furthermore, it gives a more detailed description of the exceptional growth in BEVs in Norway, as it forms an important background for answering the research questions.

4.1 The National Transport Plan

This thesis considers the National Transport Plan (NTP) as the most significant planning documents within the transport sector. It describes government infrastructure projects, priorities and guidelines, and the current plan covers a 10-year period. Two working phases form the basis of the NTP; the analysis and strategy phase, and the planning phase. Figure 1 illustrates the planning phase. Based on guidelines from the Ministry of Transport and Communications the national transport agencies – the Norwegian National Rail Administration (NNRA), Norwegian Public Roads Administration (NPRA), and The Norwegian Coastal Administration (NCA) – together with the state-owned limited company Avinor (self-financed and in charge of airports and aviation), provide the suggested projects that fulfil the

goals in the guidelines. These suggestions are open for a public hearing, before it is treated in the Parliament for revision and acceptance.

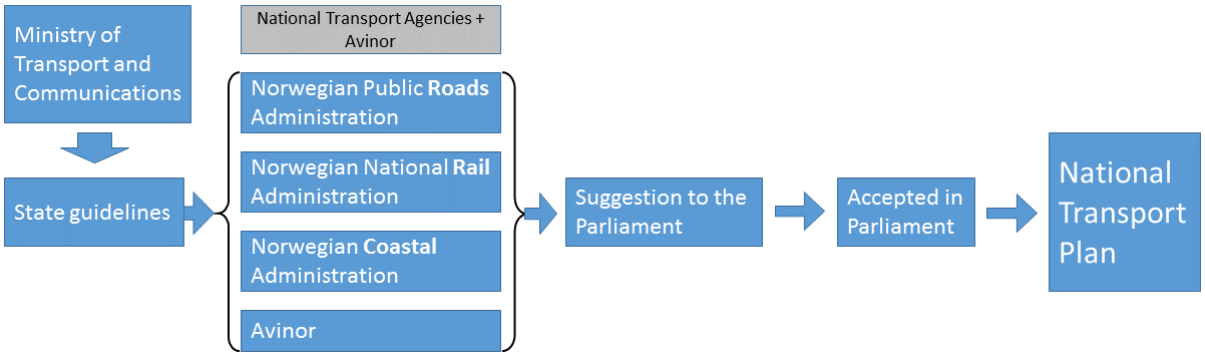

Figure 1: National Transport Plan - Planning process. Own illustration

4.2 Norwegian electric mobility – the development

There has been an exceptional growth in sales and registrations of electric vehicles in Norway over the past 8 years – see figure 2. To a large extent, it derives from the governmental decision to introduce tax exempts on electric vehicles in the late 1990s (Figenbaum & Kolbenstvedt, 2013). Since then, the numbers have grown almost exponentially, from just over 2000 vehicles in 2010, to close to 70 000 in 2015 (Statistics Norway, 2016).

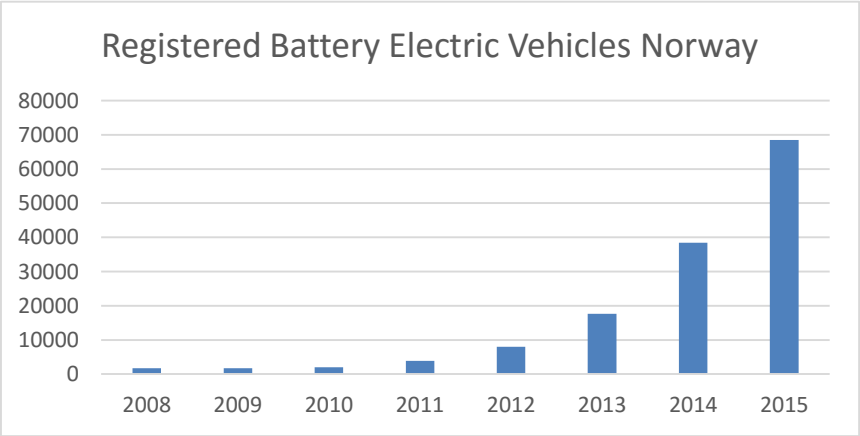

Figure 2: Registered battery electric vehicles (2015). Numbers from Statistics Norway, 2016, own illustration.

Although the financial incentives have been present for almost 20 years (Figenbaum & Kolbenstvedt, 2013), as figure 2 shows, the real 'take-off' in the number of sold BEVs did not happen until 2010/2011. The two counties of Oslo and Akershus have the most BEVs and plug-in hybrid electric vehicles (PHEVs)

(fig. 3), and thus deserve further attention. On the European BEV market, Norway's sales made up 23,6 % of the market share in 2015, by far exceeding the market share in other European countries (EAFO, 2016). Although most other European countries have some form of financial incentive, the higher starting point for the Norwegian tax exempt, compared to other countries, helped make BEVs cheaper in Norway compared to what the same incentive would have done in many other European countries (Figenbaum & Kolbenstvedt, 2013). Although Norway's situation is often presented as a success story (New York Times, 2015), out of the total amount of 2.6 million cars in Norway, BEVs and PHEVs still make up a relatively small percentage (Statistics Norway, 2016).

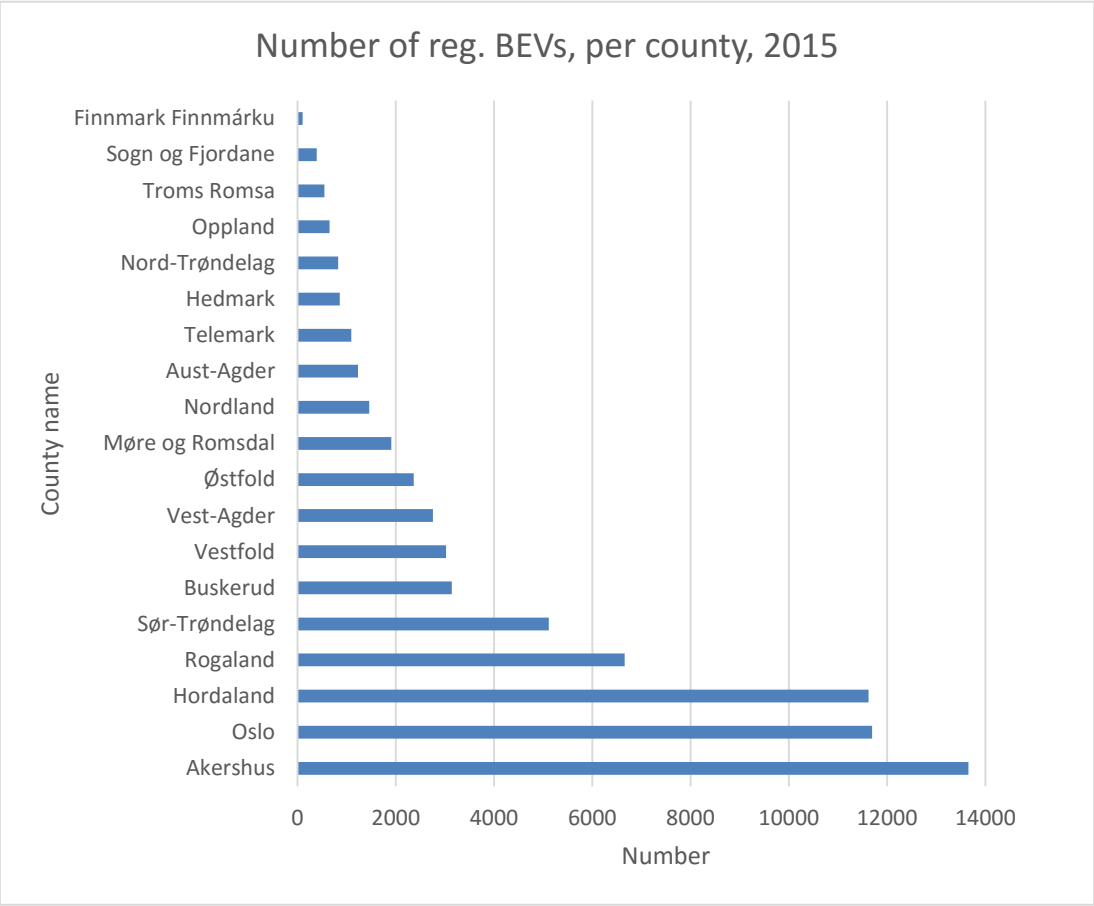

Figure 3: Number of registered BEVs, per county, 2015. Numbers from Statistics Norway, 2016.

4.3 Oslo then and now – development of transport planning

As a fast-growing city, Oslo has gone through massive changes in its recent history. Early city planners had the idea of "Big-Oslo" already in the 1930s (Gjellebæk, 2015, p. 26). The substance of this idea was that the greater city regions should be designated for different purposes to escape the industrial city problems (Gjellebæk, 2015). A city with specialized regions meant that the main transport goal should

be to connect these different pieces together. This view has greatly changed. Today the goal is rather to densify suburban city centers in order to reduce traffic to the city center (Oslo City Council, 2015; Akershus County Council & Oslo Municipality, 2015). Since the end of the 1980s, Oslo has worked extensively on developing its public transport system and infrastructure. The public transport company in Oslo (Ruter), has been important in promoting more use of buses, trams, metro etc. In this thesis, I do not look closely at Ruter as an actor, because their views and goals are reflected to a large extent by the views of the two owners, Oslo municipality and Akershus county council. Instead, I will focus my attention on the 'Oslo packages' in the section below – and explain how Oslo package 3 developed.

4.3.1 Oslo Package 1, 2, 3

The first Oslo package (OP) commenced building in 1988, with the purpose of expanding the road network in order to divert traffic away from the city center. Several important tunnels were built in the city center, and two key financial and political decisions were made, both of which are still relevant for understanding the current re-negotiations[1]. One was the location of the toll stations; the local politicians negotiating the deal in the 1980s established the toll station where it was the reasonable in relation to local roads, and where it could effectively generate the finances needed (Minken, 2016). The other concerned the distribution of income from toll roads between Oslo and Akershus. Based on expected traffic volumes, the number agreed was a 60/40 % distribution in favor of Oslo (Minken, 2016). OP 2 emerged because traffic increased faster than expected, thus creating a demand for more public transport. While the OP 1 had construction of roads on top of its agenda, OP 2 spoke in favor of more public transport (Oslopakkene, 2009). It continued the income distribution and toll station placement. Since 2004, the planning phase of OP 3 has picked up the pieces of the financing gap that would be left in the wake of OP 2, and extended the responsibilities to include both public transport infrastructure of rail and metro, and road infrastructure (Oslopakkene, 2009). Its budget is the largest in Norwegian history, and it still largely leans on user-payments of the toll roads.

4.3.2 Regional Plan for Land use and Transport

The Regional Plan for Land use and Transport (RTLT) exemplifies an important document that combines politics from both Oslo and Akershus. The main goal of the RPLT is to see how land use and transport can be better coordinated in the region, with the purpose of developing a competitive and sustainable region (Akershus County Council & Oslo Municipality, 2015). The awareness about the connection

[1] The Oslo package 3 re-negotiations between Oslo city council and Akershus county council regarding financing of a new metro line, the E18 western corridor expansion, and other financial issues was supposed to finish May 10. 2016, but as of May 15, the negotiations are on over-time without a set deadline.

between land-use and transport has not always been as dominant as now, and Tennøy notices a shift in the mentality of planners that also has been evident in the shifts in OPs (2012). From seeing road transport as a 'predict and provide' system in the 1990s (OP 1), it is now seen as a more holistic system with strong connections to land-use, as is evident in the RPLT (Tennøy, 2012, p. 155). The need for planning that looks at the land use in connection to transport has proven important (Strand et al., 2013).

As this section has briefly presented, there is a myriad of actors and plans involved in discussing and planning transport in Oslo. In order to answer the research question on how these actors and plans relate to each other and to the wider socio-technical system of the transport sector, the next section will outline the analytical framework that will be applied as the tool for later analysis.

5 The multi-level perspective as analytical framework

5.1 The socio-technical system and the MLP

In this thesis I see the transport sector in Oslo as the socio-technical system. I look closer at this system through the lens of the multi-level perspective (MLP). The system in which the levels of the MLP are situated draws an important boundary for the analysis. Geels defines the socio-technical system as the "linkages between elements necessary to fulfil societal functions" (2004, p. 900). Because the socio-technical system consists of human actors and characteristics that are socially created, e.g. knowledge, capital or labor, the socio-technical system accounts for the stability in which the landscape, regime and niche level operate (Geels, 2002). A key reason for the use of the MLP as the tool for studying transitions is that the transition is happening at multiple systemic levels (Geels, 2002; 2004; 2005). The description and relationship between these different levels is a central point for the MLP.

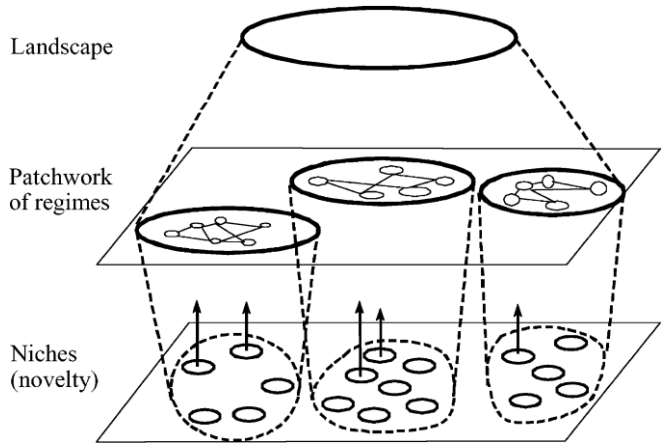

Figure 4: Multiple levels as a nested hierarchy (Geels, 2002, p. 1261)

As figure 4 shows, the illustration of the MLP starts with the niche level at the bottom (Geels, 2002). The niche level comprises of entrepreneurs and early users of new technology or experimental technological innovation. On the regime level, technologies, institutions and actors are locked to more permanent structures and configurations of society, and are accompanied by cognitive and normative rules (Geels, 2002; Rip & Kemp, 1998). Landscapes make up the top level of the MLP, and the technologies on the landscape level have become a fundamental part of our society. It makes up the external context that actors in the niche and regime level to a certain degree take for granted. The relationships between the landscape, regime and niche levels can create a window of opportunity for the niche to break through (Geels, 2005). This is illustrated in Figure 5, showing the relationships between the different levels of the MLP (Geels, 2002).

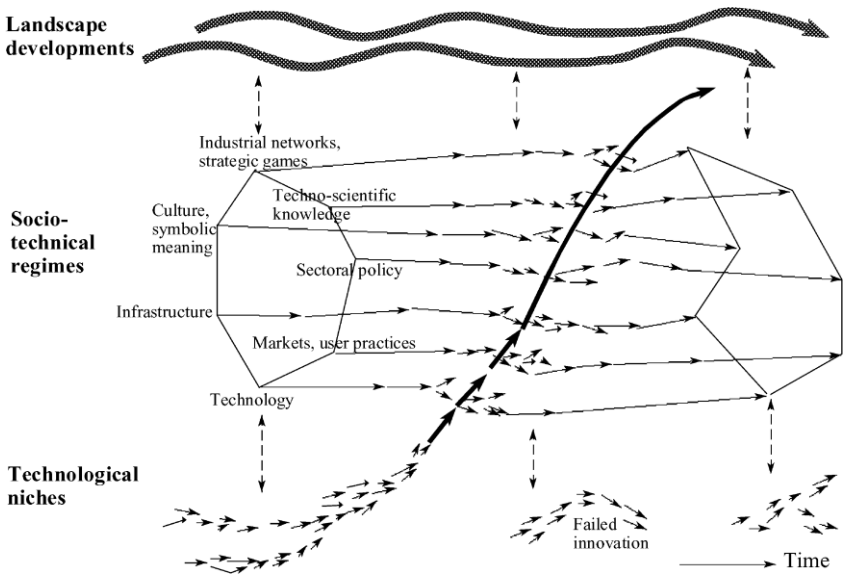

Figure 5: A dynamic multi-level perspective on TT. (Geels, 2002, p. 1263).

5.1 Development and definitions of the levels in the MLP

5.1.1 Landscape

The landscape level of the MLP makes up the elements in the socio-technical system that "form the 'gradients' for action from which it is hard to deviate" (Geels, 2005, p. 451). These 'gradients' are elements in society such as "oil prices, economic growth, wars, emigration, broad political coalitions, cultural and normative values, environmental problems" (Geels, 2002, p. 1260). Notably, the landscape level does not include technological aspects. Changes in the landscape level consequently occur slower than on the regime level, but they do occur (Geels, 2002). In transition research that explores past transition, such as Geels' study of the transition from sailing- to steam ships (2002) or from horse to

car (2012) looking back at clear-cut transitions in the socio-technical systems clearly indicate that there has been a shift in the landscape level as well as on the regime level.

5.1.2 Regime

Because the technological regimes form the dominant trajectory, they are particularly interesting when researching transitions using the MLP. In his research into the shift from sailing ships to steam ships, Geels applies the MLP as an established example of the usefulness of the MLP in transition research (2002). The MLP has a longer history, however, and when identifying and defining the technological regime level, Geels draws the development back to Richard Nelson and Sidney Winter who first coined the concept in 1977 (2002). In their original conceptualization, Nelson and Winter applied the term technological regime to describe and exemplify the way in which norms, rules and routines within an organization shape the direction of e.g. research (1977). The technological regime is thus established when e.g. researchers or engineers all start applying the same routines and patterns of research and end up looking at similar issues (Geels, 2002).

These trajectories are part of making the regime stable. This is because the technological change that is taking place within the regime follows the trajectories of the actors involved (Geels, 2002). The concept of technological regime has been further developed over the years, particularly through the work of Rip and Kemp (1998) where they connect the concept of technological regime to the sociological category of 'rules' (Geels, 2002, p. 1260). When seen through this lens, the rules are no longer only shaping the research of technological entrepreneurs, but can also be applied as a way of researching change on a larger scale. Linking back to the original framing of technological regimes from Nelson and Winter (1977) the way in which these rules are defined can thus be used in research on several different aspects, e.g. water management (Van Der Brugge, Rotmans, & Loorbach, 2005), or for transitions in the energy system (Rotmans, Kemp, & van Asselt, 2001).

In this thesis, I adapt the definition of a regime provided by Holtz, Brugnach, & Pahl-Wostl (2008), as their article provides five variables for identifying a regime within transition research. As is seen from the definition below, there are clear inspiration from the original source from Nelson and Winter (1977), as well as from Rip and Kemp (1998) and Geels (2002). "A regime comprises a coherent configuration of technological, institutional, economic, social, cognitive and physical elements and actors with individual goals, values and beliefs" (Holtz et al., 2008, p. 629).

Their definition is derived on the identification of the following five variables, further outlined below; 1) purpose, 2) coherence, 3) stability, 4) non-guidance, and 5) autonomy (Holtz et al., 2008, p. 627). Purpose entails how the regime is related to other functions in society; "a regime consists of all actors

and elements that are involved in originating, shaping, fulfilling this need and/or in regulating how this happens" (Holtz et al., 2008, p. 626). Secondly, coherence indicates how parts (actors, institutions, technologies, values and beliefs etc.) in the regime are linked together. Stability in the way the regime is organized is the third variable. This stability is what they call dynamic, meaning that it opens up for changes in the regime (Holtz et al., 2008, p. 627). The fourth variable is non-guidance, referring to the actors in the regime being guided by their own interests, without a central driving force (Holtz et al., 2008). Autonomy indicates that the changes in the regime come mostly from within, it is not required that the change happens in the entire socio-technical system (Holtz et al., 2008, p. 627).

Summarized, the regime level of the MLP is where the societal "rules" among the actors involved are formed, re-established and changed to serve the societal needs – and where these rules can be challenged to establish a transition or re-establish the regime in a different form (Geels, 2005).

5.1.3 Niche

When defining a niche, authors often connect and define it as socio-technical radical innovations (Geels, 2011b; Kemp, Schot, & Hoogma, 1998; Schot & Geels, 2008). The niche level in the MLP, illustrates a 'place' where the technological innovations form – sometimes excluded from the regime and the dominant technologies already in the regime (Geels, 2002). The military is often used as an example for an arena where new technologies successfully have been tested out for a military purpose, for later to be widely utilized by the general public (Kemp et al., 1998). Holtz et al. see the niche as "immature structures providing the same function as a regime (e.g. in terms of mobility or energy) and emerging from radical technological or social innovations" (2008, p. 169). In the field of transition research that focus specifically on the regime level (Holtz et al., 2008; Marletto, 2011), the niche level is usually not the most significant point. Within so-called strategic niche management, however, niches are in the center of attention; making up the point of departure in attempting to understand what causes the implementation of new technologies (Kemp et al., 1998; Schot & Geels, 2008).

As we have seen in previous chapters, the different levels of the MLP carry different meanings, and contain different elements shaping the relationship between them. Although the definitions vary, there are similarities, and a long tradition of academic literature to support these resemblances (Geels & Schot, 2007; Holtz et al., 2008; Nelson & Winter, 1977; Rip & Kemp, 1998). In the following chapter, the results from the interviews and analysis section below will be connected to the MLP.

6 Results and analysis

The following chapter has three parts, and together aims at answering the two first research questions. Section 6.1 maps out and describes the plans, actors and goals in relation to the landscape and regime level in the MLP. In order to answer the second RQ I use the results from the interviews actively in order to see how they frame the problems and solutions to these problems.

6.1 Mapping the institutions and planning relationships

In the desktop research on the central reports and planning documents from the key institutions, I have identified the zero growth goal (ZGG) as an important point of departure from which much transport planning is shaped. All the actors I interviewed also mentioned the ZGG as an important goal. As shown in the background section, this goal emerged from the Climate Agreement of 2012, where the ZGG is seen as a measure towards reaching the national emissions reduction goals (Ministry of Climate and Environment, 2011-2012). There are arguably aspects of both national and international policies that are part of shaping the way in which the actors work. Elaborating in depth on potential contradictions and incoherence is beyond the scope of this thesis, but some of the fundamental trends and policies are part of the landscape level, as shown in the section below.

6.1.1 The landscape level of the MLP in the Norwegian context

Since the main focus in this thesis is connected to the socio-technical system of the transport sector, the National Transport Plan (NTP) reveals elements from the landscape level and their influence on the transport sector. The first evident landscape influence comes from the strong foothold that economic growth and regional development has in the projects (Ministry of Transport and Communications, 2012-2013). On the regional level, economic growth acts as a cornerstone, guiding and stabilizing the actors in the regime level. This is an implicit goal they all work towards and agree on. Evidence for this is found in the way the NTP emphasize socio-economic benefits as a key variable in calculating costs – which often forms the basis for political decisions (Ministry of Transport and Communications, 2012-2013). The main goal for traffic policy from the government (as stated in the NTP), is: “to provide an efficient, accessible, safe and environmentally friendly transport system that meets the society’s transport requirements and promotes regional development” (Ministry of Transport and Communications, 2012-2013, p. 14). This goal indicates that regional development is the end goal, and the means to get there is through an efficient and accessible transport system that keeps up with the demand. Secondly, this works towards lowering emissions from the transport sector in order to fulfil the climate goals from the government (Ministry of Climate and Environment, 2011-

2012). As Norway is also part of the global climate agreement, these guiding policies act as landscape level trends.

The goal of increasing efficiency in the transport system is not necessarily always aligning with an environmentally friendly transport sector, an issue I will discuss further in section 7.1.2. However, in the NTP several projects specifically aim to reduce travelling time and distance between regions in order to "boost the competitiveness of business and industry and to contribute to maintaining the main features of the settlement pattern" (Ministry of Transport and Communications, 2012-2013, p. 14). When it is stated that this efficiency will be achieved by building, expanding or upgrading major highways (e.g. E18 and E39) there is a dichotomy between the two goals. Research from Tennøy (2012) has shown that an expansion of road capacity will increase the traffic load, leading to higher emissions based on the assumption that not all 2.5 million cars in Norway are zero-emission vehicles. The dichotomy between the goal of more efficient and larger highways, and the goal of zero growth and emission reduction will be picked up again in the discussion. The interest in expanding and keeping up the highway system also connects to the socio-cultural landscape, in which the car is seen largely as the "ultimate" means of personal transport. This characteristic is also linked to strong capitalist interests and marketing over several decades, reproducing the car's "specific character of domination" (Urry, 2004, p. 25).

Main goals and actors:

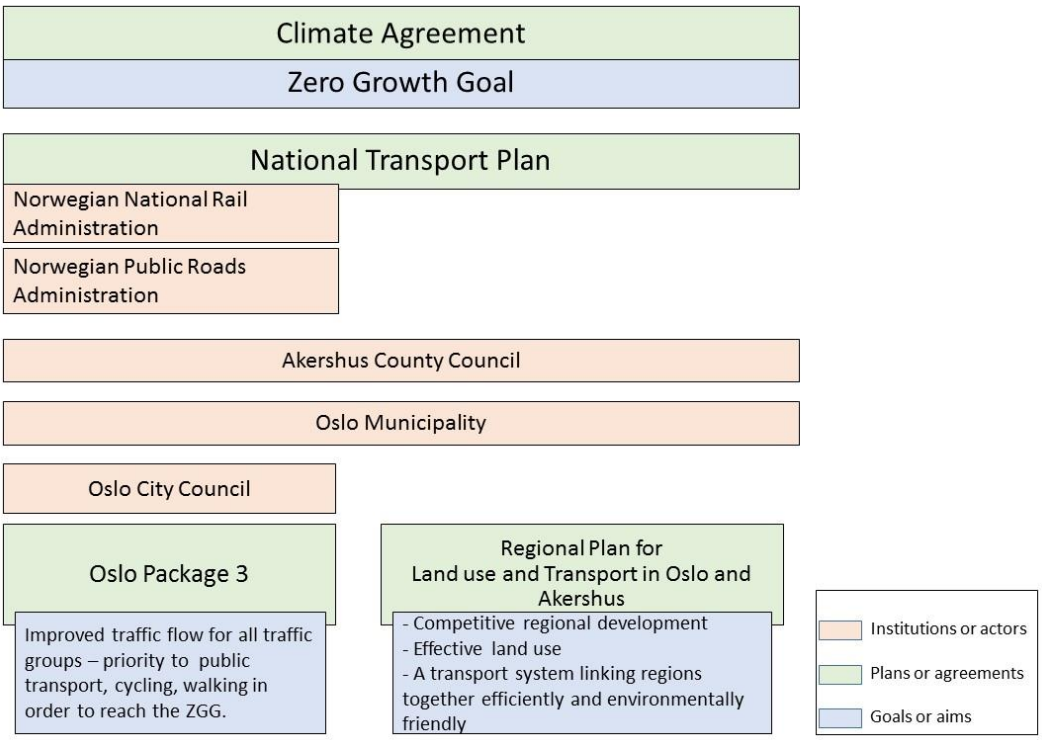

Figure 6: Illustration of key actors, plans and goals. Overlap means a direct relationship between actor/plan/.

6.1.2 Regime characteristics in Oslo

This section describes the characteristics of the regime in Oslo, the transition takes place (Geels & Schot, 2007). As figure 4 from Geels (2002) shows, the regime level consists of a patchwork of different regimes, being influenced by the landscape and niche level to a varying degree. From the socio-technical system outlined above, and from the landscape level driving the developments in the regime level, I see the regime level consisting of a combination of transport planning, individual car-dominated habits, and a lock-in to road-based infrastructure. With a patchwork of regimes present (Geels, 2002), I pay more attention to transport planning than car dominated habits and infrastructure lock-in. Covering all three patchworks in depth is beyond the scope of this analysis. The transport planning regime in Oslo is made up by a large group of actors that work towards the societal need of transport and mobility in the increasingly larger city region. The illustration in figure 6 indicate the connection between the actors on regime level, to the plans they are part of, and how these plans again spring out of a landscape level problem formulation in the climate agreement. Actors within this regime come from different governmental arenas, and are largely driven by the transport policies of the region.

I base the regime level in Oslo on the five variables mentioned by Holtz et al.; societal function, coherence, dynamic stability, non-guidance, and autonomy (2008, p. 628). These variables have not been operationalized to indicators, but in the sections below I provide examples linking them to the case of Oslo. These examples are illustrated, where possible, with figure 6. The section below also aims at presenting some of the main problems as seen from the actors on the regime level. This is key in order to understand solutions on the niche level better.

Societal function. Transport of people has become a central societal function in most modern-day societies. It is a dominant section in budgets, offers much political debate, and increased transport capacity is seen largely as a way towards a more developed society (Essebo & Baeten, 2012). If traffic flow does not match expected level of mobility, the societal function of transport planning quickly becomes a political issue. The socio-economic societal function is often brought forward by people advocating for regional development or economic growth. The variable of societal function is evident in most the plans presented in the background and figure 6. The Oslo package 3 negotiations around the E18 expansion is one clear example where the arguments largely circle around regional and economic development.

Coherence. There is an expected connection between the actors in the regime and the way in which they follow similar 'rules' (Rip & Kemp, 1998). In transport planning in Oslo this is evident when actors such as the ACC and Oslo Municipality are part of several plans, and thus working towards similar goals

(Akershus County Council & Oslo Municipality, 2015). Figure 6 further shows that the goal formulation in the three plans illustrated follow problem perceptions of efficiency, traffic flow, emission reduction, and economic and regional growth. A further example is found in the way infrastructure development to a certain extent keep up a car-based mobility system by keeping attention on the personal car as an important contributor to mobility.

Dynamically stable. The definition of a regime from Holtz et al. indicate a level of the MLP that is dynamically stable due to the actors following the same general direction (2008). However, the regime is also dynamic, and the dynamic environment allows for technological development and potential regime adjustments or changes. In the Oslo transport planning regime, this is evident in the way the transport sector now interacts more with other aspects e.g. land use (Akershus County Council & Oslo Municipality, 2015). This dynamic adjustment away from the mentality of 'predict and provide' as was the case with earlier Oslo packages is interesting (Tennøy, 2012). However, the way the problems are framed in the planning documents and goals from the regime actors, illustrated in figure 6, shows that the 'provide' aspect of this mentality still is dominant. This links back to the first variable of the societal function. There is still more focus on the societal function of high capacity, than on the social inequality underlying a hypermobility society.

Non-guidance. The dynamic stability in the regime level can also be linked to the non-guidance variable. In essence, according to Holtz et al. this variable highlights that no central actor is in control of the way in which the actors in the regime shape their goals and plans (2008, p. 628). The individual actors come up with their main goals in the interaction with other actors, and although they move in the same general direction, they have individual goals that might diverge slightly from the main trajectory. This is illustrated in figure 6, showing the "dynamic multi-level perspective on TT" (Geels, 2002). We find an example of this on the regime level in Oslo when looking at how the regime actors (e.g. NPRA, ACC, Oslo Municipality) differ in their individual goals, but because they are within the regime, they move in the same general direction.

Autonomy. Linking to the points above, the dynamically stable and non-guided regime level is shaped by the internal processes within the regime itself – it has autonomy in how it is shaped. In other words there is no definite external actor that need to change in order for the regime to change (Holtz et al., 2008, p. 628). This is a key component for a regime level transition, as it is only an autonomous regime that allows cracks to form and transition to take place. In the case of the transport planning regime level in Oslo, autonomy is exemplifying in the actors themselves frame the problems and solutions – as illustrated from the goals in figure 6.

6.2 Perceived challenges

The following section will first analyze the perceived problems among the interviewees in the transport planning regime, then present the suggested solutions from the individual actors and institutions. This will help shed light on research question two; what is the role of technological innovations in the planning regime.

6.2.2 CO^2 emissions and air pollution

A starting point for the perceived problem among the actors on the regime level is that the population in Oslo and Akershus is expected to grow rapidly in the coming decades (Ministry of Transport and Communications, 2012-2013b; Akershus County Council & Oslo Municipality, 2015). It is seen as a challenge, but not as something policy makers attempt to hinder; it is largely taken as a given. What this population increase brings with it in terms of transport related emissions, however, is seen as something politicians naturally want to minimize (Ministry of Climate and Environment, 2011-2012). CO^2 emissions and air pollution in the form of micro-particles from road traffic is indicated by the informants as the two most important challenges. The reasons why these were most pressing issues largely relates to health problems in the city (NIPH, 2014) and fulfilling politically accepted goals of emission reduction. As the informant from Bellona said when referring to the challenges of achieving better air quality; "*…we just have to get there because people are dying from the air-pollution in Oslo. We need to take strong measures".*

The perceived problem of air pollution can be traced back to focus on negative health consequences in large cities when particle levels have been far above the legal level (NIPH, 2014). Political attention on this issue has also sharpened since October 2015, when the European Free Trade Association (EFTA) court charged Norway for not fulfilling the EUs clean air directive (EFTA Court, 2015). Two Norwegian governments have not done enough to get the emissions down, and Bellona mentioned this court ruling as a "wake-up call" for politicians to take the issue more seriously. The researcher from the Institute for Traffic Economics (ITE) emphasized that, yes, there are global issues with the large amounts of CO^2 emissions from the traffic sector, but these are perhaps not the most important ones. Health issues caused by air pollution is a serious problem for most of the interviews, and when asked directly about the challenges from the personal transport sector, the air pollution problems in Oslo seemed to be of higher importance than the global climate related impacts from traffic emissions. The public debate regarding emissions and air pollution is also mirrored in the NTP and the aims of "contributing to achieving national goal of reducing greenhouse gas emissions. Contribute to achieving

national clean air and noise pollution goals. Help to reduce the loss of biodiversity. Limit encroachments on cultivated land" (Ministry of Transport and Communications, 2012-2013b, p. 14).

Air pollution and the emissions from the transport sector tie back nicely to the definition of hypermobility presented in section 2.1.1. I lean on the definition from Khisty & Zeitler who define it as mobility that causes negative externalities for the "welfare and personal freedom" of both humans and non-humans (2001, p. 598). The Climate Agreement addresses the problems of emissions, and the recognition of the severity of these problems is further backed up by the informants. It is, however, expected that the local and regional plans and actors are shaped by the national climate goals as they are required to follow up on them in their own planning.

6.2.1 Traffic flow

Achieving and maintaining an efficient flow of the road based traffic is seen as a major challenge in the plans and among all the actors interviewed. As with emissions, this links to population increase, as it is an outspoken expectation in the interviews that traffic will increase more or less proportionally with the population growth. During the current re-negotiations of Oslo package 3, the disagreements over the expansion of the western corridor of the E18 is one of the clearest examples where traffic flow has been a major discussion point. Currently, the road is heavily congested with work traffic to/from Oslo in the mornings and afternoons. It is recognized among most actors that this is a socio-economic problem with countless working hours lost in traffic jams every day. The financial side of the debate is also connected to toll roads, as the E18 expansion is seen as a vital source of income for the largely toll road funded maintenance of public transport. This adds to the environmental consequences of heavy traffic. These arguments are key for proponents of the road expansion, but the political discussion is still ongoing so it was difficult to get a clear answer from the two informants representing different sides in the negotiations (NPRA and ACC). All the informants did, however, agree that traffic flow is a central problem in the region.

Improved efficiency on the roads is also one of the points on which the NTP has the most objectives on a national scale. Their main objectives are to "reduce travel times in and between regions. Reduce distance costs between regions. Improve reliability in the transport system. Reduce rush hour delays for public transport in the four largest urban areas. Improved infrastructure for pedestrians and cyclists" (Ministry of Transport and Communications, 2012-2013b, p. 14). In the 'predict and provide' mentality mentioned earlier, traffic flow challenges are seen as a lack of infrastructure capacity. Although this mentality has somewhat shifted (Tennøy, 2012), the researcher from ITE emphasized the need to further disconnect this thought from the plans:

"…and the traffic flow is really bad. Some people suggest that we can solve this by building new roads because it is a political goal to improve the infrastructure with faster, better, and larger roads, but I think we have to think differently than just building roads" – ITE.

6.3 "What makes up the key institutions, actors and characteristics"?

In the first research question, I ask; what makes up the key institutions, actors and characteristics of the transport planning regime in Oslo? To summarize the previous section; the NPRA, NNRA, Oslo Municipality (including the Oslo City Council), and Akershus County Council are all seen as key institutions or actors. These institutions are, as figure 6 shows, all partially involved in the major transport plans for the Oslo region. Most important for the socio-technical system in Oslo is the NTP which shape large parts of the regional decision making. The Regional Plan for Land use and Transport for Oslo and Akershus (RPLT) is an interesting connection to land-use and an important guiding plan especially for Akershus as it is made in cooperation with Oslo municipality. For both Oslo and Akershus, the Oslo package 3 is vital for infrastructure financing and maintenance.

6.4 Suggested solutions

Answering research question one laid a foundation for an analysis into the second research question; what role does technological innovations play in visions and the transport plans in Oslo? The perceptions of the challenges, and the formulation of what the underlying cause of the problem is, shapes what the actors see as solutions. In this section I refer to the informants' and the plans own formulations of what the main solutions to the problems are in order to answer the second research question.

6.4.1 Zero growth goal

As a goal that aims at addressing both the traffic flow issues and in effect also reducing emissions, the ZGG is the overarching solution mentioned the most often by the informants. As described briefly in the background section, it states that "the growth in passenger transport in urban areas must be absorbed by public transport, cycling and walking" (Ministry of Transport and Communications, 2012-2013b, p. 14). This will thus equate to "zero growth", as the population growth carries with it increases in transport. In this definition they see personal transport mainly as the personal car traffic. The definition is in itself interesting, as it leaves out the freight and business transport sector (transport of goods and services). Due to its position, the ZGG came up frequently in the interview with the informant from the Oslo Package 3 secretariat (NPRA).

Most interviewees see the ZGG as achievable, and both the NPRA, ACC, and ZERO emphasized that the numbers from 2007-2014 show that in this period the ZGG was reached. However, as the NPRA informant mentioned, this achievement comes with an important caveat stemming from the definition of the ZGG. Because it excludes freight and business transport, the total road traffic volumes have actual seen a 5-6 % increase in the 2007-2014 period. This equates to between a third and half of the population growth. Due to increased overall consumption following population growth, 5-6 % is according to the NPRA within what they consider the ZGG. Thus, unless consumption decrease, a 5-6 % increase over 7-8 years means that the capacity on the roads will need to increase in the long run to maintain an effective traffic flow. Expanding roads has been shown to produce more traffic (Tennøy, 2012), and facilitating for a potential increase in the future could further exaggerate the degree of hypermobility in society. In later interviews, I also asked the other informants about the potential percentage number of "accepted" increase in car traffic over a certain period of time, but none of them could confirm a number.

The two environmental organizations differed in their views regarding the ZGG. The informant from Bellona stressed that, although the ZGG is an admirable goal, it is hard to pinpoint how realistic it is. This goes back to the political landscape and decision making that has to be accepted to reach the objective. In addition, Bellona emphasized that the ZGG has to be sped up – "we cannot wait 20 years to reach zero emissions, this has to happen faster if we should have a chance to reach our international goals".

6.4.2 Electrification of road traffic

There is a high level of agreement that the BEV is a solution to the emission problems and all informants consider electrification of road traffic as essential to get the emissions down. The number of BEVs in Norway has dramatically increased over the past years (Statistics Norway, 2016), making Norway somewhat of a pioneer in this market. When the informants describe the dynamics concerning BEVs for future plans, they focus on the continuation of economic incentives and expansion of charging infrastructure in order to increase the number of BEVs. The informant from the NPRA is optimistic about the future in terms of emissions, saying that: *"I'm sufficiently optimistic in terms of the climate challenge that I believe we have solved the emissions from the local transport by utilizing electric vehicles, but also hydrogen and a much larger degree of autonomous vehicles and car sharing"*. Although a large-scale adoption of electric vehicles would help reduce emissions, it would not offer a viable solution to the issues of traffic flow. At the moment, BEV cars get access to the bus lanes on some highway stretches, and a highway can be equally congested with BEVs as with petrol/diesel

driven vehicles. “Some people have an expectation that you can drive as much as you’d like when you have a BEV, and that’s something we will struggle with in the coming years. Although I think people realize that they can’t, I think there will be some tantrums when some of these privileges change” – NPRA. When discussing the decision to make Oslo city center car-free (further discussed below), Bellona brought forward the goal of making all cars within “Ring 3” zero emission vehicles from 2024 – as stated in the county council declaration (Oslo City Council, 2015). If fossil fuel driven vehicles are restricted within Ring 3, it could send a potentially strong “electric signal” to both consumers and producers.

6.4.3 Other socio-technical innovations

Technological innovations found on the niche level of the MLP are a central part in transition research. Outlined above I frame the transport sector as the socio-technical system, and some of the main problems in this system from the actors are seen in the previous sections. Two potential niches emerge from the analysis of the regime level characteristics above. First, the Oslo city council’s decision to make Oslo city center car-free from 2019. The second is the application of more information communication technologies (ICT) and car-sharing services.

The role of niches in the eyes of transport plans, and the visions from the actors interviewed, will be more thoroughly discussed in this section. In the case of Oslo, some clear technical innovations are especially visible from the actors’ point of view. The technological innovation that has emerged most clearly over the previous years is the battery electric vehicles (BEVs). The battery capacity for these vehicles have improved drastically, and together with substantial economic incentives from the Norwegian government has led to BEVs now having a higher market share in Norway than in any other country.

6.4.3.1 Car- sharing and autonomous vehicles

Car sharing was mentioned by three of the informants as an interesting new development, and as the potential solution to many of the traffic flow issues. Although car sharing in urbanized areas has existed for several decades, changes in mobile technology, payment options, insurance policies, and several newly established companies have made it more accessible (Shaheen & Cohen, 2013). It further follows a growing trend towards a more circular economy (Hamari, Sjöklint, & Ukkonen, 2015). In the discussion regarding traffic flow, development in the car sharing market offers an interesting alternative to individual car ownership, and it might have a positive effect on traffic flow issues if it becomes mainstream enough. The optimism for this to actually happen was prevalent among the

informants. NPRA summarized this vision (shared by several of the informants): “the interest to own your own car is probably small in 20 years. I mean, what are you going to do with your own car?”

The informant from Bellona framed car sharing in combination with electric autonomous vehicles as something that could have a potentially disruptive effect on the way we see car ownership. Helped along with the applications on smartphones and the media attention new car sharing services have gotten recently, it is reasonable to expect a rise in the number of autonomously car-sharing services as the technology develops further. The informants from the ACC, Bellona, ZERO and NPRA all see this combination as something positive both in terms of emissions and traffic flow.

6.4.4.2 Information and Communication Technology (ICT)

The technological side of the solutions, with applications for smartphones and an interest for ICT in connection to both car-sharing and public transport was prominent among the informants. Both environmental organizations view ICT as something that – combined with for instance car sharing applications or public transport – can give people “the last mile home” (ZERO). The combination of ICT and car-sharing would according to most of the interviewees help solve issues such as traffic flow. The idea that by tracking demand/supply of shared cars with the help of ICT, public transport can become as seamless as transport by car. The potential technological future with the help of virtual reality (VR) technology also came up in the interview with NPRA as a potential future scenario: “And we don’t know how much of the mobility demand that will be covered by for instance VR technology”. The researcher from ITE was more critical “we can’t expect that the technological innovations by themselves will drive solutions to the problem. The way I see it this is what the different political sides argue for – if we just get the new innovative solutions out things will solve themselves – that is a technology deterministic attitude”.

6.4.3.2 A car free Oslo city center

The goal to make Oslo city center car-free is interesting goal in the transport planning regime and considered ambitious among the informants. The plan was outlined in the Oslo city council’s declaration and states that within 2019 Oslo city center inside the inner ring road (Ring 1) will be car free (Oslo City Council, 2015). Although defined as ‘car free’, the goods, freight, and other services would still be demanded, and most of these are today delivered via fossil fuel driven vehicles. However, ZERO made clear that they see this as a measure that might help increase the pressure on more ambitious alternatives. In terms of emissions, the car-free city center would be rather insignificant when only including “Ring 1”, as this is not where the majority of traffic today takes place. It would, however, work towards making streets more open for softer mobility types like cycling and walking. In

connection to hypermobility, this would work towards a less 'business-as-usual' situation as outlined by Adams (1999).

6.5 "What role do socio-technical innovations play in transport plans for Oslo and the visions for the future"?

Based on the suggested solutions, most of the informants are technological optimistic. They share an attitude with the leading planning documents where technological change is key in for instance lowering emissions. The visions for the future are thus largely dependent on technological innovations such as ICT, BEV technology. Car-sharing is seen as an exciting, and necessary development to improve traffic flows. It also presents an option more focused on social aspects, not technological innovations. The acceptance for car sharing is a prerequisite for a strong sharing economy to establish, and this ties to behavior change, as two out of the five informants mentioned a change in individual behavior as an important part of their solutions.

7 Discussion

This chapter will answer the third and final research question; what conflicting interests, visions or other pressures are present in the transport planning regime and what are their implications on enforcing the status quo or opening up for a transition? In doing so, I will discuss connections to the theoretical framework of hypermobility. Secondly, in connections to the visions, plans and goals, I briefly discuss some thoughts regarding the solutions to the problems present, and whether solutions should be systemic or technologically driven.

7.1 Organizational structural problems

The first apparent feature from the plans and interviews is that there are organizational structures that reinforce the status quo through power-relations and financial structures. These structural aspects spiral down to the visions and goals, and manifest as inconsistencies in the formulation of goals and visions. This is recognized in the NTP: "it is a substantial challenge in that administrative levels not necessarily share coinciding interests and goals in their priorities (Ministry of Transport and Communications, 2012-2013, p. 144, own translation). It is reasonable to argue that facilitating change in an organizational structure where goals and interests diverge is challenging. Conflicting interests and goals among the regime level actors are thus likely to maintain the status quo rather than create a crack for the regime to change.

An example of this organizational structure challenge is found in the relationship between ACC and the NPRA. By law, the ACC are required to use the NPRA as their official road administration. This provides a somewhat challenging environment for the current re-negotiations of the Oslo Package (OP) 3 where the NRPA is the state representative. When the ACC need advice or the professional opinion from their road administration (NRPA), when negotiating *with* the NPRA the informant from ACC told me it gets complicated. Although they do manage this negotiation environment, the informant from ACC did not hide the fact that it is challenging.

Together with Oslo municipality, the ACC recently published the regional plan for land use and transport (RPLT) (Akershus County Council & Oslo Municipality, 2015). It outlines policies in the coming years regarding land use and transport issues. The goals in the RPLT are largely based on regional development in Akershus and Oslo. Due to this, the informant from the ACC stressed that they see transport "as one of the several goals we focus on" – not the overarching goal. In the RPLT it is stated that the growth and development in the Oslo and Akershus region provides potential. *"The process has shown that the growth can be an opportunity to reach the goals of a more competitive and sustainable region if state, counties and municipalities change course and coordinate their land-use and transport policy in accordance to the plan"* (PRLT, 2015, p. 3, own translation). This quote indicates conflicting goals from the ACC side; the state, county and municipal plans should be directed towards achieving the RPLT. The impression from the ACC was that, rather, it is seen as if the RPLT should accommodate the goals in the plans from OP 3. It is reasonable to argue that the challenges regarding organizational structures are part of maintaining status quo. Regional development, road expansions, and higher efficiency in the transport sector problems would thus amplify hypermobility. Breaking free from organizational configurations is also difficult due to the financial structures present.

7.1.1 Financial structures

Financing the maintenance and operation of public transport as well as other infrastructure projects in the Oslo region is a major point of discussion in the current re-negotiations of the OP 3. Toll roads provide a key financing mechanism for many of the large road projects. In this financing system, an interesting conflict of interests emerges. Currently, more than 60 % of the operations costs for the public transport come from toll roads in and around Oslo. With the ZGG as an overarching goal in the NTP, and with OP 3 and the RPLT not wanting more car traffic to the city center, it can seem problematic to base so much of the public transport operations on toll roads requiring car traffic.

That the financial structures are set up this way can support the status quo because it would take strong political will to step away from the system that has been in place since the previous Oslo

packages. Minken recently critiqued this structure as a plan patched together based on historic ways of seeing road development (2016). This system is in a way a spiraling loop of accommodating for more people in the transport system, and expectations of a hyper-mobile population, emphasizes a main problem with keeping up a hypermobility society. Skewed access to welfare for humans and non-humans and lower personal freedom is the result of the impossible task of having a system like the transport sector continuously grow. The researcher from ITE summarized this quite nicely when he thinks of transport like a resource. Like any resource, it is not unlimited and should be distributed fairly between people. In the case of the E18 western corridor, the toll road fee has to dramatically increase in order to achieve the two goals of financing public transport, while at the same time keeping the number of cars down. This would result in an increasingly large part of the population not being able to afford to keep up the same level of mobility as the "elite" (Cohen & Goessling, 2015). This unbalance would likely not be as consequential if the public transport system was as seamless as the car journey, but currently it is not, and the hypermobility imbalance is present. Furthermore, in the sector of business and freight transport there would be an imbalance towards the businesses that can pay for the increase in toll roads.

7.1.2 Road capacity increase

The dichotomy between the goal of more efficient and larger highways, and the goal of zero growth and emission reduction is a central point in the negotiations over the western corridor. The argument from the 'pro-expansion' side is that an increase in capacity is vital for business and regional development. They further argue that higher road capacity is beneficial for public transport. These benefits in traffic flow, however, are likely only temporary. Research has shown that increasing road capacity will make a goal of less car traffic harder to reach (Tennøy, 2012).

Drawing a connection back to hypermobility again, many of the infrastructure projects in the current NTP, largely justified in economic terms and linked to the economic benefits of reduced travel time. Aside from E18, one of the most debated investments are linked to the road development and accepted goal to turn E39 in Western Norway into a connected road without ferry crossings (Ministry of Transport and Communications (2012-2013b). With E39, the argument is that it will connect the regions, and improve road conditions. However, because it is expensive and largely user financed, the toll road prices will be high. E39 thus share similar challenges of the goal conflict between regional development and environmental concern in infrastructure development. Moreover, it encourages continued dominance of car-based mobility. Due to the likely increase in car traffic on the E39, this project is also currently loudly being debated in the media, with opponents saying the claimed CO^2

reductions from the project are wrong, and that the emissions from the cars that ultimately will use this stretch are underestimated (Sado and Rydland, 2016).

7.1.3 "What conflicting interests, visions or other pressures are present in the transport planning regime and what are their implications on enforcing the status quo or opening up for a transition"?

This thesis has so far mapped out the characteristics and important actors of the transport planning regime in research question one. The problem formulation and suggested solutions were discussed for research question two. This section will attempt to answer the last research question based on the analysis of the interviews and the discussion above.

As briefly pointed out above, changing the organizational structures that surround the decision making in the transport planning regime is complex. The organizational foundation of the Oslo package 3 is one example where the financial and organizational structure outlined 20 years ago still shape the status quo. Furthermore, although not explored in depth in this thesis, I would argue that the habits within the 'car-culture' form another complex structure maintaining status quo. These habits link to large-scale economic structures as part of the landscape level and are thus harder to influence. As we have seen from the discussion, economic and financial structures are also part of maintaining conflicting goals between regional development and emission reduction. Climate change mitigation follows as an underlying red thread throughout the planning documents and interviews. Reducing emissions through measures e.g. the ZGG and technological change is not exclusive to Norway, rather, it is a dominant discourse in much climate policy. These overarching political, financial and organizational structures are part of maintaining, rather than opposing the status quo.

Although the planning regime have many organizational structures that support the status quo, I identify the decision to make Oslo city center car-free as one of the potential cracks that can challenge the transport planning regime. I argue that, although it is only Ring 1 that will be car-free in the current plan, that this potentially could affect how people view the city areas. If the inhabitants and visitors in urban areas see the potential in turning streets into more than a place for cars, there could be a potential re-structuring of the planning regime in favor of 'soft' rather than 'hard' forms of transport. This links back to the indicators of hypermobility, where a society of a less 'hyper' state of mobility could foster more equality, less crime, and increase people's decision-making power (Adams, 1999).

7.2 Technology vs. society – discussions on systemic or technological change

Ecological Modernization:

> "The car, one might suggest, is Weber's 'iron cage' of modernity, motorized, moving and privatized".
> (Sheller and Urry, 2000, p. 744)

The above quote from Sheller and Urry (2007) summarized the view that one might have on the car if seen from the critical research surrounding cars in modern society. The idea connects to that of ecological modernization, claiming that most problems can be solved through technological innovation (Jaenicke, 2008). This has also been linked to research on mobility, both when critiqued through the hypermobility lenses, and also through "the myth of prosperity through mobility" (Essebo, 2013, p. 2). This myth, Essebo argues, is prominent in urban development projects, where better mobility is a goal for economic growth and regional competitiveness (2013). In the new NTP suggestions from the transport authorities, concerning the NTP period from 2018- 2029, the transport authorities have high confidence in that technological innovations will be an important factor in reaching climate goals. A featured article from ITE shows that from the ambitious emission cuts in the new NTP suggestions, over 90 % of the emissions are expected to be cut through technology and alternative fuels (Lindberg, 2016). David Banister, in his article "Reducing the need to travel" said it fittingly; "There is a strong belief that technology is the most attractive option as it involves the minimum pain" (1997, p. 441).

Banister (1997) might be right to some extent in that technology seems appealing because it often allows a continuation of practices from before. However, I argue that with some of the solutions presented among the informants, especially connected to car-sharing and a car-free city center, there is potential for wider social benefits. Considering a society where car-sharing is commonplace, it might be one where people are more open to interact with their neighbors because they share a car or can be picked up by an autonomous vehicle together when going the same place. Although this turns speculative, the informant from Bellona emphasized, and I agree with him, that:

> "W*e have to prepare ourselves – as a population – that there will be put restrictions on what we are allowed to buy and where we can drive. So far the discussions have followed predictable paths; those that are against are always against, and the general public are on the fence waiting to see the result".*

This quote mirrors somewhat a broader concern when dealing with complex problems such as transforming the transport system; the individual actions of people are not enough in the wider scope of things (Barr & Prillwitz, 2014). Restrictions in individual behavior is naturally a sensitive political

issue, however, the impression from several of the informants was that in order to reach their goals, politicians will have to use stronger measures. Reaching their goals also requires them to take a stance with policies in favor of the car, as mentioned by the ITE researcher:

> "w*e at ITE use quite a bit of time telling politicians what to do in order to reach these goals. At the same time as they work towards these goals, they work to improve car-transport, making it unrealistic to reach the goals. Part of the challenge is that, in order to reach zero-growth in car usage you have to go in with powerful measures".*

The technologies innovations that are seen as the solutions within the regime level are likely not enough to cause wide cracks. For that to happen it does not seem like the innovations and solutions are radically opposing the current regime level to a large enough extent. However, as mentioned above, car-free city center is an example of a suggested solution that could start the process of challenging the current regime. If it turns out that the technological innovations find traction faster than expected, these innovations might make it faster into the plans, and the visions will change accordingly. The informant from ZERO said fittingly that, "goals are always subject to change and can be tightened when they are achieved. The realism thus gradually adjusts itself based on the achievement of the goals." With the technological and socio-technical innovations slowly gaining power, the question of whether a technological change or a societal change is the 'right' way is perhaps not the right question to ask, as the most promising pressure to the transport planning regime seen throughout this thesis comes in the intersection between societal and technological innovations.

8 Conclusions

This thesis has explored the transport planning regime in Oslo region through the analytical framework of the MLP and the theoretical framework of hypermobility. This approach has led to answers to the three research questions. In research question 1, I described what key institutions, actors and characteristics are shaping transport planning in Oslo. By analyzing key documents, I mapped the relationships between important regime actors, as shown in figure 6. The characteristics shaping this regime was explored by analyzing actors through the MLP. Research question 2 looked at what role socio-technological innovations (BEVs, car-sharing, ICT, and autonomous vehicles) play in transport plans for Oslo and the visions for the future. Main conclusion emerging from this question circle around technological innovations as a measure to reduce problems connected to emissions. However, these innovations would not as easily address issues of traffic flow. Moreover, what the actors see as the main problem largely constitute their view of the solution. In research question 3, the findings from RQ 1 and 2 draw together and help analyze what conflicting interests, visions or other pressures are present in the transport planning regime and what their implications are on enforcing the status quo or opening up for a transition.

In answering these three research questions, I have explored the issues of a specific transport planning regime that, on the one hand, envisions an increasingly hypermobile society with a firm lock-in to car-based mobility, while on the other hand preaching emission cuts and reduction air pollution through less car traffic. These two goals are not easily united and the discussion has revealed a few organizational and financial aspects that maintain the status quo. Moreover, the objectives and regional (self) interest among the actors is a challenge for a coherent planning process. This tendency is amplified by the organizational structure in which the planning and cooperation takes place. Financing infrastructure is a key discussion point among actors. Although technological optimism in the plans is widespread, the visions largely still support a hyper-mobile population and the transport planning regime still cater for cars while expecting technological fixes to “green” them. The rise in BEVs in recent years has helped introduce emission free vehicles, but the growth has happened without discussing the negative imbalance of hypermobility within the planning regime, and with traffic flow issues persisting.

Although this thesis has revealed some interesting contradictions, conflicting goals, and diverging visions for the future, further research is needed into the additional implications these findings might have on the social sphere in connections to hypermobility.

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10 Appendices

Appendix A: Contact list

Institution	Type/affiliation	Position/Title	Interview date:
Zero Emission Resource Organisation (ZERO)	Independent (not-for-profit) NGO	Section leader ”Transport division”	14. April, 2016
Bellona	Independent (not-for-profit) NGO	Section leader “transport division”	18. March, 2016
Akershus Fylkeskommune	Akershus County Council	Oslo package 3 secretariat	1. April, 2016
Statens Vegvesen	(Norwegian Public Roads Administration)	Responsible for the transport division	14. March, 2016
Transportøkonomisk Institutt	The Institute of Transport Economics	Researcher 1	17. March, 2016

Appendix B: Interview guide

Category	Question
Personal info	1. Name 2. Occupation/ position a. Can you briefly tell me what your job entails? b. How did you end up in [institution/position/organization]?
Perceptions of environmental challenges, transport and mobility	1. What do you see as the most urgent environmental challenges connected to the personal transport sector in the greater Oslo region? a. Would you describe the environmental policies addressing these environmental problems as efficient? 2. What would you say your institution/work place/ position or role is in connection to the in environmental challenges from personal transport in Oslo/Akershus? a. How do you work to address the challenges you mentioned earlier? 3. Is the term 'mobility' something you encounter in your everyday work? a. If so, how do you define it? b. Even if you don't work with it in your everyday tasks, how would you define 'mobility'?
Transport planning	1. What do you see as the most important transport planning tool in Oslo? 2. Are the planning measures/tools that are available helping or making your work complicated? 3. What do you consider to be the largest barriers in cooperation between sectors in transport planning? 4. What do you see as the biggest advantages/disadvantages with the current transport planning policies?

Goals and visions	1. Do you consider the 'zero-growth-goal' (*all growth in transport with public, walk, cycle)* is realistic? a. If this is achieved – let's say in the timeframe of until 2030 – what problems do you think would remain with regards to environment and transport? 2. What do you think about the claim: "it is possible to build our way out of traffic problems"? a. What infrastructure projects do you consider as most important in order to reach the zero-growth goal? 3. There has been an exceptional growth in EVs in the Oslo/Akershus region in recent years. Do you see this development influencing transport planning visions and goals for the region? a. In a positive or negative way?
City development	1. This fall it was decided that Oslo city center should be closed for car-traffic. What positive and negative consequences do you think this can have regarding future transport planning?