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BETWEEN DARING AND DELIBERATING

3G AS A SUSTAINABILITY ISSUE IN SWEDISH SPATIAL PLANNING

Stefan Larsson

Blekinge Institute of Technology

Licentiate Dissertation Series No. 2008:02

School of Technoculture, Humanities and Planning



Between Daring and Deliberating
3G as a Sustainability Issue in Swedish Spatial Planning

Stefan Larsson

MiSt

TOOLS FOR ENVIRONMENTAL ASSESSMENT
IN STRATEGIC DECISION MAKING



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3G as a Sustainability Issue in Swedish Spatial Planning

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Preface

By the time I started Law school in Lund in 1999, the Swedish 3G development was in its planning stages. In the autumn of 2003 I took my first class in Sociology of Law, gradually finding out about the strength this discipline had when related to my law studies. The 3G coverage was intended to be reached by the end of that year. I however did not pay much attention to the 3G roll out at the time. In 2005, when I graduated both in law and sociology of law, the roll out still continued. This could be seen in media, with by people expressing their opinions on electromagnetic radiation or regarding some legal changes that were made in order to facilitate an infrastructure roll out that had been delayed. This was the year the 3G development and I first met.

A year before this, sometime during 2004, I remember sitting in a black sunken down leather chair in the head of the Sociology of Law department Per Wickenberg's office and he had just asked me if I had ever considered becoming a postgraduate student. I guess I had made some plans for the future, but much remained uncertain. I knew I did not want to practice law. I knew the court career was not for me. I had a feeling I asked too many questions, and had an interest in almost too many other things. I knew that sociology of law had given me some kind of new view on many matters. Still I had honestly never thought about becoming a postgraduate student in the sense of aiming for a PhD. This alternative had just never occurred to me, but from that day I started thinking about it. This is one of the reasons why I am grateful to Per, the one who asked the question and the one who guided me to it. I soon began to work on making this happen. I am also thankful to Professor Håkan Hydén, who was the one who triggered a genuine interest for socio-legal studies during this time of thesis writing on copyright and file sharing.

In early 2005, I received a phone call from Professor Karsten Åström when standing outside the massive iron gates of the gothic cathedral in Lund a cold winter day. Karsten explained that he had a resting project regarding the 3G development in Sweden with a professor Lars Emmelin at the Blekinge Institute of Technology that could be of interest to me. Karsten knew of my interest in communication technology from the two theses I had written in sociology of law. This was the chance I had been looking for, which I understood as I stood there saying "yes, of course, yes, interesting", breathing out smoke clouds in the chilly air. This is when and how my postgraduate studies began.

At first, I was of course supposed to write a licentiate thesis in sociology of law, but after a while me and my supervisors discussed the possibilities of me writing the thesis in spatial planning at BIT instead. It changed the expectations on the thesis towards being more founded in planning theory, which meant I had a lot to learn, and it affected what classes I had to take to fulfil the degree. I took the challenge.

Several people have contributed to the making of this thesis, in different ways. I am grateful to Lovisa Bjarting and Lars Nilsson, two Master students at BIT, who under supervision by Lars Emmelin collected the municipal permit process data which has been very important for the study. I am also grateful to Lilian Dahl at the department of Sociology of Law, who always seems to have time to lend a helping hand on administrative matters.

I need to thank my Anna for being so supportive, and always keeping her faith in me, especially in the quite intense final period of the thesis writing. My brother Marcus has lent

his most accurate eyes for proof-reading important parts of the manuscript. Of course, many of my colleagues at the department of Sociology of Law in Lund have been helpful through the years via discussions, debates and useful criticism. It is much thanks to this every day collective exchange I have moved forward towards the scientific researcher I never even thought I could become.

The thesis is very much a product of the two supervisors Karsten and Lars, which have been sincerely dedicated and enthusiastic. I am very grateful for all support, all ideas, and for making me go to places like Stavanger, Seoul and Bräkne-Hoby. I am grateful for making our meetings so relaxed and always filled with anecdotes and humour in a good balance with sharp comments on the thesis and relevant scientific discussions. Thank you not the least for being such “masters of digression” and somehow almost always finding your way back to the discussed theme and making a point out of the departure from the subject. I believe that it is an open mind and creativity that can bear the most fruit in science – and life. These are qualities I have found in these two gentlemen, not the least giving the thesis, and me, such an interdisciplinary approach. Any good thing that will come from this thesis shall reflect favourably on Lars and Karsten.

Stefan Larsson
Lund, 28 February 2008

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PART ONE - THE CASE AND THE PROBLEM

1. Introduction

The specific case of the 3G infrastructure development has been studied, which has offered knowledge regarding Swedish spatial planning in general, but in relation to the infrastructure development specifically. The 3G case is in the thesis analyzed in the perspective of how sustainable development is handled in it, through identified indicators of this handling. The title suggests the strategic nature of decision making present in a large scale infrastructure developments such as the one of 3G in Sweden. There is a balancing between what should be planned in more detail before the decision and what can wait for later; a too daring approach may result in costly unforeseen consequences, and a too deliberating approach may stifle progress. The thesis structure first addresses the design of the 3G development, and then the implementation of this design. By this approach the consequences of the conditions for the licence winning operators have been empirically investigated, displaying the difference between the design and the implementation, as well as the legal application of the regulations relevant in the 3G case.

1.1 *Presentation of a problem – 3G as a sustainability issue in planning*

Sustainable development both *is* a main goal for the politics of Sweden, and *was* at the time for the decision to develop the 3G infrastructure.¹ It is in this context the Swedish environmental quality objectives fit well in. Of the 15 objectives proposed in the government bill from 1998 the objective “a safe radiation environment” was included (prop 1997/98:145). The precautionary principle has been part of Swedish environmental politics for several years, and is for instance referred to a number of times in the governmental bill on environmental quality objectives. A study of the handling of sustainable development in the 3G case shows the empirical side of this governmental ambition, as well as addresses specific problem areas connected to the complex government of developing infrastructure for telecommunications, often controlled by legal framework which has its application in different levels of the environmental management and spatial planning.

Infrastructure for the third generation of mobile telephony is since the year of 2000 under development in Sweden. After the initial allocation of spectrum by proposed criteria in a selection process, the so called beauty contest, four operators were given licenses to build the

¹ Compare prop 1997/98:119 Housing politics for sustainable development, Prop 1997/98:56 Transport politics for sustainable development, prop 2002/03:122 Common responsibility: Sweden’s politics for sustainable development, Communication from the Government (Regeringens skrivelse) 1999/2000:14 A sustainable development of the countryside etc., Regeringens skrivelse 2005/06:126, p 1.

infrastructure for 3G. Within three years the four operators were to build competing systems to cover 8 860 000 individuals in the populated areas of Sweden, at the time equalling 99,98 % of the population, giving the administrative system an extreme challenge. An estimation conducted for the Post and Telecommunications Agency, the PTA, stated that a reasonable area coverage would be around 170 000 km², about 41 % of the total Swedish surface area (Björkdahl and Bohlin 2003). The coverage by the end of the period was around 66 % and 74 % of the promised 8 860 000, with only three remaining operators still participating in the development. It was not until 1 December 2006, about three years after the initial deadline for reach of coverage, the first operator (Tele2/TeliaSonera) reported to the PTA, that their common net had reached the coverage of 8 860 000 inhabitants of Sweden. The operator was followed by the remaining two operators, Hi3G and Telenor, 7 months later.

The operators blamed a slow municipal permit handling for the delay, a reason that “could not have been foreseen”, which would make them escape sanctions from the PTA (PTA Decision of 17 May 2004, p 3). The operator actions, the appeal of PTA decisions, the application for changes in licence conditions, during roll out postponed the formal deadline. This is in the thesis compared to the PTA handling of the situation, as well as national and regional coverage data at different times in order to see how legitimate the reasons stated by the operators are, regarding that the municipal permit handling processes slowed down the roll out in an unforeseen way.

The relevant legal framework is analyzed, and the roll out has been studied in its practice, by collecting a sample of 248 building permit cases in Blekinge from the beginning of the roll out in 2001 to 2004. The thesis shows that a slow municipal permit process can not explain the lack of coverage by the end of the roll out period in some areas of Sweden. The “regional balance” and social cohesion aspects tied to the extreme coverage was not implemented in the way it was designed. The market logic had formally been locked in, but practically applied. No operator was sanctioned by the PTA, and the PTA was not sued by operators not given a licence.

The 3G case offers a unique possibility for studying how the planning and environment protection administrations at local and regional level in practice handle a sustainable development issue; on the one hand a national technological growth system and on the other environment protection, resource use, public concern over radiation etc. The interplay between the administrative levels, as well as the difference between the design and the implementation of the 3G licence conditions takes place within a legal framework, that has controlled the outcome, but can not solely explain the events that occurred. Land use and environmental management include a complex set of rules mainly consisting of the two most important legal corpuses, the Environmental Code and the Planning and Building Act. At the implementation level these two legal corpuses may conflict with each other. This is shown below in the 3G case. The outcomes of this, as well as aspects of the mast permit process, is analyzed through two paradigms of governance, following from a planning theoretical context. The concepts of norms, in its sociology of law sense, joined with the two paradigms of governance forms an external and critical perspective on law and society, in order to explain the outcomes and deficiencies of the legal design and the setting of the construction of the 3G mobile telephone system in Sweden.

The goals of the initial policy decisions on 3G in Sweden and the shaping of the “beauty contest” are of a strategic nature: to keep Sweden at the forefront of IT-development. The decision to set up a 3G-system in Sweden has elements of all three pillars of sustainability. To build the system rapidly to enhance economic growth and national technological

competitiveness is in line with the EU-strategy stemming from the Lisbon summit of March 2000 (Leonard 2005, pp 118-122). To make an advanced technology available to essentially the entire population and to stimulate regional development by equitable distribution of advanced technology rather than according to market logic of development can be seen as both a growth policy and as an instrument of social cohesion. The competition ideology inherent in the decision to have four competing systems with a low level of cooperation is an element of the growth policy but also of the social component: the notion that competition will stimulate development of applications. The situation at the time of decision was one of technological optimism with limited substance. Telephones for the system were not available, and applications beyond conventional mobile telephony and the capacity to handle large amounts of information were largely a matter of assumption. Environmental concerns surfaced as a result of the decision, not as part of the decision (Emmelin & Söderblom 2002, p 22 – 24). The task of looking at environmental impacts of the system was given after the strategic decision had been taken to a group of environmental agencies with the National Board of Housing, Building and Planning as coordinator. This work focused on mitigation through efforts at reducing the number of masts through voluntary cooperation.

The pillars of sustainable development have been present in the 3G infrastructure development with dissimilar emphasis. The emphasis has however been shifting over time, and also depending on administrative level. Different aspects have been important on national, regional and local levels.

Spatial planning and environment protection have separate legislation which is essentially based in different paradigms. The plan paradigm and the environmentalist paradigm do not necessarily share the same view of sustainable development (Emmelin & Lerman 2006). The precautionary principle is claimed to be a cornerstone of rational ecological governance (Lundqvist 2004). The interpretation of the principle and the clash between seeing it as mainly reflecting scientific uncertainty versus a deliberative issue is one example of paradigmatic difference that the 3G case illustrates.

Part of the problem within the system of spatial planning is the conflicting goals of the national policies a) to construct the 3G infrastructure, and b) to *sustainably* construct the 3G infrastructure. The national policies decided upon centrally and nationally only meet and have to be taken care of at the local level, mostly in the local permit process. This leads to the assessment problem: Can an infrastructure system of a total of 10 000 masts or more be successfully assessed only through parts of the jigsaw puzzle, via one mast at a time, without a comprehensive assessment? The permit process within the municipalities holds many of the keys regarding spatial planning and the implementation of the decision of the 3G infrastructure roll out. Hence the legal design, the planning and environmental legislation, and the outcomes of it, especially the permit process for mast construction, are empirically investigated.

The public fear of radiation and the question whether it is a legal concern or not is of interest, especially in relation to the *precautionary principle* of Swedish environmental law (Emmelin & Söderblom 2002, p 31f.). The study of conflicting norms, legislation and means of control is clearly interesting in the case of 3G in Sweden. In practice, the 3G infrastructure construction is a case that shows how sustainability issues are handled in environmental management and spatial planning. The theoretical basis of the analysis combines spatial planning and sociology of law, suggesting a cross-disciplinary approach to planning issues. The interplay of the law and the planning and implementation of the technological

infrastructure is addressed in the study. The thesis is based on the findings of an ongoing study within the MiSt programme, which will be reported during 2008.²

1.2 Object of thesis

Methodologically the thesis captures and explains aspects of the 3G infrastructure development based on a quantitative foundation with qualitative contributions to it in certain aspects of special interest. The study is a continuation of a pilot study of the 3G infrastructure development by Emmelin and Söderblom (2002). It is both empirically broadened and theoretically differently founded. This study is presented as a licentiate thesis in spatial planning at Blekinge Institute of Technology, and is a part of the MiSt2 project.³ The object of the licentiate thesis is

1. to show and analyze how sustainable development is handled in both the design and the implementation of the 3G infrastructure roll out in Sweden;
2. to chart the 3G mast permit processes as they develop in time and screen for main issues and conflicts in order to show and analyze the difference between the design and the implementation;
3. to investigate and present the relevant legal framework as it was before roll out, and as it was changed during roll out. This is compared to its application and analyzed from a sociology of law perspective in order to show legal deficiencies or inconsistencies in its practice;
4. to show the actions of the PTA and the operators in order to explain the delayed reach of coverage, once again focusing the difference between the design and the implementation, and hence analyzing the legitimacy of the delay.

The case of the 3G infrastructure illustrates how sustainability issues are handled in planning and environmental management, partly with conflicting goals at different institutional levels concerned with the infrastructure development in various ways. Chronologically, the thesis first investigates the setting, including the design of the licence allocation as such and legal framework, before the focus is turned towards the implementation of 3G in Sweden, meaning the practical outcomes of Swedish spatial planning in relation to the infrastructure development. This composition of the thesis is motivated by two main reasons. The first regards the mentioned approach on the 3G case, attempting to first line up the design of the Swedish 3G development, both legal as well as what was agreed upon, as opposed to how this turned out, and was implemented. The other lies in the theoretical viewpoint of sociology of law, where law can be found on one side and its application or consequence on the other. This means that as a parallel to the approach on the 3G case, the relevant legal framework is

² MiSt is an interdisciplinary research programme on tools for environmental assessment in strategic decision making funded by the Swedish Environmental Protection Agency. The programme is co-ordinated from the Department of Spatial Planning, Blekinge Institute of Technology. See http://www.bth.se/tks/mist_eng.nsf

³ MiSt2 is one of the projects in the programme, lead by professor Lars Emmelin, called "Infrastructure for the third generation mobile telephone system as a sustainability issue in planning and environmental administration".

analyzed from a socio-legal perspective in the light of the “law in books” as opposed to the “law in action”. This is the reason that some components of the thesis to some extent are repeated.

The sustainable development perspective is analyzed from indicators found in the 3G case. The sustainability indicators show how sustainability was handled, or not handled, in the case, either in the setting stage or during the infrastructure roll out of the first licence period. The indicators are found in the research process, and do not necessarily represent how the development is presented in media, by the operators, or by the politicians. This does not mean that the thesis presents a normative approach on how to make the 3G case more sustainable. The handling or non-handling of each indicator is explained and further analyzed in chapter 8 of the thesis, and more liberally discussed in the finishing chapter 9.

1.3 Content and delimitations

You are now reading *the first chapter*, which introduces some problems of the 3G infrastructure development in Sweden, the more specific object of the thesis as well as methodological concerns when researching this object, the concept of sustainable development and how Sweden is governed.

The second chapter of the thesis focuses the initial stage of developing the 3G infrastructure in Sweden, how the roll out was planned, the licence allocation in the so called beauty contest, as well as some technological preconditions of interest for planning and understanding issues that occurred later, in the implementation. The second chapter is summed up in a presentation of what indicators of sustainable development that has been handled at this stage. This is in line with object 1 and 4 of the thesis to the part that matters the “design” of the 3G infrastructure development in Sweden.

The third chapter outlines the legal framework relevant in the 3G case, as well as the legal changes that were made during the roll out. This is in line with object 3, although the analysis is not made in this chapter.

The fourth chapter is in line with object 2 and 4 in showing the implementation of the “3G design”, the national roll out of infrastructure including operator and PTA actions, the application of important legal provisions, as well as the radiation issue. The chapter is summed up in a presentation of what indicators of sustainable development that has been handled in the implementation stage. This is when the difference between the design and the implementation is shown, although not yet analyzed.

In order to be able to analyze the 3G case the theory part of the thesis is presented in the following three chapters, beginning with spatial planning in *the fifth chapter*, sociology of law in *the sixth chapter*, and the linking of the two disciplines in *the seventh chapter*. It is in this part of the thesis that planning theory, two paradigms of governance, norm science as well as different perspective on the legal order is presented. This is in order to be able to analyze the design and the implementation from both a spatial planning and a socio-legal perspective.

The eighth chapter shows and analyzes the indicators of how sustainable development has been handled in the 3G case, both in the design and in the implementation. This is how object 1 is completed as well as partly 2, 3 and 4. *The ninth chapter* mainly focuses object 3 and 4 in analyzing the legal framework, as well as relevant changes, and the game of the PTA and the operators.

3G would at first seem a perfect example of the need for Strategic Environmental Assessment, SEA. The question is however what an SEA could have achieved. In a separate study within the MiSt programme, at a later stage of this examination of the Swedish 3G-system development, this issue will be addressed based in the empirical material at national, regional and local level.

1.4 Studying the 3G case – methodological concerns

This thesis can for many reasons be said to be cross-disciplinary. Some sources are judicial, of which a traditional legal method has been used to understand and describe the existing legal provisions. These legal sources are however also viewed from an “external” position of sociology of law. The focus is then to detect power struggles and driving forces hidden in the dogmatic regulations of the law and to see the effects and outcomes of the legal design. By doing this, one departs from the strict legal method and using a social scientific method to answer the planning relevant object of the thesis. Some methodological remarks are necessary regarding what data the thesis depends upon for the analysis and for answering the research questions, and how the data has been collected. There is a methodological difference when a legal scholar who wants to investigate existing law and when a social scientist seeks to state something about the circumstances of the world. This methodological difference is developed in the theory segment of the thesis.

The collecting of empirical data regarding the permit processes in Blekinge was initiated in a pilot study on the infrastructure development, which was undertaken prior to this research project (Emmelin & Söderblom 2002).⁴ The Blekinge material concerning permit processes continued to be collected, after the pilot study project, and is now used for the purpose of this thesis. For the purpose of understanding and explaining sustainability issues in the spatial planning via the 3G case the Blekinge material has been extended and completed with the use of PTA questionnaires as well as legal studies and document studies of PTA reports and other, outlined below.

Methodological concerns are also presented in their relevant contexts below. Regarding the methodological differences of social sciences and a traditional legal method, a take on this is presented and discussed in the theoretical chapter of sociology of law, which is motivated by its importance in telling the disciplinary identity of sociology of law, and its relationship to the legal dogmatic perspective. The sources used to tell the story of the 3G design are outlined in chapter two, and the extensive data of telling the implementation story, for instance the collection of permit processes as well as the national questionnaires, are outlined under

⁴ This data is collected by Lovisa Bjarting and Lars Nilsson, Master students at BIT, under supervision by Lars Emmelin.

chapter 4. The data to support the questions under objective 3 and 4, the issue of legal inconsistencies, or topics related to sustainable development in practice are presented under these chapters or partially where these data has been introduced before (as in the case with the Blekinge permit process material).

A reliable research method is one where we would receive the same result over and over. The focus is on the method, on its pro's and con's, in terms of consistency. The validity of the method chosen is to what extent the data actually describes what it is intended, or said to describe. A more thorough review is conducted from a more general methodological perspective in this chapter. The empirical data could, in short, be described as follows.

- 248 mast permit processes in Blekinge, from the beginning of 3G construction until late 2005.
- PTA questionnaire (7 April 2003) conducted by Temo AB for the PTA regarding handling of building permits; a quantitative survey to all municipalities, and a qualitative study on 25 municipalities.⁵
- PTA questionnaire (29 December 2003) conducted by Temo AB for the PTA regarding building permits, a quantitative survey of all municipalities.⁶
- Legal cases, appealed permit processes and other cases of relevance.
- Legal documents, preparatory work, law studies etc.
- Both the PTA reports and other, and PTA regulations and other documents, such as the call for 3G licence applicants.
- Other 3G related studies.
- Press releases and articles.

1.4.1 Research ethics

Regarding research ethics this study forms most of its data from documents that are official and free for anyone to research. Displaying information does not however need to be regarded as ethical on the mere basis that it is derived from official documentation. The official secrets legislation can not be trusted of drawing this line in relation to a complex research world. The ethical limits are tied to how the information is used and presented, and to the context it is presented in. And this line is drawn under the responsibility of each researcher.

This thesis does not display any personal information that from an ethical perspective could be regarded as sensitive, for instance in cases of mast permit appeal. This is connected to the fact that the research area of this study is not any kind of experimental quest such as focusing on human behaviour. The area focused on is the one of such an abstract level as the environmental management and spatial planning. The criticism of administrations, authorities or perhaps large scale corporate organisations is well inside the boundaries of what can be considered to be an outcome of ethical research. No individual involved in the permit processes is for instance named. The individuals of the study that are represented by their own names and opinions are individuals already in positions where the media focus is strong, such as corporate officials or ministers displaying opinions in press releases.

⁵ Data made available by the PTA.

⁶ Data made available by the PTA.

1.4.2 The building permits

Of the formalized structures one of the most important legal document is the building permit. There are several reasons for the fact that the investigation of the permit processes will be able to tell us something of the sustainable development issues of spatial planning.

The Emmelin & Söderblom pilot study (2002) collected the initial permit processes of the infrastructure construction in Blekinge. This collecting of building permits was continued until late 2005 and early 2006 in the municipalities. The permit processes are 248. These building permits allow scanning for main issues and conflicts of interest for how the planning and environmental administration functions from a sustainability perspective. A selection of the permits has been further analyzed according to the research questions. For quantitative analysis of the Blekinge material, an access database and a SPSS database have been built. This has allowed both a necessary overview of the extensive material, as well as a convenient means for quantitative analysis.

3G mast permit processes in the five municipalities in Blekinge County until November of 2005.

Municipality	Frequency	Percent
Karlshamn	51	20,6
Karlskrona	82	33,1
Olofström	30	12,1
Ronneby	71	28,6
Sölvesborg	14	5,6
Total	248	100,0

Parts of the Blekinge material has been analyzed qualitatively, through a text analysis looking for key words in the documents used to communicate between municipal authorities and the individuals and other concerned parties. The Blekinge data forms a case study, which is compared to the national questionnaires performed on PTA initiative. The method triangulation, the use of different data regarding similar issues, corroborates the results, and raises the likelihood of the study researching what it is said to research. Systematic errors in any of the collected data is not likely to be reduced in the other (Esaiaasson et al. 2004, p 61ff).

One example follows. The Blekinge permit process data is “raw” in the sense that it is from documents regarding for instance when the applicants applied, and the actual application sent in to the local authorities, as opposed to the national questionnaire data where planning officers answered a web based survey regarding matters of the permit process within their respective municipality. The important difference between these two types of data, regarding the validity of a scientific method, is that where the Blekinge data describes the actual dates and figures we can not corroborate the questionnaire data in the same way, because this may in some cases show the opinion of the local planning officer more than exact measured figures. This is where one can assume that many different types of data all pointing in the same direction also is likely to be true (Denscombe 2000, p 102 – 104). This increases the validity of the method, meaning that the chosen method is more likely to measure what it is claimed to measure.

As a matter of how able results from Blekinge are to be naturally generalized a few notes can be made. The administrative system for land use planning is nationally regulated. It means that it is designed the same for the entire country of Sweden. The country is divided into 290 municipalities (21 regions/counties) which to the extent of the most part of planning of the spatial environment are sovereign, or delegated to the local authorities, by supervision from the County Administration. The region of Blekinge has a coast line with archipelagos as well as a rural inland, containing valuable culture and nature. The urbanized areas of Karlskrona,

Karlshamn and perhaps Ronneby represent many of the middle sized urban areas of Sweden. Blekinge County is representative on a national level from several perspectives. It is the most industrialized region and the most densely populated area outside the three big city areas (www.scb.se). The Blekinge region however is not an example on the extremely sparsely populated areas such as in the northern parts of Sweden, which has shown a lack of coverage due to the operators' lack of driving forces due to the problems of getting a construction profitable in such areas – no matter the licence conditions. Nor does the region have, by Swedish standards, a significantly large urban area such as the one of Stockholm or Gothenburg, with the big city issues of urban planning when it comes to infrastructure planning and construction.

One of the operators, Europolitan (later Vodafone, today Telenor) is located in Karlskrona, the biggest municipality of Blekinge.⁷ Whether or not this has been affecting the permit processes of the municipality is a question of interest, dealt with below. In the Blekinge region there are also a relatively high amount of military facilities and military zones, which may have had an impact on the 3G roll out.

The Blekinge focus of the permit processes of the empirical data leads to the possibility that some issues and conflicts of the region of Blekinge to some extent do not find their representation on a national level. In such case, this will show in the PTA national questionnaires. To be able to generalize interesting issues to a national level however the national questionnaires issued by the PTA during 2003 can be compared to the permit processes of Blekinge. The questionnaires give a national picture at a few chosen moments.

1.4.3 The PTA questionnaires

The two questionnaires performed by Temo addressed to the municipalities of Sweden are from 29 December 2003 and 7 April 2003 regarding the permit process. Both surveys are quantitative but the latter is complemented by a qualitative study based on interviews with handling officers, politicians and trade and industry spokespersons of 25 municipalities and 2 county administrative boards. The interviews are conducted via telephone and a semi-structured interview guide.

The two quantitative PTA questionnaires were conducted through a web based survey by a professional research company, Temo AB, on behalf of PTA. The municipalities received an e-mail, containing a link leading to the web form. A number of reminders were sent during the research period, to ensure a high participation. All of Sweden's 290 municipalities were included in the survey. The quantitative questionnaire of 2 April 2003 had a participation rate of ca 75 %, meaning 218 municipalities. We have been given access to the raw data and information of this questionnaire. The questionnaire of 4 December 2003 had a participation rate of ca 75 %, or 217 municipalities.

The qualitative research of 2 April was conducted through interviewing with the help of a semi-structured interviewing guide. A total of 25 municipalities and 2 County

⁷ Europolitan was originally owned by Nordic Tel Holdings but was bought by Vodafone 15 April 2002. During the following year the company changed the name to Europolitan Vodafone and later was called Vodafone. Vodafone was bought by Telenor 31 October 2005 and in 2006 the company changed the name again. The name changes in the thesis chronologically and the reader will be reminded of it.

Administrations (Kalmars Län and Västra Götalands Län) participated. In the municipalities the responsible handling officers, local politicians and corporate representatives were interviewed. At the County Administration it was the responsible handling officers who were interviewed. A total of 73 interviews were conducted by Temo AB on behalf of the PTA.

1.5 What is sustainable development?

Sustainable development was a main goal for the politics of the Sweden at the time for the decision to develop the 3G infrastructure.⁸ It is in this context the Swedish environmental quality objectives fit well in. Of the 15 objectives proposed in the government bill from 1998 the objective “a safe radiation environment” was included (prop 1997/98:145). The precautionary principle has been a part of Swedish environmental politics for several years.

The first Swedish national strategy for sustainable development was delivered to Parliament in 2002 (skr. 2001/02:172). The Swedish government has annually, since 1997, presented to Parliament how the work with reaching an “ecologically sustainable development” progresses (Skr. 2001/02:172, p 4). Sweden has by this stated that sustainable development is a major policy goal. In the light of this national policy let us turn back to the concept in itself, and its origin.

The term sustainable development got an international breakthrough in environmental politics when the World Commission on Environment and Development published their report *Our Common Future* (WCED 1987), often referred to as the Brundtland report. The report defined sustainable development as:

“...development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

The WCED report signalled the environment as a critically important factor of international governance. It initiated an explosion of work on development and sustainability (Sneddon et al. 2005).

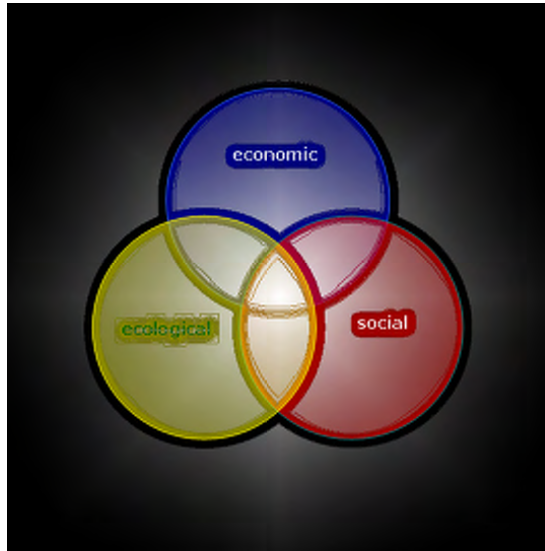
Following the UN environmental conference of 1992 in Rio de Janeiro, UNCED, 178 nations adopted Agenda 21, with its set of guidelines for development in the 21st century where sustainable development is the principal objective. The 40 chapters of Agenda 21 cover issues that cut across three pillars of sustainability. The term “sustainable development” is open to many interpretations, but at least holds the idea of societal development and measures should be long term sustainable, leading to an inter-generational responsibility, over time. The third principle of the declaration of the Rio conference states:

“The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations” (principle 3).

⁸ Compare prop 1997/98:119 Housing politics for sustainable development, Prop 1997/98:56 Transport politics for sustainable development, prop 2002/03:122 Common responsibility: Sweden’s politics for sustainable development, Communication from the Government (Regeringens skrivelse) 1999/2000:14 A sustainable development of the countryside etc., Regeringens skrivelse 2005/06:126, p 1.

This political statement has been scientifically discussed, leading to a wide variety of definitions of ‘sustainable development’ and its pillars. The wording from the Rio conference can be recognized below when we look into the Swedish legislation on environmental issues and spatial planning related law. A central message in the Agenda 21 is the application of the precautionary principle, next to the polluter pays principle and the strengthening of local democracy (see for instance prop 1997/98:145, p 28).

The content of sustainable development has been widely discussed in a post-Brundtland context, with various disciplines attempting to define the term based on different assumptions of the relationship between society and nature. Although the scientifically and politically shattered use of the term ‘sustainable development’, it is widely accepted as a desirable policy objective (Elliot 2006, p 7). The most definitions of sustainable development encompass the idea that there are three interdependent pillars of sustainable development (Elliot 2006, p 11).



Mainstream sustainable development, following in part from the Rio conference, but presented as three circles by Barbier (1987) involves three dimensions: ecological, economical and social, the latter including cultural aspects. Sustainable development is in this conception the balancing of the three dimensions. In this view it is impossible to sustain one part of the total system without the others being involved. There is a mainstream definition of the three pillars of sustainable development that also has affected the legislation, the preparatory legal work as well as the political rhetoric. This definition is:

- Ecological/environmental sustainability – which requires that natural resources remains intact. The extraction of renewable resources should not exceed the rate at which they are renewed, and the absorptive capacity to the environment to assimilate wastes should not be exceeded. The extraction of non-renewable resources should be minimised and should not exceed agreed minimum strategic levels.
- Economic sustainability – which occurs when development, which moves towards social and environmental sustainability, is financially feasible.
- Social sustainability – which requires that the cohesion of society and its ability to work towards common goals be maintained. Individual needs, such as those for health and well-being, nutrition, shelter, education and cultural expression should be met. (Elliot 2006)

This image is the most common of the sustainable development, which in this thesis is used to analyze the handling of sustainable development in the 3G infrastructure development in Sweden. The model focuses the balancing of the three components. When all three conditions are simultaneously fulfilled the development is considered to be sustainable. The existence of

a balance point or intersecting area of all three circles in the Venn diagram is a matter of assumption, which has to be demonstrated in individual cases (Emmelin 1997, 2007).

On a national Swedish political or legislative level, *the ecological pillar* is expressed through the environmental quality objectives Parliament enacted 1999 (prop 1997/98:145, bet. 1998/99:MJU6, rskr. 1998/99:183). Parliament has during 2001 to 2003 enacted 71 minor goals meant to lead the way towards the environmental quality objectives. The environmental quality objectives are for the benefit of people health, the biological multitude and environment, the culture environment and the culture historical values, the preservation of the long range production capabilities of the eco system, a secure radiation environment, and good resource use. These goals, and the part time goal, are to be guidance for governmental and other societal players. In 2005 one more goal of a rich plant and animal life was presented (prop 2004/05:150, bet. 2005/06:MJU3, rskr. 2005/06:48 and 49). The environmental assessment, as well as the planning and building assessment (as we will see below), that are legally regulated are formulated in the terms of sustainable development. The ecological pillar is in this thesis represented by indicators mainly focusing *when* and *where* in the administrative system that the environmental and ecological concerns are addressed, as well as observations of interest in the 3G case of *how* they are addressed.

The social pillar of sustainable development may be the pillar that has been less discussed and analytically developed during the years following on the Brundtland report, even though the discourse has evolved later (Lehtonen 2004). The social pillar is in this thesis discussed from two main sides or aspects, the democratic or participative aspect and the aspect of social cohesion. Participation, which can be direct or through legitimate representation, forms an importance content of the “good governance” discourse beginning in late 1980’s or early 1990’s (Doornbos 2003), including the transparency of decisions taken, and that the enforcement is done under support of legal provisions (See Graham et al. 2003).

When it comes to *the economic pillar* it has often been described in antagonistic terms to ecologic sustainability. And much economic progress has been depending on a non-renewable use of resources. This leads to the important aspect of balancing of the pillars is addressed in the analysis of the 3G case. The “conflict between ecology and economy” is said to be resolved by the Brundtland and Rio model. Economic growth is considered not only necessary for resolving social and environmental problems but the goals are also considered to be compatible. The existence of win-win solutions is the basis for assuming that there is in fact an area of overlap between all three sustainability components (Emmelin & Lerman 2004 p 110-111, 2006 p 38-39). In the 3G case the economic growth and national and regional development is stressed, along with technological competitiveness, well in line with the strategy stemming from the Lisbon summit of March 2000 (Leonard 2005, pp 118-122). How and for whom this growth is aimed, is addressed and analyzed in the thesis.

The strive for a sustainable development has in Sweden taken its expression in that it has been incorporated in many legal bodies, not the least regarding the planning of land and water use, in Sweden mainly the Planning and Building Act, the PBA, and the Environmental Code. This gives the legal regulations are of great interest to the spatial planning discipline, which naturally has to deal with the ideas within the discourse of ‘sustainable development’.

Without referring further to the extensive debate of sustainable development over the years, the concept has taken an important part in the Swedish legislation. This is especially the case in the environmental planning and legislative corpuses, shown below, leading to a responsibility when it comes to arranging the activities under these legislations in a

sustainable manner. The specific legal regulations of sustainable development, in a Swedish perspective, are outlined below in chapter 3.1. First we need to return to the case of this study, and tell the story of the 3G development, especially in a Swedish context.

1.6 How Sweden is governed

This subchapter presents the administrative levels of Sweden. This is of importance in the light of understanding the strategies of the operators when it comes to coverage development, but more decisively when it comes to the assessment of the design of how to develop the infrastructure for the third generation of mobile telephony in Sweden.

The governance levels of Sweden are the central State level, the regional level, meaning 21 Counties with a County Administration, and the local level, meaning the 290 municipalities. The planning of land and water use is to a large extent made at the local and regional levels in Sweden, which has a great impact on the development of the 3G infrastructure, why it is necessary to develop these levels of government a bit further.



1.6.1 The national level – Government and Parliament

"The Government governs the Realm. It is accountable to the Parliament."

(Chap 1, art 6 of the Instrument of Government, official translation)

At the national level, the people are represented by Parliament (the Riksdag) which has legislative power. The Government implements parliamentary decisions and draws up proposals for new laws or law amendments. Sweden is a monarchy but the Head of State – the King or the Queen – has no political power. Sweden is a European Union member state.

1.6.2 The regional level – the County Administration

Sweden is divided into 21 counties, each of which has its own County Administration and County Governor. The County Administrations function as representatives of the state in their respective counties, and are links between the inhabitants, the municipal authorities, the central Government, Parliament and the central state authorities.⁹

⁹ See <http://www.lst.se/lst/en>

1.6.3 The local level – the municipalities

Sweden is divided into 290 municipalities, each with mandate over land and water use planning, being the permit authority regarding numerous construction practices, such as the construction of 3G masts. The municipal government consists of elected politicians and salaried employees. The municipal structure of Sweden today has its origin in the expansions of the 60's and the fusions of the early 70's (Wetterberg 2000, p 30). The inhabitants in the 290 different municipalities in Sweden range from the 2 573 in Bjursholm to the 771 187 inhabitants in the Stockholm municipality (2005).¹⁰ The area sizes of the municipalities range from 9 square kilometres of Sundyberg to the 20 000 of Kiruna (equalling the total size of Skåne, Blekinge and Halland). With such a range in the municipal sizes follows that there can be differences in the organizational shape in some ways from municipality to municipality. The smaller municipalities generally have fewer committees, and for instance the Stockholm municipality is divided into 14 District Administrations.¹¹

¹⁰ SCB, Govern. numbers of Nov 1, 2005. www.scb.se

¹¹ <http://www.stockholm.se/Extern/Templates/Page.aspx?id=117419>

2. Background: 3G infrastructure development in Sweden

The Swedish model with the so called beauty contest to allocate spectrum for 3G telecommunications is outlined in this chapter. This mainly relates to the first object of the thesis, to the part of showing how sustainable development is handled in its design, so it can be compared to its implementation and further be analyzed below. The fourth object of the thesis regards the actions of the PTA and the operators. This chapter sets the basis for this analysis in showing the preconditions following from the so called beauty contest, which is the background for such an analysis.

The data is generally in form of official documents. The legal provisions, preparatory work, the PTA documents, decisions and reports all have their references in the text when used. Press releases have in the study mainly been used to tell a background story, to show examples on the rhetoric around the construction. Articles in different magazines have been referred to, showing the public opinion that has been expressed in the press. The press has not however been used in any sense to try to show more exactly how spread the issues have been.

Before turning to the Swedish version of the 3G infrastructure an international and historical view is presented in this chapter. The reason is the Swedish dependency on the European development, being an EU member state. Parts of the formal setting of the infrastructure development can be derived from EU directives.

2.1 3G in Europe

In February 1995 following the workshop “Towards 3rd-Generation Mobile Communications Systems” held in Brussels the European Commission set up the UMTS Task Force, with the mission to propose a Universal Mobile Telecommunications system, UMTS, strategy for Europe (The UMTS Task Force report 1996). UMTS is the standard of 3G chosen in Europe. The UMTS Task Force was a high level advisory group of twenty recognised persons from network operators, manufacturers and European regulatory authorities, appointed by the European Commission. The group submitted a final report on 1 March 1996, which included a preliminary program for developing and introducing UMTS by 2002. In December 1998 the European Parliament and the Council made a decision (Nr 128/1999/EG) whereby all the European Union member states should enable a coordinated and gradual introduction of the 3G services in their respective countries starting no later than 1 January 2002 (Lindmark et al., 2004, p 315). A directive of the European Parliament and the Council (97/13/EG, 10 April 1997) states that the member states shall grant 3G licenses on grounds that should be objective, non-discriminatory, specified, transparent and proportional.

“Where a Member State intends to grant individual licences:

- it shall grant individual licences through open, non-discriminatory and transparent procedures and, to this end, shall subject all applicants to the same procedures, unless there is an objective reason for differentiation” (Article 9, section 2).

In article 10, section 3, the directive emphasises competition and benefit to the consumers, regarding how the selection criteria for the licences should be organized.

“Member States shall grant such individual licences on the basis of selection criteria which must be objective, non-discriminatory, detailed, transparent and proportionate. Any such selection must give due weight to the need to facilitate the development of competition and to maximize benefits for users.”

In the decision of the European parliament and the Council 14 December 1998 (nr 128/1999/EG) it is clear that the purpose is to facilitate a fast and coordinated construction of compatible UMTS-nets and services, within the community. In 1998 the European Commission stipulated that Member States reserve at least one 3G license. It was left to the member states to decide on the licensing terms. In practice two main licensing formats were used: the auction and the 'beauty contest'. In the auction system the licenses were given to the highest bidders (which sometimes turned out to be the minimum price as not always more parties participated than there were licenses). In the 'beauty contest' the contestants could be assigned a license based on qualitative criteria. Finland, Ireland, and Portugal did also choose the so called beauty contest as means to allocate the 3G licences. France, Spain and Norway had a form of beauty contest that has been described as a sale with a set price. Seven countries chose to allocate the licences through auctions (Hultkrantz & Nilsson 2001, p 52).

2.2 3G in Sweden

The infrastructure roll out formally started in December 2000 in Sweden, with the PTA decision on which applicants had received licences. The goal of the Swedish government at the time for the decision on the licence terms for the development of the 3G infrastructure was to maintain Sweden's position as one of the leading nations in IT and telecommunications (SOU 1999:85, p 29 ff.). After the initial allocation of spectrum by proposed criteria in a selection process, the so called beauty contest, four operators were given licenses to build the infrastructure for 3G. Within three years the four operators were to build competing systems to cover 8 860 000 persons, by this time meaning about 99,98 % of the population (PTA decision of 16 Dec 2000), giving the administrative system an extreme challenge.

The licence conditions stated that each operator had to have 30 % of own infrastructure and up to a maximum of 70 % shared of the coverage (PTA decision of 22 Mar 2001, p 3.1). An estimation conducted for the PTA, stated that a reasonable area coverage would be around 170 000 km², about 41 % of the total Swedish surface area (Björkdahl & Bohlin, 2003). Parts of the licence conditions, such as the maximum of 70 % shared infrastructure, are following from set values that were decided before the so called beauty contest, and some conditions emanate from the contest itself, such as the degree of coverage and the roll-out speed.

2.2.1 Legal changes before the infrastructure roll out

Before the licences were distributed three main changes were made in the Telecommunications Act (SFS 1993:597) (replaced by the Electronic communications Act on 25 July 2003).

The first change, taken by Parliament on 8 December 1999, meant that mobile operators with own infrastructure were obligated to offer net capacity to companies without an infrastructure of their own. The purpose was to make possible for operators to offer mobile services to the consumers via the networks of others. Good accessibility and regional balance were stressed, as part of the political telecom goals (prop. 1999/2000:1, utg. omr. 22 p 92).

The second change, decided 14 April 2000, regarded the operators' obligations to let other service providers to use the infrastructure. The competitive aspects were stressed. See the governmental bill 'Enhanced competition in the mobile telecom market' stating the importance of letting the conditions of the market rule (prop 1999/2000:57 p 15 ff). A minor change was also made at the same time to make it possible to have a so called beauty contest as a method for net capacity allocation.

The third change of the Telecommunications Act was decided by Parliament 14 June 2000, and regarded that the operators with a network of their own with mobile services were obliged to supply national roaming for other operators with own network. National roaming can be of good assistance with coverage for an operator that is to establish oneself at a later stage than the already existing operators. So, once again, competition aspects were stressed (prop 1999/2000:100 p 129). See 3.4 and 3.6 for further development and summary of legal changes during the 3G roll out. The changes were in force 1 July 2000.

2.3 The 3G technology

The chapter presents basic technical information regarding the 3G technology. Some facts are necessary for the understanding of planning relevant problems in the thesis, such as the fact that the frequency affects the necessary distance between base stations, and to shed some light on the electromagnetic radiation issue.

A phone call to a mobile phone is transferred through cables or radio link and switchboard in the same way as other phone calls to the so called base station. From the base station to the mobile phone the information is transmitted through radio signals. In the base station there are one or more transmitters and receivers that are connected to one or more antennas. These antennas can be mounted on a mast or for instance on a roof or a façade of a building.

Radio waves that are received and sent by an antenna can be modulated so that they can transmit information useful for communication. The longer bearing wave you want to send, the higher antenna you need. And the lower frequency the waves have, the longer the reach is. This means that the higher frequency a radio based network uses the shorter the distances between the base stations have to be, resulting in that more antennas need to be constructed, as in the case of 3G compared to GSM.

There are several electronic communication networks for radio communication, with the common denominator that the communication is carried through radio waves. The different networks use different parts of the frequency spectrum – from long wave to micro wave. This means that the frequency and the wave length differ between the different networks, which in return mean different conditions for the communication.

In Sweden there are right now three systems for public networks for mobile communication:

- *Digital NMT* is a 3G technology (CDMA450) in Sweden using the 450 MHz frequency band, replacing the analogue system *NMT 450* (Nordic Mobile Telephone, the “1st generation”) shut down 31 Dec 2007. Digital NMT covers about 80 % of the land surface of each County of Sweden, making it the mobile system with the best area coverage in the sparsely populated parts in Sweden.¹²
- *GSM* (Global System for Mobile Communication) is a digital system also called the second generation for mobile telecommunication, 2G.
- *UMTS* (Universal Mobile Telecommunications system) is the standard of 3G chosen in Europe.

The world's first 3G commercial system was launched by SK Telecom in South Korea in October 2000 (using CDMA2000 1X standard).¹³ In 1998 the European Telecommunications Standards Institute, ETSI, adopted the UMTS standard for 3G.¹⁴ The substantial difference between 3G and GSM is the capacity for information transmission to and from mobile telephones and other mobile terminals, where 3G is faster than GSM, using a different technique for the communication (packet switched instead of circuit switched). The system can be used for ordinary voice calls, to send and receive graphics, still pictures and moving images and more advanced information services, such as, for example, positioning-based services. This is the reason that 3G has been called a mobile broadband. In the case of GSM, there is an evolution path from 2G, called GPRS, also known as 2.5G. GPRS supports a better data rate, and is packet switched rather than connection oriented (circuit switched). It is deployed in many places where GSM is used. E-GPRS, or EDGE, is a further evolution of GPRS and is based on more modern coding schemes.¹⁵

2.3.1 The base station, antenna, mast and tower

The base station is the radio equipment located at the centre of each cell in a cellular telephone network. The base station communicates with all the active mobile telephones in the cell and provides them with a connection to the switched telephone network.

The antenna can be attached to a tower or a mast. If the antenna is mounted on a house or façade it does not necessarily need a mast or tower. The tower construction does not require

¹² <http://www.pts.se/Nyheter/nyhet.asp?Itemid=7120>

¹³ <http://www.cdg.org/technology/3g.asp>

¹⁴ ETSI is an independent, non-profit, standardization organization of the telecommunications industry (equipment makers and network operators) in Europe, with worldwide projection. ETSI was created in 1988 and is officially recognized by the European Commission and the EFTA secretariat. ETSI is officially responsible for standardization of Information and Communication Technologies (ICT) within Europe.
<http://en.wikipedia.org/wiki/ETSI>

¹⁵ http://en.wikipedia.org/wiki/Universal_Mobile_Telecommunications_System

supporting wires, of the type that the mast construction does. The mast and the tower is however comparable and are therefore hereafter named “masts”. From a permit applications perspective there is no difference between the mast and the tower.



Pictures: To the left, a 3G tower in Gammalstorp, Blekinge.
 In the middle, a telecom mast on water tower in Bräkne-Hoby, Blekinge.
 To the right, a mast with tech shed in Äryd, Blekinge.

2.3.2 The cell, the net and the frequency

The cell is the basic geographic unit of a cellular communications system. According to estimates a site in an urban area covers approximately 3.5 km² and a site in a rural area covers approximately 29 km² (Björkdahl & Bohlin 2003, p 7). The net consists of *cells*. Service coverage of a given area is based on a network of cells, each with a radio base station (transmitters/receivers) at its centre. The size of each cell is determined by the terrain, the antenna height and power. The third generation of mobile systems, UMTS, uses radio frequencies around 2000 MHz. The frequency used has implications on how far the information can travel and how much information the signal can contain. The UMTS uses a higher frequency than the GSM system, and can therefore contain larger amounts of information, but will on the other hand require more base stations since the signals travel a shorter distance.¹⁶ The higher the frequency, the shorter the distance of the signal, and ability to penetrate material. This, naturally, requires more base stations for the same coverage, giving more 3G masts per area than GSM masts, for the same coverage.

NMT – around 450 MHz
 GSM – between 900 and 1800 MHz
 3G – around 2,1 GHz

2.3.3 Electromagnetic radiation

The electromagnetic radiation has been a debated issue in the 3G infrastructure development, and been the subject for many legal processes, especially regarding mast building permits. The questions have concerned whether or not the radiation is hazardous for humans living nearby, and in line with this the matter of if this worry or fear of the radiation is something that can be acknowledged legally and for instance be a reason for a denied building permit. The object of this study is however not to classify the physical effects of the radiation, which is the natural scientific prospect, but to study how the radiation issue is handled, which is a social scientific task. The legal decisions refer to the responsible governmental authority, the

¹⁶ http://www.ssi.se/ickejoniserande_stralning/Mobiltele/Mobiltele.html?Menu2=Mobiltelefon

Radiation Protection Authority. The following is how the radiation is presented in relation to mobile telephony by this governmental agency.

The antennas of the base stations generally are aimed, which means that the strength of the electromagnetic radiation is not the same in all directions. The most energy is concentrated to the antennas main radiation direction and a smaller part radiates in other directions. The intensity diminishes rapidly with increasing distance from the antenna. At a distance more than five metres from the antenna the radiation strength decreases with the square on the distance from the antenna, which means that if the distance is increased with three times the strength is decreased by nine times. Base stations and other radio and television transmitters do not send out the ionizing radiation that one associate with x-rays or radioactivity. The radiation is in this case *non-ionizing*. The threshold values for radio- and microwaves in mobile telephony are based on scientific research often connected to the level of thermal effect of the radiation. Concerns have been raised since the 1990s, especially since the wireless mobile telephony increased, and has been a constant public concern regarding the 3G. Mobile phones adjust the effect for the reception conditions at the time, which means how good the connection to the closest base station is. Good connection means that the effect from the phone can be lower than is the case with a weak connection.¹⁷ In June 2002 the Radiation Protection Authority appointed an international expert group (Independent Expert Group on Electromagnetic Fields) to follow the ongoing scientific research on electromagnetic fields and its effect on human health. On 18 September 2003 the group presented its first report.¹⁸ In short, the experts stated that no thorough results of the last years gives any reasons to change the estimates of risk regarding electromagnetic radiation.

2.4 The beauty contest

The 12 May 2000, the Swedish Post and Telecommunications Agency, the PTA, invited operators to apply for a licence. The number of licenses was decided in April 2000 by the board of the PTA after Parliament had decided upon the framework of the license process (PTSFS 2000:5). While various other countries had an auction concerning the licenses the Swedish licenses were offered in a “beauty contest” to those who promised the highest coverage reached within the shortest time-span. The PTA regulations stated that “at the most four licences for a national coverage according to the UMTS/IMT-2000-standard will be available” (PTSFS 2000:5, §6). The intention seemed to be to reach the highest number of licensees, with regards to the services of the 3G that then could be offered from a consumer perspective, and not the least with references to achieving competition between the operators. Both reasons emphasized by the General Director of PTA at the time, Nils Gunnar Billinger, in a press release in 14 April 2000.

“Four UMTS licences mean that the four operators with licence can dispose over such a large frequency spectrum that they can offer complete broad band services in the air.

¹⁷ *Strålning från mobiltelesystem. En informationsbroschyr från sex myndigheter*, (December 2002) Post och Telestyrelsen, Statens Strålskyddsinstitut, Socialstyrelsen, Arbetsmiljöverket, Elsäkerhetsverket och Boverket.

¹⁸ Resent research on mobile telephony and cancer and other selected biological effects: First annual report from SSI's independent expert group on electromagnetic fields, Dec 2003. www.ssi.se/english/EMF_exp_Eng_2003.pdf

At the same time the competition in the mobile sector will build up, because there are more operators that will have to compete for customers” (PTA press release 14 April 2000, author’s translation).

“The beauty contest” as a method for selecting 3G licence holders in Sweden has been analyzed from several aspects, such as a spatial planning and environmental administrative perspective (Emmelin & Söderblom, 2002) and in an economic context (for instance Andersson, Hultén & Valiente, 2005). The “beauty contest” consisted of allocation of spectrum by governmental agencies that proposed criteria to be followed in the selection process. The lack of transparency of this way of allocating licences has been criticized (Andersson, Hulthén & Valiente, 2005, p 579). On 12 May 2000, the PTA invited all parties wanting to provide network capacity for the third generation of mobile telecommunications system in Sweden to apply for a licence. Four licences were to be issued, valid until 31 December 2015. The selection was divided into two steps where the contestants were reviewed using certain criteria.

Further, “the beauty contest” has been questioned for having many elements resembling an auction, due to the extremely high coverage conditions that the operators receiving licences promised to fulfil (Hultkrantz & Nilsson, 2001, Ds 2001:40, p 67f). In the first stage of “the beauty contest” an evaluation of the contestants was made to review if the operators had fulfilled the preconditions for the establishment of a UMTS network. This included financial capacity, technical as well as commercial feasibility, and appropriate expertise and experience (Andersson, Hulthén & Valiente 2005, p 583). Five of the ten contestants failed to prove this. In the second stage of the evaluation the operators made promises regarding coverage in relation to surface area and population, and the roll-out speed for the networks (PTA 12 May 2000, p 9 and Andersson, Hulthén & Valiente 2005, p 583). The four promising the most, received a licence.

The applicants were to submit their application at the latest on the 1 September 2000. By that date the fee for application, 100 000 SEK, was to be paid. The initial evaluation of the contestants was made to review if they had fulfilled the preconditions for the establishment of a UMTS network. This included financial capacity, technical as well as commercial feasibility, and appropriate expertise and experience (PTA 12 May 2000, p 8-9 and Andersson, Hulthén & Valiente 2005, p 583). If a contestant passed this initial consideration the second stage of the evaluation regarded coverage in relation to surface area and population, and the roll-out speed for the networks (PTA 12 May 2000, p 9 and Andersson, Hulthén & Valiente 2005, p 583).

“10 § An in-depth consideration will be founded on the applicants

1. assurance of geographical coverage with access net according to UMTS/IMT-2000 standard. The consideration shall take into account the extent of the coverage in relation to the area of the country and population and the spread throughout the country.

2. assurance of the expansion pace for net according to point 1, and from what moment UMTS/IMT-2000 services and GSM services, will be provided within a publicly available telecommunications net.” (PTSFS 2000:5, the author’s translation)

At the second stage of the beauty contest the operators were awarded points according to the extent and speed at which they offered coverage by the end of 2003, 2006 and 2009. Coverage was defined on the basis of three factors: proportion of population, territorial coverage and distribution throughout Sweden. The population that was the reference data for

the PTA was the statistical data from SCB by 31 Dec 1999 (PTA 12 May 2000, p 10). As we will see below, this is not without relevance in relation the delayed roll out, and hence the ratio changed as the population grew, making it slightly easier to reach the coverage demands.

The importance of a good access throughout the country was stated early regarding broadband and UMTS (PTA report 27 June 2001, p 9). At the same time the PTA did not want to put in a clause of too high coverage in the licences, fearing it would discourage operators to take part in the development of the 3G system, which was the case in the earlier application process regarding the GSM licences in the 1800 MHz spectrum (PTA report 27 June 2001, p 9). This is the reason for the application criteria where the applicant has to promise the coverage, and the promise of higher coverage beats the promise of lower.

The results of the so called beauty contest have been a roll out that both regarding speed and coverage Sweden differs from the rest of Europe. This is particularly interesting regarding the uncertainties of the practical use of the system, the handsets and the applications, at the time for the decision (Emmelin & Söderblom, 2002, p 47-48). The process attracted a large number of applicants, and a large number of new entrants – comparable only with the UK. Six contestants were not awarded licences.

2.5 The decision

Ten applicants competed in the beauty contest. Three of the competitors were the leading mobile telephone operators in the Swedish market: Europolitan, Tele2, and Telia. The remaining seven were consortia formed for the 3G beauty contest (Andersson, Hulthén & Valiente, 2005, p 584).¹⁹

Applicants/first stage		Second stage		Licence holders
Broadwave Communications AB				
Europolitan AB	→	Europolitan AB	→	Europolitan AB
HI3G Access AB	→	HI3G Access AB	→	HI3G Access AB
Mobility4Sweden AB				
Orange Sweden AB	→	Orange Sweden AB	→	Orange Sweden AB
Reach Out Mobile AB				
Tele2 AB	→	Tele2 AB	→	Tele2 AB
Telenordia Mobil AB	→	Telenordia Mobil AB		
Telia AB				
Tenora Networks AB				

PTA decided that Europolitan (later Vodafone, now Telenor), HI3G (3), Orange and Tele2 should each get a licence. All four undertook to cover at least 8 860 000 people by the end of

¹⁹Telia Sonera was founded 1 January 2003 when Swedish Telia and Finnish Sonera joined. The thesis mostly uses Telia, and sometimes TeliaSonera.

2003. These licences apply up to and including 31 December 2015, and the licence conditions to 31 of March 2006 (PTA decision of 22 March 2001, p 8).

Telia, Telenordia and Reach Out Mobile, which did not get a 3G licence, appealed the PTA decision to the County Administrative Court (Case nr 499-01). The County Administrative Court confirmed the PTA decision on 27 June 2001, without further appeal. The fact that Telia did not get a licence surprised many. Telia became a part of the infrastructure development via collaboration with Tele2 that did get a licence. The three operators Hi3G, Telenor (Europolitan at the time) and Orange signed a deal regarding collaboration on the coverage requirements of the licence conditions.

2.6 The licence conditions

Applications were assessed by an initial consideration in which financial capacity, technical and commercial feasibility and access to appropriate expertise and experience were investigated. At the second stage of the review, the operators were awarded points according to the extent and speed at which they offered coverage by the end of 2003, 2006 and 2009. Coverage was defined on the basis of three factors: proportion of population, territorial coverage and distribution throughout Sweden. The applicant had to promise to cover 30 % of the populated areas of Sweden with own coverage, and up to 70 % collaboratively. This licence condition was set up in the guidance for the applicants:

“The PTA, in the conditions of licensing, shall impose a requirement that the licence holders are to ensure at every phase that at least 30% of the promised population coverage takes place through establishment of their own radio infrastructure. For other parts of the population, the licence holders have the possibility of satisfying the coverage requirements by national roaming...A licence holder that cannot satisfy the licence conditions by national roaming is thus obliged to establish its own access network to satisfy its obligations.” (PTA 2000 12 May 2000, p 12, 5.1.1, author’s translation)

The 30 % own coverage condition was a requisite set up by the PTA to ensure competition amongst the operators (PTA 22 Mar 2001, section 3.1).

The licence conditions in themselves do not contain any sanctions for the operators if they would not fulfil the requirements. Instead, the sanctions have a more general description in the legal provision controlling the Post and Telecommunications Agency. According to chapter 7 section 5 of the Electronic Communications Act (2003:390) there is a possibility for the PTA to issue “such orders and prohibitions as are necessary for a rectification to take place” when it comes to operators not fulfilling the conditions bound to the 3G licence. This is of importance especially since the operators did not complete the coverage within the time limits of the licence conditions, and that one of the operators, Orange, later withdrew its participation in the construction. This is developed further below.

The most important licence condition regards that the licence holders at the latest by 1 March 2004 should verify that 8.860.000 persons in Sweden are covered by 31 December 2003 (PTA 22 Mar 2001, section 1.1.2 and 1.3.1). Regarding the starting point of a functional network

the licence holders were to make net capacity available by 1 January 2002 (PTA 22 Mar 2001, section 2). Another important aspect is that the licence conditions are in force until 31 Mar 2006. After this date they can be reviewed, which also was the case.

2.7 The operators

When the announcement of the four winners was made, the fact that Telia did not receive a licence surprised many. The reason Telia did not receive a licence is that the PTA did not find the Telia application to fulfil the demands on technical feasibility that was stated in 9 § of the PTA statutes regarding the licence distribution (PTA decision 16 Dec 2000, p 88). Structural changes and consolidations were expected. Europolitan (later Vodafone, now Telenor) signed preliminary agreements with Ericsson and Nokia, two major system suppliers, in order to guarantee a fast roll out. In January 2001 Telia announced it was closing a deal with Tele2, to form a new joint company, later called Svenska UMTS AB. The ownership of the joint company was divided 50/50. In late January 2001 Europolitan and HI3G announced that they were going to collaborate in the infrastructure development (Andersson, Hulthén & Valiente, 2005, p 587-588).

In May 2001 Europolitan announced that they formed a collaborative UMTS-company with the HI3G – the 3G Infrastructure Service, 3GIS. Orange became part of this collaboration by an agreement of intention (Emmelin & Söderblom 2002, p 16). The result of these collaborations is two main joint ventures regarding the infrastructure development:

Svenska UMTS-nät = Telia and Tele2

Telia and Tele2, through the joint venture Svenska UMTS-nät, were to roll out a common 3G network.

3GIS = Europolitan and Hi3G (and Orange)

To meet the licence conditions, Vodafone and Hi3G were to build individual networks, which had to cover 30 % of the population, and most likely located in Stockholm, Gothenburg, Malmö and Karlskrona. The shared network of the joint venture of Vodafone and Hi3G, 3G Infrastructure Services, 3GIS, was estimated to cover approximately 70 % of the population (Björkdahl & Bohlin 2003, p 3).

Although the licence conditions clearly allowed sharing up to 70 % of the infrastructure, the fact of the joint ventures were criticized as a result of the original rhetoric of four different infrastructures that would be decreased to only two. As put by Andersson, Hulthén & Valiente (2005):

“The original plans to invest 100 billion SEK in four totally separate 3G networks were rapidly being reformulated. In May 2001, it was even asserted that the ‘four companies will construct not more than two 3G networks’ (in Dagens Nyheter 12 May 2001) (Andersson, Hulthén & Valiente 2005 p 589, author’s translation).

2.8 Investment costs

The presentation of investment costs is here done mainly out of two reasons. Firstly, the presentation shows the magnitude of the 3G project in itself for a country of the size of Sweden. Secondly, a reason to show the rather high cost of investment is that it contributes to the understanding of a driving force by the operators. The operator strategies are quite naturally affected by the fact that lowering the number of sites required is a way to cut significant costs.

The Björkdahl & Bohlin estimate shows a total of 24,4 billion SEK in infrastructure investment costs. Other estimates have been made as well, still there is no doubt that the project is a large scale infrastructure construction for a country of Sweden's size. As a comparison can the Öresund Fixed Link be mentioned, a construction estimated to have cost all from 20 billion to 37 billion SEK.

In the report of February 2003, conducted by IMIT and Chalmers on the account of PTA, an estimated cost per site (base station) would be SEK 1 250 000. By re-using an existing 2G site, approximate SEK 500 000 could be saved per site (Björkdahl & Bohlin 2003, p 11).

The Björkdahl & Bohlin report estimated that 3GIS (Hi3G and Vodafone – today Telenor, Orange had in practice withdrawn their participation by the time for the estimate) would use 7 740 sites, 2 280 in urban areas and 5 460 in rural areas. 3GIS would re-use 1 000 existing 2G sites, from Vodafone, which render a total investment estimate for 3GIS on SEK 11.0 billion (Björkdahl & Bohlin 2003, p 13).

The report estimated that Vodafone (Telenor) would use 860 sites in its individual network, and 350 of these sites would be re-used from its existing GSM network. Vodafone would share 200 sites with other operators in its individual network, and the total investment for the individual network was estimated to SEK 870 million. The total investment of the whole network includes the collaborative network within 3GIS, which makes the total estimated investment to be SEK 6, 4 billion.

The report estimated that Hi3G would use 860 sites for its individual network, and share 200 sites of this, which collects to a sum of SEK 1.0 billion for the individual network. Together with the part in 3GIS the estimated sum for infrastructure investments was in the report SEK 6, 6 billion.

The report estimated that Svenska UMTS-nät (Tele2/TeliaSonera) would use 8 600 sites in its network, of which 5 460 sites would be placed in rural areas and 3 140 in urban/suburban areas. Svenska UMTS-nät would re-use 3 100 2G sites, which renders a total estimated investment to be SEK 11.4 billion, equally divided on Telia and Tele2.

Summary – estimated network investments (Björkdahl & Bohlin 2003, p 18)					
	3GIS	Europolitan/ Vodafone, individual network	Hi3G, individual network	Svenska UMTS-nät	Total
Number of sites	7740	860	860	8600	18060
Number of sites in urban/suburban areas	2280	860	860	3140	7140
Number of sites in rural areas	5460	0	0	5460	10 920
Re-use of 2G sites	1000	350	0	3100	4550
Total investment (SEK billion)	11,0	0,9	1,1	11,4	24,4
Surface coverage (km²)	167 000	3000	3000	170 000	-

Table: Estimated total investment.

	Telia	Tele2	Vodafone	Hi3G	Total investment
3G network investment (SEK billion)	5,7	5,7	6,4	6,6	24,4

Note that the number of sites does not equal the number of masts, since all sites do not require a mast.

2.9 Indicators of the handling of sustainability in the design of the 3G infrastructure development

In accordance with the first objective of the thesis, the display above of the design of the 3G infrastructure development here is followed by a brief analysis from a sustainable development perspective. The indicators presented here are indicators found in the research process, as part of this study, and do not necessarily represent how the development is presented in the media, by the operators, nor the political view, although the difference is more striking in the implementation part. Each indicator is explained, and further analyzed in chapter 8 of the thesis. The indicators show how sustainability was handled, or not handled, in the design of the 3G development in Sweden and below, the implementation.

The case of the 3G infrastructure illustrates how sustainability issues are handled in planning and environmental management, partly with conflicting goals between institutional levels concerned with the construction in various ways. Before the focus is turned towards the

practical outcome of the 3G development, and hence issues tied to institutional levels connected to the implementation, the thesis looks at the setting, the design as such, before the first 3G mast building permit was ever applied for.

2.9.1 Technology optimism and “leading IT nation”

The information sent to the municipalities from the Post and Telecommunications Agency, the PTA, shortly after the licences had been allocated stated that “there is within Parliament and the Government a strong goal orientation toward keeping Sweden’s competitiveness within the IT sector, and to secure the position as a significant IT nation” (PTA 2001 p 2, author’s translation). The information sent out refers to the new millennial governmental bill named “An information society for everyone” (prop 1999/2000:86) stating:²⁰

“Given that Sweden already is a leading IT nation the ambition should be that Sweden as first country becomes an information society for everyone” (Prop. 1999/2000:86, p 1, author’s translation)

This vision has definitely affected the 3G development design of Sweden, both in terms of a willingness of having extremely high coverage requirements, and a willingness to reach this coverage fast, affecting the design of the so called beauty contest.

The Government and the PTA was under pressure from the EU directive from 14 December 1998 giving the member states until 1 January 2000 to decide on what method to use for the licence allocation, and to have a collective UMTS development no later than by 1 January 2002 (128/1999/EG). This directive alone can not explain the Swedish urgency to get started fast, and certainly not explain the extreme coverage.

During the autumn of 1999 critical voices were heard regarding that the infrastructure development ran a risk of being delayed in Sweden, and was an expression of a fear of that Sweden would lose its world leading position in telecom (PTA report June 2001, p 5). Behind the critique were Swedish telecom operators and producers of telecom equipment. Mona Sahlin called for the PTA to speed up the licence allocation process.²¹ Finland had already allocated the licences, a fact that most likely stressed the Swedish critics, especially Ericsson (PTA report June 2001, p 5). It was the necessary changes of the Telecommunications Act that partly delayed the Swedish allocation, which were made in order to secure competition in the telecom market, see also 2.9.3.

One must remember that at this stage there are no handsets for 3G, and the service provided by the UMTS technology that would make GSM obsolete was described as “wireless Internet” and the main function referred to be video conversations (Emmelin & Söderblom 2002, p 7, 19-20).

²⁰ Swe. *Ett informationssamhälle för alla* (Prop 1999/2000:86).

²¹ ”Mångfald, valfrihet och lägre priser på mobiltelefonmarknaden”, Press release from the Ministry of Enterprise, Energy and Communications (Näringsdepartementet) 15 Dec 1999.

2.9.2 Economic growth

Growth is an obvious element in the design of the 3G development, that is the prediction of growth, regional, national as well as for operators. Several telecom operators and producers of telecom equipment criticized the process for being too slow in Sweden. In fact, one of the reasons the roll out conditions were set to stimulate a fast roll out originated in a concern for that Sweden would lose its “world leading position in telecom” (PTA 27 Jun 2001). Behind this one can picture the mobile industry, fronted by Ericsson, and the well known importance to the national economy, and the initial pressure on the PTA to hurry up the licence allocation process, referred to the fact that Finland, already had allocated the licences. Behind this lures the Ericsson and Nokia competition.²² Part of the economic growth aspects comes from the vision of Sweden as a “leading IT nation”, and it is important to remember that economic growth not necessarily can be viewed as economic sustainability. Growth is however a fundamental driving-force behind the Swedish 3G development, both as part in the regional development, and the operator profit, making it an indicator of interest in the analysis. Incidentally the indicator of coverage used illustrates the problem of simplistic development indicators. Covering the approximately 40 % of the area of Sweden where 99 % of the population lives may have little relevance to future applications of 3G such as in tourism, sailing, the logging industry etc. The indicator used may not be a stimulus to development of services relevant even to the goal of social cohesion. In view of the simultaneous forced expansion of the Swedish broad band system at which serves the stationary the lack of wider systems thinking is an interesting example of the real difficulties in predicting and steering with planned development and development indicators.

2.9.3 Extreme coverage, beyond commercial reason

The social side of sustainability is in the 3G decision sense two-sided. On one side accessibility can be discussed, from a social cohesion and regional development point of view. On the other side, the participative aspects, or rather the lack of them, in the 3G case can be discussed. Accessibility to a technology can be discussed in terms of social cohesion, and hence tied to the social pillar of sustainability. The sustainability indicator here is the deliberate design of the licence allocation to secure that the infrastructure would be rolled out also in the sparsely populated areas, a roll out that can not be motivated by commercial reasons but out of regional political ones. To motivate a change in the Telecommunications Act in 1999 good accessibility and regional balance was stressed, as a part of the political telecom goals (prop. 1999/2000:1, utg. omr. 22 p 92). This was part of the preparation for the Swedish 3G development.

The so called Traffic committee of Parliament (Trafikutskottet), that prepares matters of electronic communications and IT politics, stated in late 2000 the importance of a fast roll out that benefits households and companies throughout all of Sweden. Speed of roll out and coverage was stressed (Bet. 2000/01:TU1). This was also early emphasized by the PTA.²³ This is tied to the vision of a “leading IT nation”, especially in the mentioned vision of an “information society for everyone” (prop 1999/2000:86, p 1). This is significant for Swedish IT politics in general (Sundqvist 2001, prop 1999/2000:86 p 130, Larsson 2005a p 39). This can be expressed in terms of social cohesion, as a part of social sustainability, not uncommon

²² Dagens Industri (24 Nov 1999) *Trögt med licenser för nya mobilnät*. Statement from CEO Kurt Hellström, Ericsson.

²³ See Computer Sweden (6 Dec 1999) *Mobilnätet skall täcka Sverige*.

in Swedish politics. The emphasis on a wide coverage was made early, and formed an important element of the 3G politics prior to the licence allocation. To make an advanced technology available to essentially the entire population and to stimulate regional development by equitable distribution of advanced technology rather than according to market logic of development, can be seen as both a growth policy and as an instrument of social cohesion, which is why the indicator can be discussed in terms of both handling the social and the economic sustainability. This indicator we will see is especially interesting in relation to how the roll out later was performed.

2.9.4 Participation

The participative side, which can be direct or through legitimate representation, on the national level of the 3G case is an important indicator for the social side of sustainability. It shows the governance of the 3G decision and hence the non-handling of participation in the design of the 3G development. Mentioned above is also the transparency of decisions taken, and that their enforcement is done under support of legal provisions (See Graham et al. 2003). Firstly, the public participation in how to arrange the licence allocation was low, the Parliament did not take the decision as such, although it has contributed to make legal changes in order to secure competition in the telecom sector as a preparation for the 3G to come (see decision taken on 8 Dec 1999 in order to be able to make coverage demands in licence allocations according to the Telecommunications Act).²⁴ Further the selection of stakeholders that had the chance to affect the design of the so called beauty contest was unbalanced with a predominant representation in the IT sector, although the impact of the coming infrastructure would have important environmental impact as well (see list in appendix).

The decision to develop 3G was taken on EU level, and how to develop 3G is mainly affected by the PTA approach of a wide geographical coverage as very important, as well of the reach of it, emerging from political processes mentioned above. Stakeholders in the 3G infrastructure development was consulted regarding the PTA regulation on the so called beauty contest (see appendix). These 56 parties, to be exact, of which many telecom companies and governmental agencies, could affect the so called beauty contest, but would not have been able to lower the PTA demands of designing the licence allocation in order to retrieve applicant promising a very high coverage, and a fast reach of it. In addition to the possibility for some parties to have an opinion on the draft, a hearing was organized 23 March 2000, with the intention that concerned parties could clarify their standpoints, and 43 companies were invited (PTA 2001 p 7).

The 3G development is a result from harmonization within the EU, and could hence not been avoided, but the process in Sweden has excluded the public from participating on the coverage and the roll out speed. Many of the involved stakeholders, including later licence winners, were included in the group that was referred to for consideration of the PTA licence allocation draft, but it seems unlikely that the premises that was set to secure a high coverage and fast roll out could have been changed by their protests. This political vision was too strong and secured in the PTA management.

²⁴ SFS 1999:1197, prop. 1999/2000:1, utg.omr. 22, bet. 1999/2000:TU1, rskr. 1999/2000:85.

2.9.5 Competition

The legal changes prior to the licence allocation were all stressing competitive aspects. The decisions were taken by Parliament late 1999 or first half of 2000, and the changes in the Telecommunications Act were in force by 1 July 2000.

The first change meant that mobile operators with own infrastructure were obligated to offer net capacity to companies without an infrastructure of their own. The purpose was to make possible for operators to offer mobile services to the consumers via the networks of others, and good accessibility and regional balance was stressed, as a part of the political telecom goals (prop. 1999/200:1, utg. omr. 22 p 92).

The second change regarded the operators' obligations to let other service providers use the infrastructure. The competitive aspects were stressed once again. See the governmental bill 'Enhanced competition in the mobile telecom market' stating the importance of letting the conditions of the market rule (prop 1999/2000:57 p 15 ff).

The third change was that the operators with a network of their own with mobile services were obliged to supply national roaming for other operators with own network. National roaming can be of good assistance with coverage for an operator that is to establish oneself at a later stage than the already existing operators. So, once again, competition aspects were stressed (prop 1999/2000:100 p 129).

When setting up the conditions for the construction of four separate infrastructures for a telecommunications systems with a maximum of 70 % shared infrastructure, but most likely much less, the emphasis is on competitive aspects, in assumed favour to the consumer.

At the same time formally the market is set aside, by political values such as that everyone, no matter where in Sweden they live, should have access to the new network. This is a result of the second stage of the beauty contest regarding the necessary assurance of extremely high coverage in relation to surface area and population, and very fast roll-out speed.²⁵ The design of the 3G licence conditions bears plan economic resemblances in the coverage conditions being as high as 99,98 % of the population at the time, which is opposed to a market logic of constructing where it is most commercially viable to construct.

To build the system rapidly to enhance economic growth and national technological competitiveness is in line with the Lisbon strategy. To make an advanced technology available to essentially the entire population and to stimulate regional development by equitable distribution of advanced technology rather than according to market logic of development can be seen as both a growth policy and as an instrument of social cohesion. The competition ideology inherent in the decision to have four competing systems with a low level of cooperation is an element of the growth policy but also of the social component: the notion that competition will stimulate development of applications

²⁵ See PTS (12 May 2000), p 9 and Andersson, Hulthén & Valiente (2005), p 583.

2.9.6 Environmental impact

The indicator shows the non-handling of the ecological pillar of sustainable development at this stage of the 3G case. No environmental authorities received the draft for rules of “the beauty contest” for consideration (Emmelin & Söderblom 2002, PTA 13 Mar 2000). This is remarkable in view of the stated policy of “environmental integration” and sector responsibility as a major component of Swedish environmental policy (Lundqvist 2004). The impact of four parallel infrastructures was not discussed from an environmental point of view, only in terms of competition and consumer benefit.

2.9.7 Sum – more daring than deliberating

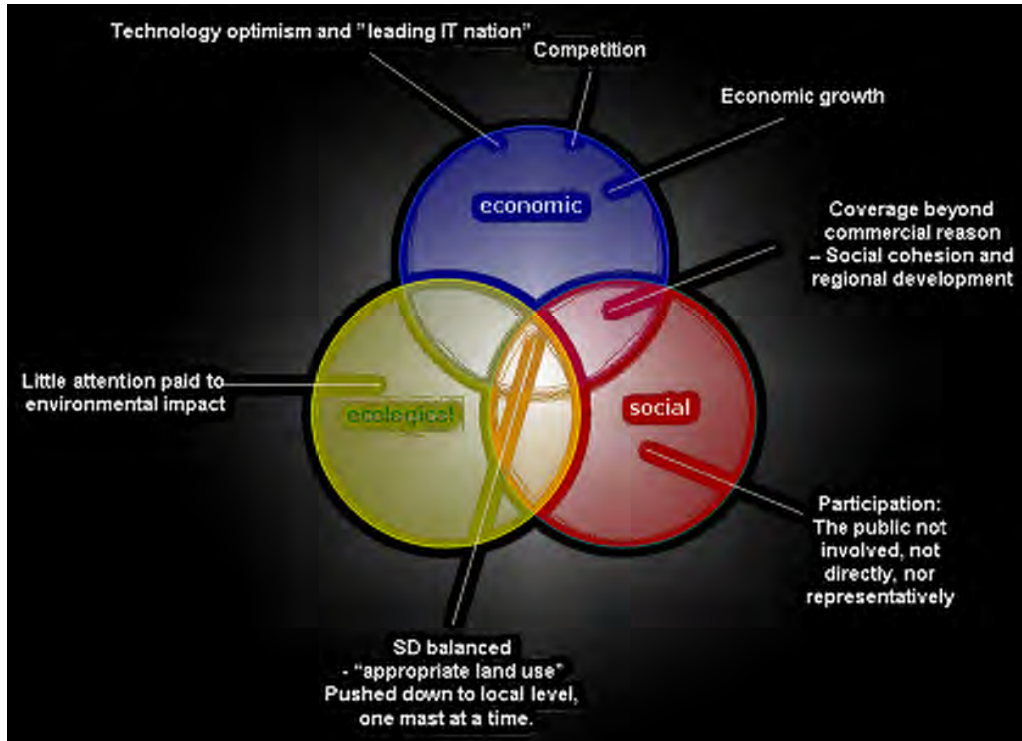
The main conflict in the design of the 3G infrastructure development in Sweden is to be found in the emphasis on growth and regional development based on a very optimistic attitude towards the technology versus the environmental and ecological components of sustainability that was lost to be handled. Borrowing the Clausewitz dichotomy of “daring versus deliberating” of decision making in a planning context, the decision was here more daring than deliberating. The extreme coverage and the fast intended reach resulting from the beauty contest related to that the handsets and “killer applications” were yet to come and therefore meant a leap out into the unknown. The design of the 3G development in Sweden was more based on optimistic visions of information technology based growth than specific knowledge regarding this particular technology’s conditions for growth and development. A more balanced assessment, including all pillars of sustainable development is pushed down in the administrative system to where the base stations are to be constructed, assessed one mast at a time.

The coverage conditions of the licences demanded coverage also in the sparsely populated areas, where the forces of the market based on profitability would not reach. In this sense, the setting of the 3G infrastructure construction looked much like a plan economic decision rhetorically defended with reasons such as that everyone shall have access, leading to “regional balance” (a roll out based on market logic would cover more densely populated areas, at least initially, and places like shopping malls and bigger roads) and that competition amongst several operators will benefit the consumers.

The beauty contest has been criticized for actually being an auction under false name, due to that the coverage and speed representing investment costs (Hultkrantz & Nilsson 2001 p 67 – 69), which also one of the applicants pointed out could be a problem already before the “beauty contest”, in the referral round. The so called beauty contest has further been criticized for having the elements of an auction but with two main downsides making it a failure, namely costly “overcoverage” and worsened circumstances for competition from the fact that the two companies with biggest shares of the 2G market (Telia/Tele2) forms an alliance forcing the remaining three 3G companies to team up (ibid p 70-73).

In the progression of the infrastructure roll out that followed on the licence allocation more indicators on how sustainable development has been handled are found. Before the thesis reaches the implementation and infrastructure roll out, the legal provisions of relevance are presented. The reason for this is to outline the framework for the 3G development, making an analysis of the legal application possible, for instance to reveal if the legal order holds any

inconsistencies, and to recapitulate the rules of the 3G game, so to speak. Rules that have been changed along the way.



3. Relevant legal framework

This chapter represents a selection of legal regulations and principles that are of importance for the 3G case. The relation between the PTA and the operators are mainly regulated by the Electronic Communications Act (2003:389) replacing the Telecommunications Act (1993:597) and the Radiocommunications Act (1993:599) in 2003. Two main legislative bodies of the planning of land and water use and environmental management are the Planning and Building Act (1987:10), the PBA, and the Environmental Code (1998:808). Relevant changes that were made during the infrastructure roll out, such as the one regarding utility easement, are described in the chapter. Relevant legislation is also referred to in the context it is relevant throughout the thesis.

3.1 Sustainable development in law

The notion of a sustainable development has in a post-Brundtland perspective come to be expressed in Swedish law, in the EU, as well as in international law, and it has affected the perspective on the environmental science (Ebbesson 2003, p 17-18). The term sustainable development and its legal meaning in Sweden have been discussed in the literature (Basse, ed., 1996 and Westerlund 1997). Sweden has four fundamental laws which together make up the Constitution. One of the four, The Instrument of Government (Regeringsformen, SFS1974:152) since the 1 January 2003 states in the first chapter, the *basic principles of the form of government*, §2, part 3:

“The public institutions shall promote sustainable development leading to a good environment for present and future generations”.

As outlined under chapter 1.5 sustainable development has been a Swedish policy from before both the decision to develop 3G and the changes in the Constitution. This ambition found in the Constitution can be found in a more specified version in the statement of the first chapter, first section of the Planning and Building Act:

“This Act contains provisions on the planning of land and water areas as well as building. The provisions aim, with due regard to the individual’s right to freedom, at promoting societal progress towards equal and good living conditions and a good and lasting sustainable environment for the benefit of the people of today’s society as well as of future generations.” (Law 1993:419, translation by the National Board of Housing, Building and Planning (Boverket), wording from 1 June 2004)

Through a legislative change in 1993 an addition to this section of the PBA was made, regarding the part that the law has a purpose to promote good and sustainable living conditions (Prop. 1992/93:180. 1992/93:JoU14). This echoes the statements of Our Common Future (WCED 1987). If we turn from the planning legislation to the initial statement of the Environmental Code we find that:

“The purpose of this Code is to promote sustainable development which will assure a healthy and sound environment for present and future generations. Such development will be based on recognition of the fact that nature is worthy of protection and that our right to modify and exploit nature carries with it a responsibility for wise management of natural resources.” (As translated and published by The Ministry of Environment, Ds 2000:61)

The wording of the constitution above is recognized. The Environmental Code was adopted in 1998 and entered into force 1 January 1999. The Code is a major piece of legislation; it contains 33 chapters comprising almost 500 sections. However, it is only the fundamental environmental rules that are included in the Environmental Code. More detailed provisions are laid down in ordinances made by the Government. The planners of the different levels, may it be municipal, regional, or national, have to handle these provisions in the everyday work of planning.

The cross generational responsibility is clearly stated in the initial sections of the most important legislative bodies of planning and environmental administration. Sweden's first national strategy for sustainable development was delivered to Parliament in 2002 (skr. 2001/02:172). The Swedish government has annually, since 1997, presented for the parliament how the work with reaching an “ecologically sustainable development” progresses (Skr. 2001/02:172, p 4).

Sweden has stated that sustainable development is a major policy goal. This shows the strong political intentions leading to sustainable development as a main goal for the politics of the Swedish government (Regeringens skrivelse 2005/06:126, p 1). This national strategy includes “all dimensions of sustainable development: the economic, the social and the environmental” (2005/06:126 p 1), and also four comprehensive challenges, all connectable to sustainable development. Worth to mention at this stage is that the issue of “social cohesion”, is “a fundamental part of sustainable development that is emphasized and accentuated in each of the strategic challenges” (p 19).²⁶

For the investigation of sustainability issues in the planning and environmental management a further presentation on what legal provisions that form this management is necessary.

3.2 The Planning and Building Act

The Planning and Building Act, the PBA, expresses the idea that land and water use should be planned by society. Already the second section of the first chapter states that it is a municipal concern to plan the use of land and water. The law opens with a section stating the fundamental values behind the legislation. The PBA addresses the part of the municipal

²⁶ Translated from: “Social sammanhållning är en ...grundläggande del av hållbar utveckling som belyses och betonas i var och en av de strategiska utmaningarna”, 2005/06:126 p 19.

planning that regards the use of land and water, the buildings, meaning the development of the building etc. through spatial planning, permit reviewing and supervision. The provisions are said to promote a societal development on equal and good social living conditions at both short and long range. Through a legislative change 1993 an addition was made that the law has a purpose to promote good and sustainable living conditions. The addition was made to emphasize the meaning of the environmental issues in the spatial planning (Prop. 1992/93:180. 1992/93:JoU14).

In 27 June 2002 the Government appointed the PBA committee, in order to revise the PBA. The final report of the committee (SOU 2005:77) suggested changes in the court hierarchy for permit appeal, leading to the governmental bill of 2006/07:98, which still is to be decided upon.

3.2.1 Municipal planning

For spatial planning and building control the municipality has at its disposal two types of instruments: *plans*, and *permits* for specific construction projects. The five types of plans that the PBA defines in chapter 1, s. 3 are (as translated by Boverket, the National Board of Housing, Building and Planning 2006).

- The comprehensive plan

It is demanded that a municipality has a comprehensive plan, which is important in the providing of information to other authorities and private interests regarding what claims are directed towards a specific area. The purpose of the comprehensive plan is to form a basis for location decisions and an instrument for controlling development and preservation. The comprehensive plan is not binding, but has to a great deal a guiding function for other legally binding decisions such as detailed development plans, area regulations and building permits (regulated in chapter 4 of the PBA).

- The regional plan

The regional plan is a voluntary platform for inter-municipal coordination (regulated in chapter 7 of the PBA).

- The detailed development plan

The detailed development plan is the form that is to be used if the municipality desires a complete legal regulation of land use and construction within a limited area of the municipality. The detailed development plan is binding for both authorities and individuals (regulated in chapter 5 of the PBA).

- The area regulations

Area regulation can be used to regulate characteristics of land use and the built environment outside the area for the detailed development plan, with the same legally binding results as with the detailed development plan but with some restrictions. Area regulations can be used to secure that the purpose with the comprehensive plan will be reached or to secure that national interest according to the Environmental Code will be satisfied (are more closely regulated in chapter 5, sections 16-17 and 33-36).

- The property regulation plan

Property regulation plans can be adopted to facilitate the implementation of detailed development plans (regulated in chapter 6 of the PBA).

Of these plans it is only the last three that have a direct legal impact, in the sense that they are binding and have a direct effect on the legal protection of environment and health. Comprehensive plans and regional plans are guidance for further planning, and for the permit process. Detailed development plans and area regulations are the plan decisions of the most legal relevance for the environment (Ebbesson 2003, p 111-112).

In addition to the plans, the municipalities can decide over permits for specific buildings and constructions, as provided by the PBA. These decisions can regard:

- building permits (for buildings and constructions, including most 3G masts)
- demolition permits
- site improvement permit

The PBA relevance for environmental protection is not only made clear from the specific references to the Environmental Code in the law, but also from the purpose of the PBA found in chapter 1, section 1, outlined above, as well as the regulations controlling the permit process, described below. The most important formalized instrument controlling the 3G infrastructure construction at the local level is the building permit. For an assessment of how sustainable development is handled in practice it is crucial to study the impact of this instrument in the spatial planning. Before turning to the empirical side of the 3G mast building permit, the process and the legal instrument needs to be demonstrated in more detail.

3.2.2 Building permits

In the process of planning and building 3G antennas the operators need to apply for a building permit from the municipal building committee according to chapter 1, section 4 of the Planning and Building Act. The law states that the conditions of chapter 3 and 4 of the Environmental Code should be applied, when it comes to building permits (chapter 2, section 1, part 2). Section 14 of chapter 3 states that constructions specified in chapter 8, section 2, including radio and telecommunications antennas or towers (point 5), the provisions for buildings of chapter 3 sections 1-3 and 10-13 apply. This includes “Buildings shall be placed and designed in a suitable manner with regard to the townscape or the landscape and the natural and cultural values at the site (section 1)”. This legal provision was revised in the preparatory work (prop 1997/98:117), which claimed that “It should be clearly stated by the legal regulations that aesthetic values shall be regarded and taken into account at the design of our built environment” (See chapter 6.1.). The preparatory work also concludes: “The meaning of the values of the every day landscape shall be brought forward and be given an increased emphasis which all in all leads to a reinforcement of the culture-historical and aesthetic values” (prop 1997/1998:117, chapter 5).

According to chapter 8, section 12, first part of the PBA shall permit applications for constructions outside detailed planned areas be approved if the activity fulfils the demands of chapter 2, not are subject for detail planning due to regulations in 5 chapter, 1 section, not conflicts the area regulations and fulfils the demands of chapter 3, section 1, 2 and 10-18.

This means, among other things, that the permit application has to fulfil the requirements of chapter 3, section 2 of the PBA:

“Buildings shall be placed and designed in a matter that neither the buildings themselves nor their intended use will pose any threat to the traffic safety, cause any other danger or significant impact to the surroundings.”²⁷

This is an assessment regarding the safety of the planned construction that the municipal building committee must do. These legal provisions are of interest in the 3G case because if the radiation issue would find its way into the permit process the wording of “any other danger or significant impact to the surroundings” would be one possible door that legal practice could open for its entrance. If the radiation would be considered dangerous in some sense, under some circumstances, this could be the reason to reject a 3G mast building permit under these circumstances. The preparatory work for the PBA discussed the use of the regulation in relation to the environmental legislation at the time, the Environmental Protection Act (1969:387), and stated:

“...the intention is of course not to introduce extra requirements than what follows from the Environmental Protection Act. The purpose with section 2 is to give the municipalities possibility to already at the building permit stage make such demands on the building that primarily can be justified by the proposed use (prop 1985/86:1 p 484, author’s translation).

And when it comes to what activities are to be included in the section, and therefore can be found to have such a “significant impact”, the preparatory work states:

“The inconveniences can be atmospheric pollution, noises, shakings, light or other similar disturbances that are not entirely temporary” (prop 1985/86:1 p 484, author’s translation).

The similarity to the section in the Environmental Code that states what activities are environmentally hazardous is discussed below, in chapter 9.1.

Within the detailed planned areas the conditions for a building permit is that the building do not conflict with the detailed development plan. Measures that are in a minor conflict with the detailed planned area may be admitted if the conflicting issues are compatible with the purpose of the plan (chapter 8, section 11 PBA). Before the permit is decided upon, known concerned parties are to by a written notification be given opportunity to express their opinion on a building permit (PBA chapter 8, section 22).

3.2.3 The building permit appeal

The right to appeal a decision taken by the municipal building committee aspires to fulfil reasonable demands for legal security in the administrative procedure and benefit legally

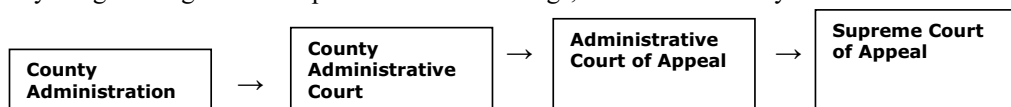
²⁷ Legislation translated and released by the National Board of Housing, Building and Planning 2006.

consistent decisions. It happens that decisions are incorrect, or at least can be reasonably questioned (Ragnemalm 2007, p 142 f.).

Most administrative processes are single party processes²⁸, where the single applicant stands alone before the deciding authorities, which's task is both to take care of the public interests as an opponent to the individual, and at the same time to objectively and impartially apply legal provisions. This double role is sometimes expressed as “both judge and prosecutor”. When a decision that is in favour for the applicant is appealed by a second party to an administrative court, the process changes to become a two party process²⁹ (Bohlin & Warnling-Nerep 2004, p 97 f.).

The administrative process for building permit appeal has changed a number of times since the PBA came into force in 1987. Of relevance for the 3G case are the changes that were made in 2003. Changes were made in the court hierarchy for building permit appeal, and the governmental appeal alternative was removed. The reasons were to lessen the governmental burden as well as to avoid the problems that came with the so called mixed cases, meaning cases that both regarded issues that should be tried by the government and had issues that should be tried by court. The changes came into force from 1 July 2003 (prop 2002/03:27).

Before 1 July 2003 appeal based only on chapter 3 of the PBA, regarding landscape and cultural environment and regulations stating that the buildings or the intended use shall cause any danger or significant impact to the surroundings, the court hierarchy was:



If the appeal included also chapter 2 of the PBA, regarding public interests, the court hierarchy was County Administration, straight to the Administrative Court of Appeal for trial according to chapter 3, and then the Government for trial according to chapter 2. There is reason to come back to this in relation to the Blekinge data below. As mentioned, after 1 July 2003 the version leading towards a Governmental trial was removed. The older regulations apply to appeal of decisions taken by the County Administration before 1 July 2003.

The right to *administrative appeal* is regulated in the Administrative Procedure Act (1986:223), APA, and (not to be mistaken with) the Administrative Court Procedure Act (1971:291), ACPA. The building permit is applied for by the operator at 1.) *the municipal building committee*. The building committee has to communicate that it has received a permit application to concerned parties, such as neighbours, (8:22 Planning and Building Act, and the ACPA, section 10-12) which can attach a statement of their opinion of the permit application. This material takes part in the decisive process of the committee. If someone, for instance a neighbour, wants to appeal an operators received permit decision, this is done at 2.) *the County Administration*³⁰, chapter 13, s. 2, PBA. A right to appeal has, according to general administrative principles (see section 22, APA) the one whom the decision concerns. This is a hard line to draw and the legislator has left it to court practice to define. This is relevant in the cases of appealed mast permits, where for instance in Blekinge a number of appeals has been denied on the basis of that the complainant is not (legally) concerned by the permit decision.

²⁸ “Enpartsförfarande”.

²⁹ “Tvåpartsförfarande”.

³⁰ “Länsstyrelse”.

A decision of the County Administration can be appealed to 3.) *the County Administrative Court*³¹, (chapter 13, section 4, PBA). The county administrative courts are general administrative courts and deal with cases, relating among other things to disputes between private persons and the authorities. There are 23 County Administrative Courts throughout Sweden.

In order for a building permit to be appealed in an Administrative Court³² a few conditions have to be fulfilled. It is required that

- the appeal is directed to the right authority
- the appeal document arrive within set time limits
- the decision is possible to appeal
- the complainant has the right to appeal
- the appeal document is complete

If these conditions are fulfilled the appeal will be tried. It is the deciding authority's duty to tell if the appeal has been made within the time limits. If so, it hands over the case to the authority to which the decision is appealed. Whether or not the complainant has the right to appeal is a question of interest in relation to the building permit processes for 3G masts. In the Blekinge material there are several appeals that have been rejected because the complainant was not found to have the right to appeal.

Decisions of the County Administrative Court can be appealed to 4.) *the Administrative court of appeal*³³, which demand a leave for the appeal (section 33, ACPA). The vast majority of cases in the Administrative Court of Appeal have first been considered and determined by a County Administrative Court, but not all cases can be reconsidered on appeal. The Administrative Court of Appeal takes a case to trial if

- 1) it is of importance for the guidance of the application of law that a superior court considers the appeal (precedent exemption)
- 2) reason exists for an amendment of the conclusion made by the County Administrative Court, or
- 3) there are otherwise extraordinary reasons to entertain the appeal (the Administrative Court Procedure Act, section 34a).

5.) *The Supreme Administrative Court*³⁴ is the supreme general administrative court and considers determinations on appeal from any of the four administrative courts of appeal in Sweden. The prime task is to try appeals on the Administrative Court of Appeals decisions according to the ACPA. The possibilities to get a case appealed to the Supreme Administrative Court are slim. According to section 36 of the ACPA a leave to appeal is granted only if there is a need for a precedent case or if the Administrative Court of Appeals has made a serious mistake (Bohlin & Warnling-Nerep 2004, p 229).

In some cases, when an appeal partly relates to a question which 6.) the Government shall decide, and the Administrative Court of Appeals finds that the questions should not be separately decided upon; the appeal shall be handed over to the Government, including a

³¹ "Länsrätt".

³² "Förvaltningsdomstol".

³³ "Kammarrätt".

³⁴ "Regeringsrätten".

statement from the Administrative Court of Appeal. This is not common procedure, but it happened in the case of an appealed permit process, *Tararp 3:5*, in Karlshamn, Blekinge.

3.3 The Environmental Code

When the Environmental Code was prepared, the possibility to incorporate the planning legislation to the Code was discussed, due to the importance of planning for the environment protection. The planning and building issues were however regarded as containing too many external aspects for the Environmental Code, which is why the planning of land and water use still lies under the PBA (Ebbesson 2003, p 111). Part one, chapter one, first section of the Environmental Code states:

“The purpose of this Code is to promote sustainable development which will assure a healthy and sound environment for present and future generations. Such development will be based on recognition of the fact that nature is worthy of protection and that our right to modify and exploit nature carries with it a responsibility for wise management of natural resources.”³⁵

Further the section states:

The environmental Code shall be applied in such a way as to ensure that:

1. human health and the environment are protected against damage and detriment, whether caused by pollutants or other impacts;

The term “damage and detriment”³⁶ is intended to clarify that the applicable area of the Code includes a protection against such disturbances as directly affects the wellbeing of people or the environment, or that in other ways affect the wellbeing of people within the frames of what is regulated in mainly chapter 9 of the Environmental Code.

2. valuable natural and cultural environments are protected and preserved;

This means the application of chapters 3-4, 7-8 and regulations that has been announced with support from these chapters.

3. biological diversity is preserved:

4. the use of land, water and the physical environment in general is such as to secure a long term good management in ecological, social, cultural and economic terms; and

Note here the choice of terms used, pointing towards the pillars of sustainable development.

5. reuse and recycling, as well as other management of materials, raw materials and energy are encouraged with a view to establishing and maintaining natural cycles.

When it comes to responsibility it is the one who applies for setting up an activity that needs a permit according to the Code that has to prove that the activity is not hazardous, or that the right precautions has been taken (chapter 2, section 1 of the Environmental Code).

³⁵ As translated and published by the Ministry of Environment, Ds 2000:61.

³⁶ ” skador och olägenheter”.

3.3.1 The precautionary principle

Of special interest in international environmental care is the precautionary principle, the idea that in the absence of a scientific consensus that harm would not follow from an action or policy, the burden of proof falls on those who would initiate taking this action. The precautionary principle can in Swedish environmental law be seen in the provisions for someone performing activities applicable to the Environmental Code, when applying for a permit, 2 chapter, section 3, part 2:

“Such precautions shall be taken as soon as there is cause to assume that an activity or measure may cause damage or detriment to human health or the environment.”³⁷

This can be recognized in the Radiation Protection Act (1988:220):

”The purpose of this Act is to protect people, animals and the environment against the harmful effects of radiation” (section 1).

The Radiation Protection Act applies to both ionizing and non-ionizing radiation. It is meant to protect both human health as well as the environment as such, which means, and is clarified in section 6, point 1, that anyone who conducts activities involving radiation shall take the measures and precautions required to prevent injury to people and animals and damage to the environment.

The precautionary principle, as expressed in the Environmental Code, aims both at the one responsible for the activities, which in the case of 3G masts would be the operators, and the supervising authority. The Swedish Radiation Protection Authority is both to announce necessary regulations, and in its supervision see to that the regulations are respected. Every municipality exercises control within its area over the environmental and health protection, including base stations for mobile telephony. This municipal supervision is actualized in the case regarding 3G masts in Landskrona, presented in the Environmental Court of Appeal case below. The precautionary principle expresses a decision making strategy that borders both science and politics, both calculating rationality and deliberative rationality. With it follows a shift of who has to prove what is hazardous, meaning that the active part, the entrepreneur has to prove (or corroborate) that the activity is not hazardous.

3.3.2 Environmentally hazardous activities

With the legal term “environmentally hazardous activity” is meant every use of land, building and construction that brings, or can bring, discharge of land or water, pollution of land, air or water, or cause detriment to the surroundings in another way (Ebbeson 2003, p 125). The latter is specified in chapter 9, section 1, of the Environmental Code:

‘Environmentally hazardous activities’ shall mean:

...

4. any use of land, buildings or structures that may cause a detriment to the surroundings due to noise, vibration, light, ionizing or non-ionizing radiation or similar impact.

³⁷ From official translation in Ds 2000:61.

With "similar impact" means such detriment "that is to be comparable with the enumerated and that may be decided through court ruling". As examples on "similar impact" are insects, air born bacteria and virus, other sounds than noise, sparkles, or mental effect mentioned (prop 1997/98:45, part 2, p 108).

The government has through the Ordinance (1998:899) on Environmentally Hazardous Activities and The Protection of Public Health stated what activities that need a permit, where to apply for it, and what activity that has to be reported. The responsibility to arrange necessary protective measures is the one that operates the activity. The ordinance states that activities under more than 100 categories need a permit or to be reported in, divided into three levels, where the first require a permit from an environmental court (A-activities), the second require a permit from the County Administration (B-activities), and the third, regarding even smaller activities do not require a permit but must be reported to the local municipal Environmental Committee (C-activities).

3.3.3 "12:6-consultations" under the Environmental Code

When it comes to the regional level, the level of the County Administration, the regulations in the Environmental Code regarding a consultation procedure is applicable to some 3G masts.

"If an activity or measure for which a permit or notification is not required pursuant to other provisions of this Code is liable to have a significant impact on the natural environment, notice of consultation shall be made to the supervisory authority in accordance with the provisions of chapter 26 or with rules issued in pursuance thereof" (chapter 12, section 6 of the Environmental Code. Ministry of the Environment translation in Ds 2000:61)

The key wording for the consultations regards activities which have a "significant impact on the natural environment". These activities are to be reported to the County Administration by the one responsible for the activity, which means that the responsible part has to make a judgement whether the activity has this impact or not. The information basis for this judgement can be highly insecure, and in the initial stages of the 3G roll out it is likely that neither the PTA or the operators was aware of this responsibility (Emmelin & Söderblom 2002, p 27 f.).

The consultation concerns nature conservation, heritage, landscape aesthetics and amenity values. The activity may start at the earliest six weeks after the reporting has been done if not the County Administration admits something else. The County Administration can prescribe the responsible of the activity to take precautions or even forbid the activity. This duty to report has a wide application, and the focus lies on the impact on the natural environment, in its visible or aesthetic sense. The activity can be prohibited by the County Administration "in order to protect the natural Environment" (12:6, section 4).

The purpose of this duty to report for consultation is according to the Environmental Code investigation that this creates a possibility to see what activities that are performed in sensitive areas, and to control that activities hazardous to the natural environment are prohibited. This

can steer the one exercising the activity away from sensitive areas, to areas where there is no duty to report (prop 1997/98:45, p 304).

In the general advices from the Environmental Protection Agency regarding the 12:6 consultations, decided 21 June 2001, the terms in the 12:6 of the Environmental Code are interpreted. Regarding the “natural environment” that Agency concludes that:

“The term natural environment ought to be interpreted in a wide sense, and include what usually is called the nature, such as.... The term should also include the landscape and the cultural landscape. It should include all nature, not only valuable nature or untouched nature, and hence include also the natural environment in the area close to population centres” (NFS 2001:15, author’s translation).

The term should according to the Agency normally not include built environments. This means that there are legal provisions with some room for interpretation, and the practice of the County Administrations is likely to differ to some extent. Note that the responsibility to report the site lies on the one responsible for the activity, meaning the operators constructing masts.

The advices from the Environmental Protection Agency has specified that free-standing masts should be reported for 12:6 consultation, because they are likely to have a “significant impact”. This is even if there is a process for building permit. This means that even if the mast gets a building permit, the site can be prohibited to protect the natural environment. The processes are parallel. This lack of coordination has been criticized for being a bad legislative coordination, but also a manifestation of “competition between professions as well as governmental authorities, and is an expression of a distrust towards municipal permit processes that exists within the environmental sector” (Emmelin & Söderblom 2002, p 28).

This addresses the question of the relation between the Planning and Building Act and the Environmental Code. Most masts need a building permit. Of these masts, when they are to be put up outside population centres, they are often likely to have a significant impact on the natural environment and hence subject for 12:6 consultation. This opens up for that when the site is tried in relation to the aspects of the Environmental Code, the purpose of the Code and for instance the general rules for consideration in chapter 2 are of relevance, especially the principle of localisation in section 4. When the same site is tried according to the Planning and Building Act the status it acquires when receiving a mast building permit can be questioned in a parallel process, by a different authority, referring to a different legislation, leading to a “permit that is not a permit”.

A decision from the County Administration that prohibits the construction of a 3G mast in an area can be appealed to the Environmental Court by the operator in question, or the consultant that handles the case for the operator. If an operator seeks to construct a mast on another’s property, a County Administrative decision has no legal implications when it comes to building permit or utility easement. This means that even if the County Administration sees no hindrance for a mast from a natural environment point of view, it does not necessarily mean that the mast is permitted by the Plan and Building Act (this is another, municipal, trial). It is accepted in legal practice that those who has some kind of special right to the property, for instance being the owner, that the consultation decision concerns also has a right to be heard before the decision, see case in the Environmental Court of Vänersborg (M 5148-04, 22 April 2005), where the decision was appealed because the County Administration had not communicated the decision to the property owner. This leads to that the case was

redirected to the County Administration. The right to appeal a decision based on the 12:6 consultation likely requires that the person can be affected by the decision in the sense of being property owner, or with some special right to the land.

In a case from the Environmental Court of Appeal (Case M 7839-03, 8 Feb 2005) a person appealed the Environmental Court decision to allow a 3G mast in accordance with chapter 12, section 6 of the Environmental Code. The person had no property that was affected by the decision, and therefore not found to have the right to appeal the decision with references to public interest.

However, the practice of the 12:6 consultations when it comes to 3G masts is investigated below, in the implementation stages. How often these consultations have been made, and what the reported material has been including can to some extent be found in the Blekinge data. This “law application” is therefore interesting to get back to, mainly because it is one form of participation that is allowed in the 3G implementation. Who are included, and what questions that have been included is returned to below, in the implementation stages, as well as in the final analysis of the 3G case in the two finishing chapters of the thesis.

3.4 *Electronic Communications Act*

The Electronic Communications Act (2003:389) came into force on 25 July 2003 (prop 2002/03:110). The act replaced the Telecommunications Act (1993:597) and the Radiocommunications Act (1993:599). The Telecommunications Act was in other words the main legislation controlling the introduction of the 3G development in Sweden. A number of changes had to be made in the law during 1999 and 2000 in order to be able to make demands of coverage in the licence allocation (decided 8 Dec 1999), to obligate operators to make available net capacity for other service providers, for the sake of competition (decided 14 April 2000), and national roaming (decided 14 June 2000).

The Electronic Communications Act of 25 July 2003 covers all electronic communication networks and electronic communication services, which includes the role of the Post and Telecommunications Agency’s relation towards the operators, the legal grounds for the agency actions that affects the operators. This is shown below in relation to when the operators failed to fulfil their obligations under the licence conditions and the PTA demanded rectification under the provisions of the Electronic Communications Act. The regulation in chapter 7, part 4, giving the operators reasonable time to voluntarily correct errors after notification from the PTA had no equivalence in the former legislations (prop 2002/03:110, p 398). The PTA role and supervision is further addressed in the 3G case below.

The Electronic Communications Act also regards the issue of cooperative use of masts, the duty for a mast-owning operator to in some cases share the mast with competitors when applied for by another operator.

3.4.1 Cooperation in the use of mast

Unless the operators can settle an agreement of sharing a mast of an area of particular interest – an operator may for instance have been denied a building permit and alternate locations are missing – there is a possibility for the operator to apply for a forced mast cooperation, meaning a legal permit to use another operators mast to put own telecommunications equipment in. This is done according to chapter 4, section 14, of the Electronic Communications Act, and the application is addressed to the PTA, which can order an operator to provide, in return of commercial reward, co-location or other opportunities for shared use of property or other resources. This is if it's required to protect the environment, public health, public security or in order to achieve the objectives of spatial planning.

PTA has also the legal power to make an operator provide space on a mast if it is necessary to achieve effective competition, providing that the PTA find the operator to have a significant influence on the market (chapter 4, section 4, ECA).

According to a governmental meeting of 17 Feb 2005 the PTA decisions regarding co-location are few, and it is said to be due to lack of capacity in the masts for extra equipment, in the cases tried. No forced co-location had been done regarding competitive reasons.

Investigator Urban Karlström was appointed to investigate the need for co-location in February 2005, which later expressed in this preparatory work for the co-location of masts:

“A regulation should be designed so that the handling of antennas leads to a desired balancing between, on one side, the interest that there are sufficient antennas for an efficient infrastructure competition and for the desired coverage, and on the other side, the interest of respect for nature and cultural values and of the urban and the landscape” (SOU 2005:97, p 14, author's translation).



Mast in Malmö shared by Svenska UMTS (Telia Sonera/tele2) – using it for both GSM and UMTS, Vodafone (Telenor), and Tele2 – using it for GSM.

The idea of balancing interests is obvious. This is however a late legislative action in the sense that by this time the coverage already had reached between 85-90 % of the required amount of persons and it was still a long way to a legislative change on the area (PTA 27 Jan 2005). The investigation resulted in a legal proposal expanding the possibilities for the PTA to force co-location (Prop. 2005/06:191). The regulatory changes are in effect since 1 July 2006. The issue of mast cooperation is further analyzed in chapter 8.5.1 of the thesis.

3.5 Utility easement

Utility easement means a right for the possessor of the utilities to use other's property to for example set up power lines or communication wires of public interest. The utility easement regards power lines or wires that are of a public purpose, section 2, point 1 of the Utility Easement Act (1973:1144), the UEA.

The utility easement is tried and the decision is taken by the public authority that manages the Swedish cadastral system (Lantmäteriet), here called the Land Surveying Agency, the LSA, and is attached to the property.³⁸ The LSA performs an assessment of its own, no matter if there already is a municipal permit to build the mast. The building permit does not necessarily mean that a favourable utility easement decision is taken, by the LSA. With the decision of The LSA follows the level of compensation the owner of the property is allowed (section 13 and 22 of the Utility Easement Act). The utility easement can be given against the will of the property owner.

3.5.1 Utility easement and 3G masts

The government decided 7 February 2002 to start an investigation regarding some questions of the utility easement, which in October resulted in a part time report (SOU 2002:83). The report suggested changes in the Utility Easement Act. After being referred for considerations the report formed a governmental bill (prop 2003/04:136). This proposal for new utility easement legislation was first drafted and then decided upon by the Swedish Parliament on 17 June 2004. The proposal of the investigation aimed at facilitating the roll out of the 3G network and hence suggested that the Utility Easement Act should include 3G masts. The legal changes came into effect 1 August 2004. One of the reasons that the law was changed was that all of the operators had claimed that the difficulties to get building permits slowed down the roll out (Prop. 2003/04:136, p. 9-10).

“Our conclusion is therefore that also when it comes to construction of masts and such there is a clear need of being able to make available land against the will of the property owner. The most natural is then that this is made through utility easement“ (prop 2003/04:136, p 9, author's translation).

The legal revision did not pass without critique. The environmental debater Björn Gillberg, and known 3G opponent commented the changes of the Utility Easement Act as “an interesting combination of capitalism and communism” (Dagens Nyheter 18 April 2004).

The right to give utility easement for a telecommunications mast that is not connected through wires had in legal practice prior to the legal change been uncertain. There are examples of when this has been done (Land Court of Malmö, case F 2914-00, 22 Aug 2001, Court of Appeal over Skåne and Blekinge, case Ö 1861-02, 6 Feb 2003), and when it had not been done (Land Court in Stockholm, case F 7644-02, 25 Apr 2003). The issue had yet not been tried by the Supreme Court (prop 2003/04:136, p 8).

Interestingly enough a case in the Supreme Court of Sweden ruled that utility easement could not be given to a 3G mast, and this is during the summer, *after* the decision was taken in

³⁸ This handling is called “förrätning” in Swedish.

Parliament that the utility easement could be given for the 3G mast, but *before* the legislative changes was in force (7 June 2004, NJA 2004 s 336). Besides, the Supreme Court case is the appeal from the Court of Appeal case from 6 Feb 2003 that gave utility easement.



Picture of a site between Sjöbo and Tomelilla in Skåne, Sweden. The picture shows two infrastructures from different times, that from a construction perspective got associated legally with the changes in the Utility Easement Act of 1 August 2004. On the left, a copper based telephone wire, connecting one phone in an unbroken line with another. This infrastructure was started to be developed in the late 19th century. On the right, the 3G and/or GSM mast, representing an infrastructure from 100 years later, based on a digital technology.

Since existing law prior to the Supreme Court decision had been unclear, the period when existing law more clearly denied the possibility lasted only for the 55 days the law still remained unchanged. The changes in the regulation however clarified beyond all doubt that this legal institute was applicable to the construction of 3G masts by 1 August 2004.

According to section 11a of the UEA it is possible for a utility easement possessor to reach an agreement for others to use the utility easement, for instance can an operator let another operator put up a mast, a technical house and wires for a base station within the area that the first operator received the utility easement for, and this without the consent from the owner of the property. The right connected to the utility easement is quite extensive to the loss of the property owner.

The changes in the Utility Easement Act to clearly include 3G infrastructure is of interest especially from the perspective of the mix between governmental responsibility to develop infrastructure and the corporate involvement included in the 3G roll out of infrastructure, in the name of “public interest”. When the law first was drafted in the early 1970’s the term was more homogenous since there were less private interests included in infrastructure development. This makes the changes in the Utility Easement Act of principle interest, which gives us reason to get back to this, in the analytical chapter.

3.5.2 Compensation when expropriated

The compensation regulations of the Expropriation Act (1972:719) are relevant for the cases when utility easement is given for mast construction. The land owner has the right to compensation for the loss in value the mast site brings to the property. The Utility Easement Act refers in this case to the Expropriation Act, and especially to the key regulation in chapter 4, section 1.

“For a property unit expropriated in its entirety, purchase money shall be paid to an amount corresponding to the market value of the property unit, except where otherwise indicated by the provision made below. If part of a property unit is expropriated, encroachment money shall be paid to an amount corresponding to the reduction caused by the expropriation in the market value of the property unit. If damage is otherwise incurred by the owner through the expropriation, such damage shall also be paid for” (Expropriation Act translated by the Department of Real Property Science of The Royal Institute of Technology in Stockholm).

It is generally the “part of a property” compensation³⁹ that is relevant for 3G mast cases. How this is valued or measured is interesting, especially the term “market value” which is not defined in the Act. The preparatory work, from 1971, states that with “market value” means the price the property probably would have rendered in a sale on the open market (prop 1971:122 s. 171). By this is generally meant that this hypothetical sale would take part in a situation *not affected* by the expropriation at hand, whether the expropriation situation will increase the value or diminish it (prop. s. 171 f. and for instance NJA 2002 s. 45). This hypothetical reasoning is continued in the next section.

In chapter 4, section 2, (the so called “rule of influence”) it is stated that if the company for which expropriation is being done, has affected the market value of any significance, so shall the compensation be determined from the market value the property would have had if such an influence would not have occurred.

The topic of interest in this thesis is mainly that the regulations of compensation for expropriation are sprung in a society different from today, in this case especially when it comes to infrastructure development. Such enterprises used to be governmentally controlled and monopolistic. This has changed, and a privatisation trend brings new questions on how compensation for such enterprises should be measured. The clear dichotomy of public interest versus private is not clear in the same sense anymore, which is actualized in the case of utility easement for 3G mast infrastructure.

3.6 Other 3G relevant legislative areas

With a similar purpose as the solution of cooperative mast use in the Electronic Communications Act is the use of the Utility Easement Act (1973:1144) to assist mast constructors to attain admittance to property sites favourable for 3G masts, from the land owners. Another important question is where a base station is not assessed through the means of any legislation, and what consequences this brings, which will be discussed further below.

³⁹ “Intrångsersättning”.

3.6.1 Aviation regulation and Armed Forces review of masts

The Swedish Civil Aviation Authority, earlier the Swedish Aviation Agency, and the Swedish Armed Forces review the masts with regards to aviation and if the radio activity could be conflicting with the armed forces' telecommunications. An example is the mast at Bråten 1:2 of Ronneby, Blekinge, where the planned mast was to be 90 metres but was only permitted to be 51 metres on demand from the Armed Forces.

3.6.2 Unregulated base stations

A building permit is required within areas covered by a detailed development plan (see below) in order to repaint buildings or replace facing or roofing material or make any other alterations to buildings *which essentially change their external appearance*, chapter 8, s. 3 PBA. These provisions may or may not be applicable when establishing a base stations and a minor antenna. The municipal practices are likely to differ to some extent. There are even examples with 3G antennas in flag poles, such as the case with a Vodafone antenna in Näset, outside Gothenburg (DN Ekonomi 7 Sep 2003).⁴⁰

So, if the antenna or short mast does not essentially change the external appearance, it may not require a building permit. This is interesting in relation to the radiation issue. Since the radiation been legally defined out of the permit system, with reference to the Swedish Radiation Protection Authorities, as well as the activities under the scope of the municipal supervision under the Environmental Code there are a lot of base stations that are mounted without notice of the public, and hence without a public say in the process.

From a participative perspective this is problematic. Neither the public nor the local environmental authority can really know where these bases stations are, if they would like to avoid them, or to supervise the activity.

3.7 Regulatory changes of relevance during roll out

The legal regulations of relevance for the third generation of telecommunications systems in Sweden have changed in various ways along the development. The dates in the picture below show when the changes were in force. Before the licences were distributed some changes had to be made in the Telecommunications Act. The first change, taken by the parliament on 8 Dec 1999, meant that mobile operators with their own net were obligated to offer net capacity to companies without a net of their own. (prop 1999/200:1, utg. omr. 22). The second change, taken on 14 April 2000, regarded the operators' obligations to let other service providers to use the infrastructure. A minor change was also made at the same time to make it possible to have a so called beauty contest as a method for net capacity allocation (prop 1999/2000:57). The third change of the Telecommunications Act was taken by the parliament on 14 June

⁴⁰ <http://www.dn.se/DNet/jsp/polopoly.jsp?d=678&a=179242&previousRenderType=2> accessed 20 Dec 2007.

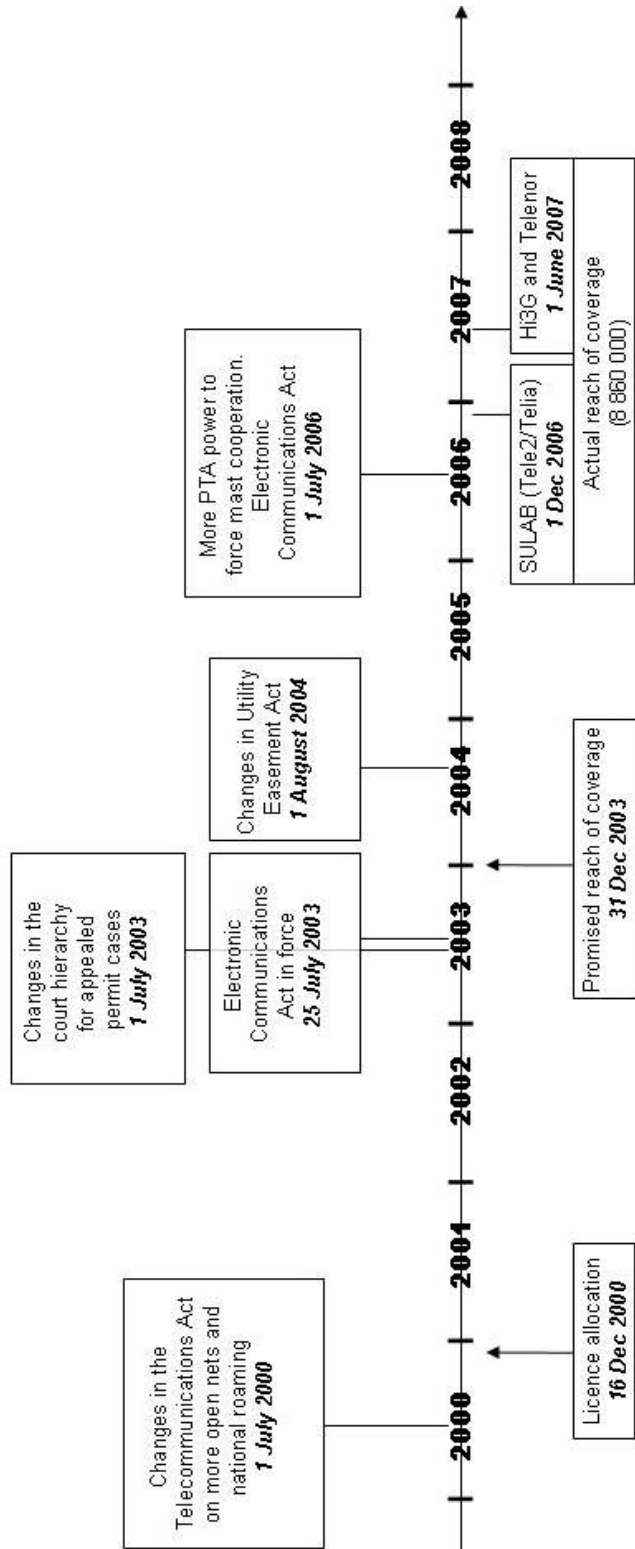
2000, and regarded that the operators with a network of their own with mobile services were obliged to supply national roaming for other operators with own network (prop 1999/2000:100). The changes were in force from the 1 July 2000.

Changes were made in the court hierarchy for building permit appeal, and the governmental appeal alternative was taken away. The reasons were to lessen the governmental burden as well as to avoid the problems that came with the so called mixed cases, meaning cases that both regarded issues that should be tried by the government and had issues that should be tried by court. The changes came into force from 1 July 2003 (prop 2002/03:27).

By a parliament decision on 5 June 2003 the Electronic Communications Act came into force on 25 July 2003, replacing the Telecommunications Act and the Radiocommunications Act (prop 2002/03:110). The proposal for the changes in the utility easement legislation was decided by the Swedish parliament, on 17 June 2004. The proposal of the investigation aimed at facilitating the roll out of the 3G network and hence suggested that the Utility Easement Act should include 3G masts. The law came into effect 1 August 2004 (prop 2003/04:136).

In the beginning of the year 2005 a commission was appointed to investigate the possibilities of forced co-location and how the cooperation between operators could increase, which was not met with enthusiasm by some of the operators. The commission resulted the 20 March 2006 in a governmental bill regarding changes in the Electronic Communication Act on the forced mast collaboration. The changes came into effect 1 July 2006 (Prop. 2005/06:191, SOU 2005:97).

A governmental report was published in 7 May 2007 on how the legal means for expropriation are being used in cases of forced land use. The second largest type of cases related to the expropriation laws where the cases of utility easement, to a large extent depending on the development of 3G infrastructure, and most likely the legal changes of the Utility Easement Act of 1 August 2004, that clearly stated that the law was applicable to 3G mast construction (SOU 2007:29).



Picture: Regulatory changes of relevance to the 3G case.

3.8 Problem areas to be further analyzed

Before turning to the actual infrastructure roll out and what conflicts that emerge in it, a few remarks can be made regarding the framework for the 3G infrastructure development. Environmental management and planning are upheld by a legal system that is complex, of which the 3G case can bear witness. The assessment is done at different administrative levels, under several legislations tied to differently structured court hierarchies, and facing different governmental and municipal authorities.

A single mast site can be tried under the municipal authority regarding building permit under the Planning and Building Act, and two regional authorities with one being the County Administration performing an assessment under chapter 12, section 6 of the Environmental Code, and the other being the national Land Surveying Agency, LSA, performing an assessment of the site for utility easement under the Utility Easement Act. The LSA decision can be appealed to the Land Court by either the land owner or the operator, the municipal decision can be appealed to the County Administration by any concerned party for whom the decision has been negative, and the 12:6 consultation decision can be appealed to the Environmental Court by either the operators, if the site is prohibited, or by land owner that can be found to be a concerned party.

Three different legal institutes, handled at two administrative levels, by three authorities, all with its own court hierarchy for appeal, create a complex assessment system. This is how planning is formalized through law. With the processes being parallel this is hard for the entrepreneur, as well as any concerned party to overlook and understand the legal system. In addition to this it is bad resource use also for the handling authorities. The complexity of the assessment system is shown in the implementation of the 3G roll out. To study the application of this legal complexity is part of the objective of the thesis, and to do so the implementation needs to be investigated in more detail. The PBA in relation to the Environmental Code is to selected parts analyzed. Also, the changes of the Utility Easement Act letting the 3G mast in under its scope is of principal interest, especially in relation to the compensation regulations that follow, and is further addressed below.

Both the changes of the legislation, as well as the relevant unchanged legal framework, is better understood in the context of the infrastructure roll out they were made in, which is presented in the following chapter. This chapter has much regarded the “law in books”. It is now time to focus the “law in action” in the 3G case.

4 The national implementation

When it comes to the implementation of the 3G decision in Sweden it is a fact that the operators did not reach the coverage they had promised in time. The aim of this chapter is to show the roll out empirically, including the operator actions, the PTA handling, as well as the legal application of building permits 12:6 consultations and the utility easement. The roll out is described by building permit application frequency from 2000 to 2003 nationally as well as in the regional case of Blekinge. Coverage data from the year 2003 to the year 2007 shows the national roll out, and partly the intentions of the operators. A regional case of a few big city municipalities in the Gothenburg area are compared to a regional case of municipalities in the Västerbotten County, in order to show the difference between densely and sparsely populated areas. The Orange case, the operator that during late 2002, 2003 and 2004 tried different ways to make use of the licence before the company gave up and handed in the licence, is a case of principal interest partly because it shows the strengths and weaknesses in the PTA supervision. From a governmental steering perspective it is of interest to follow legal changes that was made during the roll out. These changes have been outlined above, and will be put in context here. The national implementation of the 3G development further shows some interesting features when it comes to the municipal role in the infrastructure expansion, how the pillars of sustainable development are being handled in the local permit process. This includes the relationship between the national and the local level, as well as the relationship between the Environmental Code and the Planning and Building Act and the electromagnetic radiation issue regarding public fear of the radiation. First out, as an important part of the infrastructure development, is the description of the relation between the PTA and the operators, as it is described by law, licence conditions, and the formal actions between the two sides. The relationship between the PTA and the operators may serve as an introduction to how sustainable development has been handled in the implementation stages of the roll out of 3G infrastructure in Sweden.

4.1 *The PTA and the operators*

The licence conditions in themselves do not include any sanctions for the operators if they would not fulfil the requirements. Instead, the sanctions have a more general description in the legal provisions controlling the Post and Telecommunications Agency. According to chapter 7 section 5 of the Electronic Communications Act (2003:390) there is a possibility for the PTA to issue “such orders and prohibitions as are necessary for a rectification to take place” when it comes to operators not fulfilling the conditions bound to the 3G licence. Section 4 gives the operators a respite to correct what they have not fulfilled, on notification from the PTA. The minimum for rectification is one month, and the maximum time is not prescribed, but the time is tied to the wording “within a reasonable time” of section 4.⁴¹ Such orders may “when there is a need for it” be combined with a fine (Prop 2002/03:110, s 299). For such an order specific legislation regarding fines is applicable (Viteslagen 1985:206).

⁴¹ ”inom skäligen tid”, PTA translation.

The 12 May 2000 the PTA invited operators to apply for a licence before 1 September 2000. The PTA decision on what applicants that received licences was announced on 16 Dec 2000. The roll out period started with the PTA facing the appeal of the licence allocation decision by Telia, Telenordia and Reach Out Mobile. The County Administrative Court of Stockholm supported the PTA decision on 27 June 2001, without further appeal (Case nr 499-01). The fact that Telia did not get a licence surprised many. Telia became a part of the construction via collaboration with Tele2 that had a licence. The three operators Hi3G, Europolitan and Orange signed a deal regarding collaboration on the coverage requirements of the licence conditions.

When the operators already in 2002 started to apply for an extended time limit the PTA turned down the requests. Orange was first out in August, applying for an extended deadline and less coverage, followed by Vodafone (which was the name of Europolitan by now) in September and Hi3G in November, and Svenska UMTS-Licens AB (Tele2/Telia) in April the following year. The operators' requests were all denied (PTA decisions of 30 Sep, 25 Nov 2002 and 14 May 2003). As a reason for the delay, the operators did all point out the municipal permit handling process as being slower than expected.

When the operators in April 2004 were addressed with the fact that they had failed to reach the coverage of the licence conditions stating 31 December 2003, the reported coverage had been at the most between 65-75 %, when it was supposed to be 99,98 % of the populated areas (PTA 10 Mar 2004). The operators were given "a reasonable time" to "voluntarily" (as expressed in the PTA decisions of 17 May 2004) rectify the lack of coverage, with a referral to the preparatory works of the Electronic Communications Act (prop 2002/03:110, p 398). The time limit for reaching the full coverage according to the licence conditions was postponed to 1 Dec 2004, meaning 11 months later than the original time limit. The PTA motivated this by following the operators' position based on that the operator's prerequisites for the construction had been changed after the initial licence agreement by factors outside the control of the operators. These factors were said to be a slow municipal permit process and that the assessment from a flight hindrance and telecommunications conflict perspective performed by the Armed Forces had in different respects been delaying the processes (PTA decisions of 17 May 2004). The PTA concluded:

"In some respects the conditions for the company have been changed in a way that could not have been foreseen at the time for the application, and that has been outside the control of Hi3G" (PTA Decision of 17 May 2004, p 3).⁴²

The same wording has been used in the decision to all the four operators. The wording is interesting, especially in reference to the time acquired for the permit processes. In what way had the conditions changed? And in what way could these "changes" not have been foreseen? Is this a legitimate reason for the coverage delay at all? To be able to answer these questions we have to take a look at the actual roll out, from an empirical side, which is done below.

In the time following the decision, in 28 June 2004, all operators (but Orange), meaning Hi3G, Vodafone, SULAB (Tele2 and TeliaSonera) applied for a change in the licence conditions which mainly concerned a delay in the coverage conditions to be fulfilled by 31 Dec 2007, and a lowered pilot signal in the sparsely populated areas. These operators' main arguments regarding the postponed coverage were that the permit processes had been taking

⁴² "I vissa avseenden har emellertid förutsättningarna för bolaget ändrats på sätt som inte kunnat förutses vid ansökningstillfället och som legat utanför Hi3G:s kontroll".

considerably longer time than expected due to the public debate on the effects on the environment, cultural and nature values and the worry for electromagnetic radiation (PTA decision 7 Dec 2004, p 4). Parts of the arguments from the recent postponement decision of the PTA were re-used, but with a bigger jackpot at stake: more than three more years to reach the full coverage. The PTA found that the reasons to change the licence conditions regarding the delayed coverage were not strong enough to change the conditions. This was partly based on a Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions from June 2002 – (Towards the Full Roll-Out of Third Generation Mobile Communications) stating the importance of a predictability and stability in the regulatory environment.

“When balancing the benefits and drawbacks of a rigid application of the conditions determined by the issued 3G licences, the Commission is of the opinion that in principle the **licensing conditions should not be changed** because the sector is best served by a predictable environment. Predictability allows business cases to be established in a reliable manner and to be credibly defended when accessing investment funds” (Underlining and bold letters are as in the text, 3.1 of COM(2002) 0301 and p 8 of the PTA 7 Dec decision).

And the communication continues:

“Changes to licence conditions should be envisaged only when circumstances have changed unpredictably and in these cases any modification should be proportional, transparent and non-discriminatory.”

These formulations are interesting, not the least in the sense they describe important elements of sustainable development, and it is motivated to return to these when summarizing the handling of sustainable development in the implementation stages of 3G in Sweden. The pilot signal strength was lowered in sparsely populated areas, meaning a change of the licence conditions to some extent. The reasons that rendered in a delay in 6 months from the PTA notice to the operators, until 1 Dec 2004 (11 months from promised reach of full coverage according to licence conditions), were not considered strong enough to change the licence conditions. The operators were just given a respite. The reported coverage of 1 December 2004 was for Hi3G 84 %, Telia and Tele 2 86 % and Vodafone 84 % (PTA report 27 Jan 2005). The fact that the argument rendered in a respite nevertheless means that the PTA gave the argument some credibility. On what empirical grounds, is however unclear.

Hi3G and SULAB did in late December 2004 appeal the decision (in addition to the lowered pilot signal they had applied the decision of not postponing the deadline) to the County Administrative Court (Länsrätten) on basis of that more areas of Sweden should be included in the lowered pilot signal requirements, above the postponed time limit. The processes made the PTA accept a lowered pilot signal in some more areas, which is for the benefit of the operators, and the appeal was withdrawn.

By January 2005 the PTA stated that since the licence conditions had been changed (lowered requirement in the way to measure coverage in the sparsely populated areas) the operators should have a new respite to rectify the lack of coverage. This time the respite however was set to a month, and by 28 February 2005 the operators should have reached the coverage of the licence conditions or the PTA “may issue an order” according to 7 chapter, section 5 the

Electronic Communications Act. And that this order may be combined with a fine (PTA report of 22 Feb 2005).

What is interesting here is that the changes of the obligations connected to the pilot signal in the rural areas of Sweden meant a beneficial way to measure the coverage for the operators. It was this beneficial change (less base stations required for the same degree of coverage) that gave the operators another respite, due to the “changes of the licence conditions”. The logic here is not obvious. It is possible that the radio planning connected to these conditions demand some extra planning time, a relocation of resources which on the other hand could be balanced against the fact that the operators saved up to 25 % (according to the PTA press release of 24 October 2005) of the infrastructure cost of the remaining parts after the PTA decision by 7 December 2004 (when the coverage was somewhere around 80-85 % of the coverage requirements). The pilot signal was allowed to be lowered further in the so called buffer zone in October 2005 (PTA report of 22 Feb 2006, p 20).⁴³

	Coverage in % of 8 860 000 persons		
Report date	Hi3G	SULAB (Tele2 Telia)	and Vodafone
31 Dec 2003	68	74	66
June/July 2004	76	80	74
1 Dec 2004	84	86	84
1 Mar 2005	87	86	86

Table from PTA (22 Feb 2006, p 10).

So on one hand, when it comes to the coverage percentage, the PTA stresses the importance of predictability and no change of the coverage requirements of the original licence conditions, and on the other hand, when it comes to the perhaps a bit less easily understood pilot signal issue, the PTA changes the licence conditions in favour for the operators. So, instead of changing the coverage conditions, the definition of coverage is changed. What happened when the operators by 1 March 2005 reported that the lack of coverage was not rectified? In fact, SULAB, had not raised the level of coverage at all between 1 December 2004 and 1 March 2005, see table above. The story told on this issue in the PTA report from 22 February 2006 stops here. Nothing is said about the order that “may be issued” or the sanctions that could follow (see p 12-13).

When Hi3G and Vodafone In June 2005 applied for the PTA to allow some of the 3G activity to be performed through an alternative 3G technology, the so called CDMA2000 in the 450 MHz band, the PTA decided to ask all operators if they could ensure the continued infrastructure development with this new technology. At the same time the PTA decided to await these results before issuing an order combined with a sanction for the operators to rectify the lack of coverage. But why did not the PTA act during the three months following from the reported lack of coverage by 1 March? PTA concluded, regarding NMT450 and 3G (UMTS), that there was no way to bridge the technologies without lowered quality for the consumers. For instance there where no hand sets on the market covering both technologies.

⁴³ This buffer zone consists of the area that reaches three kilometres from the boundaries of the population centres for places with more than 1000 inhabitants according to the Statistics Sweden, SCB, of the 31 December 2000.

The PTA turned down the request, and by this the operators again had gained some time in the continuing reach for an adequate coverage. The decision came 24 October 2005.

When the first licence conditions ran out by 1 July 2006 the coverage was between 93 and 94 %. The new licence conditions were favourable for the operators. The pilot signal in the outskirts of the urban areas was lowered, rendering in a higher coverage. With the lowered demands for the pilot signal the area considered to be covered increased to 98 %. This is without any new base stations being constructed. On 9 August 2006 the PTA notified the operators when the full coverage should be reached, and the new dates were based on the operators' own estimates of when to be ready. This means that the operators had managed to reach the end of the first licence period without completing the promised amount of coverage and without receiving expensive fines from the PTA, and that on the other side of the 1 July 2006 the coverage requirements were lowered and depending on their own estimates. The PTA had avoided heavy critique, as well as being sued by applicants that did not receive a licence. On 1 December 2006, about three years after the initial deadline for reach of coverage, the first operator (Tele2/TeliaSonera) reported to the Post and Telecommunications Agency, the PTA, that their common net had reached the coverage of 8.860.000 inhabitants of Sweden, followed by the remaining two operators, Hi3G and Telenor, 7 months later (PTS fact sheet of 1 June 2007, PTS-F-2005:5, p 6).

4.1.1 Orange – the regretful operator

One of the operators, Orange, chose not to fulfil the commitment at a relatively early stage, resulting, after a series of events, in that the Orange frequency spectrum was split between the three remaining operators. From the licence application of Orange:

“Honest: We do not promise something we can not keep; we do stuff instead of just talking.”⁴⁴ (The Orange vision. See Summary of application 2000, p 3).

Orange applied, along with nine more companies to receive a 3G licence, and ended up as one of the four winner of the so called beauty contest. The Orange application stated above that Orange will have the fastest 3G development, that the owners of Orange make a “long term commitment”.⁴⁵ In retrospect it is easy to smile at these pitching marketing phrases.

The Orange case is of principle interest because of its unique position of being the only operator in Sweden wanting to get rid of the retrieved licence. Orange applied in August 2002 for more time to develop the infrastructure to a lower coverage, with no success with the PTA. A PTA press release from 19 Dec 2002 reveals that the PTA found out from an Orange press release that Orange intended to withdraw its participation in the 3G infrastructure development in Sweden. The PTA had not been informed. Orange on the 6 February 2003 applied to the PTA to allow a transfer of the licence to a subsidiary company, GGG Licens AB, which the PTA denied on the ground that Orange was likely to be planning to sell this subsidiary company in order to withdraw the Orange contribution to the Swedish 3G infrastructure construction (PTA Decision 23 April 2003). The 30 September 2003 Orange and the SUNAB (Telia Sonera and Tele 2) owned Svenska UMTS Licens II AB applied to the

⁴⁴ Translated from ”Ärlig: Vi kommer inte med utfästelser vi inte kan hålla; vi gör saker istället för att bara prata”.

⁴⁵ Translated from “Varaktigt åtagande”, p 6 of the application summary.

PTA to allow a transfer of the Orange licence to Svenska UMTS Licens II AB. PTA denied the request mostly based on competitive aspects, that the competition in the market would decrease from the fact that SUNAB would be in control of two out of the four licences (see the PTA 28 April 2004 document referred for consultation, and PTA decision of 26 May 2004).

In short, Orange from late 2002 and in 2003 to 2004 tried different ways to make use of the licence, when clear over the fact that Orange would not invest to a full infrastructure, which the company only three years earlier had promised in order to obtain a licence. During the fall of 2004 the PTA, on application from Orange, retrieved Orange's licence (PTA report of 22 Feb 2005, p 10) by a decision in 8 November 2004. Chapter 7, section 6 of the Electronic Communications Act states:

A licence may be revoked and licence conditions amended immediately, if...
...5. the licence holder requests that the licence should be revoked.

Remember that the PTA has the right to request the operators to present documentation over the roll out, under penalty of a fine if they decline (section 15, part 1, 4 of the abolished Telecommunications Act 1993:597, chapter 7, section 3, Electronic Communications Act). The PTA did not put much pressure on Orange in the time the company still formally participated in the 3G development, but obviously showed no intent to fulfil the requirements. This once again shows the action space of the PTA, within the legal frames.

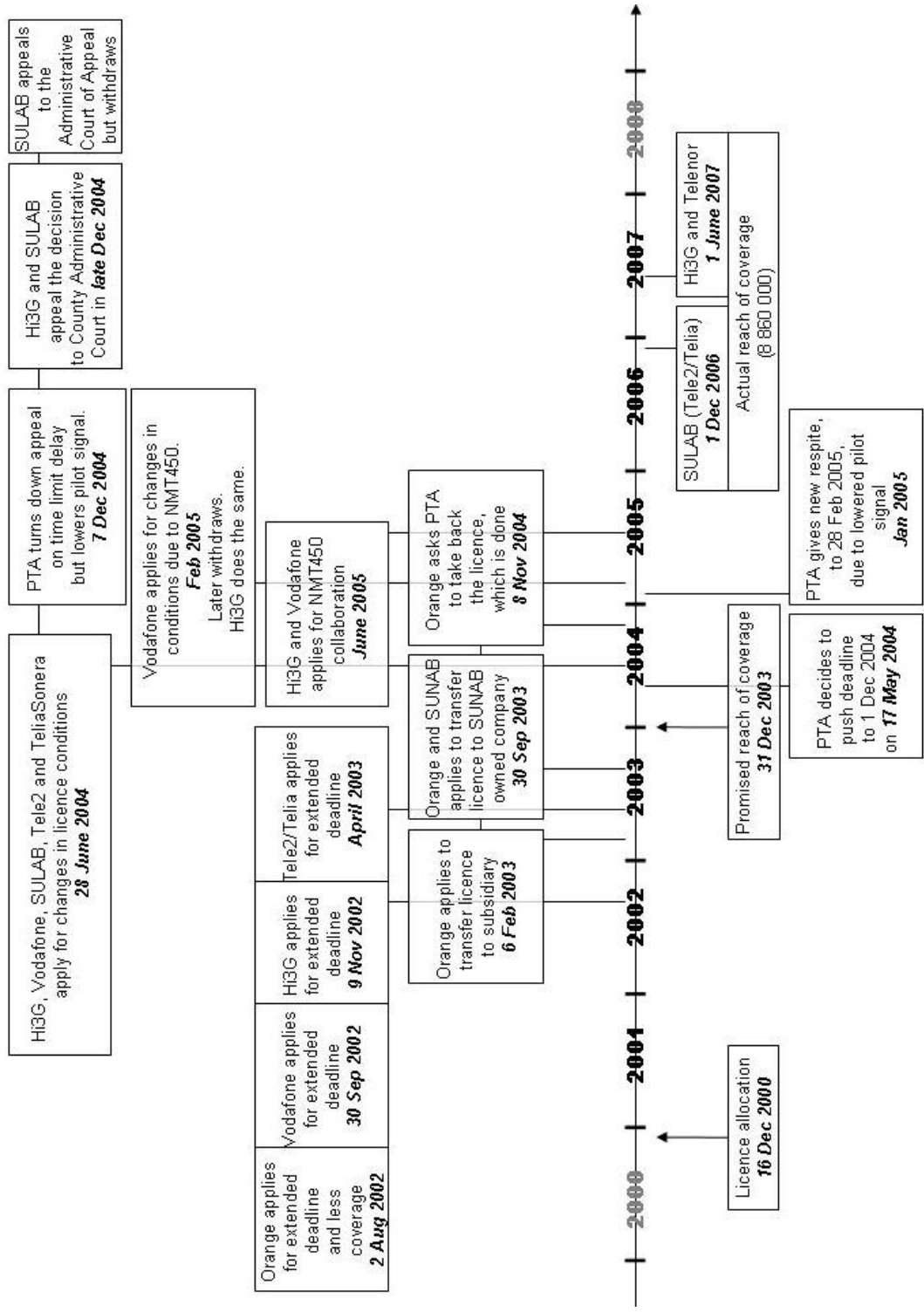
4.1.2 Sum

In conclusion, this leads to the important question of why was not the coverage reached according to the licence conditions, which is one of the implementation issues of the 3G infrastructure construction in Sweden. Were the permit processes exceptionally slow, as often claimed in the numerous applications for changed licence conditions? What was it in the permit process "that could not have been foreseen at the time for the application"? As expressed by the Orange application to postpone the deadline (PTA decision 30 Sep 2002).

"Orange assumed that there would be a will to get UMTS-coverage fast, why the permit processes would be handled without delay." (author's translation)

Whose will the company is talking about is left out in the discussion, but it is surely the municipalities' will Orange is talking about, which calls for the question if the operators expected to get an exceptional treatment when it comes to the permits? And on what grounds?

To be able to answer questions tied to the infrastructure roll out over Sweden, we need to empirically investigate how the building permit applications developed over time, and compare this to reached coverage in different areas. This will show both the intentions of the operators, where they started the roll out and how their roll out proceeded. This is compared to data regarding the building process itself, derived from both PTS questionnaires and the Blekinge data over mast permit processes. The rules of the game however change during the roll out. This chapter will approach also legal changes, as well as the dropping out of one operator. The focus is to find indicators for how sustainable development is handled in the process, which is the reason that the chapter addresses 12:6 consultations and other aspects of interest in this context.

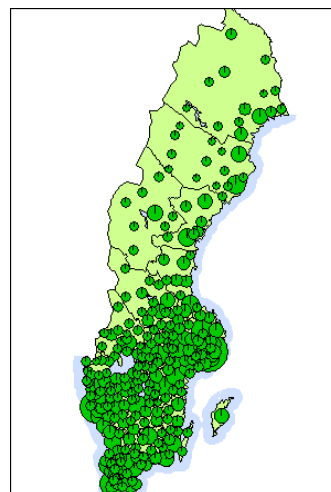


Picture: Operator actions towards the PTA during 3G roll out.

4.2 A “plan economic decision” versus the logic of the free market – the actual infrastructure roll out

As shown above, the design of the 3G licence conditions bears a plan economic resemblance in the coverage conditions being to cover 8 860 000 persons of the population in the statistical data of SCB in 31 Dec 1999, which was 8 861 426, equalling about 99,98 % of the populated areas. This is opposed to a market logic that would lead to a development of infrastructure where it is most commercially viable, where the most people live and use it. In Sweden, most people live in the south, in the three big city areas, and along the coastline. It is here important to remember that a roll out according to market logic within the promised time frames is well in line with the licence conditions. It is only by the end of 2003 that the licence conditions stipulate the extensive coverage, not before.

It is already concluded that the operators did not reach the coverage in time. The operators that received a licence did this on promises regarding this specific matter, to reach an almost full coverage of the populated areas within about three years. When they later failed to fulfil this promise, one could argue that they had received the licence on false pretensions. When it then came to what responsibilities the operators had, the question of what factors the operators could not have foreseen that delayed the process became important. They had early in the roll out period claimed that the municipal permit processes was slower than expected. This chapter addresses this matter, as well as shows that no matter the facts of this matter the operators did not even try to finance a full roll out in the sparsely populated areas. These two aspects make the question regarding how conscious the operators were at the time of application about how hard it would be to reach such an extreme coverage within such a short period of time, a question returned to in the analysis chapter. First, let us take a look at the actual roll out in the first years.



Picture: Sweden, the dark green circles represents population per municipality, year 2005. Data from www.scb.se

4.2.1 2001: A permit application odyssey

The operators got the licences in December 2000. The roll out started however late, the awaited offensive of permit applications in 2001 failed to come. The discussions in media regarded an amount from 50 000 antennas (Emmelin & Söderblom 2002, p 7), which later was revised to an expected 8000 - 10 000 along with the news of the collaboration agreements between the operators (Boverket 11 May 2001).

Early in the roll out period the operators argued that the slow infrastructure development was partly a result of a too slow municipal permit process. A fact, they claimed, that could not have been foreseen at the time for the 3G licence application. An interesting remark to this, which is developed below, is that a majority of 61 % (122 of 201) of the municipalities did not receive a single building permit application during 2001, the first year of the three until the reach of full coverage deadline of the licence conditions (PTA 2 April 2003).

To be able to answer questions of the actual roll out, the 3G mast permit processes for the five municipalities of Blekinge have been collected from the first received application of 11 Oct 2001 in Karlshamn updated to the autumn of 2005 and early 2006. The permit processes are all in all 248 although there are a few from the region within the time span that the collector of the documents had problems in retrieving. These building permits allow scanning for main issues and conflicts of interest for how the planning and environmental administration functions from a sustainability perspective. A selection of the permits has been further analyzed according to the research questions. Three PTA surveys were done during 2003 – two quantitative, of 2 April and 4 December, and one qualitative of 2 April. These show the early national development of the infrastructure.

Following a market logic the operators would develop infrastructure where most people live and would use the 3G services – although it can be noted that the services and the hand sets were not available, in the early stages of the roll out. A comparison between a sparsely populated area, which is likely not to be a commercial success from a 3G point of view, but still within the requirements of the licence conditions, and a big city area shows that the roll out started in the latter. The three big city areas attracted the most mast building permit applications in 2001. The municipality of Gothenburg received 78 and Malmö 58.

First, we look at a sparsely populated region in the north of Sweden, consisting of 10 of the 15 municipalities of the County of Västerbotten - the other five did not answer the PTA questionnaire of 2 April 2003 - a county in the north of Sweden.⁴⁶ The total amount of permit applications in the year of 2001 are only 10, all of which are from Umeå, the most urbanized area of Västerbotten. Compared to the big city area of Gothenburg, where 7 of the 13 municipalities answered the questionnaire of 2 April 2003, the amount of received permit applications was 13 times as high during the first



Figure: Permit applications for 3G masts

Year 2001
10 of 15 municipalities in the County of Västerbotten

Municipality	Received
Bjurholms kommun	0
Dorotea kommun	0
Malå kommun	0
Nordmalings kommun	0
Norsjö kommun	0
Skellefteå kommun	0
Storuman kommun	0
Umeå kommun	10
Vilhelmina kommun	0
Åsele kommun	0
Total	10

Figure: Permit applications for 3G masts

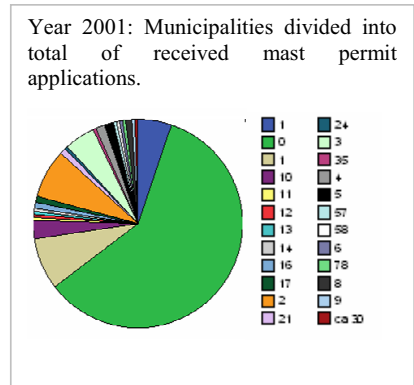
Year 2001
Area of Gothenburg

Municipality	Received
Alingsås kommun	0
Göteborgs kommun	78
Härryda kommun	17
Kungälv kommun	ca 30
Partille kommun	1
Stenungsunds kommun	1
Öckerö kommun	3
Total	130

⁴⁶ In these 10 (Bjurholm, Dorotea, Malå, Nordmaling, Norsjö, Skellefteå, Storuman, Umeå, Vilhelmina, and Åsele) the population is 220 980 inhabitants on the surface of 37 675 km², which equals about 6 person per km² Statistics from www.SCB.se *Folkmängd i riket, län och kommuner 30 september 2006 och befolkningsförändringar kvartal 1 - 3 2006* and *Kommunprofiler*.

year.⁴⁷ This is an example of an expression of the driving forces of the operators. Naturally, the operators aim to as soon as possible have a network in operation where the most potential network traffic will be, in the most profitable areas, the big city areas. This shows the conflict between profitability on one side and access to technology and regional balance on the other side. So far, this does not interfere with the licence conditions, it is still the first year of three.

As mentioned, a majority of 61 % (122 of the 201, whole country = 290) of the municipalities that answered the questionnaire of 2 April 2003 did not receive a single building permit application for 3G base station with antenna during 2001. The green area represents the number of municipalities that did not receive a single application. The high numbers represent the municipalities of Gothenburg (78), Malmö (58), Uppsala (57) and Enköping (35). Only about one fourth of the municipalities received more than 2 permit applications during 2001.



This leads to one significant element of the roll out, it reached the municipalities with a slow start. The Blekinge data confirms the slow start of the infrastructure roll out. Only one building permit for 3G mast was applied for in Blekinge in 2001.

Figure: Permit applications for 3G masts

Year 2001
County of Blekinge

Municipality	Received
Karlshamn kommun	1
Karlskrona kommun	0
Olofström kommun	0
Ronneby Kommun	0
Sölvesborg kommun	0
Total	1

With the licence followed a condition stating that a functional network with the right pilot signal strength should be up and running no later than 1 January 2002 (PTA 22 Mar 2001, section 2). These small networks passed the PTA measurements in early 2002 (see PTA press release of 11 Feb 2002).

- Orange had net capacity in an area of Malmö
- Telenor (Europolitan/Vodafone) had net capacity in an area of Karlskrona
- Hi3G had net capacity in two separate areas of Stockholm
- Tele2 had net capacity in three areas of Stockholm.

The expected wave of applications in the first year of the three did not come, except perhaps in the big city areas. In fact, in the sparsely populated areas the application rate is remarkably low.

Figure: Permit applications for 3G masts

First received permit application
County of Blekinge

Municipality	First Received
Karlshamn kommun	11 Oct 2001
Karlskrona kommun	8 Apr 2002
Olofström kommun	28 May 2002
Ronneby Kommun	26 Mar 2002
Sölvesborg kommun	11 Apr 2002

⁴⁷ Alingsås, Göteborg, Härryda, Kungälv, Partille, Stenungsund, and Öckerö, consisting of an area of only 2689 km², but with a population of 665 988, giving about 248 persons per km². Statistics from www.SCB.se *Folkmängd i riket, län och kommuner 30 september 2006 och befolkningsförändringar kvartal 1 - 3 2006 and Kommunprofiler.*

4.2.2 2002: The roll out speeds up

The second year of the three, 2002, showed an increase in permit applications throughout the country. The national data from the PTA questionnaires however only allow a detailed display of permit applications of the first 6 months of 2002. Nevertheless, when looking at the same municipalities and areas as above it is now that we see that some more densely populated areas also in the northern county are targeted by 3G mast permit applications. Still, Västerbotten holds a few of the least populated municipalities of the entire country. The increase is with about 30 times compared to the previous year, if the numbers are split in two halves.

Figure: Permit application for 3G masts

First half of the year 2002 County of Västerbotten

Municipality	Received
Bjurholms kommun	0
Dorotea kommun	0
Malå kommun	0
Nordmalings kommun	17
Norsjö kommun	0
Skellefteå kommun	84
Storumans kommun	0
Umeå kommun	50
Vilhelmina kommun	0
Åsele kommun	0
Total	151

If we continue the comparison with the seven municipalities in the big city area of Gothenburg that answered the PTA questionnaire in 2003, we see that the first six months of 2002 holds about 165 3G mast permit applications. This represents an increase of more than twice the number compared to the year before (if it's split in two equal halves). So in 2002 the building permits are applied for also in the northern parts of Sweden, although most likely targeting the more densely populated areas. In our case for comparison this is represented by the municipalities of Skellefteå and Umeå, as compared to the total lack of operators' interest in for instance Dorotea and Vilhelmina.

Figure: Permit applications for 3G masts

First half of the year 2002 County of Västerbotten

Municipality	Received
Alingsås kommun	11
Göteborgs kommun	68
Härryda kommun	32
Kungälv kommun	ca 30
Partille kommun	8
Stenungsunds kommun	10
Öckerö kommun	6
Total	ca 165

In Blekinge the 3G mast permit application boom happened in April 2002. The difference in the numbers in the table to the right showing the permit applications of Blekinge in the first half of 2002 suggests that there could be some cases missing in the Blekinge data, or that there could be some uncertainties in the reported figures of the PTA questionnaire data. Nevertheless it seems that 2001 was a year of planning, for the operators, and with attention paid mostly towards the big city areas. An attention spreading towards other densely populated areas in 2002. When looking at the applications received in the municipalities of Blekinge, the spread over the two halves is about the same over the county.

Figure: Permit applications for 3G masts

First half of the year 2002 County of Blekinge

Municipality	Received
Karlshamn kommun	15
Karlskrona kommun	28 (30)
Olofström kommun	4 (7)
Ronneby kommun	43 (41)
Sölvesborg kommun	2 (12)
Total	92 (105)

(numbers within parenthesis from Temo, the others from Blekinge data)

It is during 2002 the operator started to express a worry that the permit processes are slowing down the roll out. Yet, the permit application data does not really reveal an intense rate of applications, especially not during 2001, and early 2002. Still, Tele2 seemed to expect, or at least suspect (according to an interview with the CEO) a delay as early as in January 2002.

(Dagens Nyheter 21 Jan 2002). During the spring of 2002 the Post and Telecommunications Agency denied that the licence conditions would be changed regarding the deadline, which had been discussed in media (PTA press release 29 May 2002 and 16 July 2002, see for instance article in DN 18 April 2002 “3G delayed at least one year”, author’s translation).

Figure: Permit applications for 3G masts

Year 2002	
County of Blekinge	
Municipality	Received
Karlshamn kommun	47
Karlskrona kommun	53
Olofström kommun	24
Ronneby Kommun	49
Sölvesborg kommun	ca 12
Total	ca 185

Orange was the first operator formally applying for an extended time limit in August 2002, followed by Vodafone in September and Hi3G in November, and Svenska UMTS-Licens AB (Tele2/Telia) in April the following year. The operators’ requests were all denied (PTA decisions of 30 Sep, 25 Nov 2002 and 14 May 2003). The operators did all point out the municipal permit handling process as being slower than expected. The thesis returns to this key question of the 3G infrastructure roll out below, after the third year of the roll out is outlined and the following comparison of coverage data.

4.2.3 The year of 2003

There are still no figures showing the coverage over the country, at least no data available for the public, although the PTA and the operators have meetings where the operators present the roll out status during this time. The national permit process data that the PTA collected via Temo does not cover 2003 so here is concentrated on the Blekinge case, for now. The data reveal that the permit application rate has slowed down again. For the entire year only about 50 3G masts were applied for in the municipalities. Whether this is a representative trend for the country is hard to say. Of the 50 applications 48 (96 %) were received to the municipalities before October. 2003 is the year when Orange tries to transfer its licence twice, likely hoping to be able to sell it, but is stopped by the PTA. The period following after the promised reach of coverage of the licence conditions is an interesting period. All operators failed to fulfil the licence conditions regarding coverage by the 31 December 2003. They had all applied for a postponed deadline, they had all referred to a slow municipal handling process as a circumstance that could not have been foreseen by the time of licence allocation, and they had all been denied in their demands by the PTA. Before we turn to the data showing the municipal permit process length, in order to see if the operators’ lack of coverage could be explained by a slow municipal handling, we turn to the coverage data, that the operators had to report in the beginning of the year 2004 regarding 3G coverage by 31 December 2003. This may indicate the how the operators’ coverage strategies were, and therefore help to answer the question of the importance of the municipal handling process in the infrastructure roll out delay.

Figure: Permit applications for 3G masts

Year 2003	
County of Blekinge	
Municipality	Received
Karlshamn kommun	3
Karlskrona kommun	24
Olofström kommun	4
Ronneby Kommun	16
Sölvesborg kommun	3
Total	ca 50

4.2.4 Coverage by 31 December 2003

The coverage of the operators infrastructure by the 31 December 2003, was lacking between 34 and 26 % compared to the licence conditions, with only three operators still participating in the development (Orange did not, in practice, participate any more, although still formally). Hi3G reported that the company covers 5 980 758 persons, which means that 67,5 % of the promised coverage of 8 860 000 is filled. Svenska UMTS-Licens AB (Telia/Tele2) reported that the company covers 6 559 087, which means 74 % of the promised coverage. Vodafone (later Telenor) reported that the company covers 5 849 883 persons, which means 66 % of the promised coverage. Orange did most likely not report at all, although the company could argue for that it had reached some coverage, through the agreement regarding collaboration with Hi3G and Vodafone. In addition to the reported coverage it is likely that the operators have some coverage where nobody lives, for example along roads and shopping malls. This is however not required in the licence conditions.

Depending on how the coverage is spread throughout the country, the operators' intentions of fulfilment of the licence conditions can be interpreted. An honest intention to cover all of the populated areas in accordance with the licence conditions would lead to an increase of applications in the areas that was avoided in the early days of the three year period. One assumption is that the handling process is likely to take about the same time all over the country, or at least not differ significantly. Below is shown the length of the process in the Blekinge municipalities, as well as the national mean for year 2001 and 2002.

When the coverage differs greatly between the big city areas and the sparsely populated areas, the reason for this is not likely that the handling process has hindered the operators' roll out in these regions. When returning to the comparison between the area in Västerbotten in the northern parts of Sweden and seven municipalities in the Gothenburg big city area of the west coast, the coverage by 31 December 2003 is as follows (see PTA 10 Mar 2004).

Table: percentage of coverage over populated areas per municipality per 31 Dec 2003

Within County of Västerbotten	Municipality	Hi3G (3)	SULAB (Tele2 and Telia)	Vodafone
	Bjurholm	-	-	-
	Dorotea	-	-	-
	Malå	-	64	-
	Nordmaling	-	47	-
	Norsjö	-	35	-
	Skellefteå	53	71	54
	Storuman	9	-	9
	Umeå	72	87	72
	Vilhelmina	-	-	-
	Åsele	-	36	-

The lack of coverage is striking. The higher SULAB coverage is likely a consequence of that Telia and Tele2 already had GSM infrastructure that could be used for 3G sites, with some additional equipment put up. Nothing in the PTA survey indicates that the sparsely populated municipalities had been so reluctant to the 3G development that they had stalled the roll out in this extreme extent. Further than that, it is unlikely that it by coincidence are the least commercially attractive municipalities – from an operator point of view – that at the same time has been the most reluctant and most permit hindering.

With the lack of coverage by the end of the prescribed period, for the whole country, combined with a higher coverage in the big city areas than in the sparsely populated areas, it is likely to assume that the 3G mast permit applications of the whole 2002 and 2003 will show a pattern of less permit applications in the sparsely populated areas. The coverage is not a consequence of a slow municipal handling process, it is a consequence of the operators not developing the 3G infrastructure in these areas. This is further supported by the comparison with the municipalities in the Gothenburg area, showing a striking difference in coverage (PTA 10 Mar 2004).

Table: percentage of coverage over populated areas per municipality per 31 Dec 2003.

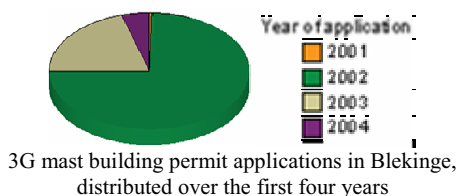
Big city area	Municipality	Hi3G (3)	SULAB (Tele2 and Telia)	Vodafone
Göteborg	Alingsås	69	76	69
	Göteborg	89	85	80
	Härryda	85	77	82
	Kungälv	70	78	64
	Partille	92	99	67
	Stenungsund	65	72	66
	Öckerö	76	63	66

The striking lack of coverage of the less populated of the two areas compared (see table) indicates that the operator argument that it is the slow municipal permit process that has hindered the construction and reach of coverage simply is not the whole truth of the lack of coverage. The more likely reason is that the operators were not willing or able to fulfil the promise in “the beauty contest” and focused on building the infrastructure where the return of the investment was likely to be the highest, namely in the big city areas. The argument that the permit processes hinder the construction is in this context only a reason given in trying to avoid the sanction that the PTA could impose on the operators when not fulfilling the conditions of the licences. When looking at the Blekinge coverage by 31 December 2003 the coverage is comparable to the Gothenburg municipalities.

Table: percentage of coverage over populated areas per municipality per 31 Dec 2003.

County	Municipality	Hi3G (3)	SULAB (Tele2 and Telia)	Vodafone
Blekinge	Karlshamn	84	92	85
	Karlskrona	64	71	69
	Olofström	34	85	35
	Ronneby	71	71	79
	Sölvesborg	71	98	71

3/4 of the permit applications in Blekinge until 2005 are from 2002. Why, in the light of that the coverage was not reached in time, did the application rate slow down? The operators, it seems, did not invest in the infrastructure in accordance with the licence conditions.



4.2.5 Coverage by the end of 2006

Almost three years later, the full coverage of the licence conditions was still not reached. On 1 December 2006 Telia Sonera and Tele2 (SULAB) reported to the Post and Tele Agency that their common net had reached the coverage of 8.860.000 inhabitants of Sweden, which was required to fulfil the licence terms. The coverage, by this operator was reached three years too late, and the other operators had still to fulfill the coverage of the licence conditions.⁴⁸ In 2 May the same year, only seven months earlier the SULAB coverage in Blekinge looked like this (PTS report of 8 June 2006).

Table: Coverage per municipality 2 May 2006 (of 8 860 000), as reported by the operators.⁴⁹

Municipality	Inhabitants by 31 Dec 2005 (SCB)	Hi3G	SULAB	Telenor
Karlshamn	30 915	99 %	95 %	97 %
Karlskrona	61 347	88 %	80 %	97 %
Olofström	13 409	98 %	76 %	98 %
Ronneby	28 346	94 %	86 %	97 %
Sölvesborg	16 526	98 %	99 %	98 %
Sum: Blekinge county	150 696	140 509	129 479	146 437

There is still quite a lot missing of the promised coverage, especially in Karlskrona, Olofström and Ronneby. The reasons SULAB could make such an improvement in the coverage over the following seven months are mainly two, above the fact that they rolled out more base stations, a fact that can not explain the increase alone.

First, the PTA decided to lower the pilot signal when the first licence conditions ran out by 1 July 2006. This meant that the overall national coverage of all operators was increased from between 93 and 94 % to about 98 % of 8 860 000 covered persons overnight, without any new base stations put up. The other is the fact that coverage is measured on this number of persons, 8 860 000, which equalled around 99,98 % of the population by 31 Dec 1999, not in 2006. And the fact that the population grew, and the densely populated areas grew the most, lead to a higher percentage. Instead of pushing coverage in the investment expensive areas where only a few lives, the population to some extent moved in under the coverage. This is the reason the coverage can be a little less in the sparsely populated municipalities as long as the densely populated are highly covered. This can be seen in the coverage percentage of SULAB in Blekinge by 31 Dec 2006, when the coverage requirements of the licence conditions were fulfilled, nationally (Covered persons from PTA 24 Jan 2007, and inhabitants from SCB by 31 Dec 2006 – the PTA report used data representing 31 Dec 2005).

⁴⁸ <http://www.pts.se/Nyheter/nyhet.asp?Itemid=6243>

⁴⁹ PTS report of 8 June 2006, *Befolkningsäckning per kommun den 2 maj 2006 baserat på 3G-operatörernas inrapporterade uppgifter*. See www.pts.se

Table: Coverage per municipality 31 Dec 2006, as reported by SULAB.

Municipality	Inhabitants by 31 Dec 2006 (data from SCB)	SULAB covered individuals	SULAB coverage in percent
Karlshamn	31 179	30 666	98,4 %
Karlskrona	61 844	60 270	97,5 %
Olofström	13 355	12 360	92,5 %
Ronneby	28 443	27 802	97,7 %
Sölvesborg	16 615	16 482	99,2 %
Sum: Blekinge county	151 436	147 580	Mean: 97, 1 %

It is a fact that the sparsely populated areas are expensive to cover, with a little effect on the percentage, the share of the total. With the coverage tied to a fixed number of individuals rather than a percentage of the population was therefore beneficial to the operators under two circumstances: the population grew, and this requires time, the more extra time, the better. This is an extra benefit the operators gained with the unsanctioned postponement of the reach of coverage, which stands clear when looking at the coverage data of the reference municipalities in Västerbotten, by the time SULAB had fulfilled the coverage requirements of the licence conditions, 31 Dec 2006.⁵⁰

Table: Coverage over populated areas per municipality by 31 Dec 2006 (PTA 24 Jan 2007)

Within County of	Municipality	Inhabitants by 31 Dec 2006 (SCB)	SULAB covered individuals	SULAB coverage in percent
Västerbotten	Bjurholm	2 541	2277	89, 6 %
	Dorotea	3 069	1742	56, 8 %
	Malå	3 348	2937	87, 7 %
	Nordmaling	7 426	6672	89, 8 %
	Norsjö	4 437	3424	77, 2 %
	Skellefteå	71 966	69043	95, 9 %
	Storuman	6 432	3876	60, 3 %
	Umeå	111 235	108 761	97, 8 %
	Vilhelmina	7 280	4603	63, 2 %
	Åsele	3 271	2587	79, 1 %
Total		221 005	205 922	Mean: ~93 % (individuals)

Note that this is when the coverage requirements of the licence conditions are fulfilled. Despite the total percentage of about 93, the fact that five of the 10 have a coverage on less

⁵⁰ The same municipalities in Västerbotten are chosen for the example to be in line with the examples from above, where the municipalities represented the ones that had answered a PTA questionnaire.

than 80 % shows that the high coverage of the more densely populated municipalities, Skellefteå and Umeå, shows that the coverage conditions allows low coverage in sparsely populated zones without the total coverage being especially low. This is not how the infrastructure roll out was described to become during 1999 and 2000.

Table: Coverage over populated areas per municipality by 31 Dec 2006 (PTA 24 Jan 2007)

Big city area	Municipality	Inhabitants by 31 Dec 2006 (SCB)	SULAB covered individuals	SULAB coverage in percent
Göteborg	Alingsås	36 481	33 968	93, 1 %
	Göteborg	489 757	474 641	96, 9 %
	Härryda	32 395	31 904	98, 5 %
	Kungälv	38 899	38 230	98, 3 %
	Partille	33 614	33 043	98, 3 %
	Stenungsund	23 190	22 867	98, 6 %
	Öckerö	12 229	12 231 ⁵¹	100 %
Total		666 565	646 884	Mean: ~97 % (individuals)

When looking at the same figures of the municipalities of a big city area we have followed above, the figures support the thesis that the real coverage of the populated areas are more like 97 % than the 99,98 % that so extensively was discussed around the time for licence allocation and directly after.

4.3 Time aspect of the building permit process

Eventhough a slow municipal handling of the 3G mast permit applications can not explain the big difference in coverage between the big city areas and the sparsely populated, it may still have affected the over all roll out, it may still have been a fact. To be able to shed some light on this question empirically the Blekinge data base and the PTA questionnaires of 2003 have been used. When Hi3G, Vodafone, SULAB, Tele2 and TeliaSonera in 28 June 2004 applied for a change of licence conditions regarding coverage deadline, and pilot signal strength, the operators argued that a number of reasons have made the permit processes slower than anticipated:

“Due to the public debate regarding the effect of the base stations on the environment, culture and nature values and the fear of electromagnetic radiation, the handling and decisions of the building permits has been taking a significantly longer time and resulted in more denials than estimated.

⁵¹ This number has most likely been counted based on the population figures by 31 Dec 2005, where it represents an exact 100 % of the Öckerö population. During 2006 has however the population decreased by 2.

This has also lead to a difficulty for the operators to enter into lease or rental contracts at reasonable conditions with land owners. These circumstances have not been able to foresee. The consequence of this is that the operators not have been able to expand [the infrastructure] as decided, and that the 3G nets continually has to be re-planned depending on in what areas building permits and land contracts has been reached” (PTA decision of 7 Dec 2004, p 4, author’s translation).

Were the permit processes exceptionally slow? What “circumstances” has not the operators “been able to foresee”? Did the operators expect to get an exceptional treatment when it comes to the permits? This will be answered through an empirical analysis, partly from a display of how the 3G antenna building permit applications developed over time. According to the national questionnaires the mean permit process time was 12 weeks in 2001, which increased to 13 weeks in 2002. Two thirds of the permit processes are completed in 15 weeks. The last third however demands 16 weeks or more.

How long was the mean time (in weeks) for building permit processes regarding 3G masts that were completed in 2001 or 2002?

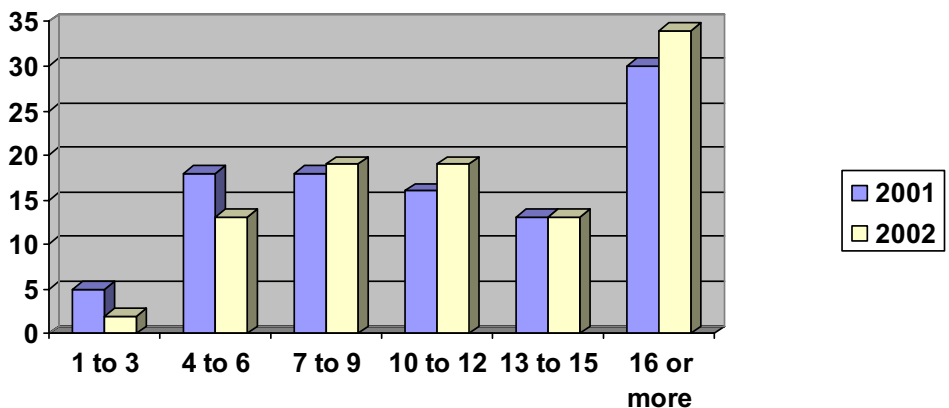


Figure: In percent of the municipalities that had applications (PTA 2 April 2003, p 13, author’s translation).

About 1/3 of the municipalities had a mean time on the handling process that was 16 weeks or more. On the other side, about 70 % of the municipalities had a mean that was less than 16 weeks. One can not tell from these numbers if it is the appealed processes that take time, or how much the handling process in itself, before the municipal decision comes, affects the mean values.

4.3.1 Blekinge

The Blekinge data can be used as an interesting comparison since this data is based on the quantitative measuring of the actual documents, unlike the PTA questionnaire that can be seen as an estimation of the local planning officers. In Karlshamn, Karlskrona and Sölvesborg there has mainly been one handling officer dealing with the 3G mast permit applications. In

Ronneby the case documents do not clearly reveal who has handled the cases, and in Olofström there have been different handling officers, although with more focus on one.

In Karlshamn all applications are handled on the housing and building committee meetings, with a few exceptions when awaiting decision from other instances. Karlshamn has a mast policy, and the building permits are not in force until the answers from County Administration, the Civil Aviation Authorities and the Armed Forces have been received. Karlshamn has 51 permit application cases between the first application of 11 Oct 2001 and the last of the Blekinge data of 9 Sep 2003.

In Karlskrona the mast permit decisions are in most part delegated from the housing and building committee, meaning that the handling officer decides and then informs the committee. Karlskrona has some policy directives for decisions regarding 3G masts. Karlskrona has 82 permit application cases between the first of 8 April 2002 and the last of the Blekinge data of 28 Sep 2004.

Olofström has 30 permit application cases between the first application of 28 May 2002 and the last of the Blekinge data of 30 Aug 2004.

According to the Ronneby mast policy a photographic montage should be handed in by the operators to present localisation and design. No photo montage can however be found in the documentation. Ronneby has 71 permit application cases between the first application of 26 March 2002 and the last of the Blekinge data of 30 Aug 2004.

Olofström nor Sölvesborg has a general mast policy. The majority of decisions in Sölvesborg are taken by the committee, but a few cases have been delegated. Sölvesborg has 14 permit application cases between the first application of 11 April 2002 and the last of the Blekinge data of 5 March 2004.

The median time of the handling of permit processes in the five municipalities differ quite considerably between the fastest and the slowest. The mean time for the Karlskrona permit process is twice as high as the mean for Ronneby, both municipalities with a similar amount of permit processes.

Table: Handling time in weeks, of finished cases in the Blekinge municipalities.

Municipality	Mean	N	Std deviation
Karlshamn	21,334	44	12,6771
Karlskrona	26,895	61	16,9526
Olofström	15,270	28	4,3258
Ronneby	13,258	62	6,4074
Sölvesborg	23,750	12	13,4189
Total	19,874	207	13,1703

N is lower than the number of cases collected in Blekinge because this data naturally demand that the cases are closed, which not all cases are. In some cases the decision date is missing in the data.

The difference between the municipalities may have three main explanations. The organisation can be more or less efficient from municipality to municipality, and the data does not reveal if this is the case. Another reason can be that there are differences in the actual cases. Some types of cases are more commonly appealed and therefore demand a longer handling time. Some cases may qualitatively be more difficult and demand more investigation.

Table: Building permits of Blekinge 2001-2004

Municipality	Not appealed	Appealed	Appealed by operator	All
Karlshamn	33	15	3	51
Karlskrona	74	8	0	82
Olofström	19	6	5	30
Ronneby	63	7	1	71
Sölvesborg	10	3	1	14
Total	199	39	10	248

31 of the cases that were appealed against a permit were done in 2002. Nine permit denials were during 2002 appealed by an operator.

Table: Appealed building permit decision by year, Blekinge 2001-2004

	Not appealed	Appealed	Appealed by operator	Total
Year of application 2001	1	0	0	1
2002	142	31	9	182
2003	42	7	1	50
2004	10	1	0	11
Total	195	39	10	244

A third possible explanation is that there is a difference between the operators' applications. The material sent in varies in Blekinge between the operators, and between the different consultants that the operators have used. The interviews that were made in 25 municipalities for the PTA in 2003 support this. Many thought that the material often lacked or had incorrect data, and some thought that Svenska UMTS-nät AB (Telia/Tele2) had better applications than the others (PTA 2 April 2003a p 10).

Table: 3G mast permit handling time in weeks, in the Blekinge municipalities.

	N	Min	Max	Mean	Std. deviation
Handling time	207	0,3	98,0	19,874	13,1703

The permit process time in Blekinge range from 2 days (0,3 weeks) to 98 weeks, with a mean close to 20 weeks. The masts are often found to interfere with the landscape view, and often are put up in sensitive nature or cultural areas (PTA survey 2003a, p 14).

4.4 12:6 consultations in practice

As outlined in chapter 3, there is a parallel assessment to the municipal building permit at regional level according to chapter 12, section 6 of the Environmental Code. This is applicable for activities that “are liable to have a significant impact on the natural environment”. The section also states that “the Government or the authority appointed by the Government may also issue rules specifying the information to be supplied in such a notice”, meaning that the content of what is supposed to be sent in to the County Administration can be specified by, in this case the Environmental Protection Agency. In this subchapter the thesis focuses the empirical side of the 12:6 consultations, the law application.

On 26 June 2001 the Swedish Environmental Protection Agency invited the county councils to a seminar for discussion and information regarding the handling of consultations for 3G antennas. This resulted in a work group consisting of representatives from the Environmental Protection Agency, the county councils of Stockholm, Skåne, Västra Götaland and the county of Västmanland. This group was appointed to elaborate a proposal for what a report should contain according to chapter 12, section 6, of the Environmental Code. The group concluded that free-standing masts should be notified to the County Administration for the so called 12:6 consultations. The consultation should also be done even if there is a permit process (Emmelin & Söderblom 2002, p 41 f). The work of the group resulted in an extensive and rather ambitious list (especially in the light of what material the County Administrations actually received, later on) of information to add to the 12:6 consultation reports from the operators. In addition to the localisation information such as coordinates and map, the site should be described, mast height and type, description of the surrounding environment, the nature and cultural values of the area, the consequences of the mast site on plants and animals, landscape, reasons for the location, a commentary on alternatives of mast height and location etc (from 23 Oct 2001, see appendix of Emmelin & Söderblom 2002).

The 12:6 consultations have a different purpose than the municipal building permit process. To see the impact and application of the 12:6 consultations is of interest especially when it comes to studying the planning and environmental administrations as a whole, to see if the parallel processes to be uncoordinated, and therefore displaying deficiencies in the administration.

Table: 3G mast cases reported for 12:6 consultations to the Stockholm County Administration.⁵²

Year	Number of cases	Sites that has been prohibited
2001	108	2
2002	571	3
2003	181	3
2004	40 until and including August	0 until and including August

The rate of mast sites are prohibited by the County Administration following from the 12:6 consultations is low. Only 8 sites out of the 900 reported to the Stockholm County Administration was prohibited according to chapter 12, section 6 of the Environmental Code, which is less than 1 %.

⁵² According to web page of the Stockholm County Administration visited 20 Dec 2007. http://www.ab.lst.se/templates/InformationPage___4485.asp

4.4.1 12:6 consultations in Blekinge

In the Blekinge County Administration there has been one person handling all the 3G cases. For each case there has been a reference group from the cultural and environmental units at the County Administration. This group discusses the case but has not been able to visit each mast location, due to lack of time resources.

The County Administration does in general not comment on cases within detailed planned areas due to that the 12:6 consultation decisions are to be taken from a nature and cultural point of view, which is not seen as being as important inside this area as outside it. The first reported cases for 12:6 consultations came in to the Blekinge County Administration 11 April 2002. These were received from Avtalsbolaget (Svenska UMTS-nät AB) and contained nearly 40 sites which were added with some more, shortly thereafter.

No matter the extensive list of the working group of Environmental Protection Agency (from 23 Oct 2001, see appendix of Emmelin & Söderblom 2002) the first applications for 12:6 consultations in Blekinge the material only consisted of coordinates and the mast height, for each site. No description regarding the environment or performance was included. This means that there was a clear discrepancy between the minimalist approach regarding the data for the 12:6 consultations from the operators, which was accepted by the County Administration, and the list of requirements from the Environmental Protection Agency.

Both 3GIS and Svenska UMTS-nät send the application to the County Administration, the Air Navigation Agency (Luftfartsverket) and the Swedish Armed Forces for consultation, as standard procedure. It is only rarely that the following statements from the County Administration are negative from an environmental perspective according to these 12:6 consultations (see p. 6 of the appendix). The statements from the Air Navigation Agency and the Swedish Armed Forces are rarely negative to the permits as well. The Swedish Armed Forces usually collects a number of cases before they submit the statements all at once. The handling officer of the municipal building committee sends the documents to the Environmental Department for a statement out of an environmental perspective.

The County Administration case list for the 12:6 consultation cases does not match the one from the municipalities. By August 2004, 234 cases had been collected from the municipalities. 100 of these that are outside detailed planned areas and are not reported for consultation at the County Administration. Of these 100 only 12 have 12:6 consultation documentation that can be found in the municipal documentation.

Of the 134 cases by the County Administration 34 cases can not be found among the cases that have been collected from the municipalities.

The term “consultation”⁵³ could bring participative associations, but despite this the assessment is done at regional level, by the Country Administration, and the public has little to say about how the decision is to be taken. The consultation has an outspoken environmental emphasis, but radiation issues are not found to be a part of the decision. The radiation is defined as not hazardous as long as it passes under the standards put up by the Swedish Radiation Protection Authorities.

⁵³ “Samråd”, in Swedish.

4.4.2 Appealed 12:6 consultation decisions

How the line is drawn legally for who has the right to appeal a decision taken under these provisions is of interest from a participative perspective. As concluded in the legal chapter 3 of the thesis, this has been up for trial in a few cases. The decision can be appealed to the Environmental Court. The operator, that gets a negative decision, has a right to appeal the decision taken by the County Administration.

The legal practice accepts that those who has some kind of special right to the property, for instance being the owner, that the consultation decision concerns also has a right to be heard before the decision, see case in the Environmental Court of Vänersborg (M 5148-04, 22 April 2005), where the decision was appealed because the County Administration had not communicated the decision to the property owner, which lead to that the case was redirected to the County Administration.

The right to appeal a decision based on the 12:6 consultation likely requires that the person can be affected by the decision in the sense of being property owner, or with some special right to the land. This can be compared to a case in the Supreme Administrative Court that concluded the one who owns a property that is affected by a decision according to the Environmental Code has a right to appeal the decision if it negatively affects his or her legal status, for instance through limiting the possibility to use the property (RÅ 83 2:85).

In a case from the Environmental Court of Appeal (Case M 7839-03, 8 Feb 2005) a person appealed the Environmental Court decision to allow a 3G mast in accordance with chapter 12, section 6 of the Environmental Code. The person had no connections to property that was affected by the decision, and therefore not found to have the right to appeal the decision with references to public interest. This is in line with for instance municipal permit appeal. The Environmental Court of Appeal drew the line here, which

Note that if an operator seeks to construct a mast on another's property, the County Administrative decision has no legal implications when it comes to building permit or utility easement. This means that even if the County Administration sees no hindrance for a mast from a natural environment point of view, it does not necessarily bring that the mast is permitted by the Plan and Building Act (this is another, municipal, trial).

When it comes to appeal of the content of the decision, there are a few cases. The County Administration of Dalarna had prohibited a mast site on Sollerön (an island in the lake of Siljan) on basis of that the mast would harm the national interests in the area (the culture and nature environment). The decision was appealed by the operator, Svenska UMTS-nät AB, and the Environmental Court of Appeal revoked the County Administrative decision. The County Administration appealed this decision, and the Environmental Court of Appeal set the original County Administrative decision, which prohibited the mast. The court agreed that the mast would harm the cultural and natural environment, and concluded that other localisations were likely to be found for the site on the island (case M3825-03, 27 Nov 2003).

4.5 Utility easement in practice

By September 2006 less than 100 utility easement cases have been decided by the national Land Surveying Agency, the LSA, regarding 3G masts in Sweden.⁵⁴ The data is not easily collected since the LSA does not differ between 3G or GSM, or other telecommunication masts. A few examples can however be mentioned regarding the number of cases, which in Stockholm had been around 8, in Uppsala 1, Kalmar 0, Skåne 12, Västra Götaland 7 and Jämtland 1, until September 2006. In Blekinge there has been at least one case.⁵⁵ The handling officers of the LSA dislike the unpleasant situation of being in the middle of such a clear conflict as the one between the land owner that does not want a mobile site on its property and an operator that applies for utility easement to put up the mast on the same property. The land owners seem to generally think the utility easement renders a too low compensation (from interview).

The possibility for a utility easement decision for the operator that wants to put up a mast on other's property strengthens the operator's position in a contract negotiation with the land owner. This would mean that an amount of cases would never lead to an entanglement with the LSA since the land owner knows that the possibilities to avoid the mast is slim and the compensation from the utility easement decision is low (according to LSA about 10 – 15 000 SEK as a one time amount).

Even if the utility easement conflicts in the 3G roll out in Sweden have been quite few, many issues regarding compensation levels are probably solved through negotiation. But since the legal changes have changed the negotiation position for the land owners, it is likely that this side accepts lower compensation than what would have been the case if the utility easement alternative was closed for the operators. One case can here serve as an example.

The case regards a property in the municipality of Ronneby, in Blekinge. The mast site is located at a property through a rental contract which had a time limit that had run out. The land owner wanted the mast removed and the operator applied for utility easement and the decision of the Land Surveying Agency, the LSA, was in favour of the operator, Vodafone, which was liable to pay compensation of 11 000 SEK (about 1 150 €). Of these, the actual compensation for the mast site intrusion on the property was SEK 3000. This is the sum that is set to compensate for the reduction of the market value of the property, as a result of the utility easement (Section 13 of the Utility Easement Act referring to chapter 4 of the Expropriation Act). The property owner appealed the utility easement decision to the Land Court, which approved the utility easement but raised the compensation to SEK 171 000 (about 17 834 €), and ordered the operator to pay for court costs of the property owners (Case nr F 750-05, 14 Dec 2005).

Vodafone appealed to the Court of Appeal over Skåne and Blekinge. Vodafone demanded both that the compensation level for the utility easement should be like the original decision of The LSA, and that compensation for court costs should be lowered. Vodafone stated that the compensation should be decided from the value of the land as it has been used, namely as pasture land and field. The land owners stated that the compensation should be measured through a capitalisation of the future rental fees which they would receive for letting the site being used for mast purposes. The Court of Appeal agreed on the utility easement and set the

⁵⁴ Interview with Carl-Erik Sölcher, "Lantmäteriet", 27 Sep 2006.

⁵⁵ Interview with Rudi Olvemyr, "Lantmäteriet", 28 Sep 2006.

compensation at the original level (SEK 3000) that was decided by The LSA (Case Ö 152-06, 24 Oct 2006).

The compensation levels are an interesting issue in itself, as mentioned in the legal chapter of the thesis, regarding the Expropriation Act, which is the legal regulation that controls how the compensation levels shall be decided in cases of utility easement. The numbers of cases that has been up for trial regarding compensation for utility easement has increased from 2000 to 2005. This may however include other cases than those regarding 3G mast sites.

Table: Legal cases in Land Courts regarding compensation via the Utility Easement Act.⁵⁶

Year	1975	1985	1995	2000	2005
Number of cases	5	12	15	4	17

It is however likely that the increase from 2000 to 2005 is depending on the 3G infrastructure development. During 2006 did the Court of Appeal (appealed Land court decisions) decide in three cases regarding compensation for GSM/3G sites.⁵⁷ One of them, regarding a location in Ronneby, Blekinge, will be studied in more detail in chapter 8. All three were appealed to the Supreme Court but the questions of review permit are yet to be decided.

4.6 Fear of radiation

The radiation has been an issue during the infrastructure roll-out. And the magnitude of the issue to come was not foreseen before the roll out. There has been a public debate, media has been very much involved, books have been written, non-profit organizations have been formed, web pages established and numerous articles produced in protest of the 3G development in Sweden. Much of this related to the feared hazardous effects, or health problems, related to the electromagnetic radiation of mobile telephony. The experienced lack of participation in the decision of where to set up the masts has lead to that masts has been sabotaged or simply sawed off by angered 3G antagonists, either from a more general view against the technology and its effect in the landscape, or of a more local NIMBY-approach.

The university of Örebro arranged a symposium with the theme “Base stations for mobile telephony, is the radiation a health issue?” (author’s translation) on the 25 April 2001, the same day as the Swedish radiation protection authority published the report Exposure to radiofrequency fields and mobile telephony (2001:09). The report was a result of a study that was motivated by the increased public debate regarding radiations issues related to mobile telecom (2001:09, p 4), among other things regarding the base stations. The report however refers to a radiation debate regarding GSM telephony, which shows that the radiation issue did not just emerge during the 3G development, but rather took a new turn (the results are not derived from studies on the 3G frequencies, since this infrastructure was not yet developed).

⁵⁶ Figures from SOU 2007:29, p 90.

⁵⁷ Court of Appeal over Skåne and Blekinge Case Ö 152-06, 24 Oct 2006, Göta Court of Appeal, case Ö 1719-06, 22 Aug 2006, and Svea Court of Appeal, case Ö 4136-05, 20 Nov 2006.

The Radiation Protection Authority has been criticized for its handling, or lack of handling, of the issue. The fear of the electromagnetic radiation could be seen also in the parliament. Several parliamentary bills during 2001, although rejected, regarded the radiation issue, and the precautionary principle of environmental law, the radiation standards by the radiation protection authorities, and so on (Betänkande 2000/01: MJU20).

Several municipalities responded to the public debate with talk of establishing “mast free zones” or “radiation free zones”, as a result of scepticism or a way to handle the radiation issue. This was the case for example in Karlshamn, Nässjö, Linköping, Norrköping, Helsingborg, Västerås, Arvika, Sunne, Emmaboda, Olofström, Rättvik, Sotenäs and Söderhamn (see Emmelin & Söderblom 2002, p 31-32).

Despite the information from Radiation Protection Authority and other national agencies, the municipalities are during the roll out facing the radiation fear in form of real as a resistance towards the mast building permits.

4.6.1 The radiation issue and the Planning and Building Act

The public fear of radiation faces the legal system and planning administration in the appealed permit processes. Before the permit is decided upon, known concerned parties are to by a written notification be given opportunity to express their opinion on a building permit (chapter 8 section 22 of the PBA). Both this chance to have a say, which is a part of the decision making material, and the actual appeals describes the legal application when it comes to the worry for radiation, and to what extent the issue can have an effect on the 3G mast roll out when it comes to the mast sites that require a building permit.

Since the permit processes in the municipalities not regularly are collected and arranged in any searchable form there is no way to say how many appealed cases there are based on fear of radiation, and the outcome of the processes. The Emmelin & Söderblom pilot study (2002) collected however the initial 3G mast permit processes in Blekinge, and the MiSt financed project which this study is part of continued until 2005. So, this Blekinge case can show how the permit processes progressed in this part of the country. In addition to this the two mentioned studies performed by Temo, on behalf of the PTA in 2003, brings valuable information of the national perspective.

According to the interviews of the municipal planning officers the radiation is not taken into account by the local planning officers, it is considered to be an issue for the Radiation Protection Authority. Some planning officers however claim that the public fear of the radiation affect them in their handling, for instance meaning that they tend to put more effort into the cases when the issue of public fear of radiation is at hand (PTA 2 April 2003a, p 14). The local politician claims that the public radiation fear is an important issue at the political committees.

4.6.2 Blekinge cases appealed due to radiation anxiety

Of the 39 appeals from non-operators at least 30 mentioned a fear of radiation as part of the reason to appeal. This makes it a very common reason, indicating on the importance and range of the radiation issue in Blekinge.

Table: Where radiation is part of the stated reason for appeal in Blekinge.

		Not due to radiation	Radiation is one of the reasons	Missing	Total
Appealed to County Adm.	Appealed, not operator	5	30	4	39
	Appealed by operator	10	0	0	10
Total		15	30	4	49

A few examples of how these processes have looked like follows. The case of a permit process of *Tararp 3:5* outside a detailed development planned area in Karlshamn was criticized by 11 neighbours on grounds that the 72 m antenna would not be aesthetically appealing and with regards to the worry for the negative effects of the radiation, referring to the PBA 2:2 stating:

“With due regard to natural and cultural values, planning shall promote a purposeful structure and an aesthetically pleasing design of built-up areas, green belts, routes of communication and other constructions. It shall also aim at promoting good living conditions from a social point of view, good environmental conditions and a long-lasting and effective management of land and water areas, energy resources and raw materials.” (Author’s translation)

The critique also developed an argument based on that the location could be changed without any negative effects on the radio planning of the network. The permit was denied by the municipal building committee on the grounds that alternative locations should be investigated. The operator (Svenska UMTS-nät) appealed the denied permit decision, to the County Administration, which approved the operators appeal on the grounds that there were no legal hindrances in chapter 2-3 of the PBA for the mast permit (24 Feb 2003). The neighbours, on their hand, appealed this decision on the same grounds as in the earlier critical statement, to the County Administrative Court which found that the case could be handed over to the Swedish Administrative Court of Appeals in Jönköping (2 Apr 2003). The Administrative Court of Appeals handed the case over (by decision 13 Oct 2003) to the government (Ministry of the Environment) for trial submitting a statement saying that there are no hindrance for a building permit, giving the County Administration and the operator right. The Government however laid down the decision of the County Administration which denied the appeal of the neighbours rendering in a building permit for the UMTS antenna for the operator Svenska UMTS-nät (23 June 2004).

This is an exceptional case, which took 2 years, 2 months and 14 days, from the permit application of 9 April 2002 to the decision of the Government of 23 June 2004. This shows that the time from an application to the final decision can be extremely long, if the process holds the right elements (appeal, and for instance redirecting decisions from higher to lower court). The interesting result of the case is however that it continued all the way through the court hierarchy and that the Government (this is from the time before the court hierarchy in this kind of cases was changed) found that the reasons the complainants, meaning the neighbours, bring forward, such as fear of radiation, do not constitute any hindrance for the

building permit. The Government did so by agreeing with the decision and motivation stated by the Swedish Administrative Court of Appeals in Jönköping (Kammarrätten), saying that the fear of electromagnetic radiation being hazardous is not a reason to deny a mast building permit, since the Swedish Radiation Protection Authority has stated that it is not hazardous as long as the radiation levels is below the set up standard values. The initiating appeal had come from the operator representative, since the municipal building committee had denied the permit.

Many neighbours have submitted critical letters regarding electromagnetic radiation, such as in the case of the antenna on *Froarp 1:2* in Karlshamn:

“We oppose this building permit due to the following reasons.

...

3. The radiation – [We are] missing an impartial information regarding the radiation.”

In the case of *Hästaryd 25:1* in Karlshamn, worried parents to a nearby elementary school collected name lists to prevent the mast to be built, and one of three reasons were the claimed negative effects of the radiation. The operator (3GIS) received the permit, on decision by the municipal architect, on delegation from the building committee, which later was appealed by the parents of the children in the nearby school. The appeal was denied by the County Administration on the grounds that the fact that the children went to school 70 metres from the mast did not make them, or their representatives (parents), concerned parties, and therefore they had no the right to appeal the decision of the municipal building committee.⁵⁸ This is of interest not the least from a participative perspective, returned to in the analytical chapter.



Hästaryd 25:1, Karlshamn

In the case of *Karlshamn 3:6* the working committee of the municipal building committee suggested a denial of the permit application due to the amount of critical statements from 13 concerned neighbours. The operators withdrew the application before the decision was taken.



Åryd 1:135, Karlshamn

The case of *Åryd 1:135* in Karlshamn is of interest due to that the case was appealed by neighbours to the mast site up to the County Administrative Court of Appeals mainly on grounds of fear of electromagnetic radiation. In this case the neighbours submitted a negative statement after the notice of the permit application for a 72 metre mast and two technical sheds. The permit application from the operator was initially denied by the building committee (11 Dec 2002). The committee addressed chapter 2, section 1 and chapter 3, section 1 of the PBA and referred to the closeness to buildings and the statements from the neighbours. The committee also

⁵⁸ Decision of 2 February 2004, by the Blekinge County Administration.

stated that cooperation between operators should be reached, by a permit application to Åryd 1:146.

The operator, Svenska UMTS-nät, appealed the decision to the County Administration, which re-directed the case back to the building committee on the grounds that the location could not be regarded as affecting the nature and culture values or the picture of the landscape to the degree demanded to deny a permit. Further, which is of particular interest, the County Administration stated that

“There are no scientific results supporting the assumption that the radio waves has an immediate or long term inconvenience or damage on humans” (27 Feb 2003, author’s translation).

The County Administration further stated that any such intended cooperation was not possible to manage through the legal framework of the PBA. This decision was appealed by the neighbours, but the appeal was rejected by the County Administrative Court (6 May 2003). This does not conclude the case, because of the re-direction of the case of the County Administration to the municipal building committee.

The municipal building committee decided however already 26 Mar 2003, with referral to the decision of the County Administration, to allow the building permit it earlier had denied. This permit the neighbours appealed (28 April 2003) to the County Administration, which again had to consider the case, but this time appealed from the neighbours, not the operator. The County Administration referred to its earlier argumentation for decision and denied the neighbours appeal of the building permit of the municipal committee (9 July 2004).

This decision was also appealed by the neighbours, this time to the Administrative Court of Appeals. The appeal was firstly based on the anxiety for the possible harmful effects of the radiation, and secondly on the possible decrease of property value due to the mast site.

“...we are afraid of the radiation the antenna will give us and the other inhabitants of the area.”

The appeal was written in a pleading manner:

“We now hope that you really understand our worries for the antenna you are to permit to be built, and believe and hope that you withdraw the intended building permit” (2 Aug 2004).

The appeal was denied by the County Administrative Court of Appeals, with referral to that there are no reasons to make a different judgement than the County Administrative Court had done earlier (18 Feb 2005).

In the case regarding a site on a small island, Aspö, outside Karlskrona in Blekinge the appeal was made by parents to children in a school 300-400 metres from the site, and a property owner neighbouring the site. The complainants were 17 families, with one person pleading their case. This case can exemplify the handling of the radiation in the permit processes. The case to a high extent regarded the right to appeal, and who has it, but the County Administration also referred in the factual matters to chapter 3, section 2 of the PBA, the

section that states that buildings shall be placed so that they do not “cause any other danger or significant impact to the surroundings”.⁵⁹

The County Administration concluded that the term ”significant impact” (”betydande olägenheter”) in legal practice is regarded to mean that there has to be concrete circumstances that speaks for that a risk of disturbance is at hand. The court continued with “the circumstance that the mobile telephony mast arouses discomfort or causes worry for disturbances can not be considered such significant impact that is intended in chapter 3, section 2 of the PBA” (CA decision of 4 May 2006, p 2, author’s translation). The County Administrative Court later dismissed the appeal by stating that the court agreed in the judgment the County Administration had done (Case 221-05, 27 Dec 2005).

This line is supported by a governmental decision (the government was part of the court hierarchy for some cases decided by the County Administration before 1 July 2003) of 4 Nov 2004, with references to the Administrative Court of Appeal (Case M2003/4037/F/P, M2003/4047/F/P, M2003/4048/F/P).

So, no appeal based on a fear of radiation has affected the outcome of the permit process. On the other hand when a permit is given, according to the Blekinge data, an appeal no matter for what reason, hardly ever lead to a revoked permit when the process was over. Of the 37 appeals that neighbours or other non-operators raised, only one lead to a denied permit in the end. In terms of participation, this is interesting, and addressed further below.

Table: Appeal compared to if final permit or not, Blekinge 2001-2004

		Not appealed	Appealed	Appealed by operator	Total
Finally a permit?	No	44	1	7	52
	Yes	141	36	3	180
	Not decided or missing	14	2	0	16
Total		199	39	10	248

This is the case for processes that has been appealed above the decision of the municipal committee. As regards the municipal decision, the neighbourhood opinion has been taken into account. It is seen for instance in the cases of Tararp 3:5 where the permit was turned down partly due to the notifications from the neighbours (although the operator appealed and finally got the permit), Uttorp 4:2 where the neighbours referred to fear of radiation, the negative effect on the landscape view and an assumed decrease of property value. The operator responded and suggested to move the site 100 metres, and the building committee granted the permit after this. In the case of Färmanstorp 4:1 a neighbour objected that the mast was too close, the radiation can be hazardous and the property value may decrease. The operator responded, altered the site location, and the municipal building committee stated that the permit could be granted after the relocation, the conditions in chapter 3 of the PBA was now satisfied. There are more examples of how neighbour objections participate in a “negotiation” of the exact location of the mast site.

Although the municipality not clearly acknowledges the fear of radiation as a reason to deny a permit, the examples show that the municipal planning is open for the opinions of individuals that are affected by the mast sites. It is however so that to listen to concerned parties before

⁵⁹ Legislation translated and released by the National Board of Housing, Building and Planning 2006.

the decision is within existing law, but to acknowledge radiation fear is outside existing law. The examples however point in the direction that exactly where this line is drawn is not the most pressing issue in the local planning, but in the legal process which may follow in an appeal, which demonstrates the binary way in which the legal decision is taken.

4.6.3 The radiation issue and the Environmental Code

Apart from the 12:6 consultations that concerns the impact on the natural environment, in its visible or aesthetic sense, the question is if the precautionary principle is applicable on the 3G mast activities or not.

The precautionary principle can, as mentioned above, in Swedish environmental law be seen in the provisions for someone performing activities applicable to the Environmental Code, 2 chapter, section 3, which has to take precautions “as soon as there is cause to assume that an activity or measure may cause damage or detriment to human health or the environment.”⁶⁰

There have been several 3G mast building permit appeals in Blekinge that refer to the precautionary principle and the municipal responsibility to use this principle with references to the uncertain scientific status regarding if the radiation is dangerous or not. Some refer to the further definition of what environmentally hazardous activity is, that can be found in chapter 9, sect 1 of the Environmental Code, and the definition of the term “damage or detriment to human health” which is found in chap 9 sect 3. None of these appeals have had any success on this point.

On the Environmental Code side of the environmental administration a case from 12 October 2005 the Environmental Court of Appeals opens a tiny gap regarding the legal perspective on the radiation being hazardous or not, as well as discussing the psychological side, the fear of the radiation. The Environmental Code does however also regulate the environmental supervision duties of the municipalities. The municipality supervises that the activities permitted under the Environmental Code are run according to the provisions, and for instance the activities that are hazardous or detrimental to human health or the environment. During the roll out of 3G infrastructure there has been a single case of extra interest in relation to this. The following aims to address the more important aspects of this case.

The case started with the operator Svenska UMTS-nät by the environmental committee of Landskrona municipality being obliged to hand in a detailed map over all the base stations that send and receive electromagnetic radiation for the UMTS system within the municipality. The committee referred to chapter 26, section 9 and section 21 of the Environmental Code.

The decision was unsuccessfully appealed to the County Administration by the operator. The County Administration considered the information to be of significance to the Environmental committee’s supervision, for instance regarding the threshold values of the radiation. The decision was appealed once again by the unsatisfied operator, and the Environmental Court of Växjö on 13 Sep 2004 ruled out the possibility of 3G base stations being regarded as an activity causing damage or detriment to the environment (Case no M 3411-04). It stated:

⁶⁰ The Environmental Code, as published by the Ministry of the Environment in 2000.

“The Environmental Court finds the radiation from base stations for mobile communications so weak that, according to contemporary scientific findings, it can not cause detriment to the environment. The activities that consist of operation of stations of this type can not therefore be included in the Environmental Code definition of environmentally hazardous activities.”

This had the direct effect that the operator did not have to map out the mast locations for the municipality, which the environmental committee of the municipality had demanded to fulfil its duties of supervision. The decision of the Environmental Court is in line with the legal practice so far had been supporting.

The decision was appealed again, this time by an unsatisfied municipality. The Environmental Court of Appeal revoked in 12 October 2005 the decision, stating that base stations *are included in the definition of environmentally hazardous activities* of the Environmental Code (Case nr M 7485-04). The Court firstly concludes that an activity that is included by any of the items indicated in chapter 9, s. 1 of the Environmental Code is to be characterized as environmentally hazardous, even if the activity is not hazardous to the environment. It is sufficient, regarding the actual constructions, that there is a matter of use of real property that can bring detriment to the surroundings. It is sufficient that *a risk* may exist.

The Court refers to a publication from the Swedish Radiation Protection Authority (Strålning från basstationer för mobiltelefoni, 2001:3, Aug 2003) in which it is stated that the threshold values are exceeded at a few metres distance from the radiating surface of the antenna. Even if the risk for hazardous effects caused by the radiation of the mobile base station is very low it, the Court considers, has to be regarded as such a risk for influencing the surroundings that is designated in chapter 9, s. 1 part 3 of the Environmental Code. This is a door opener. This is when legal practice lets the radiation emitting from 3G base station radiation to be a legally legitimate hazardous phenomenon according to the Environmental Code.

The Court also pointed out that the base station may cause psychological anxiety among the individuals living close by, which in itself is sufficient for that the base station should be regarded as causing detriment. This is the reason, according to the court, for that the base station is regarded as included in the Environmental Code definition of environmentally hazardous activity. This is not in line with how the fear of radiation has been regarded before.

In conclusion, this meant in the case that the mast activities fell under the scope of what the municipality should supervise from an environmental perspective. The municipality had demanded to receive a map from the operators over where the base stations were located in the municipality, which they did, following the court decision. But what does this mean, in a wider sense, for the assessments and permit applications regarding 3G masts? It is a bit unclear.

Does this mean that the view on the impact of the radio activity that a 3G mast has on its surrounding has changed from the initial view of the Radiation Protection Authority, SRPA, and the National Board of Health and Welfare? Does this mean that the court practice that, for instance, the Swedish Association of Local Authorities (the municipalities) lean against while supporting the municipalities on the question whether or not the precautionary principle or the health issues in the permit processes has changed? Had the Environmental Court of Appeals reached this decision a few years earlier, how would this have affected the construction via the local decisions of the permit processes?

4.6.4 Base stations that do not require a permit

As mentioned in the legal chapter there are unassessed base stations as well, base stations that do not require a permit. This means that they are not within the 12:6 consultations regulation because they can not be found to have “a significant impact on the natural environment”, which means that they are not especially visible, and most likely within populated areas, and “hidden” on the façade of a building. This further means that they do not “*essentially change their external appearance*” (chapter 8 section 3, the PBA) even if it is within a detailed planned area, and for this reason do not require a building permit to be mounted.

Naturally, base stations of this kind don't show in the municipal data, and data of these base stations demands an extra effort to be collected. This data has however not been collected in this study, and how frequent of these unassessed base stations are can not be said. It seems that the municipality, in its environmental supervision, can require the locations of all base stations within the municipality, from the operators, following from the decision of the Environmental Court of Appeal outline above.

What can be said is on the other hand that these cases, or rather the fact that some base stations are not hit by any regulation, is interesting in the relation to the radiation issue. The public participation does not exist for these base stations.

4.7 Indicators of handling of sustainability during the 3G infrastructure roll out

The intended 3G roll out, the design, and the outcome of it, the implementation, differs quite a lot in several aspects. During the implementation and infrastructure roll out a few more indicators of how sustainable development has been handled are found, except from the ones of the initial stage, that still are relevant but with changed emphasis. They are only briefly presented in this subchapter, and more thoroughly described in connection to the analysis in chapter 8.

4.7.1 Technology optimism and “leading IT nation”

The “leading IT nation” and to “be a forerunner” was still the legitimating rhetoric when attempting to facilitate the staggering roll out, in this case when it comes to letting the 3G masts to be included in the utility easement legislation (prop 2003/04:136, p 9, author's translation). The technology optimism present in the time prior to the so called beauty contest seemed however to have turned a bit colder during the roll out as the operators reported problems, the handset production was delayed, an environmentally based criticism was raised towards the number of masts, and the IT sector went into a period of decline as the bubble burst and companies turned bankrupt. The roll out slowed down all over Europe, the licence conditions in Sweden were changed when it comes to the coverage favourable pilot signal, although not formally the number of individuals to be cover or the deadline. The operators did all they could to avoid a direct collision on this matter with the PTA, stalling the process by appealing decisions and applying for changes.

4.7.2 Economic growth

The tables in 4.2.4 and 4.2.5 showing the coverage in the sparsely populated areas of Västerbotten by 31 December 2003 and Dec 31 2006 are examples on how the logic of the market has controlled the construction of the network infrastructure, despite the fact that the design had intended just the opposite. The operators have focused to apply for building permits where the most people live. The results are not astonishing, but remarkably clear. The licence conditions, which formally were set to satisfy other values, such as the social sustainability of a connectedness for everyone, regardless of where in the country they reside, is proven to be just formal, not actual. The driving forces of the operators have in this sense controlled the roll out, riding on the norm of profitability. It is not the operators' responsibility to support social cohesion and to create a regional balance, but it is the PTA responsibility to see to that the operators fulfil the assurances that gave them their licences.

4.7.3 What about the extreme coverage, beyond commercial reason?

The emphasis on a wide coverage was made early, and formed an important element of the 3G politics prior to the licence allocation. The design of the infrastructure roll out stressed the importance of making the technology available to essentially the entire population and to stimulate regional development by equitable distribution of the infrastructure rather than according to market logic of development. There was much debate around the 99,98 % of the population that would be covered.

The operators managed to hold out, unsanctioned by the PTA until the first licence conditions ran out by 1 July 2006. By this date the PTA lowered the pilot signal in some areas meaning that the overall national coverage of all operators was increased from between 93 and 94 % to about 98 % of 8 860 000 covered persons overnight, without any new base stations put up.

The “regional balance” and social cohesion aspects tied to the extreme coverage was not implemented in the way it was designed. The market logic had formally been locked in, but practically applied. No operator was sanctioned by the PTA, and the PTA was not sued by operators not given a licence.

4.7.4 Competition vs. environmental impact

The heavily stressed benefits of competition between four different infrastructures managed by four competing operators at least partly turned to concern for the impact in the environment, which was debated in the year, and continuingly, following in the licence allocation. Environmental concerns surfaced as a result of the decision, not as part of the decision (Emmelin & Söderblom 2002, p 22 – 24). The task of looking at environmental impacts of the system was given after the strategic decision had been given to a group of environmental agencies with the National Board of Housing, Building and Planning as co-ordinator. This work focused on mitigation through efforts at reducing the number of masts through voluntary cooperation. The national policies decided upon centrally and nationally only meet and have to be taken care of at the local level, mostly in the local permit process.

This leads to the assessment problem with an infrastructure system of a total of 10 000 masts that is assessed only one mast at a time.

When the planned roll out struck the landscape the environmental and planning administration was burdened, but it did not happen in 2001, like expected. It took until 2002 until the boom of mast building permit applications were received in the municipalities. The assessment is fractioned to one mast at a time, of a system of several thousands. This leads to a difficulty to overview the rolled out infrastructure. The inflexibility of the radio planning of 3G and the extreme coverage demands may have lead to local conflicts that likely to a higher degree could have been avoided by a more comprehensive and systematic planning, which had included more of the environmentally and locally important issues in addition to the ideal radio planning. It is interesting to see how the emphasis on competition and lack of environmental impact discussions of the 3G design turned into a concern for the operators' refusal to collaborate on mast sites.

The Minister of Information Technology in the year of 2003, Ulrika Messing announced in a press release in March that the Government wanted to reinforce the PTA possibilities to intervene "when the free competition is not working". This choice of words can be seen as marking this change of political attitude, responding to the public debate. How sincere the environmental concern was from the central, political arena is hard to tell, but it is a fact that the first legal changes had only little effect (forced mast cooperation between the operators), and in time for the other the coverage had almost been reached. This makes these legislative actions look more like political rhetoric than an actual intent to lessen the impact of the infrastructure on the environment by forcing the operators to cooperate. The change of rhetoric is however intriguing in relation to the competition emphasis before the roll out.

4.7.5 Participation

The participation in the 3G case is different in different levels. The participation in the implementation stages of the roll out is tied to the local context, most importantly to the building permit. The means that the possibilities to take part in, and affect the 3G infrastructure is closely tied to legally being defined as a concerned party in the assessment of the single mast. This also concerns the 12:6 consultations and the utility easement, and is often connected to the possession of property in connection with a mast site. In the utility easement it is attached to actually being the property owner of the intended mast location.

Although property owners neighbouring the mast site applied for are legally included, their appeal can be tried in fact, the outcome of this legal trials finally hardly ever result in a denied permit, no matter what the appeal is based on.

From a participative point of view *the complexity* of the regulations controlling the environmental management and planning is a problem, both for the public, and the operators. The assessments are parallel and not linked to each other formally, although the matters from a reasonable perspective as well could be. Both the authorities to contact differ, as well as court hierarchy and who is concerned party.

There have been only limited ways to participate above the level of one mast at a time. The legal changes that affected the roll out were voted upon in the parliament, and in a representative sense can one argue for that there has been a type of participation. There is

however an important aspect that fall aside the assessments under the mentioned permits, such as the fear or worry for radiation, further addressed below. In relation to this is also the fact of those base stations that do not fall in under any of the assessments, the base stations that do not require any permit, because they are mounted on a façade or alike.

4.7.6 The radiation issue

The radiation issue serves as an indicator of how relevant parts of both social and environmental sustainability have been handled. Permit appeal under the Planning and Building Act based on fear of electromagnetic radiation is always rejected in court, this is the legal practice. The court refers to that the radiation can not be said to be dangerous, meaning that it is referring to that the scientific evidence is not showing that he radiation is dangerous. The fear itself, no matter if the radiation is hazardous or not, meets no legal recognition.

The legal application of the court hierarchy design and appeal regulation leads to time-consuming processes if the parties appeal every decision and also decisions are redirected to a lower court. The legal application of chapter 3, section 2 of the PBA, stated that 3G masts was not found to “cause any other danger or significant impact to the surroundings”, from a radiation point of view.⁶¹ This is in line with a legal definition of the electromagnetic radiation from base stations as not hazardous. The electromagnetic radiation from 3G masts, and the public fear of it, has not been regarded as applicable under the scope of the Environmental Code, as long as the radiation standards of the Swedish Radiation Protection Authority are not violated. The precautionary principle is definitely a debated term in relation to the 3G mast site activities. The principle, as it is expressed in law, and its somewhat blurry borders in existing law is open for an interpretation that could include the mast activities. It is just that the legal practice so far has denied it, the Environmental Court of Appeal decision of 12 Oct 2005 not included.

The conclusion of this is that the radiation issue can not be said to have been handled in environmental management and planning relevant in the 3G case, it has rather been shut out, and avoided by all means. The question has been handled as an expert decision, not as a deliberative. From the Swedish environmental management and planning point of view those fearing radiation simply are wrong.

4.7.7 Tiering

The confusion between responsible authorities of how and where the impacts of the infrastructure roll out should be assessed was big in the first year. The lack of coordination between the agencies in contact with the infrastructure development can be seen as a problem of tiering, a term further outlined in chapter five below. The national decision has been facing implementation problems within the spatial planning system, for instance municipal mast free zones, a local initiative that conflicts the extreme coverage requirements. Aspects of tiering are further analyzed in chapter 8.8.

⁶¹ Legislation translated and released by the National Board of Housing, Building and Planning 2006.

4.7.8 Sum – from daring to deliberating?

The daring enterprise with many unknown factors of the Swedish 3G infrastructure roll out faced some setbacks in its implementation. Regarding the lack of coverage at the end of the formal, or intended, licence period, a few remarks can be made:

- The operators did not appeal for mast permits in the sparsely populated areas as much as in the big city areas. The lack of coverage in these areas can therefore not be explained by slow permit processes.
- Some mast site conflicts renders in very long processes in a rather complex court hierarchy.
- The operators benefited from the actual postponement of the coverage demands not only but the actual extra time, but also from the fact that the population grew.

The technology optimism found prior to the 3G decision likely had a setback during roll out, and the competition benefits so eagerly stressed prior in the 3G design was in practice toned down as environmental concerns were raised during roll out. In order to facilitate the roll out legal changes were made, including stronger PTA tools for forcing mast collaboration between operators, and including 3G mast sites in the “light” version of expropriation of the utility easement, by the loss of the property owners. Participation during roll out was found in the parliamentary discussions and voted legal changes – in its representative democracy version, but perhaps more importantly in the permit processes, both under the PTA and the 12:6 consultations, of the single mast site, where the key word is “concerned party”. The environmental management and planning depends on a legal system that is complex, which is problematic both to operators, other participants, as well as governmental and municipal authorities, as well as resource consuming and therefore inefficient. The non-handling of the radiation issue was a conflict that emerged during roll out, and this non-handling is further analyzed below.

With the radiation being legally defined out of the permit system, with reference to the Swedish Radiation Protection Authorities, as well as the 12:6 consultation of the Environmental Code, and there are base stations that are not visible enough to be an object of legal interest and therefore not assessed from a radiation perspective, an interesting conflict appears from the fact that the radiation has been such a big issue for the public - both as a reason for appeal, and as a basis for debate and protest. This alerts not the least the question of public participation in the 3G infrastructure development in Sweden.

The distorted sustainable development handling in the 3G design, where the ecological dimension remained unhandled, finds some sort of balance in the implementation stages to the extent of the single mast assessments. The vertical perspective however remains distorted or un-tiered since the extreme coverage requirements and fast roll out speed has pressured the municipal handling system, and undermined the local planning monopoly. The fact remains that the comprehensive impact of the system is not assessed, and the piecemeal assessment mast by mast can not balance this loss.

The indicators of how sustainable development has been handled raise further questions, and needs to be more thoroughly analyzed. However, to do this, a theoretical foundation has to be set.

PART TWO – THEORY

Governance of technological development in a spatial environment cuts through the fields of both the socio-legal sciences as well as planning theory. To be able to assess the legal design of the 3G decision when handing out licences to operators but more importantly the environmental management and spatial planning as far as it concerns the 3G case a review of planning theory is necessary. This will give a theoretical basis combined with the perspective on norms of sociology of law.

The development of the theoretical basis of the thesis has become necessary for the further analysis of the 3G case of Sweden. Theory is a way of understanding the world. Theory is a framework to organize facts and experience and interpret them in a systemic way. The way to organize and systemize, as well as the way to interpret, needs to be explained, in order to raise the level of knowledge produced to become scientific, and also to allow this knowledge to be criticized from more objective grounds. The thesis has to show on what theoretical grounds it stands when reaching its conclusions.

Scientific research in or sociology of law involves more than the identification of a topic and the selection and competent use of an appropriate method. Research is inevitably framed by conceptual and theoretical considerations, of which the research and analysis of a chosen topic will benefit, or even require being possible to perform in the first hand. The following sets of theoretical framework are divided into three main categories: spatial planning, sociology of law, norm science, and points of reference between these.

Both spatial planning and sociology of law, in perhaps slightly different ways, has been relating to the discourse of sustainable development. The summary of the chapter aims at a proposal of where sustainable development, spatial planning and sociology of law may converge, or offer understanding to the other. Both spatial planning and sociology of law are of an interdisciplinary character and have traditionally been open for external influence. Spatial planning has captivated the creativity of scholars and practitioners from different disciplines such as architecture, sociology, gender studies and political science (See for example Etzioni 1967, Huxley 2000, Falkemark 1999). Planning approaches have been inspired by theories on communicative action as well as the relations of power as presented by Foucault (Habermas 1984, 1987). Sociology of law on the other hand has a natural influence from both the legal dogmatic studies from one side and sociology and the social sciences from another.⁶² When attempting such an interdisciplinary approach as of this thesis one quite naturally begins with closing in on the identities of spatial planning and sociology of law, to depict what it is that makes a discipline to be a discipline, what it is that makes *these* disciplines to be *these* disciplines. As Kaplan puts it: “Obviously, any community, including a community of scholars, is bound by a circle of conventions” (Kaplan 1993, p 171). The philosopher Toulmin develops this further.

⁶² See the debate in Retfærd on Sociology of Law as ‘the stepchild’ of the two disciplines, beginning with Banakar 2001.

“...the primary thing to be learned, tested put to work, criticized, and changed – is the repertory of intellectual techniques, procedures, skills, and methods of representation, which are employed in ‘giving explanations’ of events and phenomena within the scope of the science concerned.” (Toulmin 1972, p 159)

In these sciences concerned the “mastering” of these techniques, procedures, skills and methods is essential if one wants to “attain membership in the discipline”, Kaplan comments.. Before turning to the discipline sociology of law, the thesis turns to planning theory, or the doctrine of spatial planning.

5. Spatial planning

Spatial planning, at least theoretically, often regards approaches to decision-making, stating who should participate in what decisions. The view on what ideal spatial planning is has changed through the years and naturally has been advocated differently between different theorists. 'Spatial planning' is however a wide term encompassing a range of activities at different levels, from having a connection to "societal planning" or "samhällsplanering", which is an even wider term, and to include a practical activity, the planning profession that is found in for instance the local authorities' housing or construction offices.⁶³ Added to this profession is an academic discipline more or less well defined, or eclectic, containing theories or attitudes regarding how Spatial Planning is done or should be done.

In spatial planning, there is reason to speak of the planning theory on one hand and the planner and the planning practice on the other. Planning practice has been described as "a complex practice not derived from theory" (Emmelin 2007). Planning is not the application of theory to practice. The distance between theory and practice in planning is the reason the following title holds the "self image of planning". That the social sciences could influence planning was realized early, but it was in the 1950's and 1960's the impact became clear. Economists contributed ideas about equity and public interest and about decision-making and analysis. Psychological knowledge as well as sociology and political science have influenced planning as well as architectural and aesthetic ideals. These disciplines, naturally, with their own classic thinkers influencing their discipline. This may suggest the disparate collection of influences within spatial planning. Spatial planning, it seems, is a lot, although probably not everything, to comment on Wildavsky (Wildavsky 1973).

5.1 *Post war social change and an image of planning*

The picture below suggests a renaissance for instrumental rationalistic theories, which Amdam and Veggeland develops and exemplifies with the construction of Gardemoen, the Norwegian airport outside Oslo, although with the note that the tendencies are not as strong as in the 1950-1960's. An example of instrumental and centralistic contemporary planning can in Sweden be illustrated by the 3G case which was a decision with strongly fixed variables regarding coverage and quantity of operators with partly an own physical infrastructure (Larsson 2006, Larsson & Åström 2007, Larsson & Emmelin 2007).

⁶³ The term "societal planning" or "samhällsplanering" occurs at least in Nordic planning literature and is wider than 'spatial planning'. See Amdam & Veggeland 1998, Henecke 2006, p 60 and discussion in Emmelin/Lerman 2006.

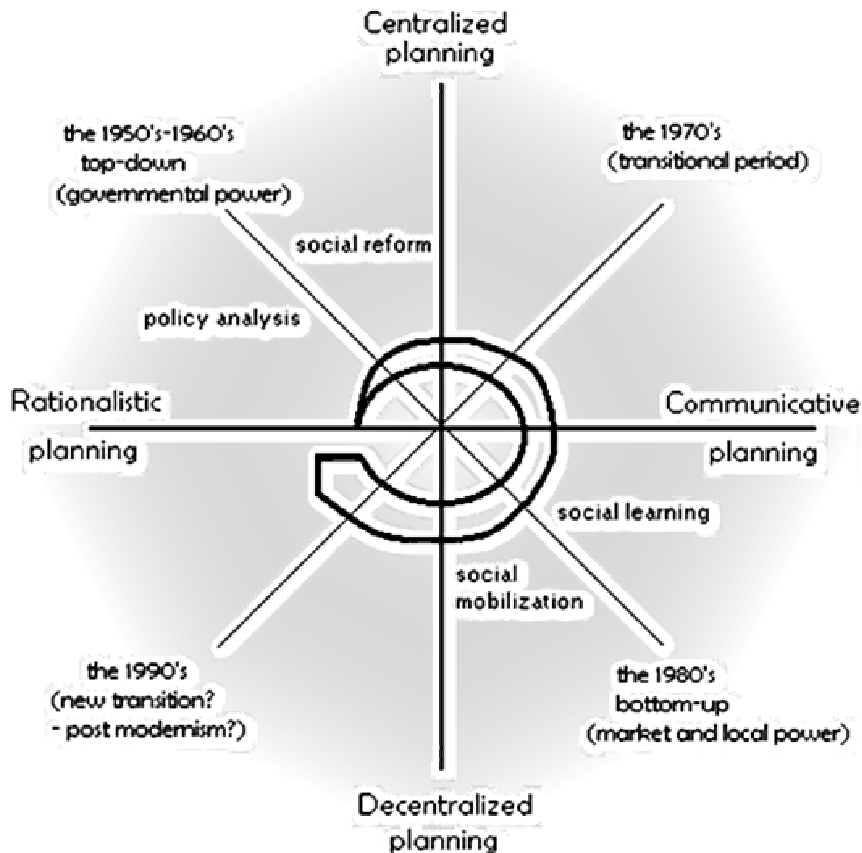


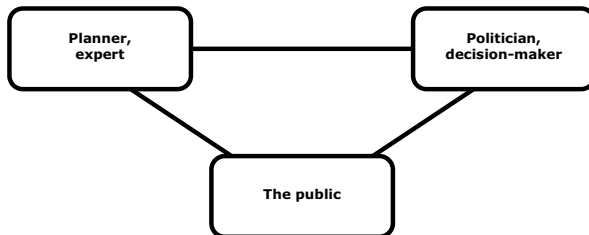
Figure: *Development trends in planning theory*, Translated from Amdam & Veggeland (1998), p 33.

Planning theories can roughly be measured on a top-down bottom-up scale. Friedmann focuses *guidance* versus *transformation* (Friedmann 1987). Guidance means in his definition a top down approach, that the powerful impose changes, assume control, try to grow stronger. This is where planning is an instrument to those who have power. The changes will probably firstly suit the powerful. Transformation means a down up approach, where social change is undertaken through communication at grass root level. According to Amdam and Veggeland the planning tradition offers a sliding transition between the two models (Amdam/Veggeland 1998, p 39). The difference can be seen as between instrumental action based on causal thinking and communicative action based on social rationality. Social rationality in a societal context can here be seen as reached through unbound communication between many participants. The planning theory is all about approaches on how the best decisions are taken, who should be included, and what type of knowledge should be the guide. Let us take a look in more detail on the strategic thinking behind decision making, according to the planning theoretical tradition.

5.2 Strategies of decision-making

The approaches to spatial planning presented below can be seen as a help to classify specific (empirical) decisions of a strategic character. The decision-making can be more or less legally regulated, and imply a type of approach with elements of another. It is shown that the public participation plays different roles in the approaches. The figures below are meant to show different levels of participation and a few fixed conceivable versions of the planning process, of which real processes can be more or less alike. The roles in spatial planning can generally be divided in three.

The roles of public planning (Amdam/Veggeland 1998, p 71)



The theories of spatial planning – the activity of presenting a possible future – focus to a great extent on strategies of decision-making: What is, and how do we reach the best decision? Early conceptions of both the 19th and the 20th century connected to planning regards utopian ideals; the idea that you can design an ideal end state. Idealistic political influences used planning as a tool for large scale societal development, at the same time as ambitious architects and planners like Le Corbusier widened the limits of architecture (Linn 1998, p 136 – 143).

5.2.1 Rationalistic planning

In the first post-war decades the instrumental rationalistic planning tradition was strong.⁶⁴ The rationalistic planning of the 1950's and the 1960's manifested itself in a centralistic planning where experts contributed information to the decision-makers who made the most rational choice based on the values of the decision-maker. As put by Etzioni:

“An actor becomes aware of a problem, posits a goal, carefully weighs alternative means, and chooses among them according to his estimates of their respective merit, with reference to the state of affairs he prefers.” (Etzioni 1973, p 217)

An important part in the process of planning and action is the flow of communication; where in the process it takes place, and between whom it takes place. The public is often excluded from the planning process, as in the instrumental rationalistic planning, whereas the politicians and the planners agree upon an action and then *informs* the public. This is the case

⁶⁴ One could start earlier in the Enlightenment in the last days of the 18th century in Europe which chiselled out the foundation for the development of spatial planning as we know it. See Amdam & Veggeland, 1998, p 34. The philosophy contributed with a strong belief in reason, rationality and logic at the same time as we shall remember that spatial planning partly has a natural origin in the early engineering and construction practice which as well can be seen as constituted out of objective arguments and rationality.

in a centrally governed process, where the experts and the decision-makers are in an alliance, and can be illustrated as follows:

One-way communication



If it is possible to ask questions and comment on the plan the figure needs to be increased to show a two-way communication. This is meant as a middle course where the power mostly still lies within the sphere of decision-makers and experts but the public can be asked to respond on a plan. The public may become passive informants with no real influence over the decision:

Two-way communication



The rational planning has a character of optimization thinking, presupposing that there are more or less correct solutions which can be reached through accurate investigation and expert calculation. The rationalistic planning became criticized for its focus on reaching an objectively best decision and lack of understanding for that the planning of reality depended on what perspective that was defining the need for planning.

5.2.2 Incrementalism and mixed-scanning

Incrementalism can be seen as a less demanding model of decision-making, outlined by Lindblom (Etzioni 1973, p 219). In the words of Etzioni the “disjointed incrementalism” seeks to “adapt decision-making strategies to the limited cognitive capacities of decision-makers and to reduce the scope and cost of information collection and computation” (Etzioni 1973 p 219). The incrementalist approach is described by Lindblom as a “muddling through”, and is developed as a describing theory for a continuing adjusting activity (Lindblom, 1959). You make up the road as you walk. Close goals instead of comprehensive, with a limited analysis. The successive composition reduces the need for theory. From the rational planning and the incrementalist planning Etzioni suggests a third: The mixed-scanning approach.

Mixed-scanning provides a particular procedure for the collection of information. The strategy combines a detailed examination of some sectors with a selected review on others (Etzioni 1973, p 224). The balancing of the two sides offers a possibility for the need, or the cost and the importance, of for instance to miss something in the selection process. If that cost is high more effort will be spent on the detailed examination. There is in other words room for allocation of resources depending on what type of object being planned.

5.2.3 Path dependency

Path dependency is a term not so often tied to a planning context, but can be mentioned in association with incrementalism. Incrementalism indicates that where a process starts is not assessed, but the process is in itself controlled or steered along the way. The type of decision making can be of low cost but as a down side suffer from lock in effects due to its path dependency.

The origin of the term lies in technological development, and has been used to explaining the survival of a less optimal technology when there are better solutions at a later stage. The earlier a decision is taken in a process the bigger the likelihood that the choice will be the standard for later solutions in the same process. The term is used to explain undesired lock-in effects and standardization processes, such as the keyboard layout, both regarding technological development as well as its connection to policy and law. David described the development of the keyboard layout in the 1860's to 1880's (David 1985), which has been criticized for being simply historically false (Falkemark 2006, p 42). Liebowitz & Margolis has investigated the QWERTY case, as well as other examples of path dependency which they have criticized (1996). Even though the QWERTY case may be false, the metaphor is easily understandable, and has lead to further theories within economics and political sciences.

Path dependency is a term used in economics and political science to describe the fact that the policy choices made when an institution is being formed, or when a policy is initiated, will have a continuing and largely determinate influence over the policy far in the history (Peters 2005, p 71 f.). The term was broadened to explain

The idea of path dependency is tightly tied to *transaction costs*. Transaction costs aims at the costs that are related to economic activities, in trade, for instance when a buyer and a seller is to find each other. The golden rule is here that the lower the transaction costs are, the easier to trade, and hence the more is traded. The market is partly regulated by transaction costs. Transferred to the discussion above, the existence of path dependency is closely related to the transaction costs of changing course, may it be in technological development, institutional or political change. Falkemark uses the term to show how an unsustainable transport system of today has partly historical reasons for its development (2006). Falkemark speaks in this context of *political transaction costs*.

There is reason to transfer the term and talk of *planning transaction costs*, in relation to what elements that are to be included in the basic data for decision making. At a later implementation stage, the choices made in the planning stage will show results. The more changes that have to be made in the implementation stage, the higher transaction costs, and probable critique aimed at the planning stage.

Different projects are differently path dependent. It depends on the character of the project. A tunnel project is for instance very path dependent to its nature. A half tunnel is useless. The project in itself can reach a movement, which can stretch before the actual implementation, through it, and the sum of decisions and hand shakes during the process creates a motion to a project, Baier describes a momentum or "normativity" in the Hallandsås railway tunnel project (Baier 2003), a momentum that may run over or exclude signs of warnings that the project may hold difficulties, a momentum that may make it hard for sceptics to be heard.

In the 3G infrastructure the planning transaction costs emerges when the planned mast sites reaches the environmentally protected areas, the cemeteries and the sensitive cultural

environment leading difficulties with building permits or prohibition in the regional 12:6 consultation process and local protests. Then the system has to be re-planned in the local context, a re-planning which may concern several base stations, due to the inflexibility of the radio system.

In short, “path dependency” describes how the set of decisions one faces for any given situation is limited by the decisions one has made in the past, even though past circumstances may no longer be relevant. In the 3G infrastructure planning perspective, the term describes that how and where you start your project will later affect where and what problems you will be facing. The radio planning that took place before the roll out would create unavoidable future mast permit conflicts, much due to the inflexibility of the system, from radio planning and wavelength reasons as well as policy reasons (extreme coverage requirements).

5.2.4 Collaborative planning

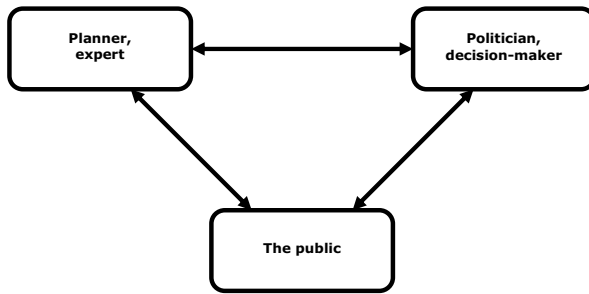
The planning doctrine of the western post war world has been taking many turns. Incrementalism questioned the system of the plan process. Implementation studies showed that planning is not about a hierarchic decision order, nor is it defined of clear goals and consensus. The communicative planning theory gives the planner a big significance when it comes to constructing the problems, informing stakeholders and attracting attention towards an issue (Khakee 2000 p 48-49).

Habermas inspired various theories based on the theories of communicative action (Harris 2002). In the 1980's the participatory ideas grew strong in planning theory advocating a deliberative democracy in decision-making (Nilsson 2003, p 57). The communicative turn in planning has dominated theoretical discourse of planning since the early 1980's, and has according to Tewdwr-Jones and Allmendinger been referred to as ‘collaborative planning’ in the UK literature and ‘deliberative planning’ in the US literature. What today is referred to as the communicative turn in urban planning is a range of different theoretical influences mixed together by Habermasian and/or Giddensian thinking (Tewdwr-Jones & Allmendinger 2002, p 206-207).

The collaborative planning insists in participation rather than representation, values the process rather than the result and consensus rather than compromise. Healey sees collaborative planning as a term closely related to democratic concerns of management, opposing more oppressive planning mechanisms and states that “[Collaborative planning] is about why urban regions are important to social, economic and environmental policy and how political communities may organise to improve the quality of their places” (Healey, 1997 xii). Collaborative planning is intended to serve as both a framework for understanding and as a framework for practical action.

Collaboration demands that all groups are actively participating in the process and can influence the actions based on the knowledge, predispositions and roles they have. Ideally the power is evenly divided between the groups and the information processes are communicated as an open dialog.

Collaborative planning



When the public can initiate and create plans which the governing sphere shall consider there is a form of limited participatory planning. The public can influence the result but does not have the final word of the process. This is the version that the permit process of the Swedish Planning and Building Act is an example of. Interest groups are to be informed about the process and receive an opportunity to influence it. The power is however unevenly divided since the actions are based upon the planners/decision-makers (or the system) premises.



In a collaborative process the issue of power is of interest. Trials with citizen groups or representatives are a way to practically try to reach a broad legitimacy and to gain a broad approval for a project.⁶⁵ Collaborative planning has been identified as a complex interweaving of two distinct bodies of theory to develop a form of model of practice (Healey 1997: xii).

5.2.5 Critique

The Foucaultian perspective has been imported into planning theory as both an alternative and complement to Habermasian communicative rationality (Harris 2002, p 30). The primary contemporary critique of the communicative action paradigm partly illustrates planning as an oppressive mechanism of social control. The relations of power need to be in focus. The policy making developed from communicative theory is affected by the power relations of the concerned parties. The process is, from this view, disrupted. Criticism from yet another direction comes from the ones claiming communicative planning theory for its apparent neglect of issues of structure and for its over-emphasis of the capacity of individual agency (Harris 2002, p 32).

Feminist critiques of urban planning have been around since the late 1970's. Planning was criticised for its gender-blindness, its unresponsiveness to local needs and its technical-rational orientation (Huxley 2002, p 136). As an alternative to the debates of modern/post-

⁶⁵ For an experiment, see the MiSt project *Exploring Strategic environmental assessment and public participation tools*, where a part in the project will evaluate public participation in a manner inspired by Habermas description of the discourse as a rational and ideal democratic dialogue (Wiklund & Viklund 2006). http://www.bth.se/tks/mist_eng.nsf/pages/84edea55a1b523dac1256e7b00316ec3!OpenDocument

modern planning theory and the problems of acknowledging difference, diversity and gender in planning practice Huxley offers a Foucaultian perspective. First she suggests that planning can be seen as a form of what Foucault calls ‘governmentality’, practices shaping the actions of others and strategies for the management of a population. Secondly, she asks, given that planning can be seen as a strategy for governing ‘the conduct of conduct’, what does this mean for i.e. greater attention towards women’s needs or for “dismantling the masculinist rationalities underpinning the planning project”? For Huxley the reason to see planning as a mode of governmentality is to open up its rationalities and effects to critical examination (note the opening for different types of rationalities).

5.2.6 Impact assessment

Environmental Impact Assessment, EIA, is according to Emmelin a “systemic approach to handling knowledge from complex scientific fields in planning and decision making” (Emmelin 1998, p 130).⁶⁶ The purpose of the assessment is to ensure that decision-makers consider environmental impacts before proceeding with projects. The use of EIA as a basis for handling conflicts fits well with collaborative planning (Sager 2001, p 206). Doctrine however addresses that there are problems in evaluating the use of the EIA (Emmelin 1998, p 130). In short, the good EIA...

...contributes to the representative democracy by increasing the legitimacy of the decision making process as a result of improved information flows from the affected people to their political representatives.

...EIA contributes to direct and deliberative democracy when arguments are tested in free and undistorted debate within the framework of the EIA process. And the bad EIA establish nothing more than a ritual (Sager 2001). There is reason to get back to this in the synthesis of the paper, where it is related to sociology of law and norm science.

The *Strategic Environmental Assessment* (SEA) is a system of incorporating environmental considerations into policies, plans and programmes, which is undertaken before the EIA. SEA is a legally enforced assessment procedure required by Directive 2001/42/EC (known as the SEA Directive). Note the Emmelin/Lerman discussion below on the environmental paradigm, where a calculating rationality with expert groups representing knowledge pervades, as opposing the communicative rationality of the plan-paradigm.

HIA, the health impact assessment, is an aspect of assessment that internationally has grown in importance the last decade or so. The HIA is a process that can be said to focus the social pillar of sustainability. For instance, the Swedish National Institute of Public Health (Folkhälsoinstitutet) has made a guide for HIA, as a complement to assessing the environmental effects of a project.

Within a framework of rational decision making a common conception of strategic decision making is one of a hierarchical system with an increasing level of detail as one move down to implementation and daily operation. This is termed “tiering” in the Strategic Environmental Assessment literature (Lee & Walsh 1992). The tiered system is assumed to be internally consistent and based on a scientific, calculating rationality (Sager 1994, Emmelin & Kleven 1999). There is reason to come back to this term in the 3G context below, especially as regards the implementation issues of the 3G design.

⁶⁶ EIA = “Miljökonsekvensbeskrivning”, MKB, in Swedish.

5.3 Two paradigms of governance

Environmental care and planning of land and water use are in some important aspects essentially different. Therefore, the Swedish system for environmental governance can roughly be said to contain two principal elements: environmental management and spatial planning with their respective sets of legislation – the Environmental Code and the Planning and Building Act – administrations and the constituent professions and professional cultures (Emmelin & Kleven 1999; Emmelin & Lerman 2006). It is useful to distinguish between two paradigms governing the respective elements. Emmelin/Lerman suggests a view of two leading paradigms behind the regulation and controlling of land use and the environment, two “philosophies of government”. The paradigms are named *Environment* and *Plan* (Emmelin & Lerman 2006, p 21ff. See also Larsson & Emmelin 2007). With these paradigms follow a mind-set, a way of approaching and viewing the world, affecting the issues of land use and environment in different, specific ways.

5.3.1 The environmentalist paradigm

The “*environmentalist paradigm*” springs out of the natural sciences. A decision is legitimate if it rests on sound scientific evidence. Expert knowledge and central overview is critical to “correct” decisions; indeed the notion of “correct decisions” in cases of conflicts of interest is one important figure of thought in the paradigm. Nature serves as a reference base, in the sense of such figures of thought as “natural” and “natural conditions”. These figures of thought reach into the pollution and environmental health discourses and are not confined to nature conservation. The paradigm leads to regulation taking its point of departure in nature and “natural states”. The limits to what nature can tolerate is an important concept in the Swedish environmental quality objectives. The need for sound scientific knowledge means that scientific expertise holds a key position in environmental policy. Legitimacy in the environmental paradigm is seen as stemming from scientific quality of the underlying information and the principles. The good and legitimate decision can be defined, and perhaps explained to the public, but not retrieved from it. It rests upon the best possible scientific judgement. In this view the health or status of the environment is something measurable, leading to a calculating rationality with expert groups representing knowledge, as opposing a communicative rationality.

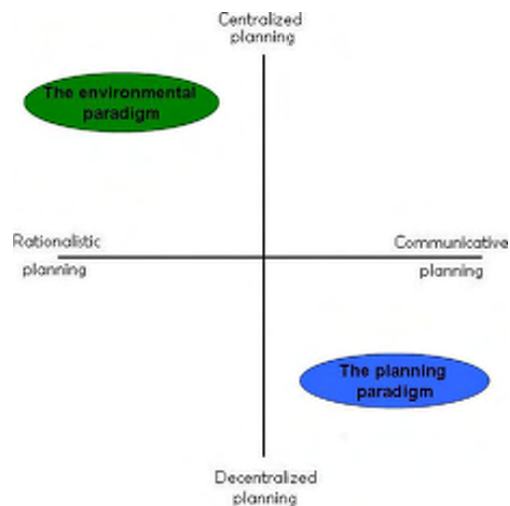
5.3.2 The plan paradigm

The “*plan paradigm*”, on the other hand, leads to the view that the government and control of transformation of land use rests upon the balancing of legitimate but not necessarily compatible interests. A decision is good and legitimate if it is reached through a process where the interests have been heard and that the balancing rests upon the decision of a representative and democratic assembly. Whether you lean on the one or the other paradigm will result in different answers for different matters. This could for instance regard how power should be divided between different societal organs, how expert knowledge will be balanced against local self-determination, the relation between politicians and the civil servants

(Emmelin & Lerman 2006), p 21-22).⁶⁷ A central conflict of interest is thus the one between public and private interests in land use. Although methods may vary over a wide scale from strictly rationalist to deliberative the ultimate decisions in spatial planning are political. Their proximate legitimacy is a claim to “fairness” and their ultimate legitimacy is democratic decision making.

5.3.3 Summing up with a picture

These two paradigms can be illustrated as a function of two dimensions. One is the central versus local. The other is the poles of decision rationality as between “calculating”/rationalistic and “communicative”, as used by Amdam and Veggeland above in a slightly modified way. Roughly, the paradigms can be seen as basic to respectively the Environmental Code and the Planning and Building Act. Different philosophies or what is considered to be the right knowledge reigns in the different paradigms. Many environmental issues are approached with the idea of that the impact has to be measured, quantified and expert-defined, even when it comes to clear value based issues such as aesthetic matters. According to Emmelin, many of the problems and complexities of Scandinavian planning and environmental management can be analysed in terms of the tensions between the two paradigms (Emmelin & Lerman 2006). The two paradigms may also be of use in understanding differences in perceptions of the role of environmental assessment and how this in turn influences implementation of directives and national legislation. Whether you lean on the one or the other paradigm will result in different answers for different matters.



The 3G case shows examples of decision making within both of the paradigms, and likely some of the conflicts within the 3G infrastructure implementation stages can be analyzed from this outlook. The 3G case are to a high extent controlled and affected by legal provisions and framework. How this legal framework functions in relation to what people feel and think is right is a question that addresses the interdisciplinary benefits of this thesis. The 3G case has above shown the difference between what was said and what was later done. This is a general implementation issue, the difference between the intentions and the outcome of either a project but also a legal rule. This, and how behavioural norms functions in relation to legal rule, is often the object of study in sociology of law.

⁶⁷ The delicate borderline between the politician and the planner in the municipality has been studied by Isaksson and Storbjörk 2005.

6. Sociology of law

When researching the empirical side of law, the distinction of law in books – law in action, often comes up.⁶⁸ The idea is then that there are two sides to law, one dogmatic, often written down, and one empirical, which you only can find outside the dogma, for it is the application of law, the consequence. In line with this the difference between intent and outcome, the difference of what you say, and what you then do, if you will. This composition has shaped the structure of this thesis, in two ways. The first regards the structure of the thesis itself but also as an approach on the 3G case, attempting to first line up the design of the Swedish 3G development, both legal as well as what was said and agreed upon, as opposed to how this turned out, and was implemented. The other lies in the theoretical viewpoint of sociology of law, where law can be found on one side and its application or consequence on the other. This relation, and the interaction of the two, goes beyond a strict legal dogmatic study of existing law. With this follows a critical view that takes its origin in social science, which needs to be additionally outlined in order to make a further analysis of the 3G case reliable and possible.

Sociology of law offers a set of perspective-giving tools in relation to law and legal institutions. Sociology of law offers a way to question legal matters from a social scientific perspective, with social scientific method and theory. In the governance and control over the spatial environment the legal frame plays a significant role. How the legal provisions are manifested in the factual sense, showing the empirical side of Law, is one of the important fields of study in sociology of law. The method of collecting permit process documents to find sustainable development *in practice* is a social scientific method. The documents are legal and corresponding to a set of rules and regulations which are analyzed along with relevant cases. The method of finding existing law is a legal dogmatic, but when questioning these findings from a socio-legal perspective the perspective of sociology of law is taken, which offers an analytical depth to the spatial planning context.

The Norwegian sociologist of law Thomas Mathiesen regards sociology of law's basic perspective to be the three aspects of the relation between society and the law (Mathiesen 2005, p. 18):

- 1) To what extent, and how, does society affect legal rules, court decisions and legal institutions.
- 2) To what extent, and how, do legal rules, court decisions and legal institutions affect society?
- 3) The reciprocal interplay of 1) and 2)

If you describe a science from the view of its scientists sociology of law may have some identity problems. The line where sociology of law ends and something else begins is drawn differently by different scientists. The relevance is decided in relation to what theory or perhaps choice of method made. To illustrate this, the different scholars from a Scandinavian context have through a series of articles in *Retfærd* discussed the identity of sociology of law and whatever paradigmatic elements it could be associated with. Banakar, who introduces and sums the series of articles, looks for paradigms that have “the potential to be developed into fundamental paradigms capable of furthering the development of a large number of different

⁶⁸ The dichotomy is credited to Roscoe Pound, whose work was a forerunner to the legal realism movement.

theories on law and society” and lists the theories of autopoiesis, especially as developed by Teubner, and legal pluralism (Banakar 2001). The paradigmatic search is something the respondent to Banakar’s first article, Mathiesen, does not favour claiming “perhaps it is a good thing that sociology of law does not have a fundamental paradigm” (Mathiesen 1998, p 68). Mathiesen, along with Jørgen Dahlberg-Larsen, sees a scientific freedom where Banakar sees a scattered science (Dahlberg-Larsen 2000). Hydén searches, on the other hand, to connect the sprawling parts of a discipline or spectre of paradigms into a science of Norms (which Mathiesen, again, has a hesitant attitude towards) (Hydén 1999). The norm approach as an explanatory entity in social processes is elaborated in a multitude of scientific work since Durkheim in the early 20th century but has come to take a specific turn in Swedish sociology of law, as shown below.

In conclusion, the perspective of the scientific research of sociology of law, assuming the position that Bernt & Doublet refers to as “an external description”, seems to be the common denominator in the view of the article writers; to question law and the legal system from an outside perspective although with differing methodology and theoretical basis. This common denominator Hydén collects within the terms of the research of norms, as something not necessarily equal legal norms. This means that a sociologist of law most likely always has to, or will, relate in some way to the legal system, the legal order or legal science in general.

The positions naturally differ amongst the different scholars, and even though this thesis not mainly aims at developing a theoretical agenda, this asks for a closer description of what position in the socio-legal landscape that is taken here, and doing so by initially focusing in on questions of method.

6.1 Traditional legal method and social scientific method

The four legal sources of law are generally regarded as the law text itself, the preparatory work, court practice, and doctrine. This means that in Swedish legal dogmatic method it is not only *the law text* that is the single guide for interpretation of existing law. *The preparatory legal work* is used as a source from which you receive guidance in interpreting the law. Here you can study the purpose of the law, as well as get descriptions of how the law is intended to be used, at best. The preparatory work you will find in the governmental bills, or as a SOU, or a department memorandum or similar that is behind the legislative proposal, and hence are produced before the governmental bill. Law text should however, if in conflict with preparatory work, have a preferential right of interpretation (Hydén 2001, p 116). The quality and the possibilities for being guided in the fine art of existing law differ in the preparatory work. Many questions are also left to be solved in court practice. This means that in seeking guidance on how a law should be interpreted, or in case of legal gaps, the legal practice is a source of law. There is no formal right for courts and agencies to follow such earlier cases, precedents, but they have nevertheless a major impact as legal source (Hydén 2001, p 116).

The courts may also, in new types of cases, or when existing law is hard to define, take into account *the doctrine* of learned scholars, legal scientist, generally meaning law professors of the law faculties of the Swedish universities.

The social scientist, as opposed to the legal scientist, has a choice to make regarding theoretical viewpoint and methodological issues. What to do with the collected data, what kind of results that are possible to validate are depending on the theoretical and methodological choices made. How an empirically dependant social science is to view a societal relation to legal structures has been discussed differently throughout the literature of social science.⁶⁹ In the moment you overcome the borders of legal dogmatic studies and intend to view the legal structure "from outside" the law, a demand for a social-theoretic foundation arises to rest the scientific discussion upon. There is a need for a conceptualization, which can mean a process where the meaningful terms for the specific task are fixed, often through the work of earlier scholars. It is a necessary stage before you can construct your examination tools. Concepts to describe the society are needed. One way to express this is that the complexity of reality needs to be reduced to something socially scientifically manageable, which a theory may offer. Again, Sayer lists the foundation of a realist approach in social science, and states:

"Social phenomena such as actions, texts and institutions are concept-dependant. We therefore have not only to explain their production and material effects but to understand, read or interpret what they mean. Although they have to be interpreted by starting from the researcher's own frames of meaning, by and large they exist regardless of researcher's interpretations of them" (Sayer 1992 p 6, author's translation).

Legal science and jurisprudence include certain legal disciplines, such as civil law, governmental law, penal law etc. Each discipline can be viewed as legal dogmatic in the sense that the main task is to interpret and systematize relevant legal knowledge of existing law. Elements, or segments, of different perspectives from legal history or sociology of law may appear in the jurisprudence (Peczenik 1995, p 312). However, sociology of law offers a set of perspective-giving tools in relation to law. The method of sociology of law is a social scientific method opposing, or in addition to, the traditional legal method. The legal method includes examination of law text, preparatory work, court practice and doctrine (Peczenik 1990, p 13f, p 65f). The main purpose of jurisprudence is to interpret and present existing law and dogmatic legal science often aims at reaching a conclusion on a legal matter. Peczenik expresses this as:

"In legal dogmatic argumentation the objectivity is determined by the high rational requirements of legal science and that the legal dogmatic in the end must be of use for the decision maker" (Peczenik 1995, p 312, author's translation).

Sociology of law, being a social science, may collect whatever facts are regarded as relevant in the context of the theoretical standpoint and the research questions. The legal science, on the other hand, may in that context be viewed upon as something internal, as a method for studying the legal structure from within. Bernt and Doublet express this as:

"If a discipline is to be characterized as a legal science, it has to be «on the inside of the law» as an authorized society regulating phenomenon" (Bernt & Doublet 1998, p 16, the author's translation).

⁶⁹ I. e. the below mentioned Bernt and Doublet, early classics as Max Weber and Karl Renner, or contemporary social or legal scholars as Jürgen Habermas and Niklas Luhmann.

The method in social science offers variations in a way that legal science does not. Bernt and Doublet describes the difference between the legal dogmatic perspective and the one of sociology of law:

”The legal dogmatic does not have the character of an external description of the virtual legal practice – this is first and foremost the task of the sociology of law and the legal history. The legal dogmatic does not describe the legal practice itself but the legal structures that govern it – *existing law*. This means that the legal scientist’s statement in a process gets the character of an *order* to the legal applier: ‘If you do not reach a correct or defensible solution of this specific legal matter, you have to found it on the following understanding of existing law in this area’” (Bernt & Doublet 1998, p 30, the author’s translation).

The empirical segment of sociology of law lies in “the virtual legal practise”. If you want to find out the *actual* consequences of a legal rule you have to *actually* open your eyes and take a look, collect empirical data of some sort. In that sense it is fair to say that the sociology of law studies the legal structure from “the outside”. Which leads to that the methodological alternatives differs from statistical data, literature studies, interviewing to questionnaires etc.

6.2 Norm science

In sociology of law the concept of ‘the norm’ can be used as an analytical tool. “The norm” is in this context something controlling or steering action or behaviour. “A norm is a directive for action that under similar circumstances gives rise to consistent actions” as Hydén puts it (Hydén 2004b, p 6). “The norm” is in this case not understood as synonymous to a legal norm, nor a fixed standard of the natural sciences. The norm in the norm scientific sense is recognized by the spontaneous action following from the norm (Hydén 2002, p 36ff.). The norm is in this context understood as something governing or assigning action, the inherent entity that is expressed through the action. Some norms do equal the legal norm, many do not, and most behavioural norms are simply not the object of legislation (Hydén 2001, 2002). There are several examples of study of norms in this specific approach in an individual, institutional or structural sense, for instance about the construction of a tunnel through the ridge of Halland (Baier 2003), or the environmental awareness reaching the compulsory school (Wickenberg 1999). The concept of norms can be used to explain actions and patterns of action among individuals, groups or on a more structural level. The concept of norms as a directive for human action indicate that human actions are not random or can be completely explained for instance out of a rational choice perspective.

Methodologically the search goes backwards compared to the legal dogmatic method, which starts with the specific regulation and draws conclusions on what to be done from how this regulation is constructed. The sociology of law analysis starts with the action, the behaviour, the empirical side, and asks what the normative premises are behind that action or behaviour. This is what is suggested in the analysis of the two paradigms of land and water administration below. The sociologist of law reconstructs the normative content against the background of the actual behaviour and its motives (Hydén 2002b, p 35-36).

The “norm” or when something is “normative” is in this sense not understood strictly as the legal norm, meaning the “law” or the specific legal regulation. The legal norm, the law, is in this perspective simply one of many values or reasons for action. It is also important to divide the “norm” in the norm science from the technical norms that emanate from natural scientific non negotiable laws of nature. Also, it is not to be mistaken for the specific environmental quality standard of the Environmental Code.

The legal system has as its purpose to control action. The legal system aims however only to control certain types of actions, which generally means that the legal system is not “activated“, other than in exceptional cases. The legal system can be divided into different segments, sometimes with different leading fundamental principles. These different types of legal sections may have differently close ties to the social norms. With a norm concept, developed as above, the legal system can be viewed as in the picture.

➊ The first arrow indicate what is mentioned above, that there are a lot of norms that are not legally defined at all, and has its background in one way or another in society. Norms grow so to speak from below. They are not formally “fixed” as the legal norms, the law, although they can be taken for granted.⁷⁰

The legal system in relation to norms

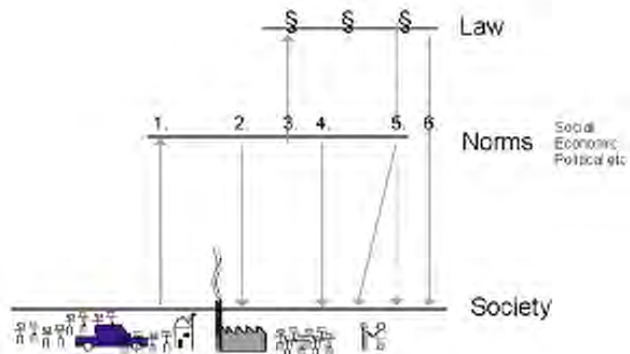


Figure: See Hydén 2002a p 271f, or 2004b, p 10.

➋ The second arrow indicates that the spread conceptions of what is right or wrong can work controlling for human behaviour. Conceptions that, once again, do not have to exist in a legal form, for instance the norm of that it is good behaviour to hold the door for the next one etc.

➌ These norms can often be the support or the forerunner for a legal rule, which the third arrow indicates. “Nulla crimen sine lege” - no crime without law - the legal scholars say. “Nulla lege sine norma” the sociologist of law could say.

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➎ The fourth arrow indicates that a lot of norms that also have their equivalence in legal rules control or affect our behaviour without us being aware of the legal rule which may never be referred to in any way. Most behaviour that is corresponding with legal regulations is withheld because of the norm and not the legal rule itself. The law is in this case a framework that comes into force whenever someone tries to differ too much from the norm that is in control. “The norm” is in this sense “the normal” from which you can not diverge too much, risking the divergence to be “illegal” above being just “illegitimate”.

➏ There are politically initiated rules that aim to let the political/administrative system on itself fulfil a duty. This is when the political system itself takes initiative to introduce the norms, which need an administration or supervising agency to control the observance of the law. This type can be described as frame law. The factual outcome of the law is dependant on other

⁷⁰ See for instance the opening definition on the legal rule in Hydén (2001) *Rättsregler*, p 9.

factors than traditional legal principle indicates, such as the professions in contact with the legal regulation, the economy of the municipalities performing the legal provisions etc. Such external, from a legal order point of view, factors will be addressed further below. Note that this is a perspective from outside the legal order, a socio-legal take on what factors that may affect certain types of decision making under the scope of law. The legal dogmatic perspective generally does not present legally controlled decision making in this sense. This is further addressed below.

• The sixth arrow indicates that there are a set of rules that are the legal system's own, which do not have their equivalence *in their design* on a norm level. This type of legal regulation can be described as intervening law, see below, and has as purpose to influence action in the society in one way or another. The background is here that there are colliding norms regarding a topic which is why a superior organ, the state, has to go in and establish what should be valid in the normative collision (Hydén 2002a, p 10 – 14).

This is a way to view the legal system as a societal institution in relation to the rest of society containing actions to a great extent controlled by norms. In a law and behaviour perspective the norm concept is of particular interest when there is an obvious clash between the legal norms and the societal. Historically this is perhaps even more pedagogic when it comes to displaying examples. Anna Christensen describes in the article *Law in a transitional society* (Christensen 1997) how the legal system in Sweden was affected by the transition of Swedish society from an agricultural society to a modern industrialized market economy and welfare state, and in what way the law in itself participated in this development. She mentions amongst other matrimonial law, labour law and property law. Christensen concludes that it took until decades of the 20th century had passed before the aging matrimonial regulations were replaced with a new:

“The most important task of law is to discern the new normative practices and the new normative conceptions that are being developed in society and to give these a legal body in the shape of new regulations. Law can have more or less readiness for discovering and accepting these normative changes in society.” (Christensen 1997 s 110)

The norm concept is a good descriptor of these changes, and perhaps a key between law and social change. A parallel of late 19th century industrialization, and the dawn of the network society in the beginning of the new millennium can be drawn in the copyright issues of file sharing. Copyright is affected by the introduction and distribution of information technology in society. Behaviour and societal norms change in accordance to how the conditions for the same change, not always in a well functioning communication with law. The norm is in this case something apart from law, they are in fact in a conflict that can be tied to a new technology, which can be described in a bigger picture as a societal change (Larsson 2005a, 2005b, Castells 1996, 1997, 1998).

The norm perspective gives a methodological context for studying the driving forces as well as other relevant factors for the actions around sustainability issues related to the infrastructure construction such as cognitive aspects and systemic disposition. All of which relevant for the outcome of the actions taken, and therefore for the issues of sustainable development. The norm model has a character of a classifying tool for aspects that lies behind action, the analysis of a given action or process can have its origin in either one of the three components and show the interplay between them.

Land use and environmental management is regulated by a complex set of rules mainly consisting of the two most important legal corpuses, the Environmental Code and the Planning and Building Act. On an implementation level these two legal corpuses may conflict each other. This is shown below in the 3G case.

The legal intertwining of the planning process and the environmental administration mean that when you want to assess or answer questions such as what sustainable development looks like in practice you have to on one side be able to outline existing law, with what would be described as a legal dogmatic method, and on the other side use social scientific methods to question the empirical side of law, the practice of it.

The practical side of the sustainability dimensions is handled at the lowest levels by local authorities. Implementation of the 3G infrastructure construction decision demand that some kind of consensus is created between the acting participants, for instance due to the cooperation between the operators to lower the cost of the infrastructure, the municipal permit process setting the framework for the construction, and the public response towards the antenna construction. This opens for factors as organisational culture, competence, the ability to cooperate, attitude towards the project etc. As also implementation oriented planning theorists has claimed: it requires that micro-organisational behaviour is taken into account (Khakee 2000, Lipsky 1979).

The study of norms, both within the organisation of a participant and between participants within the project, as well as the suggested paradigms of planning above, may partially explain the outcome and the nature of the progress of the construction. Some of the aspects that are relevant to whether a project will be successful or not, where the 'action' will take place in a way the planning intended is here described as depending on norm structures. The actions of an agency such as the PTA are controlled by legal framework. Yet, a legal dogmatic perspective may not be able to explain the actions taken within this framework, blind to the external causes that may have affected the decisions taken.

6.3 *The horizontal and the vertical perspective*

In other words, a way to describe sociology of law is to describe in what way it differs from legal dogmatics, and how it complements. Where the legal dogmatic perspective gives a very clear picture of what knowledge and what factors that should influence legal decision making, represented vertically in the following picture, the sociologist of law can examine legal decision making empirically and see if there may have been other factors, generally not outspoken, that have influenced the legal decision making, represented horizontally in the picture.

In the case of the Post and Telecommunications Agency handling the operators there is a significant use of this perspective, in the reconstruction of the normative premises that are likely to have controlled the decision making of the PTA. The legal order provides the framework for the PTA actions, but when it comes to the precise decisions, the law possibly has been only one of several factors that have affected these actions.

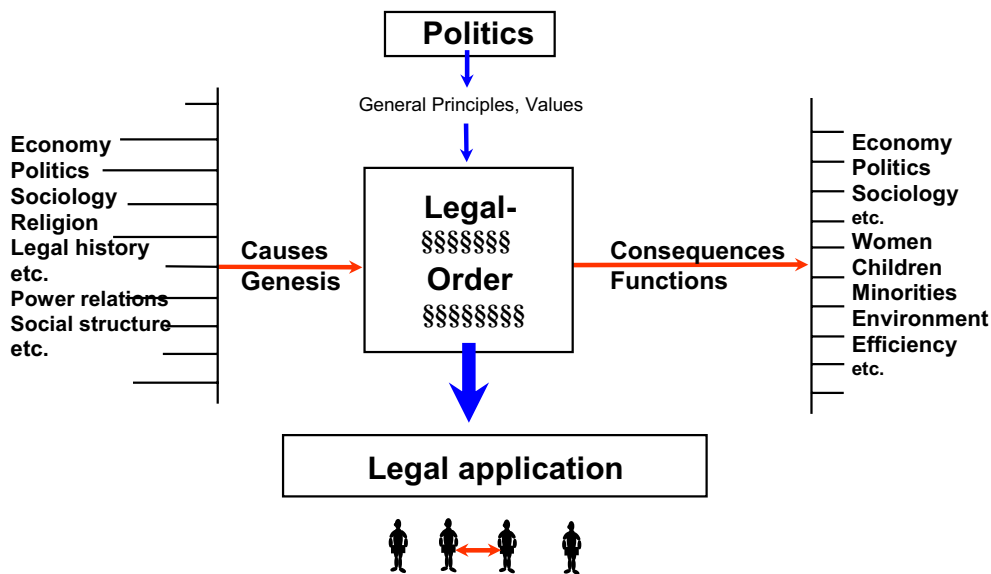


Figure after Hydén 2002b, p 16.

Generally legal decision making is formulated in the way that it operates strictly under the principle of legality, that decisions are not affected by legally irrelevant factors such as politics and economy (to the left in the picture), from the horizontal outlook. It is the task of socio-legal science to show when such factors have intervened in the legal decision making. It is also to show when the application of law leads to unforeseen, distorting effects in society, (to the right in the picture) such as environmental problems or when the legal application from a norm perspective leads to undesirable consequences that from a legal dogmatic perspective may be correct. This perspective is used in the analysis of issues related to the handling of radiation in the environmental management and planning below. This perspective also helps us understand the action of the PTA in its role towards the operators in the 3G case.

6.4 Norms and the 3G case of Sweden

Madsen, in his depicting of the institutionalization of Human Rights in the post war period, searches for the important factors in the genesis of the European Convention for the Protection of Human Rights and Fundamental Freedoms (ECHR). In doing so, he shows the blurred boundaries of law and politics of the early period (1950-1975) and how national politics managed to influence the process (Madsen 2006). Madsen opens up for a view, or a knowledge, that a legally dogmatic perspective not likely would be able to produce. This is one of the strengths of sociology of law and its external perspective on legal processes.

Drawing a parallel to the setting up, or legal design, of how the infrastructure of 3G was to be constructed in Sweden is the one of studying the genesis of the decision. The decision on how, and how fast, the infrastructure to 3G should have been developed has had several implications of great interest to both the perspective of planning and sociology of law. The

decision was central and governmental but the carrying out was set to be through the rules of the market via operators who received licenses depending on promises of coverage and fast infrastructural development. The decision included all of the populated areas of Sweden, an estimated 41 % of the total area (Björkdahl & Bohlin 2003), meaning the construction of several thousands of masts governed through the permit processes locally and regionally, including 290 municipalities and 21 county administrative boards, four operators and numerous individuals with rights to appeal on specific mast permits. The development was to be supervised by a central agency, the PTA, with power to negotiate with and sanction operators not complying with the license terms.

The study of the time of the initial decision combined with the norms, in conflict, of the concerned parties would be able to offer a tool for explaining interesting issues of the construction. The vertical perspective of the picture can explain causes and effects of decision making that is hard to explain from the traditional legal dogmatic perspective displayed vertically. The perspective of norms and what characterize the norms in the case of 3G is fruitful in several ways. Not the least in understanding of sustainability issues, especially in such a grand billion dollar project as the 3G development, benefits from such an interdisciplinary approach between planning and the legal and socio-legal aspects of sociology of law. To study the practical empirical implications of a society in transition towards the thinking and acting for a sustainable development includes the dimensions and functions of legal systems and conflicts of norms. The 3G case is related to organisations, institutions and different concerned parties, both planning, administrative, as well as private, at different levels, which clearly opens up for a norm view on conflicts, not the least as a result from the top-down design of the infrastructure construction.

7. Spatial planning and sociology of law

The natural sciences have made a persistent addition to the planning paradigm, and perhaps especially to the environmentalist paradigm. The theoretical part of philosophy dealing with logic lies close to physics and the ideas of causality of the natural sciences. ‘Rationality’ is the buzzword of planning. When receiving ideas of a less instrumental view on the actions of planning, the ‘rationality’ still remained, but this time in the shape of a ‘communicative’ rationality. This is the heritage of engineering and quantitative sciences in modern planning. When the norm of planning practice is to present the alleged “truth”, following from a traditional natural scientific approach, the risk is that it will result in an approach not seeing a value base in a decision making, and vice versa that sustainable development has an inherent value base that may not be open to a natural science approach. The fact that the approach bears a normative basic content may not be discovered.

However, due to the sociological influences in spatial planning there are “intellectual techniques, procedures, skills and methods” that do not seem unfamiliar for the sociologist of law. An example is the discussion of power relations affecting collaborative planning. However, different disciplines or sciences put different emphasis to theoretical aspects, as well as methodological aspects and what the object for that discipline or science is. And while spatial planning has been criticized for being eclectic, the norm science suggested by Hydén could receive critique on the same grounds, for the seemingly pick and choose of theoretical aspects that fits the needs of the discipline and the concept.⁷¹

Sociology of law, and norm science, offer a perspective on the value based sustainable development, and also a legal questioning that may contribute to spatial planning as the planning practices operate within legal frames. The following suggests a few points of possible influence, which partly converge, and are relevant to the construction of the infrastructure for the third generation of mobile telecommunications system.

An important similarity can be seen in the relationship between theory and practise of both spatial planning and sociology of law. The academic disciplines both have a clear practise tied to them, a research object that sort of comes naturally. In the case of spatial planning, there is the planning theory on the one side and the planner and the planning practice on the other side. In the case of sociology of law there are the socio-legal theories on one side and the lawyers, the advocates and the judges on the other. A similarity of the relation between these two sides can be seen in the fact that the planning practice “is a complex practice not derived from theory” (Emmelin 2007), at the same time as the socio-legal theories rarely affect the legal practice. Planning is not the application of theory to its practice, as well as the insights of the legal system that the empirically based sociologists of law might produce only seldom affect the legal practice, in courts as well as in the education of new lawyers.

⁷¹ See for instance Emmelin et al. (2005) in *Planering och förvaltning för friluftsliv – en forskningsöversikt*: “The term ‘doctrine’ [is] more adequate than the more often used label ‘planning theory’. What is designated as ‘theory’ is often a more or less eclectic mix of normative conceptions of the practice of planning and theoretical foundations and does not fill the normal requirements for scientific theory”, note on p. 132.

The development of 3G infrastructure in Sweden holds many questions closely related to sustainable development issues, being such a spatially located activity, with clear planning aspects. Both the planning of this case, and the implementation of it, is however depending on the legal framework, both to its prerequisites and its outcomes. The important legal framework for the environmental management and planning in Sweden is formed by the Environmental Code and the Planning and Building Act - two sets of regulation that holds complexities between them, elaborated below from an empirical base. The interplay of the law and the planning and implementation of the technological infrastructure is addressed in this thesis. The following suggests how planning theory can benefit from the norm perspective outlined above in relation to the 3G case, and how the socio-legal perspective of sociology of law can be used within the legally framed areas of spatial planning.

7.1 Norm science and sustainable development: The relation of the environment and social systems

In 1998 the sociologist of law Håkan Hydén published the article Sustainable development from a norm scientific/sociology of law perspective (Hydén 1998). The article formed three basic conditions: 1) the term Sustainable development is normative. Science in direct relation to it will be normative too and we need to be able to handle that kind of science. 2) The environmental problem can be understood in its effects, preferably by the natural sciences, and in its causes, preferably by the social sciences, why these sciences must be able to cooperate. 3) Environmental problems relate to systems (See also Baier 2003, p 49 f). The scientific approach to incorporate all the three conditions is, in the Hydén article, suggested to be the concept of norms. This is an example on how sociology of law can work as an external spectator on decisions of the legal order and add knowledge on how to understand sustainable development as a tool for social control and practically make use of it. Basic condition number two addresses the Emmelin discussion of paradigms in environmental management and planning. What can be measured in a sense of natural sciences often need to be communicated and interpreted in the social sciences; what kind of decision do we need to take now, how can the law be used as a tool to control the behaviour that causes this environmental impact, etc.

The environment, in its physical aspects, seen in relation to a systemic context, lacks a natural feedback into for instance the legal system, or the social system. This is the reason the environmental issues have to be defined by law and its practice to be understood as legal issues. This is also in contrast to, for instance, matters of civil law, where a legal matter emerges by the initiation of someone feeling wronged or ill-treated leading to the initiation of a legal action against the one committing the (alleged) wrongful act. Naturally, there are no such initiatives directly from the environment. The consequences of society, and the actions therein, will have an effect on the environment, but what happens in the environment is not necessarily noticed within the social systems. This bears a parallel to the value base of sustainable development. A *phenomenon* is not a *problem* until it is defined as such. This lack of feedback has been described as a “first environmental principal of social science”:

“What humans do within the social systems have an automatic and spontaneous effect within the natural systems but what occurs within the natural systems do not

have an automatic and spontaneous effect within the social systems”. (Hydén 1998, p 52)

What Hydén means by this is that environmental problems are socially articulated within the social systems as something which only exists in the *understanding* of the phenomenon. Thus, if it is not articulated as a problem, it is not considered to be a problem. Norm science is in this thesis used as a means to formulate phenomena as problems in relation to the legal order. And to put it in Emmelin paradigmatic terms: An environmentalist paradigmatic approach on what the problems are can miss socially originated phenomena, which the planning paradigmatic approach on its hand would discover. There is also a risk that value based phenomena are presented as measurable problems with a “correct solution”, such as aesthetic matters in the environment. And vice versa, some environmental issues are a direct result of social patterns in society. Just because there is a consensus about car driving is the best transport solution does not necessarily mean that global warming is not increasing. The natural sciences have to measure the impact and communicate the data, even if it is a reluctant crowd to inform.

7.2 *Inherent norms in the two paradigms of governance*

The model or the concept of the two paradigms presented in the spatial planning chapter can serve as an analytical tool that will reveal the character of a specific decision or in what direction a legal regulation is pointing. The two paradigms in environmental and spatial planning can be seen as containing different norms or withholding a normativity that is controlling what decisions and what knowledge that is legitimate (Larsson & Åström 2007).

The norm perspective gives a methodological context of studying the driving forces as well as other relevant factors for actions. In this case especially in relation to law and the legal domain as well as the licence conditions. Environmental governance and spatial planning are to a great extent regulated through legal processes. The legal regulations take part in a process of steering and influencing behaviour and actions. The law balances different interests in a way the legislator finds best, through a long law making process, both political and judicial, but the legal application does not always look like the law intended.

In planning of physical environments the legal regulation has to be adaptive enough to be able to embrace local and specific aspects for the given area, and still not lock in future possibilities or allow the strongest actors to too freely steer the planning, rendering perhaps less commercially viable but important environmental or social aspects to be disregarded. The desired system is both predictable, just (equal decisions each time) and flexible (See Fog et al. 1992, p 20. Compare this statement to the one of the Commission regarding licence conditions in the 3G design). This seems however to be a bit of a paradox, for instance in the sense that a courts ruling can not be both flexible, in an ad hoc sense, and predictable at the same time (disregarding the fact that it can be predictably flexible). The flexibility of a court must be limited under the legality principle. If it is too flexible, the decisions are simply not predictable.

The two paradigms describing two different approaches to environmental administration and spatial planning are attached to different “mind-sets”, ways of approaching and viewing the world, which is affecting the issues of land use and environment in different, specific ways (Emmelin & Lerman 2006, p 21ff). Each paradigm is “normative” in the sense that it bears judgement on what is the right kind of actions, what decision that is a legitimate one. This means that if a context, for instance the municipal planning, is influenced by one of the paradigms, certain expectations will be affecting the decisions taken in that context. What knowledge is considered to be the correct knowledge differs between the paradigms. Whether you operate within one or the other paradigm can therefore result in different answers to the same question. The example of the interface between the local planner and the local decision maker (politician) may serve as an example on a battle between the two normative paradigms.⁷² Also, legal bodies can be differently influenced by these “mind-sets” and hence withholding different normative content. A key issue is what knowledge is regarded as legitimate in decision making (Emmelin & Kleven 1999).

This can be compared to the vertical and horizontal perspectives of the legal order. The normative paradigms give that different types of knowledge is legitimate in the different paradigms, which both can be regulated or legally controlled and not legally specified or controlled. In the context where it is not legally formulated in some way the normative content of the paradigm affects the decision making in this context without this being acknowledged. This is an example of when the norms of the horizontal perspective affects decision making claimed to only be affected in the legal dogmatic vertical perspective.

This can be problematic when the paradigms normative content gives rise to different actions within the same system, such as in the management of the environment, and spatial planning. This is especially the case when the legal regulation on the issue is divided, such as with the Environmental Code and the Planning and Building Act, which may give rise to a conflicting system - the language and the terms used in the legal fields of the two different legislative bodies may sound alike but have different legal content, giving distorted consequences.

⁷² The politician and the planner relation in the municipality have been studied in Isaksson & Storbjörk 2005.

PART THREE – ANALYSIS

The 3G story has been told. The chronology displayed and the difference between the intended infrastructure development and the factual has been shown and to some extent analyzed. Indicators of the handling of sustainability have also been picked and accounted for. After the presentation of planning theories and the two paradigms of governance, and the socio-legal perspective of sociology of law, including the norm concept, it is time to sum up the found indicators in the 3G case, and analyze some issues of particular interest more thoroughly.

It is in the study of the 3G infrastructure development in Sweden that the “real” side of the environmental and planning management can be seen. The empirical approach on how the licence conditions have been implemented tells the benefits and problems of the licence allocation design, as well as the governmental control over the operators, via the Post and Telecommunications Agency.

Collected permit processes in combination with coverage data show that what was said when designing the development was not the same as when the design was implemented, and the infrastructure rolled out, and the implications of what happens when circumstances change into “what could not have been foreseen”. The permit processes in combination with other legal practice documents show what conflicts that became important when law was applied in the 3G case, and how these conflicts were solved legally, and sometimes likely remained unsolved socially. The participation, both as an important part of sustainable development and a concept within decision making, has been shown in the 3G case, and is further analyzed below. The empirical approach on the often legally relevant issues bears the witness of that it is not the “law in books” that displays the handling of sustainable development, it is the “law in action”, the practice.

The 3G case holds some topics that need to be addressed from a more theoretically founded position, such as non-legal aspects of legally controlled decision making. The 3G case shows how legal framework can show signs of principal conflicts both in its dogmatic perspective and in its application. This is the reason the utility easement is analyzed below, as well as the parts of the PBA and the Environmental Code that has been relevant to the case. In order to do so the paradigms of governance – containing the idea of normatively coloured approaches of decision making – has been outlined in the theory chapters.

The environmental management and planning can be split up in different levels. The classic implementation issue is how to make the different sublevels to act in accordance with the decisions taken for instance on a national level, or in the 3G case, even in combination of a supranational European level. And a likewise classic approach in sociology of law is that the success of any law or decision taken in a top-down perspective will be dependent on the norms or attitudes towards this imperative coming from above. The 3G case shows examples of some confusion between responsible authorities, as well as direct conflicts, often displayed in the local level, with the decisions of the infrastructure roll out. This is below discussed in terms of ‘tiering’.

8. Indicators of the handling of sustainability in the Swedish 3G case

The goals of the initial policy decisions on 3G in Sweden and the shaping of the “beauty contest” are of a strategic nature: to keep Sweden at the forefront of IT-development. The decision to set up a 3G-system in Sweden has elements of all three pillars of sustainability. To build the system rapidly to enhance economic growth and national technological competitiveness is in line with the EU-strategy stemming from the Lisbon summit of March 2000 (Leonard 2005, pp 118-122). To make an advanced technology available to essentially the entire population and to stimulate regional development by equal distribution of advanced technology rather than according to market logic of development can be seen as both a growth policy and as an instrument of social cohesion. The competition ideology inherent in the decision to have four competing systems with a low level of cooperation is an element of the growth policy but also of the social component: the notion that competition will stimulate development of applications. The situation at the time of decision was one of technological optimism with limited substance. Telephones for the system were not available, and applications beyond conventional mobile telephony and the capacity to handle large amounts of information were largely a matter of assumption. The director general of the VINNOVA (The Swedish Governmental Agency for Innovation Systems) stated this starkly in 2001: the success of the system depends on applications that are not yet developed (Emmelin & Söderblom 2002, p 22). The environmental or ecological sustainability of the system was not considered at all in the initial “3G design”. Environmental concerns surfaced as a result of the decision, not as part of the decision (Emmelin & Söderblom 2002, p 22 – 24). The task of looking at environmental impacts of the system was given after the strategic decision had been taken to a group of environmental agencies with the National Board of Housing, Building and Planning as co-ordinator. The group focused on reducing environmental impact through efforts at lowering the number of masts through voluntary cooperation.

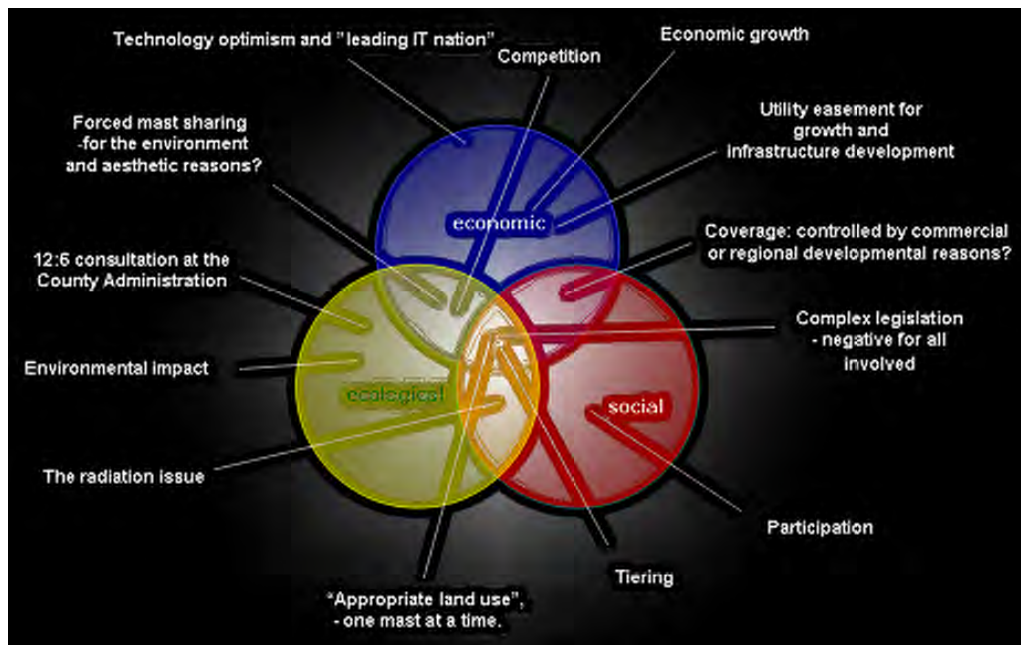
The technology optimism found prior to the so called beauty contest had a setback during roll out, and the competition benefits so eagerly stressed prior in the 3G design was in practice toned down as environmental concerns were raised during roll out. In order to facilitate the roll out legal changes were made, including stronger PTA tools for forcing mast cooperation between operators. By including 3G mast sites in the “light” version of expropriation of the utility easement, a strong tool to run over mast-reluctant property owners for a low compensation was handed over to the operators, blurring the borders of private vs. public interest. Participation during roll out was found in the parliamentary discussions and legal changes – in its representative democracy version, but perhaps more importantly in the permit processes, both under the PTA and the 12:6 consultations, of the single mast site, where the key word is “concerned party”. The legal complexity is however problematic to operators, governmental and municipal authorities, other participants which also makes it resource consuming and therefore inefficient. The non-handling of the radiation issue was an important conflict that emerged during roll out. The distorted sustainable development handling in the 3G design, where the ecological dimension remained unhandled, finds some sort of regained balance in the implementation stages to the extent of the single mast assessments. The vertical perspective however remains distorted or un-tiered since the extreme coverage requirements and fast roll out has put pressure on the municipal handling system, and undermined the local planning monopoly. The fact remains that the comprehensive impact of the system is not assessed, and the piecemeal assessment mast by mast can not balance this loss.

The operators did not apply for mast permits in the sparsely populated areas as much as in the big city areas. The operators benefited from the actual postponement of the coverage demands not only by the actual extra time, but also from the fact that the population grew. The lack of coverage in these areas can therefore not be explained by slow permit processes, although some mast site conflicts mean a very long process in a rather complex court hierarchy.

The emphasis on the sustainable development pillars has been shifting over time, and different aspects have been important on the national, regional and local level. The found indicators of the handling of sustainability in the 3G case are:

- Technology optimism and “leading IT-nation”
- Economic growth
- Extreme coverage beyond commercial reason
- Competition
- Environmental impact
- Participation
- The radiation issue
- Tiering

These indicators are further elaborated on in relation to what became, as opposed to what was said before, due to new aspects emerging in the implementation stage. The indicator regarding the handling of the radiation issue has been of such importance that it is dealt with separately even though it could take place as relevant to both participation and environmental impact. Each indicator may hold several relevant aspects for the handling of sustainable development in the 3G case. The figure below points out these aspects, as well as the indicators, which are analyzed in more detail in the following chapter.



8.1 Technology optimism and “leading IT nation”

The information sent to the municipalities from the Post and Telecommunications Agency shortly after the licences had been allocated stated that “there is within the parliament and the Government a strong goal orientation toward keeping Sweden’s competitiveness within the IT sector, and to secure the position as a significant IT nation” (PTA 2001 p 2, author’s translation). The information sent out refers to the new millennial governmental bill named “An information society for everyone” (prop 1999/2000:86) stating:⁷³

“Given that Sweden already is a leading IT nation the ambition should be that Sweden as first country becomes an information society for everyone” (prop 1999/2000:86, p 1, author’s translation).

This vision has definitely affected the 3G development design of Sweden, both in terms of a willingness of having extremely high coverage requirements, and a willingness to reach this coverage fast, affecting the design of the so called beauty contest. The Government and the PTA was under pressure from the EU directive, decided upon by the European parliament and the council the 14 December 1998, giving the member states until 1 January 2000 to decide on what method to use for the licence allocation, and to have a collective UMTS development no later than by 1 January 2002 (128/1999/EG). But this directive alone can not explain the Swedish urgency to get started fast, and certainly not explain the extreme coverage.

During the autumn of 1999, critical voices were heard regarding that the infrastructure development ran a risk of being delayed in Sweden, and was an expression of a fear of that Sweden would lose its world leading position in telecom (PTA report June 2001, p 5). Behind the critique were Swedish telecom operators and producers of telecom equipment. Deputy Minister for Enterprise and Energy (bitr. Näringsminister) Mona Sahlin called for the PTA to speed up the licence allocation process.⁷⁴ Finland had already allocated the licences, a fact that most likely stressed the Swedish critics, especially Ericsson (PTA report June 2001, p 5). It was the necessary changes of the Telecommunications Act that partly delayed the Swedish allocation, which were made in order to secure competition in the telecom market, see also 2.9.3. One must remember that at this stage there were no handsets for 3G. The service provided by the UMTS technology that would make GSM obsolete was described as “wireless Internet” and the main function referred to be video conversations (Emmelin & Söderblom 2002, p 7, 19-20).

In the beginning of 2002, all EU member states had finalised or at least started 3G licensing procedures. Sweden could not avoid constructing the infrastructure for 3G, being an EU member, but the speed and the extent of the coverage could to a large extent be decided in each country. “The beauty contest” took place at a time when the belief in the 3G technology as well as the commercial viability of the technology was strong. The design of “the beauty contest” provoked the far reaching promises of the operators to complete an infrastructure with full coverage in the populated areas of Sweden as quickly as within three years. Since the belief in the technology was strong the operators promising a lesser coverage or a lower roll-out speed would not have received a licence. In most of the European countries developing infrastructure for 3G, there were some minimum requirements regarding coverage and roll-out speed demanded of the licence holders. In many countries it was demanded that

⁷³ [Swe.] *Ett informationssamhälle för alla* (Prop 1999/2000:86).

⁷⁴ “Mångfald, valfrihet och lägre priser på mobiltelefonmarknaden”, Press release from the Ministry of Enterprise, Energy and Communications (Näringsdepartementet) 15 Dec 1999.

20-40 % of the population were to be covered within three years and 50-85 % within six years (Hultkrantz & Nilsson 2001).

The technology optimism present prior to the so called beauty contest seemed however to have turned a bit colder during the roll out. The operators reported problems, the handset production was delayed, an environmentally based criticism was raised towards the number of masts, and the IT sector went into a period of decline as the bubble burst with many companies showing big losses, some even turned bankrupt (Lindstedt 2002). Technological aspects may have played a part in a lessened belief in the 3G technology. The term "second and a half generation", 2.5G, is used to describe enhancements made to the GSM system that made the leap towards 3G a little less significant. The roll out slowed down all over Europe (PTS-ER-2002:22, 4 Oct 2002, p 31-32.). The licence conditions in Sweden were changed when it comes to the coverage favourable pilot signal, although not formally the number of individuals to be covered or the deadline. The operators did all they could to avoid a direct collision on this matter with the PTA, stalling the process by appealing decisions and applying for changes.

Several legal changes were made during the roll out, of which some were made to update legislations in accordance with EU law and others were responses to the fact that infrastructure was not built as fast as intended. The latter is a consequence of the extreme coverage requirements. The changes in the Utility Easement Act were aimed at facilitating the roll out in aspects tied to land access against the will of the land owners, which was a legal change that did not pass without critique. The governmental bill prior to the legal changes once again stressed the goal of Sweden as a "leading IT-nation":

"The grounds for the governmental proposition: As mentioned earlier is the goal that all companies and individuals in the country should have access to efficient and secure electronic communications and that Sweden in an international perspective is to be a forerunner in this respect. For this goal to be reached it is necessary that there are good basic conditions to develop the existing telecommunications network and to develop new networks. This presupposes, among other things, effective possibilities of getting access to land for the development" (prop 2003/04:136, p 9, author's translation).

The same rhetoric that preceded the design of the infrastructure roll out is in other words found in the legal changes that were made to facilitate the roll out.

The operators did not appeal for mast permits in the sparsely populated areas as much as in the big city areas. The operators benefited from the actual postponement of the coverage demands not only but the actual extra time, but also from the fact that the population grew. The lack of coverage in these areas can therefore not be explained by slow permit processes. Some mast site conflicts resulted in very long processes in a rather complex court hierarchy. The strategies of the operators can be said to have been: Apply, appeal, delay! The PTA seems not have been trying to enforce a compliance to the licence conditions to the extent the PTA could have (see 4.1 and 8.3.1). The involved realized along the way what unreasonable conditions the operators had promised in order to get the licence. The PTA handling of the operators is collaborative and understanding. Legal changes were made during the roll out, in order to facilitate it. This included stronger PTA tools for forcing mast collaboration between operators, and including 3G mast sites in the "light" version of expropriation of the utility easement, to the loss of the property owners.

8.2 Economic growth

Growth is an obvious element in the design of the 3G development, that is the prediction of growth, regional, national as well as for operators. Several telecom operators and producers of telecom equipment criticized the process for being too slow in Sweden. In fact, one of the reasons the roll out conditions were set to stimulate a fast roll out originated in a concern that Sweden would lose its “world leading position in telecom” (PTA 27 Jun 2001). The mobile industry of importance to the national economy, fronted by Ericsson, has played a part in the game, stressing a fast roll out and putting pressure on the PTA to hurry up the licence allocation process. It was referred to the fact that Finland already had allocated the licences, demonstrating the Ericsson and Nokia competition.⁷⁵

Part of the economic growth aspects comes from the vision of Sweden as a “leading IT nation”, and it is important to remember that economic growth not necessarily can be viewed as economic sustainability. Growth is however a fundamental driving-force behind the Swedish 3G development both as part of regional development, the benefits for both individuals and companies are stressed, and the operator profit, making it an indicator of interest in the analysis. The regional growth is tied to the extreme coverage requirements where the infrastructure is seen as a basis for this development, and use of the new technology is tied to operator income as well as leading to an IT sector in good production, creating job opportunities and contributing to the national economy.

Incidentally the indicator of coverage used illustrates the problem of simplistic development indicators. Covering the approximately 40 % of the area of Sweden where 99 % of the population lives may have little relevance to future applications of 3G such as in tourism, sailing, the logging industry etc. The indicator used may not be a stimulus to development of services relevant even to the goal of social cohesion. In view of the simultaneous forced expansion of the Swedish broad band system at which serves the stationary the lack of wider systems thinking is an interesting example of the real difficulties in predicting and steering with planned development and development indicators.

The regional growth was toned down during implementation as a result of a lessened investment will of the operators, despite the fact that this should not play any significant part according to the licence conditions. The tables in 4.2.4 and 4.2.5 showing the coverage in the sparsely populated areas of Västerbotten by 31 December 2003 and 31 December 2006 are examples of how the logic of the market has controlled the construction of the network infrastructure, despite the fact that the design had intended just the opposite. The operators have focused to apply for building permits where most people live. The results are not astonishing, but remarkably clear. The licence conditions, which formally were set to satisfy other values, such as the social sustainability of a connectedness for everyone, regardless of where in the country they reside, is proven to be just formal, not actual. The driving forces of the operators have in this sense controlled the roll out, riding on the norm of profitability. It is not the operators' responsibility to support social cohesion and to create a regional balance, but it is the PTA responsibility to see to that the operators fulfil the assurances that gave them their licences. This makes the issue with the delay in reaching of coverage important, both as an unspoken practical change of plans in the governance of the IT sector, as well as how such a flexible steering could be made under provisions that several times had been expressed as very much inflexible.

⁷⁵ Dagens Industri (24 Nov 1999) *Trögt med licenser för nya mobilnät*. Statement from CEO Kurt Hellström, Ericsson.

8.3 The extreme coverage that was delayed

The coverage question is of interest from several aspects. One regards the relation between the PTA and the operators as the operators began to try to push the deadline forward. From this perspective the central and national decision to design the beauty contest to boost the applicants promises for a fast and high coverage is in clear conflict with the gentle PTA handling of the operators when the roll out did not gain the speed that was necessary to fulfil the promises laid down in the licence conditions. The coverage question includes the conflict between competition on one side and environmental concern on the other. Both competition and the extreme coverage were motivated by social and developmental reasons on the consumer side. It was assumed that the infrastructure would contribute to “regional balance” and regional development.

The Traffic committee of Parliament (Trafikutskottet), that prepares matters of electronic communications and IT politics, stated in late 2000 the importance of a fast roll out that benefits households and companies throughout all of Sweden. Speed of roll out and coverage was stressed (Bet. 2000/01:TU1). This was also early emphasized by the PTA.⁷⁶

The matter is tied to the vision of a “leading IT-nation”, especially in the mentioned vision of an “information society for everyone” (prop 1999/2000:86, p 1). This is significant for Swedish IT politics in general (Sundqvist 2001, prop 1999/2000:86, p 130, Larsson 2005a, p 39). This can be expressed in terms of social cohesion, not uncommon in Swedish politics.

The emphasis on a wide coverage was made early, and formed an important element of the 3G politics prior to the licence allocation. To make an advanced technology available to essentially the entire population and to stimulate regional development by equitable distribution of advanced technology rather than according to market logic of development, can be seen as both a growth policy and as an instrument of social cohesion.

One of the changes in the Telecommunications Act, prior to the licence allocation, referred to good accessibility and regional balance, as a part of the political telecom goals (prop. 1999/2000:1, utg. omr. 22, p 92). This indicator is especially interesting in relation to how the roll out later was performed.

When the mobile consultancy company Northstream in 2001 calculated the economy of the 3G infrastructure they estimated the critical degree of coverage at 97 % of the populated areas. To this percentage the company CEO judged that the coverage could be motivated by a combination of commercial and regional political reasons. The last few steps of percentage points were considered to be extremely expensive (Hultkrantz & Nilsson 2001, p 69, Emmelin & Söderblom 2002, p 47).

The coverage was measured by the population in SCB statistics by 31 December 1999. In relation to this number the promised coverage of the populated areas was higher than 99,98 % by the four licence winning operators. However, as the population grew in Sweden 8 860 000 persons represented 98,71% in 2003, and by the time the first operator reached the coverage requirements, which was Telia/Tele2 in late 2006, this percentage had been reduced to 97,22 % (population figures from SCB, by 31 Dec 2006). To this fact is added the trend of people moving from the sparsely populated areas and to the big city areas, which makes the coverage demands even lower the more time that passed, and the formal changed licence conditions of

⁷⁶ See Computer Sweden (6 Dec 1999) Mobiltelenätet skall täcka Sverige.

the pilot signal in some areas. A delayed roll out made it easier to reach the demanded coverage. This is explained by the fact that the last few are very expensive to cover, as stated by the critics of the so called beauty contest. A delay of the deadline helped the operators be able to reach the coverage requirement without covering these expensive sparsely populated areas, because the population grew, and it was concentrated around urban areas. This is how 99,98 % turned to somewhere around 97 %.

A slow municipal permit process can not explain the lack of coverage in some areas of Sweden, for instance in Västerbotten, by the end of 2003 when the licence conditions should have been fulfilled. The operators were not willing or able to fulfil the promise in “the beauty contest” and focused on building the infrastructure where the return on the investment was likely to be the highest, namely in the big city areas. The argument that the permit processes hinders the construction is in this context only a reason given in trying to avoid the sanction that the PTA could impose on the operators when not fulfilling the conditions of the licences.

The operators managed to hold out, unsanctioned by the PTA, until the first licence conditions ran out by 1 July 2006. On this date the PTA lowered the required pilot signal strength in some areas meaning that the overall national coverage of all operators was increased from between 93 and 94 % to about 98 % of 8 860 000 covered persons overnight, without any new base stations put up. The “regional balance” and social cohesion aspects tied to the extreme coverage was not implemented in the way it was designed. The market logic had formally been locked in, but practically applied. No operator was sanctioned by the PTA, and the PTA was not sued by operators not given a licence. But who sold the Emperor his new clothes?

8.3.1 Lack of coverage due to a slow permit process?

Already in September 2001, when the operators were gathered for a conversation with deputy Minister for Enterprise and Energy (bitr. Näringsminister) Mona Sahlin, they expressed a worry that the municipal handling of mast permits is too slow and that they are not receiving building permits. A majority of the municipalities in the country had however not yet received a single permit application, so the basis and reason for this claim appears a bit uncertain. (Emmelin & Söderblom 2002, p 17). Later, when the time limit for reaching the full coverage according to the licence conditions was postponed from the original 31 December 2003 to 1 December 2004 the same claim has taken an important part in the operators’ avoidance of sanctions. The PTA for instance motivated the first 11 month long postponement of the deadline referring to the operator’s prerequisites for the construction having been changed after the initial licence agreement by factors outside the control of the operators. These factors were said to be a slow municipal permit process and that the assessment from a flight hindrance and telecommunications conflict perspective performed by the Armed Forces had in different respects been delaying the processes (PTA decisions of 17 May 2004). The PTA referred to conditions that had been changed “in a way that could not have been foreseen at the time of the application, and that has been outside the control of the operators” (See the PTA decisions of 17 May 2004, p 3, author’s translation). This is a legitimating reason for not sanctioning the operators for the breach of the requirements in the licence conditions. The wording is interesting, especially in reference to the time acquired for the permit processes. In what way had the conditions changed? And in what way could the need for time not have been foreseen? Is this a legitimate reason for the coverage delay at all?

The PTA questionnaires of 2003 show the local permit handling officers' perception of the handling time of the permit process of the municipalities.

Table: Building permit handling time, nationally.⁷⁷

Mean 2001:	12 weeks
Mean 2002:	13 weeks
Handling time 1-9 weeks 2001:	41 %
Handling time 1-9 weeks 2002:	34 %

The Blekinge material shows a slightly different picture. The reason could be some kind of tactical answering of the handling officers in the national questionnaire. Certainly, there is an important difference whether you ask a handling officer about his or her view of the application time and the actual measuring of the handling time via the official documents. Also, since there are some cases that have taken a very long time due to appeal and extraordinary circumstances, these cases are not part of the national mean of 2001, and to various extent not in 2002. The Blekinge data contain building permits applied for between 2001 and 2004, with data collected until 2005, so also the very time consuming cases are included.

Table: Building permit handling time in Blekinge 2001 - 2004, in weeks.

Mean	19,9
Median	18,0
Std. Deviation	13,2
Minimum	0,3
Maximum	98,0

It is likely that the permit processes demanded an overall time that was longer than what was expected for ordinary mast building permits before the 3G roll out, partly due to the extent of masts applied for, especially during 2002. The national mean from the PTA questionnaires does not appear to be unreasonably extraordinary. The coverage in the regional case of Blekinge 16 to 35 percentage points to low of the required coverage by the end of the licence period (the percentage is not exact in the sense that the requirement was in form of a number of people to be covered in Sweden, so a lack of coverage in one place could to some extent be covered some place else, at the time).

Table: percentage of coverage over populated areas per municipality per 31 Dec 2003.

County	Municipality	Hi3G (3)	SULAB (Tele2 and Telia)	Vodafone
Blekinge	Karlshamn	84	92	85
	Karlskrona	64	71	69
	Olofström	34	85	35
	Ronneby	71	71	79
	Sölvesborg	71	98	71

⁷⁷ PTA questionnaire of 2 April 2003, p 13.

When a 3G mast building permit is applied for in Blekinge, the statements from the Air Navigation Agency and the Swedish Armed Forces only very rarely are negative. The Swedish Armed Forces sometimes have collected a number of cases for a period of the roll out before they submitted the statements all at once. This can be questioned from the aspect of the rights of the applicants. It may have been efficient for the Armed Forces, but is not in line with how legal administrative principles and how each permit application is to be treated individually. The 3G mast building permit data of late 2003, or during the whole year, from Blekinge does however not indicate that the operators intended to reach the remaining coverage by the 31 December 2003. So, although the municipal handling can have affected the roll out to some extent, and in some areas, a slow municipal permit process can not explain the lack of coverage in some areas of Sweden, for instance Västerbotten, by the end of 2003 when the licence conditions should have been fulfilled.

Table: percentage of coverage over populated areas per municipality per 31 Dec 2003

Within County of Västerbotten	Municipality	Hi3G (3)	SULAB (Tele2 and Telia)	Vodafone
	Bjurholm	-	-	-
	Dorotea	-	-	-
	Malå	-	64	-
	Nordmaling	-	47	-
	Norsjö	-	35	-
	Skellefteå	53	71	54
	Storuman	9	-	9
	Umeå	72	87	72
	Vilhelmina	-	-	-
	Åsele	-	36	-

The operators where not willing or able to fulfil the promise in “the beauty contest” and focused on building the infrastructure where the return of the investment was likely to be the highest, namely in the big city areas. The argument that the permit processes hinders the construction is in this context a reason given in trying to avoid the sanction that the PTA could impose on the operators when not fulfilling the conditions of the licences. It is part of a game, and another important player is the Post and Telecommunications Agency, PTA.

8.4 Competition

The legal changes prior to the licence allocation were all stressing competitive aspects. The decisions were taken by the parliament late 1999 or first half of 2000, and the changes in the Telecommunications Act were in force by 1 July 2000. The first change meant that mobile operators with their own net were obligated to offer net capacity to companies without a net of their own. The purpose was to make it possible for operators to offer mobile services to the consumers via the networks of others. Good accessibility and regional balance were stressed, as a part of the political telecom goals (prop. 1999/200:1, utg. omr. 22 p 92). The second change regarded the operators’ obligations to let other service providers use the infrastructure. The competitive aspects were stressed once again (prop 1999/2000:57 p 15 ff). The third change meant that the operators with a network of their own with mobile services were obliged to supply national roaming for other operators with own network. National roaming

can be of good help in regards to coverage for an operator that is to establish itself at a later stage than the already existing operators. So, once again, competition aspects were stressed (prop 1999/2000:100 p 129).

When setting up the conditions for the construction of four separate infrastructures for a telecommunications system with a maximum of 70 % shared infrastructure the emphasis is on competitive aspects, in assumed favour to the consumer. At the same time, the market is formally set aside by political values such as that everyone, almost regardless of where in Sweden they live should have access to the new network. This is a result of the second stage of the beauty contest regarding the assurance of extremely high coverage in relation to surface area and population and very fast roll-out.⁷⁸ The design of the 3G licence conditions bears plan economic resemblances in the coverage conditions, which is opposed to market logic of constructing where it is most commercially viable to construct.

The coverage conditions of the licences demanded coverage also in the sparsely populated areas, where the forces of the market based on profitability would not reach. In this sense, the setting of the 3G infrastructure construction looked much like a plan economic decision rhetorically defended with reasons such as that everyone shall have access to 3G, regional growth (not just big city areas) and that competition amongst several operators will benefit the consumers, above the governmental responsibility for infrastructure development.

The heavily stressed benefits of competition between four different infrastructures managed by four competing operators at least partly turned to concern for the impact on the environment, that natural and cultural values would be affected in a negative way. The changes in the Electronic Communication Act regarding the forced mast collaboration can be seen as a response to a growing awareness of that the parallel physical infrastructures can lead to an unnecessary environmental impact. This is an awareness that was not present during the preparation for the so called beauty contest. See below under the ‘Environmental impact’ subchapter for the issue of forced mast cooperation.

It is interesting to see how the emphasis on competition and lack of environmental impact discussions of the 3G design turned into a concern for the operators’ refusal to collaborate on mast sites. The competition aspects of the system in many aspects conflict with environmental concern because of the fact that the basis for competition to a high extent has been tied to the development of parallel infrastructures.

8.5 Environmental impact

The lack of environmental assessment at the initial stage of the 3G development is an indicator of how environmental sustainability was handled. As stated, no environmental authorities received the draft for rules of “the beauty contest” for consideration, but around 45 of the 56 that received the draft were telecom companies and network and energy stakeholders (see appendix). This means that those who had an interest in the development had the chance to participate in the shaping of how the infrastructure should be rolled out. This is remarkable in view of the stated policy of “environmental integration” and sector

⁷⁸ See PTS (12 May 2000), p 9 and Andersson, Hulthén & Valiente (2005), p 583.

responsibility as a major component of Swedish environmental policy (Lundqvist 2004). The impact of four parallel infrastructures was not discussed from an environmental point of view.

On a national level the 3G development to an important extent regards the beauty contest, but also the handling of the involved agencies and changes of legislation. The Swedish version of the 3G enterprise is an example of rationalistic planning, emphasizing a strong “guidance” rather than a collaborative “transformation”, in Friedmann’s words. It is centralistic, where experts contributed information to the decision-makers who made the most rational choice based on the values of the decision-maker. Whether or not the public believed in the necessity of the extreme coverage of the system is not part in the planning process. The “market forces” are left out of the construction due to the fixed total coverage of the populated areas.



The environmental concern that never was in focus at the stage of taking the 3G decision now emerges in different shapes. In January 2001 the Minister for the Environment Kjell Larsson commissioned the National Board of Housing, Building and Planning (Boverket) to illustrate what environmental consequences the infrastructure development will have on nature and cultural values. The Board was also to bring forward methods for how to handle the conflicts that were to come up between infrastructure development interests and other interests (Emmelin & Söderblom 2002, p 15-16).

The rhetoric of the initial period was emphasizing the importance of a fast reach of high coverage. Still, the legal instruments for environmental assessment remained unchanged. When setting up the premises to be to construct four different infrastructures for a telecommunications systems with at the most 70 % collaborative infrastructure the emphasis was on competitive aspects, in favour of the consumer. This can be questioned from an ecologically sustainable perspective. Several thousands of extra 3G base stations and masts were to be put up for the sake of competition between the operators.

Environmental concerns surfaced as a result of the decision, not as part of the decision (Emmelin & Söderblom 2002, p 22 – 24). The task of looking at environmental impacts of the system was given after the strategic decision had been taken to a group of environmental agencies with the National Board of Housing, Building and Planning as co-ordinator. This work focused on reducing the number of masts through voluntary cooperation. The national policies decided upon centrally and nationally lead to the assessment problem with an infrastructure system of a total of 10 000 masts that is assessed only one mast at a time.

When the planned roll out struck the landscape the environmental and planning administrations were burdened, but it did not happen in 2001, as expected. It took until 2002 until the boom of mast building permit applications were received in the municipalities. The assessment is fractioned to one mast at a time, of a system of several thousands. This leads to difficulties to overview the rolled out infrastructure. The inflexibility of the radio planning of 3G and the extreme coverage demands may have lead to local conflicts that probably could have been avoided to a higher degree by a more comprehensive and systematic planning, for example by including more of the environmentally and locally important issues in addition to the ideal radio planning. It is interesting to see how the emphasis on competition and lack of environmental impact discussions of the 3G design turned into a concern for the operators’ refusal to collaborate on mast sites.

8.5.1 Cooperation in use of masts

Initially the competitive aspects of having four different operators and infrastructures were emphasized. Environmental concerns coming from the impact of the four partially separate infrastructures emerged early, but it was not until March 2003 – nine months from coverage deadline – that the issue was raised concerning PTA possibilities to intervene and force a more extensive cooperation regarding mast use, between the operators.

The rhetoric was different from the time before the licence allocation decision. The Minister of Information Technology in the year of 2003, Ulrika Messing, announced in a press release in March that the Government wanted to reinforce the PTA possibilities to intervene “when free competition is not working”. The choice of words seems intriguing in relation to the competition emphasis before the roll out.

During roll out the large amount of masts became a problem, not before. The fact that the operators would not collaborate enough regarding mast sites that were of strategic importance in the radio planning was especially stressed. In the PTA questionnaire to the Swedish municipalities 1/3 of the municipalities reported that they had received applications for permits for masts with less than 100 metres distance of each other (PTA 7 April 2003). The aspects of environmental reasons at the loss of competition was further addressed in the



Picture: Double masts southeast of Sjöbo, Sweden. In 2001 and 2002 1/3 of the municipalities received mast building permit applications for masts less than 100 metres from each other.

beginning of year 2005, when a commission was appointed to investigate the possibilities of forced co-location and how the cooperation between operators could increase, which was not met with enthusiasm by some of the operators. The Government appointed Urban Karlström to investigate the need of sharpened legislation for mast cooperation. The press release of 17 February 2005 states:

”It is in the public interest that the development of different radio based networks are made as efficiently as possible for the society. Therefore existing and future infrastructure should be cooperatively used to the largest possible extent without distorting competition” (author’s translation).

The commission resulted in a report called “When one is enough: mast sharing for the environment” (SOU 2005:97, author’s translation). Between the changes in the Electronic Communications Act of 25 July 2003 up until the end of 2004 there were 11 applications from operators to the public authorities to force other operators to cooperate concerning the space for equipment on a mast. Of these, 9 were settled through private agreements between the operators and in 2 of these cases were settled by the PTA (both applications were dismissed). So, no forced co-locations had been decided by the PTA at all. The commission presented on the 20 March 2006 a governmental bill regarding changes in the Electronic Communication Act on the forced mast co-location issue. The proposal expanded the possibilities to force an operator to offer co-location on mast with compensation adjusted to the conditions of the market and came into effect 1 July 2006 (prop 2005/06:191).

The applicable regulations in the Electronic Communications Act, in force in 2003, was not practically applied, and in time for the changes in force in 2006 the coverage had almost been reached and the roll out completed. This makes the legislative actions look more like political

rhetoric than an actual intent to lessen the impact of the infrastructure on the environment by forcing the operators to cooperate.

8.5.2 12:6 consultation

The regional level mostly concerns the actions of the County Administration and the 12:6 consultations of the Environmental Code. On the 26th of June 2001 the Swedish Environmental Protection Agency invited the County Administrations to a seminar for discussion and information regarding the handling of consultations for 3G antennas. This resulted in a working group consisting of representatives from the Environmental Protection Agency, the County Administrations of Stockholm, Skåne, Västra Götaland and Västmanland. This group was appointed to elaborate on a proposal for what a report should contain according to chapter 12, section 6 of the Environmental Code. The group concluded that free-standing masts should be notified to the County Administration for consultation according to chapter 12 section 6, Environmental Code. The consultation should be done even if the mast needs a building permit (Emmelin & Söderblom 2002, p 41 f).

The 12:6 consultations have a different purpose than the municipal building permit process. To see the impact and application of the 12:6 consultations is especially of interest when it comes to studying the planning and environmental administrations as a whole, to see if the parallel processes are uncoordinated, and therefore displaying deficiencies in the administration.

The environmental assessment of the 12:6 consultations is tied to when the masts have a “significant impact on the natural environment”. The responsibility to apply lies on the operators. The information basis for this judgement can be incomplete or uncertain, and in the initial stages of the 3G roll out it is likely that neither the PTA nor the operators was aware of this responsibility (Emmelin & Söderblom 2002, p 27 f.).

The activity can be prohibited by the County Administration “in order to protect the natural environment” (12:6, section 4), but the application of these provisions is low, since many masts are prohibited. The Stockholm County Administration had prohibited 8 sites out of the 900 reported according to chapter 12, section 6 of the Environmental Code, which is less than 1 %.

The Blekinge County Administration does generally not comment on cases within detailed planned areas due to the fact that the 12:6 consultation decision is to be taken from a nature and cultural point of view, which is not seen as being as important in this area as outside of it. The first reported cases for 12:6 consultations came in to the Blekinge County Administration 11 April 2002. These were received from Avtalsbolaget (Svenska UMTS-nät AB) and contained nearly 40 sites, and shortly thereafter there were more were added.

Despite the extensive list from the Environmental Protection Agency (from 23 Oct 2001, see appendix of Emmelin & Söderblom 2002), the first applications for 12:6 consultations in Blekinge only consisted of coordinates and the mast height for each site. No description regarding the environment or performance was included. This means that there was a clear discrepancy between the minimalist approach regarding the data for the 12:6 consultations from the operators, which was accepted by the County Administration, and the list of requirements from the Environmental Protection Agency.

Both 3GIS and Svenska UMTS-nät send the mast building permit application to the County Administration, the Air Navigation Agency (Luftfartsverket) and the Swedish Armed Forces for consultation as standard procedure. It is very rare that the statements from the County Administration are negative from an environmental perspective according to these 12:6 consultations (see p. 6 of the appendix).

The parallel process between the PBA and the 12:6 consultation of the Environmental Code is likely to have been a bit confusing for both the municipalities and the County Administrations. The Blekinge County Administration case list for the 12:6 consultation cases does not match the one from the municipalities. By August 2004, 234 cases had been collected from the municipalities. 100 of these that are outside detailed planned areas and are not reported for consultation at the County Administration. Of these 100, only 12 have 12:6 consultation documentation that can be found in the municipal documentation. Of the 134 cases by the County Administration 34 cases can not be found among the cases that have been collected from the municipalities.

When it comes to appeal of the content of the decision, there are a few cases further outlined under the subchapter of Participation below.

8.5.3 Path dependency

As outlined in the theory section of the thesis, *path dependency* describes how the set of decisions one faces for any given situation is limited by the decisions one has made in the past, even though past circumstances may no longer be relevant. In a planning perspective, possibly especially relevant in the development of infrastructure, this means that how and where you start your project will later affect where and what problems you will be facing.

The idea of path dependency is tightly tied to *transaction costs*. With “transaction costs” is meant the costs that are related to economic activities, in trade, for instance when a buyer and a seller is to find each other. There are reasons for using the term *planning transaction costs*, when it comes to the elements included in the basic data for decision making. At a later implementation stage, the consequences of the choices made in the planning stage will show. The more changes that have to be made in the implementation stage, the higher the transaction costs, which in turn will reflect on the planning stage in a negative way.

In the 3G infrastructure the planning transaction costs emerge when the planned mast sites reach the environmentally protected areas, the cemeteries and the sensitive cultural environment leading difficulties with building permits or prohibition in the regional 12:6 consultation process and local protests. Then the system has to be re-planned in the local context, a re-planning which may concern several base stations, due to the inflexibility of the radio system. The radio planning that took place before the roll out would create unavoidable future mast permit conflicts, much due to the inflexibility of the system, such as radio planning and wavelength reasons as well as policy reasons (extreme coverage requirements).

Developing an infrastructure is likely a path dependant endeavour, especially if the system has many elements and is inflexible. When Hi3G, Vodafone, SULAB, Tele2 and TeliaSonera in 28 June 2004 applied for a change of licence conditions regarding coverage deadline, and

pilot signal strength, the operators argued that a number of reasons have made the permit processes slower than anticipated:

“Due to the public debate regarding the effect of the base stations on the environment, values of culture and nature and the fear of electromagnetic radiation, the handling and decisions of the building permits have been taking significantly longer and resulted in more denials than estimated.

This has also led to a difficulty for the operators to enter into lease or rental contracts at reasonable conditions with land owners. These circumstances have not been possible to foresee. The consequence of this is that the operators have not been able to expand [the infrastructure] as decided, and that the 3G nets continually have to be re-planned depending on in what areas building permits and land contracts have been reached” (see PTA decision of 7 Dec 2004, p 4, author’s translation).

Spatial planning is controlled by the aspects the planning process includes to affect the decision making. However, the radio planning prior to the roll out was simplistic in the sense that the system planning only included radio aspects.

“First there is an ‘optimal radio planning’, where a network of base stations are rolled out in the terrain. This is in general originating from the large areas where the traffic in the GSM network is high, and where the demand for 3G can be expected to be the highest. As a basis only a few factors that directly affect the “optimal radio network” are being used, meaning that except cities it is the topography and wooded areas in the map material that is included.” (Emmelin & Söderblom 2002, p 24-25, author’s translation)

Given the fact that the system of base stations for technical reasons is rather inflexible, each base station can not be moved more than a few hundred metres without affecting the coverage (see also Emmelin & Söderblom 2002 p 24 f.), the 3G infrastructure is to a high degree path dependent. The radio planning should ideally include sensitive concerns such as environmental, cultural values etc. initially, already before the roll out begins, in order to avoid conflicts during the roll out, manifested in public protests and permit appeal.

74 % of the municipalities claim that of the rejected mast permits it is “often” to “very often” that the rejection is based on regards to nature and cultural values. This is in the two first years of the Swedish development (Temo 2 April 2003). In the case of “national interests” the percentage is 41. These percentages could most likely have been lower if the roll out planning had consisted of a basis of more aspects. Added to this are the permits appealed by neighbours and others. To what exact extent this could have been avoided by a more thorough radio planning is however hard to say. On one side it is likely that sensitive areas could have been avoided, on the other at least some of the appealing parties are likely to not have accepted masts in the vicinity in any form. The main point is that the national system planning of the operators’ “ideal radio planning” often is in conflict with the local single case planning.

Naturally, there are costs tied also to initial planning. To form a better strategic material prior to the finalizing decision the higher the costs are. This leads back to the fact that there is a strategic decision to make regarding how much should be invested early in a project above the lowest investments possible, leading to the muddling through in an incrementalist manner. In the balancing of daring and deliberating, to some extent you can foretell what conflicts that will arise, and to some extent you can not. The more you deliberate, and invest in the planning

stages, the less unknown factors are likely to show up as the project is implemented. In the same manner, incrementalism is the model for decision making in many cases simply because it is less demanding to skip the early assessment of the situation. In the words of Etzioni the “disjointed incrementalism” seeks to “adapt decision-making strategies to the limited cognitive capacities of decision-makers and to reduce the scope and cost of information collection and computation” (Etzioni 1973 p 219). The limitedness of the “cognitive capacities of decision-makers” differ, and are likely to be affected by other aspects than mere rationally calculated costs of planning, such as stakeholder driving forces, political power struggles and even personal preconditions.

In addition to the path dependency of the roll out of physical infrastructure there is a path dependency in political decisions. As a project has reached a momentum the inherent values that has been set are harder to modify, bigger modifications are connected to a transaction cost, both when it comes to the public picture of having integrity and being politically trustworthy and in the facing of stakeholders as hands have been shaken and some decisions have been taken pointing in a certain direction. It is not too late to change course, but every altered bearing is costly. Of the political struggle or the shaping of the policies early in the 3G case setting the design is not empirically targeted here more than what the official documents can display. In any large scale infrastructure project there is a balancing between what should be planned in more detail before the decision and what can wait until later. The balancing of the two sides offers a possibility for the need, or the cost and the importance, of for instance to missing something in the selection process. If that cost is high, more effort will be spent on the detailed examination. There is in other words room for allocation of resources depending on what type of object being planned. The allocation process of resources can however miss aspects that later are shown to be of importance. In the 3G case this can be exemplified by the environmental impact of the infrastructure roll out, as well as the impact the roll out had on the public worry for radiation.

8.6 Participation

Participation, which can be direct or through legitimate representation, had been discussed in political science, and formed an important part of the “good governance” discourse beginning in late 1980’s or early 1990’s (Doornbos 2003). This included the transparency of decisions taken, and that their enforcement is done under support of legal provisions (See Graham et al. 2003). Broad public participation can be said to be the cornerstone of good governance, although “governance” has been criticized for being a hard-to-define buzzword (Doornbos 2003). In this perspective it is the public that bears the knowledge regarding what will form a good decision. The effects of the legal regulation regarding participation in decision making can however be hard to foretell. The regulation can be complex, as well as the regulated field or issue that is targeted by the regulation.⁷⁹ It is here important to point out that participation is a way to see how the functions for exclusion and inclusion works, who is involved in deciding, and in what capacity. It is important to bear in mind the rather obvious fact that the fact that someone is included does not necessarily mean that the following decision is in line with the will of this someone. What it means is that this someone in some way has been

⁷⁹ Participation from sociology of law point of view is developed in Baier, ed. 2008, a forthcoming anthology.

acknowledged with a voice, may it be a concerned party in a permit process who seeks to appeal a building permit, or being represented in a democratic assembly.

With this being said, a further distinction can however be made, following from the theory section of sociology of law above, which is that there can be a difference between the law in books and the law in action also in the field of participation. Just because someone is formally included does not mean that the intentions behind this inclusion were that the expressed will of this included someone will affect the following decision. There are, simply put, sometimes other reasons for including someone, that means that in its application the legally acknowledged right to participate is not a factual one.

In the following sections, the 3G case is divided into before and during the infrastructure roll out. The former discusses participation in the sense of who could affect this design, and in what capacity – which takes place at a national and central level – and the latter discusses a participation that is a bit scattered over different aspects, and mostly found in a local and regional context.

8.6.1 Before roll out

The participative side on the national level of the 3G case is an important indicator for the social side of sustainability, since it shows the character of the 3G decision. Mentioned above is also the transparency of decisions taken, and that their enforcement is done with the support of legal provisions (See Graham et al. 2003). Firstly, the public participation in how to introduce 3G in Sweden has been modest. Not even legitimate representation in the form of Parliament has affected the decision as such, although it has contributed to make legal changes in order to secure competition in the telecom sector as a preparation for the 3G to come (see decisions taken on 8 December 1999 in order to be able to make coverage demands in licence allocations according to the Telecommunications Act).⁸⁰

The decision to develop 3G was taken on EU level, and how to develop 3G is mainly affected by the PTA approach of a wide geographical coverage as very important, as well as of the reach of it, emerging from political processes mentioned above, and consultation. The participative aspects of the 3G decision are therefore mostly to be found in the consultation of stakeholders to which the PTA regulation on the so called beauty contest is referred for consideration (see appendix). These 56 parties, to be exact, of which many telecom companies and governmental agencies, could affect the beauty contest, but would not have been able to lower the PTA demands of designing the licence allocation in order to retrieve applicant promising a very high coverage, and a fast reach of it. In addition to the possibility for some parties to have an opinion on the draft, a hearing was organized 23 March 2000, with the intention that concerned parties could clarify their standpoints, and 43 companies were invited (PTA 2001 p 7).

Looking at the draft sent to the list of stakeholders in February 2000 and comparing it to the conditions for the beauty contest that later was decided by the PTA, the only difference of significance is the lowered number of licences at stake, which was changed from 5 to 4. The important parts regarding the promises of the coverage and roll out speed stayed the same. This suggests that the stakeholders, such as future applicant only to a little extent could

⁸⁰ SFS 1999:1197, prop. 1999/2000:1, utg.omr. 22, bet. 1999/2000:TU1, rskr. 1999/2000:85.

participate in the sense that their will would actually change the preconditions for the licence allocation procedure, and therefore also for the implementation itself.

The 3G development is a result from harmonization within the EU, and could hence not been avoided, but the process in Sweden has excluded the public from participating on the coverage and the roll out speed, which was a factor that could have some variation in the member states (see Hultkrantz & Nilsson 2001). Many of the involved stakeholders, including later licence winners, were included in the group that was referred to for consideration of the PTA licence allocation draft, but it seems unlikely that the premises that was set to secure a high coverage and fast roll out could have been changed by their protests. This political vision was too strong and secured in the PTA management.

8.6.2 During roll out

The participation in the 3G case is different at different levels. The participation in the implementation stages of the roll out is mainly tied to the local context and the building permit. The means that the possibilities to take part in, and affect the 3G infrastructure is closely tied to legally being defined as a concerned party in the assessment of the single mast. This also concerns the 12:6 consultations of the County Administration and the utility easement that is decided by the Land Surveying Agency, the LSA, and often connected to the possession of property in connection with a mast site. In the utility easement it is attached to actually being the property owner of the intended mast location.

There have been only limited ways to participate above the level of one mast at a time. The legal changes that affected the roll out were voted upon in the parliament, and in a representative sense can one argue for that there has been a type of participation. There are however important aspects that fall aside the assessments under the mentioned permits, such as the fear or worry for radiation, which is discussed and analyzed in the following subchapter. In relation to this is also the fact of those base stations that do not fall in under any of the assessments, the base stations that do not require any permit, because they are mounted on a façade or alike.

The legal way to define who has the right to appeal is two-sided. First the written law states that the decision must be negative for the individual, and then the individual must be concerned by the decision, which in part is defined in law, and in part is defined through legal practice, by how far from the site the property of the complainant lies, and how visible the mast is from it.

8.6.3 Participation in the building permit process

The building committee has to communicate that it has received a permit application to concerned parties, such as neighbours, (8:22 PBA, The Administrative Court Procedure Act, 1971:291, section 10-12) which can attach a statement regarding their opinion of the permit application. This material takes part in the decision material of the committee. If someone, for instance a neighbour, wants to appeal an operators' received permit decision, this is done at *the County Administration*, (Länsstyrelsen), chapter 13, s. 2, PBA. A right to appeal has,

according to general administrative principles (see s. 22 of Administrative Procedure Act 1986:223) those whom the decision concerns, if it goes against (has a negative affect for) them.

In the permit processes the key is if the complainant is *a party concerned* or not. And this is concerned in the legal sense, that if so, the appeal will be tried in substance. If not, the appeal will not be tried, no matter how legitimate the appeal *in* substance was. According to the Administrative Procedure Act (1986:223), section 22:

“A person whom the decision concerns may appeal against it, provided that the decision affects him adversely and is subject to appeal”.

Note that the decision needs to affect the complainant adversely. And when it comes to telecom masts this has been specified in legal practice. The PBA does not say who has the right to appeal according to the law. The preparatory legal work (governmental bill 1985/86:1 p 822) mention that such a regulation was suggested in the referral to the Council on Legislation (Lagrådet), but was taken out on proposal from the Council. The Council stated that from general principles that had been developed in court practice followed who had the right to appeal. In short, the Council preferred it to be sorted out in court practice, and the legislator agreed. And hence the regulation in section 22 of the Administrative Procedure Act is applicable, and court practice has to draw the exact line for who can appeal. And when it comes to the building permit practice it shows that a party concerned is owner of a property next to the property to which the building permit is tied, and owners to property in the neighbourhood that are especially affected considering the kind and extent of the building that the permit issues, the environment etc. (see RÅ 1992 ref 81 regarding appeal of permit to build a wind power station, and RÅ 2005 ref. 36).

In a case decided by the Supreme Court of Appeal on the 28 June 2006 the court found a property 350 meters from the mast site to be concerned. The four other properties that also appealed the mast permit were located between 650 and 950 metres from the mast site, and these were not found to be concerned by the mast permit, and therefore had no right to appeal (Case 722-05, 726-05).

The Blekinge permit process data shows that the line can sometimes be hard to draw for the County Administration. Of the 248 3G mast building permits 48 were appealed, which equal about 1 out of 5. This could include both an operator that does not like the municipal's denial of an applied building permit, as well as individuals who do not like the municipal decision of approving a building permit. Let us look a little bit closer at the 15 cases where the appeal was rejected, meaning that the factual matter was never tried due to the fact that the complainant was not by the County Administration found to be a party concerned in a legal sense. 12 of these 15 come from the same person. This is someone who really does not want 3G masts to be built in Blekinge and who does not live close enough to the planned masts to have a legal right to appeal. This person (as well as most other) is legally excluded from having a say in the legal aspects of the building permit appeal.

Table: County Administration decisions in appealed 3G mast permits, Blekinge

	Frequency	Percent
Not appealed municipal decision	200	80,6
Appealed but rejected/not party concerned	15	6,0
Appealed, tried cause, but not approved	20	8,1
Changes municipal decision	13	5,2
Total	248	100,0

Of the remaining three rejected appeals one is where parents of children in a school neighbouring a planned mast site do not want the mast close to the children for several reasons. The County Administration finds that the parents can act as representatives for the children, but the fact that the children go to school near (70 metres) a planned mast site does not make them concerned parties in the sense of the law. This is a way to draw the line, and exclude the children, and the representing parents, from participation in the decision-making of this particular case. The right to appeal is often tied to owning property close to the permitted construction. The decision is assumed to be in line with existing law defined in legal practice of higher courts. The decision itself holds no such references. Another case regarded a base station where the equipment was located in a room in a building 300 metres from where the complainant lived. The County Administration found it too far to give a right to appeal. In the last of the three cases the complainant complained too late. The right of appeal is not only limited to concerned parties but, naturally, also in time.

In the case regarding a site on a small island, Aspö, outside Karlskrona in Blekinge the appeal was made by parents of children in a school 300-400 metres from the site, and a property owner neighbouring the site. The complainants were 17 families, of which many had children in a school near the planned mast site, with one person pleading their case. The person pleading lived 1,5 kilometres from the mast site, and interestingly enough the County Administration explicitly stated that by this fact have to be “considered to be concerned by the building permit in a way that it at least can be appealed by him“ (CA decision of 4 May 2006, p 2, author’s translation). Compare this to the properties 650 meters from a mast site not rendering in a right to appeal (although a case not yet decided by the time for the decision for the County Administration). This seems like a mistake by the County Administration, which also was corrected in higher court. This decision (of 6 May 2004) annulled the given building permit, and redirected the case back to the municipal building committee based on that the committee had failed to fulfil the conditions of sending information to concerned parties, and hence denied them their right to express their view. The County Administration in this decision “saved” the process for the complainants so that it could be tried once again, this time with the view of the concerned parties included. The fact is still that the line of who was found to be a concerned party was drawn extraordinarily wide in the case by the County Administration. This was also the grounds for the operator’s appeal to the County Administrative Court, although the court found that the decision of the County Administration was not possible to appeal because it had not changed the result of the case, it had only been redirecting the case to the municipal committee (12 Aug 2004). The concerned party question was therefore not tried. The wording might seem strange, since the outcome of the case had been changed, the permit had been denied and up for a new trial, however with the same result, a new mast permit was given by 10 Sep 2004. The permit was, not surprisingly,

appealed once again although the complainants had been surprised to see that they once again had missed the municipal information about the permit (15 Dec 2004).

This time the County Administration tried the appeal in fact but denied it (2 Feb 2005). The decision was appealed once again, and the County Administrative Court dismissed the appealing families stating that the fact that they visit a house nearby or have children in a school at 300-400 metres distance does not make them concerned in the eyes of the law as regards building permits, and therefore they have no right to appeal. The person living on the property next to the mast site was found to have the right to appeal, but the appeal was dismissed in the factual matter with the stating of that the court agreed in the judgment the County Administration had done (Case 221-05, 27 Dec 2005) – the permit did not be in conflict with chapter 2 of the PBA, or chapter 3, section 1 or 2 (not “significant impact”), or any other section of chapter 3 of the PBA.

The case illustrates how the participation in the decision if a 3G mast is to be constructed or not is formalized in law, defined by legal practice, and sometimes showing deviances in its legal application (the first appeal was tried, but could have been dismissed).

The PBA states that known concerned parties are by written notification be given opportunity to express their opinion on a building permit (chapter 8, section 22). This is an aspect of the inclusion and exclusion function of the permit process. When the municipal committee decides that there are no concerned parties to the building permit the information measures are limited to a message in the local press, instead of a letter, which is the case when the committee decides that there are concerned parties. The practice of when the municipal committees take this decision, and on what grounds, the Blekinge permit data base does not tell. This practice of the municipal building committees have been criticized by the environmental debater Gillberg for systematically only sending notification to the properties neighbouring the mast property while the expression “concerned parties” in a mast case can be wider than that (Dagens Nyheter 24 April 2004). This can be compared to the Supreme Court of Appeal decision of 28 June 2006 mentioned above, where 350 metres from the property and the mast clearly visible constituted the right for appeal. Gillberg’s point is that far more persons should be included in the permit process than is the case.

The permit process data of Blekinge shows that even if the concerned parties are allowed to participate, this hardly ever changes the final outcome, if the process goes above the municipal level. Thus the participation can be discussed in a formal sense and in a practical sense. Existing law may include a person but the application of the law may exclude the possibilities to affect the decisions, which then is shown in the study of cases, not in the study of the law. When the permit was given, an appeal no matter for what reason, hardly ever lead to a revoked permit. Of the 37 appeals that neighbours or other non-operators raised, only one lead to a denied permit in the end.

Table: Appeal compared to if final permit or not, Blekinge 2001-2004

		Not appealed	Appealed by non-operator	Appealed by operator	Total
Finally a permit?	No	44	1	7	52
	Yes	141	36	3	180
	Not yet decided*	14	2	0	16
Total		199	39	10	248

* For a few cases this specific data is missing (if permit finally was given or not).

This may be a sign that the process may include people, but the process does not take any notice of what they say. It is a sign that what the appealing parts in the 3G infrastructure roll out think is an issue is rarely acknowledged as an issue legally. One reason may also be found in the municipal deliberative approach on building permit handling, many disputes can be solved by the parties communicating, and for instance a mast can be relocated in a less disturbing place for the neighbours, and hence never show up in the appeal data. From this perspective the appeal data shows cases that could not be solved communicatively, where the opinion of the appealing party differs too much from the one of the operators and the municipality that legitimates the building permit decision under the PBA and legal practice.

Of the 39 appeals from non-operators at least 30 mentioned a fear of radiation as part of the reason to appeal. This makes it a very common reason, indicating the importance and range of the radiation issue in Blekinge. Appeal based on radiation is always denied. Still, the radiation's possible hazardous effect is a widely debated issue, and a common ground for appeal in the Blekinge processes, although never legally acknowledged. This is partly what is shown in the data in the table, and addressed further in next subchapter.

The discussion has so far regarded the participation aspects of the building permit. Other permits of relevance to 3G mast construction is utility easement under the Utility Easement Act, and the environmental consultation of chapter 12, section 6 in the Environmental Code, the so called 12:6 consultation. As mentioned, the right to appeal a decision is often tied to the fact that the complainant has a property that is considered affected by the decision (in a negative way – remember section 22 of the Administrative Procedure Act). Who is considered a concerned party is a bit wider in the PBA definition, which is clarified in chapter 8, section 22 where the Building Committee prior to the permit shall inform for instance “known affected parties and known co-operative tenant owners, tenants and affected residents ... and provide an opportunity to give an opinion on the application” (Translation by The National Board of Housing, Building and Planning 2006).

8.6.4 The regional level - 12:6 consultations

The term “consultation” could bring participative associations, but despite this the assessment is done at regional level, by the County Administration, and the public has little to say about how the decision is to be taken.⁸¹ The consultation has an outspoken environmental conservation emphasis, and radiation issues are not found to be a part of the decision. The radiation is defined as not hazardous as long as it passes under the standards of the Swedish Radiation Protection Authorities.

The participation when it comes to 12:6 consultations is tied to the appeal of a decision that has affected a concerned party negatively. How the line is drawn legally for who has the right to appeal a decision taken under these provisions is of interest from a participative perspective. As concluded in the legal chapter 3 of the thesis, this has been up for trial only in a few cases that are of interest. The County Administration's 12:6 decision can be appealed to the Environmental Court. This is also a right for the operator, if the mast site has been prohibited by the County Administration.

⁸¹ “Consultation” is translated from the Swedish “samråd”.

The legal practice accepts that those who have some kind of special right to the property, for instance being the owner, that the consultation decision concerns also have a right to be heard before the decision, see case in the Environmental Court of Vänersborg (M 5148-04, 22 April 2005), where the decision was appealed because the County Administration had not communicated the decision to the property owner, which led to most of the case being redirected to the County Administration. The right to appeal a decision based on the 12:6 consultation likely requires that the person can be affected by the decision in the sense of being property owner, or with some special right to the land. This can be compared to a case in the Supreme Administrative Court that concluded the one who owns a property that is affected by a decision according to the Environmental Code has a right to appeal the decision if it negatively affects his or her legal status, for instance through limiting the possibility to use the property (RÅ 83 2:85).

In a case from the Environmental Court of Appeal (Case M 7839-03, 8 Feb 2005) a person appealed the Environmental Court decision to allow a 3G mast in accordance with chapter 12, section 6 of the Environmental Code. The person had no connections to property that was affected by the decision, and therefore not found to have the right to appeal the decision with references to public interest. This is in line with for instance municipal permit appeal.

Note that if an operator seeks to construct a mast on another's property, the County Administrative decision has no legal implications when it comes to building permit or utility easement. This means that even if the County Administration sees no hindrance for a mast from a natural environment point of view, it does not necessarily mean that the mast is permitted by the Plan and Building Act (this is another, municipal, matter).

When it comes to appeal of the content of the decision, there are a few cases. The County Administration of Dalarna had prohibited a mast site on Sollerön (an island in the lake of Siljan) on basis of that the mast would harm the national interests in the area (the culture and nature environment). The decision was appealed by the operator, Svenska UMTS-nät AB, and the Environmental Court of Appeal revoked the County Administrative decision. The County Administration appealed this decision, and the Environmental Court of Appeal set the original County Administrative decision, which prohibited the mast. The court agreed that the mast would harm the cultural and natural environment, and concluded that other localisations were likely to be found for the site on the island (case M3825-03, 27 Nov 2003).

8.6.5 Base stations that do not require a permit

As mentioned in the legal chapter there are unassessed base stations as well, base stations that do not require a permit under the PBA or 12:6 consultation under the Environmental Code. This means that they are not within the 12:6 consultations regulation because they can not be found to have “a significant impact on the natural environment”, which means that they are not especially visible, and most likely within populated areas, and “hidden” on the façade of a building. This further means that they do not “*essentially change their external appearance*” (chapter 8 section 3, the PBA) even if it is within a detailed planned area, and for this reason do not require a building permit to be mounted.

Naturally, base stations of this kind don't show in the municipal data, and data of these base stations demands an extra effort to be found and charted. This data has however not been collected in this study, and how frequent of these unassessed base stations are can not be said. It seems that the municipality, in its environmental supervision, can require the locations of

all base stations within the municipality, from the operators, following from the decision of the Environmental Court of Appeal outline above.

So, if the antenna or short mast does not essentially change the external appearance, it may not require a building permit. This is interesting in relation to the radiation issue. Since the radiation has been legally defined out of the permit system, with reference to the Swedish Radiation Protection Authorities, as well as the activities under the scope of the municipal supervision under the Environmental Code there are a lot of base stations that are mounted without notice of the public, and hence without a public say in the process. Public participation does not exist for these base stations. Neither the public nor the local environmental authority can really know where these bases stations are, if they would like to avoid them, or to supervise the activity. This means that a conception that has been widely spread in the public at least is tried in the building permits and the 12:6 consultations, although always denied as a legitimate reason to hinder a mast, is never even tried in the case of base stations that do not fall under any of the legislative bodies. They travel under the legal radar, so to speak.

8.6.6 Sum

Not everyone could participate in the decision nor the permit processes of the infrastructure roll out. During roll out, this means the possibility that to take part in, and affect the 3G infrastructure is depending if the complainant is legally defined as a concerned party in the assessment of several or single masts. This concerns the 12:6 consultations, the utility easement and most importantly the building permit, and is often connected to the possession of property in connection with a mast site. The permit process data of Blekinge shows that even if the concerned parties are allowed to participate, this hardly ever changes the final outcome, if the process goes above the municipal level. The legal way to define who has the right to appeal is two-sided. First the written law states that the decision must be negative for the individual, and then the individual must be concerned by the decision, which in part is defined in law, and in part is defined through legal practice, by how far from the site the property of the complainant lies, and how visible the mast is from it.

The assessment of the system, the several thousands of base stations' impact on the environment, has been made one base station at a time as the operators apply to put up a mast. This were done regionally when it comes to mainly aesthetic aspects, and locally when it comes to bilding permits. The participative aspects can therefore mainly be found in some aspects regionally, and in some other locally, both legally regulated within the Environmental Code and the Planning and Building Act, respectively. The setting up of many base stations in a specific context does not apply to any of the legislative bodies, and therefore are constructed without any participation from the public.

From a participative point of view *the complexity* of the regulations controlling the environmental management and planning is a problem, both for the public, and the operators, as well as the involved authorities. The assessments are parallel and not linked to each other formally, although the matters from a reasonable perspective as well could be. Both the authorities to contact differ, as well as court hierarchy and who is concerned party.

Nationally, the degree of coverage and the speed of the roll out was a result of the pormises in the so called beauty contest, but the deisgn of this contest leading to these promises was

mainly decided by the PTA. The stakeholders that commented on the design did not affect the draft of the so called beauty contest on this point at all. There have been only limited ways to participate above the level of one mast at a time. The legal changes that affected the roll out were decided in Parliament, and in a representative sense can one argue for that there has been a type of participation.

There are however important aspects that fall outside the assessments under the mentioned permits, such as the fear or worry for radiation. Appeal based on radiation fear was never legally acknowledged in practice in the sense that it could change a decision in the building permit process or the 12:6 consultation. The design of the decision making of the assessment of 3G masts, where the part of the decision concerning radiation is not for the court to decide, this issue has become an expert based issue. This has in the 3G case meant that this specific issue has been lifted from the participative means that the legislation supplies. When it comes to public concern about the radiation the door is shut.

8.7 The radiation issue

The radiation issue serves as an indicator of how relevant parts of both social and environmental sustainability have been handled. The social side is mainly associated with aspects of participation and the environmental side is mainly associated with the role of the precautionary principle in the infrastructure roll out. The European Commission in June 2002, in a report to the Council, addressed the radiation issue and the environmental concerns as a problem for the infrastructure roll out schedule over Europe.

“Obtaining the authorization for installing base stations has become a real challenge in a number of Member States, which risks to impact on the schedule of roll-out envisaged and increase costs unexpectedly. The background to these difficulties lies in the alleged health impact resulting from the electromagnetic emissions by base stations as well as environmental concerns, as many new 3G masts are going to be erected.

In most Member States the relevant decision processes are taking place at regional or even local level, and applicable procedures and rules vary considerably (e.g. construction permit from local authorities).”⁸²

This is an awareness that also in Sweden grew during the roll out as the implementation hit the environmental and planning administration.

Of the 39 appeals from non-operators in Blekinge at least 30 mentioned a fear of radiation as part of the reason to appeal. This makes it a very common reason, indicating on the importance and range of the radiation issue in Blekinge.

⁸² Commission Communication of 11 June 2002: *Towards the full roll-out of third generation mobile communications*, COM(2002) 301, p 14.

Table: Where radiation is part of the stated reason for appeal, Blekinge.

		Not due to radiation	Radiation is one reason	Missing	Total
Appealed to County Adm.	Appealed, not operator	5	30	4	39
	Appealed by operator	10	0	0	10
Total		15	30	4	49

Permit appeal under the Planning and Building Act, based on fear of electromagnetic radiation, is as discussed above in practice always rejected in court. The court states that the radiation can not be said to be dangerous, meaning that it is referring to the scientific evidence not showing that the radiation is dangerous. Legally, which also means most importantly, the fear of radiation has met no recognition. Since the issue has been such a publicly spread issue, many permits has been appealed for this reason, which means that the roll out has been delayed to some extent, although the permits has not been denied in the final court decision. It is possible that the public fear has affected local decision making to some extent as well.

8.7.1 The planning paradigm in a local context?

According to the PTA interviews of the municipal planning officers the radiation is not taken into account by the local planning officers. It is considered to be an issue for the Radiation Protection Authority. Some planning officers however claim that the public fear of radiation affect them in their handling, for instance meaning that they tend to put more effort into the cases when the issue of public fear of radiation is at hand (PTA 2 April 2003a, p 14). When the local planning officers change their behaviour it is not something initiated by stimulus from within the legal order. The radiation issue has clearly been shut out by legal practice, and therefore is not part of existing law. The planners get affected by a social pressure, by the awareness or a feeling for the charged question, and the potential conflict that could arise.

As regards the municipal decision, the neighbourhood opinion has been taken into account. It is seen for instance in the cases of Tararp 3:5 where the permit was turned down partly due to the notifications from the neighbours (although the operator appealed and finally got the permit), Uttorp 4:2 where the neighbours referred to fear of radiation, the negative effect on the landscape view and an assumed decrease of property value. The operator responded and suggested to move the site 100 metres, and the building committee granted the permit after this. In the case of Färmanstorp 4:1 a neighbour objected that the mast was too close, the radiation can be hazardous and the property value may decrease. The operator responded, altered the site location, and the municipal building committee stated that the permit could be granted after the relocation, the conditions in chapter 3 of the PBA were now satisfied. There are more examples of how neighbour objections participate in a “negotiation” of the exact location of the mast site. Although the municipality not clearly acknowledges the fear of radiation as a reason to deny a permit, the examples show that the municipal planning is open for the opinions of individuals that are affected by the mast sites. To listen to concerned parties before the decision is within existing law, but to acknowledge radiation fear is outside existing law. The examples however point in the direction that exactly where this line is drawn is not the most pressing issue in the local planning, but in the legal process which may follow in an appeal, which demonstrates the binary approach in which the legal decision is taken.

Viewing this from the paradigmatic perspective outlined above, the decision making of the municipal level bears elements of the plan paradigm, and the normative content of this paradigm. This means that in the local context the weighting or balancing of legitimate but not necessarily compatible interests is the way of managing. The local decision is seen as good and legitimate if it is reached in a process where interests are explicit and weighted. Although methods may vary over a wide scale from strictly rationalist to deliberative the ultimate decisions in spatial planning are political. Their proximate legitimacy is a claim to “fairness” and their ultimate legitimacy is democratic decision making. This means in simple terms that a problem is a problem if one of the concerned parties thinks it is, which the case with the fear of radiation is in the local context. This can be exemplified by the guidelines for building permits in the municipality of Kristianstad decide upon in June 2002:

The building committee shall refer to the knowledge and investigations of the Radiation Protection Authorities. There are still persons that worry about the risks of radiation. The building committee shall at contacts with the operators work for locations that considers this worry. Locations of masts and towers on, or right next to, day nurseries and schools and such are to be avoided (Kristianstad City Architect Office, 25 June 2002 p 5, author’s translation).

The centralized decision of how the radiation shall be taken into account in the 3G infrastructure development is rationalistic and calculating (Swedish Radiation Protection Authority standards, higher court decisions - see figure in 5.3.3) rather than communicative or deliberative. In this perspective the issue of whether or not the public fear the radiation is irrelevant. From this perspective the public should not fear the radiation, since expert judgement claims that it is not hazardous. This regards the appealed permit processes, above the municipal level. On a local level however, the participatory aspects are stronger. The municipal building committees tend to regard neighbours fearing or having a sceptical attitude towards the radiation as a problem worth taking into account in the local planning. This sometimes leads to a denial of a 3G mast building permit. These communicatory features of the planning process points the local planning towards the planning paradigm (“a problem is a problem if someone involved thinks it is”). These features however fades as the appeals reaches the higher courts, and the “black box” of law closes in on the decision making and expert knowledge takes over as the more heavily weighing knowledge.

8.7.2 Legal complexities tied to radiation

The complexity of the spatial planning structures and the problem of overlapping legislation based on slightly different purposes can be illustrated by the radiation handled under the Planning and Building Act and the Environmental Code.

The PBA application of radiation and fear of radiation is homogenous and can be illustrated by the County Administrative decision in the mentioned Aspö case of Karlskrona.⁸³ The County Administration concluded that “significant impact” in legal practice is regarded to mean that there has to be concrete circumstances that speaks for that a risk of disturbance is at

⁸³ See 4.6.2 and 8.6.3.

hand.⁸⁴ The court continued with “the circumstance that the mobile telephony mast causes discomfort or worry for disturbances can not be considered as such significant impact that is intended in chapter 3, section 2 of the PBA” (CA decision of 4 May 2006, p 2, author’s translation).

The status of the Environmental Code when it comes to the activity of running a base station has been subject of much dispute. Many building permit appeals have been based on the precautionary principle expressed in the legislation, a demand that is always denied in a permit process. The municipalities can most likely apply the Environmental Code under its environmental supervision responsibility over activities in the municipalities, although not specifically in the building permit process. The case regarding this supervision was the one of the Environmental Court of Appeal where the mast activities were up for trial in Landskrona. The municipal environmental committee wanted a map from the operators of where the base stations were located, under the supervision responsibility. In order to have the right for such a map it was however needed to be stated that the base station activity fell under the scope of the law by being an “environmentally hazardous activity”.

The Environmental Court of Appeal also found it to be such an activity, based on the fact that it is sufficient with a risk of the radiation being hazardous (like for instance when being close to the base station antenna). Furthermore, the court stated that the fear itself, expressed as psychological or mental anxiety was included in the Environmental Code definition of “damage or detriment to human health” (chapter 9, section 1 and 3 of the Environmental Code, Environmental Court of Appeal Case nr M 7485-04, 12 October 2005).⁸⁵

The requirement may be lower in the Environmental Code – the impact does not have to be “significant”, but is still a fact that legally the radiation activity is found to be detrimental or hazardous under one legislation (the Environmental Code) but never detrimental or hazardous under the other (the Planning and Building Act). Or, differently put, how the radiation issue has been handled, or non-handled, gives the counterintuitive result of that an environmentally hazardous activity is not found to have a significant impact on the environment. This is a result of a complex and uncoordinated legislation that is central to the Swedish spatial planning.⁸⁶

If we compare the result of the decision of the Environmental Court of Appeal, the mental anxiety aside, and focus on that it is sufficient with a risk of the activity being hazardous leading to that chapter 9, section 1 is fulfilled, the problematic complexity between the two legislative bodies is further emphasized. When looking at a comparison between the section in the Environmental Code defining what activities that shall be found as environmentally hazardous, and the preparatory work of the PBA commenting on what activities that are targeted by section 2, chapter 3 of the PBA (the one with “significant impact”) the formulations are similar.

⁸⁴ “...betydande olägenheter...”.

⁸⁵ “...kan medföra olägenhet...”.

⁸⁶ **9 kap. 1 § MB:** Med miljöfarlig verksamhet avses...3. användning av mark, byggnader eller anläggningar på ett sätt som kan medföra olägenhet för omgivningen genom buller, skakningar, ljus, joniserande eller icke-joniserande strålning eller annat liknande.”

PBL prop 1985/86:1, s 484, angående 3 kap. 2 §: ”Olägenheterna kan bestå av luftföroreningar, buller, skakningar, ljus eller andra liknande störningar som inte är helt tillfälliga.”

Chapter 9. section 1 of the Environmental Code	Preparatory work commenting on chapter 3, section 2 of the PBA.
<p>'Environmentally hazardous activities' shall mean</p> <p>...3. any use of land, buildings or structures that may cause a detriment to the surroundings due to noise, vibration, light, ionizing or non-ionizing radiation or similar impact.</p>	<p>"The inconveniences can be atmospheric pollution, noises, vibration, light or other similar disturbances that are not entirely temporary." (Prop 1985/86:1 p 484, author's translation).</p>

The formulations are not exact, but similar. The "inconveniences" (author's translation) that can mean a "significant impact" of the PBA are the same as the activities of chapter 9, section 1 of the Environmental Code that the Environmental Court of Appeal found the 3G mast activities to be included in. Although the latter definition also explicitly includes non-ionizing radiation the stating of "similar impacts" and "similar disturbances" indicates that the activities should not be interpreted exclusively, it is the activities of this type that are hazardous.

8.7.3 What about the precautionary principle?

Firstly, such a principle has to be communicated into the legislation, and it can be found in the Swedish legislation mainly in chapter 2, section 3 of the Environmental Code. The details of the legal provisions need in many cases to be defined by court practice. The radiation issue hits existing law in two different legislations that to some extent can compete on the issue. Public concern over electromagnetic radiation and the question whether this is a legal concern or not is of interest, especially in relation to the *precautionary principle* of Swedish environmental law.

According to the interviews of the municipal planning officers the radiation is not taken into account by the local planning officers, it is considered to be an issue for the Radiation Protection Authority to decide if it should be included or not. Some however claim that the public fear of the radiation affect them, for instance meaning that they tend to put more effort into the cases when the issue of public fear of radiation is at hand.⁸⁷ The local politicians claim that the public concerns regarding radiation fear is an important issue at the political committees.

The fear of electromagnetic radiation can be described as a social implication of an understanding of a natural scientific fact. The fact is that the mobile base stations radiate, and the understanding of this fact by at least a few, is that this radiation can be dangerous, in some way, and at least in the long run. The municipalities are left to handle a fear or worry for electromagnetic radiation that the responsible authorities have found unjustified. The precautionary principle is definitely a debated term in relation to the 3G mast site activities. The principle, as it is expressed in law, and its somewhat blurry borders in existing law is open for an interpretation that could include the mast activities. It is just that the legal practice so far has denied it. This probably means that the municipalities could make demands on the operators' base station activity under the precautionary principle in their handling of the base stations under the municipal environmental responsibility of the Environmental Code.

⁸⁷ 25 kommuner om 3G (2003), Temo AB, p 14.

8.8 Tiering

The relevance of discussing aspects of tiering in relation to sustainability handling lies in the local implementation of national and global goals. How well the goals are implemented reflects on the spatial planning and shows the actual handling of sustainability aspects. Within a framework of rational decision making a common conception of strategic decision making is of a hierarchical system with an increasing level of detail as one move down to implementation and daily operation. This is termed “tiering” in the strategic environmental assessment literature. The tiered system is assumed to be internally consistent and based on a scientific, calculating rationality (Sager 1994, Emmelin & Kleven 1999). The 3G case may serve as an example of tiering problems.

8.8.1 Lack of coordination

The confusion between responsible authorities of how and where the impacts of the infrastructure roll out should be assessed was big in the first year. The lack of coordination between the agencies in contact with the infrastructure development can be seen as a problem of tiering. The initial lack of coordination between the “sustainability agencies”, the National Environmental Protection Agency (Naturvårdsverket), NEPA, and the National Board of Housing, Building and Planning (Boverket), NBHBP, as well as The National Board of Health and Welfare (Socialstyrelsen), NBHW, The Association of Local Authorities and Regions (Sveriges Kommuner och Landsting), ALAR, and the PTA.

The governmental assignment to the NBHBP came several months after the licence allocation and start of roll out as a result from insecurity by both municipalities and authorities, as well as from media attention. As Emmelin and Söderblom note, part of the problem seems to be when an authority hands out information regarding its specific area for which it is responsible but at the same time suggests or mentions how processes tied to other areas should be handled as well (Emmelin & Söderblom 2002, p 32-33). This is how contradictory information was spread to the municipalities in the early days of infrastructure roll out.

The NBHW (Socialstyrelsen) handed out partly incorrect information to the environmental and health related municipal committees claiming that a permit according to the Environmental Code is not required and that the application therefore is not received at the municipal environmental committee. Regarding the building permit process the information claimed that “some masts need a building permit according to the building rules of NBHBP”, and by this meaning the PBA! (Emmelin & Söderblom 2002, p 33). The 12:6 consultations with the County Administrations are not mentioned. The ALAR (Sveriges Kommuner och Landsting) recommended that the municipalities required radiation information in the building permits. The PTA informed on its web site that the municipalities could put the 3G mast permit applications aside while awaiting the permit applications of the other operators, a handling not in line with existing law. NEPA (Naturvårdsverket) made ambitious instructions for what material should be the basis for the 12:6 consultation, but did not try to make an environmental assessment of the whole system of infrastructure development. NBHBP on the other hand identified a critical issue, and tried to negotiate mast cooperation. To reduce the number of masts in the municipality is attractive from the view of “fear of radiation”, “rational land use” and “landscape impact and amenity value”. This option was, as already mentioned, recognised at the national level by the Board of Housing, Planning and Building

but the voluntary agreement in the early stages of the development of 3G to cooperate to minimise number of masts failed (Emmelin & Söderblom 2002 p 32-33).

All in all, the information of the coordination is however during 2001 what Emmelin and Söderblom (2002, p 16) describes as “fragmentary, inaccessible and partly contradictory” (author’s translation), and “different agencies advices to the municipalities are partly unclear or plain incorrect...” (ibid p 5).

8.8.2 Mast free zones

A phenomenon of principle interest, focusing a conflict of spatial planning, is the fact that several municipalities wanted to have “mast free zones”, as a result of scepticism or as a way to handle the radiation issue. This was the case for example in Karlshamn, Nässjö, Linköping, Norrköping, Helsingborg, Västerås, Arvika, Sunne, Emmaboda, Olofström, Rättvik, Sotenäs and Söderhamn (see Emmelin & Söderblom 2002, p 31-32). This is an example of when, even if central agencies claim the radiation to not be hazardous, the public worry for the radiation is still an entity in the local planning context. The worry itself makes people act against the infrastructure roll out. One way to deal with this opinion in the local context was for the municipalities to plan for mast free zones.

When the municipal committee denies a building permit, or delays the decision, as in the case of a mast permit in northern Karlshamn (Slänsmåla 1:9), on the basis of that “the area may become a mast free zone” it acts on the municipal right of planning its own territory, a right that has been partly challenged by the extreme coverage requirements of the licence conditions. The 3G decision does not formally change the planning rights of the municipalities, but leads to a pressure on the municipalities to comply with the state infrastructure policy. Some of the municipalities were jammed between a national technological growth system on one hand and a political will to comply with 3G opponents within their territory, sometimes putting also the coverage seeking operators in a tight spot, who had promised to roll out an infrastructure in territories where the local authorities sometimes denied them. This addresses the relation between the State and the municipality when it comes to at which administrative level the planning for land use should take place. The high coverage demands and the inflexible planning of the operators gave the municipalities no action space, no room to adjust mast roll out within its territory. This gave tiering problems, the internal consistency was damaged.

8.8.3 Tiering and sustainability issues

Economic growth is one of the basic ideas of the Swedish infrastructure development, and the importance of the infrastructure is communicated to the municipalities. The sustainable development handling in the 3G design is distorted by the fact that the ecological dimension remained unhandled at central level but was pushed down to be handled in local building permit assessment, as well as the regional “natural impact” assessment of the 12:6 consultations.

The outcome of the so called beauty contest, to cover 8 860 000 persons, equalling between 99,98 % and 97 % of the populated areas as time passed, diminished the municipal handling space and sidestepped the municipal planning monopoly. Although the handling of the

ecological dimension of sustainable development by this finds its way back to the 3G development, the vertical balance remains distorted, or un-tiered, since the extreme coverage requirements and fast roll out speed has pressured the municipal handling system, and undermined the local planning monopoly. The fact remains that the comprehensive impact of the system is not assessed, and the piecemeal assessment mast by mast can not weigh up this loss.

The governmental double role consists of both to see to that the resources of the sector, for instance the PTA, is used efficiently, and to see to that the public interest is taken care of. The relation between the State and the municipalities has been mentioned above, and is related to the matter of tiering: on the one hand a national technological growth system and on the other environment protection, resource use, public concern over radiation etc. The 3G decision is supranational, meaning that Sweden could not avoid developing 3G, but how fast and to what degree could to some extent be decided nationally. The 3G case shows the interplay between the administrative levels that is studied in the 3G case, perhaps especially in the result of the so called beauty contest in contrast to hesitant municipalities, controlling the land and water use of its territory, and facing central unavoidable decision concerning a national infrastructure of perhaps 10 000 masts assessed only one mast at a time, locally. The legal norms are involved mainly as a result of the top - down setup, which quite naturally lead to the question of what the ability is of the legal system to create a degree of consistency from supranational via national and regional to the local level where legally binding land use decisions are taken in a fragmented system.

Tiering in the 3G case can be seen as different for the three components of sustainable development. Economic growth is a major component of the policy decision and is then largely imposed onto lower levels of the system. Municipalities can oppose the placing of an individual mast based on arguments of "suitable location" but the option of saying no to the system as such is not open. In practice they have little influence over the competition ideology inherent in the system. Likewise the social cohesion element of almost complete coverage of the population is in reality outside the competence of the lower levels of the system. As mentioned the environmental component was not introduced at all at the policy level. If seen in the light of sustainable development this can be seen as the view of sustainability that sets economic growth as a prerequisite for social and environmental sustainability. The environmental impacts can be only partly handled by the present system of environmental governance at local and regional level. The regional level essentially deals with the nature conservation aspects of the mast infrastructure. The local level deals with aspects of land use. Public concern over the fear of radiation has been seen to be excluded from examination at these two levels by the expert opinion of the Swedish Radiation Protection Authority. This is an illustration of the clash between the environmentalist and the plan paradigm discussed above, which also shows the tiering problems. The expert judgement by a central authority defines the issue out of the local process. The handling of the environmental component arguably also undermines important aspects of social sustainability, where participation and of trust as factors in sustainability are often emphasised.

It is clear that there have been conflicting interests at work in the case of the 3G infrastructure development in Sweden. On one hand a national growth policy, a political will to stimulate a technologically high national profile, a leading nation in the connected global society, and on the other hand stands the interests of constructing the extensive infrastructure sustainably, accompanied by a complex legislation with some inconsistent features when facing matters as radiation fearing individuals, as well as confused or obstructive municipalities, following in the trails of the infrastructure development.

9. Discussion

This chapter continues the discussion on some of the analyzed matters in chapter 8. The chapter is in line with object 3 of the thesis in analyzing the legal framework and relevant changes of it and compared to its application in order to show legal deficiencies or inconsistencies in its practice. Furthermore, in line with object 4, the chapter discusses the actions of the PTA and the operators and analyzes this relationship in terms of *the game of 3G*. Some interesting questions of the 3G case that the material hint at but can not conclusively answer are speculated upon in this chapter.

Sweden could not avoid constructing the infrastructure for 3G, being an EU member, but the speed and the extent of the coverage could to a large extent be decided in each country. “The beauty” contest took place at a time when the belief in the 3G technology as well as the commercial viability of the technology was strong. The design of “the beauty contest” provoked the far reaching promises of the operators to complete an infrastructure with a full coverage of the populated areas of Sweden as quickly as within three years. Since the belief in the technology was strong the operators promising a lesser coverage or a lower roll-out speed would not have received a licence. In most of the countries in Europe constructing infrastructure for 3G some minimum requirements regarding coverage and roll-out speed was demanded of the licence holders. In many countries it was demanded that 20-40 % of the population were to be covered within three years and 50-85 % within six years. This is where Sweden stands out with the requirements of 99,98 % (8 860 000 persons of the population by 31 Dec 1999) within three years (Hultkrantz & Nilsson, 2001, p 52-53). The purpose of the legal complex controlling the telecom by the time for licence allocation in Sweden, the Telecommunications Act, was to secure that individuals as well as authorities shall get access to efficient telecommunications at the lowest possible societal costs (section 2). In the light of this it is likely that the extreme coverage requirements have contributed many of the sustainability issues displayed above, the handling of the radiation issue, no doubt the environmental impact, and to the fact that many conflicts arising when the infrastructure is rolled out have not been possible to avoid, which would have been the case with a slightly lowered coverage. These have been conflicts that have been costly, from a societal economic point of view. Also, regarding the infrastructure roll out costs that has been criticized especially the last few percent, a note in relation to the so called beauty contest can be made. When the stakeholders received the draft for the conditions of the upcoming beauty contest they protested against the fact that five licences were to be delivered, the frequency spectrum would not be enough, the claim was. The PTA listened, and lowered the number of licences to four. The draft remained unchanged in all other relevant aspects, including the two important sections constituting the two steps that the contest would be divided in: first the trial of the operators financial capacity, technical and business feasibility, knowledge and experience, and then the promised coverage and roll out speed. The interesting part, that could have made all the difference, is the last part of the first of these two sections, § 9, part 3:

“If the number of applicants that fulfil the mentioned criteria are more than the number of available licences an in-depth examination according to 10 § will be done” (PTSFS 2000:5, author’s translation).

Note the “if”, of the section. Note also that the applicants that were found to fulfil these conditions in the beauty contest were five, meaning one more than the number of licences that

recently had been changed, this meant that the second step had to separate the applicants, and tell who was on place number five. The promises of coverage and roll out speed was made at the same time as the applicant motivated why they fulfilled the first step, but still, one can not help to think about how different the roll out would have been if the applicants would have been stimulated to make more moderate promises.

It is the extreme coverage that makes the planning of the infrastructure development for 3G contradictory in itself. The technological optimism of the national and regional politics is struggling with environmental and sustainability goals at the same time as the local authorities are left to deal with it in the shape of permit processes. On one hand there is a central, national, decision on that Sweden will have 3G infrastructure granting high mobile coverage and on the other hand each municipality has a monopolised function of controlling the planning and building within its region. It is also the extreme coverage and roll out speed in combination with municipal handling but more importantly a lessened investment will of the operators that contributed to the PTA choice of strategy towards the operators in not pressing “hard against hard” when the operators failed to comply with the licence conditions.

It is the extreme coverage requirement that put conflicting interests at its edge, making the conflicts of for instance the land owners and the site needing operators unavoidable. If the coverage requirements had been a little less the system likely had been a little more flexible, and some conflicts could have been steered clear of, which for instance would have made the changes in the Utility Easement Act a little less necessary. Some aspects of the complexity of the legal system that is the framework for Swedish spatial planning has been exemplified in the 3G case, such as between the PBA and part of the Environmental Code, and the application of the precautionary principle. These are all aspects discussed a little more freely in relation to the 3G case in the following chapter.

9.1 *Inconsistencies of a complex legal system*

The strategies in law construction can differ. It is not necessarily only an advantage that legal concepts remain unchanged over the different sections of law in a national legislation. An example follows. When the Bürgerliches Gesetzbuch, the BGB, the classic 20th century German civil law, was created it was a reflection of the society of Bismarck’s empire. The preparatory time was extensive, beginning in 1874, finishing in 1896 with the code in force in 1900 (Tamm 1996, p 321). The BGB became famous for its systemic construction of general rules. The foundation was based on certain terms that were used consistently throughout the whole BGB. The concepts used by draftsmen – “Verfügung”, “Vollmacht”, “Einwilligung”, “unverzüglich” and many others – are always used in exactly the same sense. The language is complex and exact, and has been described as “the calculating machine par excellence” (Schwarz 1950). The BGB is not addressed to the citizen at all, but rather to the professional lawyer (Zweigert & Kötz 1987, p 149 ff.). The BGB was considered such a high standard that for instance the Japanese civil law was based on the German model (Zweigert & Kötz, pp 160, 324). On the other hand, the BGB has been criticized for being a too rigorous and inflexible legislation, unable to adapt to the complexities of a changing society. This critique has its base in the legal phrases of the law that had to mean the same thing in the different fields comprised by the law. The rigid and precise terms of the BGB did not easily meet with social change (Zweigert & Kötz, p 158).

This example shows two things. Firstly, it shows the rather obvious fact that legislation can be of different quality, to better or worse handle conflicts of the regulated field. Secondly, and more importantly, it shows the dilemma of a grand unified legislative body, incorporating a vast field, can both on one side be understandable, predictable, lead to a more legally secure application, and on the other side stifle legal development, unable to adapt to the complexities of social change.

On the other hand, a downside of a fractioned legislation is that it runs the risk of being more unpredictable, even impossible to understand for ordinary individuals, not educated in the legal method. The same legal phrases may come to mean different things in different legislative areas, leading to confusion for people facing the law. How the legal solution to the problem is designed have implications for the outcome of law and the legal decision-making process. In the context of the lay man facing the legislation the law can become unreachable and less understandable. This is problematic from a social perspective.

An aspect of social sustainability is the social cohesion and the trust that the people need to feel towards the legal system. Too fragmented and complex systems are difficult to overview and understand, they exclude people by their own intricacy. The Swedish spatial planning is upheld by a legal system that is complex, of which the 3G case can bear witness. The assessment is done at different administrative levels, under several legislations tied to differently structured court hierarchies, and facing different governmental and municipal authorities.

A single mast site can, at least in theory, be tried by a municipal authority regarding building permit under the Planning and Building Act, and at the same time two regional authorities, with one being the County Administration performing an assessment under chapter 12, section 6 of the Environmental Code, and the other being the Land Surveying Agency performing an assessment of the site for utility easement under the Utility Easement Act. The LSA decision can be appealed to the Land Court by either the land owner or the operator, the municipal decision can be appealed to the County Administration by any concerned party for whom the decision has been negative, and the 12:6 consultation decision can be appealed to the Environmental Court by either the operators, if the site is prohibited, or by land owner that can be found to be a concerned party.

Three different legal institutes, handled at two administrative levels, by three authorities, all with its own court hierarchy for appeal, create a complex assessment system. This is how land use planning and environmental management is formalized through law. With the processes being parallel this is hard for the entrepreneur, as well as any concerned party to overlook and understand the legal system. In addition to this it is bad resource use also for the handling authorities. This addresses the sometimes parallel designated area for application of the PBA and the Environmental Code, and the widespread confusion regarding the precautionary principle.

9.1.1 The PBA and the Environmental Code

When the Environmental Code was prepared in the Swedish legislation the possibility to incorporate the planning legislation into the Code due to the importance of the planning for the environment protection was discussed. The planning and building issues were however

regarded as containing too many external aspects for the Environmental Code, which is why the planning of land and water use still lies under the PBA (Ebbesson 2003, p 111). This has led to some cross over issues related to a legislative competition.

As outlined above under 8.7.2, the application of two legislations in relation to each other can be complex and seemingly incoherent. The requirement may be lower in the Environmental Code – the impact does not have to be “significant”, but is still a fact that legally the radiation activity is found to be detrimental or hazardous under one legislation (the Environmental Code) but never detrimental or hazardous under the other (the Planning and Building Act). Or, differently put, how the radiation issue has been handled, or non-handled, gives the counterintuitive result that an environmentally hazardous activity is not found to have a significant impact on the environment. This is a result of a complex and uncoordinated legislation that is central to the Swedish environmental management and planning that deals with similar areas of planning.

The Environmental Code	The Planning and Building Act
<p>Base station: <i>Can</i> be an activity causing damage or detriment to the environment (since 12 Oct 2005)</p> <p>= part of the municipal supervision</p>	<p>Masts: Municipal building permit is required, but radiation is never a significant impact on the environment</p>
<p>Masts: 12:6 consultation at the County Administration</p>	<p>Antennas: Aesthetic issue only, since the intended use has not been found to <i>cause any other danger or significant impact to the surroundings</i></p> <p>= The public does not notice.</p>

From a legal dogmatic perspective this is not contradictory. Each legal corpus has its set of terms that has to be legally defined, no matter that they may sound similar to terms in other legal corpuses. From a practical of view this may cause problems. The sociologist of law can see that the individuals interacting with the legal system can be confused by the somehow contradictory terminology, affecting the trust in the legal system, a trust that the legal system will efficiently see that the rights and the obligations of the individuals are consequently taken care of. The separation of planning and environmental legislation can lead to such anomalies. The legalist might reply that the regulations regulate different contexts, and the example is therefore not an example of an anomaly, the regulations simply regulate different things. The empirical context can in this example however be very similar. Even though the administrations around the issues are a bit dissimilar, the matter at stake regards the same electromagnetic radiation stemming from the same activity, namely the telecommunications mast for 3G. And the neighbour may sense the same fear, no matter if it is a case of building permit according to the Planning and Building Act or a case of municipal environmental supervision according to the Environmental Code. And this legal unpredictability is a downside of a fractioned legislation.

Bearing in mind the late turning point of letting the base station activities in under the scope of the Environmental Code - most of the national infrastructure had already been built in October 2005 - is it possible that a pressure has fallen on the legal institutions not to find the radiation to be hazardous in a legal sense, forcing a more thorough assessment of each case also under the PBA, which would have led to an even more delayed infrastructure development? Could this be an example of legal calculating – where the notion of the

consequences of such a decision early in the roll out would have been problematic in relation to the licence conditions and the very strong political drive in the 3G project? This is hard to tell, but can be speculated upon.

The design of a planned system that strikes nationally, with a strong development and growth emphasis may put strain on a legal order that may affect the strict legal decision making, unable to formally legitimate legal decision making in this sense. This can be exemplified by the precautionary principle, that may have been possible to apply on most activities, looking at the legal prerequisites, but bearing the whole picture in mind such an application could have meant an overarching conflict arising between the courts and the governmental infrastructure decision. It could have meant a fast and vast coverage included in the system design striking the landscape guarded by courts applying principles of precaution.

As stated above a task of the socio-legal scientist is to empirically show when the application of law leads to unforeseen, distorting effects in society, (to the right in the picture), such as environmental problems or when the legal application from a social perspective leads to absurd consequences that, from a legal dogmatic perspective may be correct. The handling of radiation related issues in the spatial planning are an example of this.

9.1.2 The paradigmatic battle

Spatial planning and environment protection have separate legislation which is essentially based in different paradigms. The precautionary principle is claimed to be a cornerstone of rational ecological governance (Lundqvist, 2004). The interpretation of the principle and the clash between seeing it as mainly reflecting scientific uncertainty versus a deliberative issue is one example of paradigmatic difference that the 3G case illustrates.

The Planning and Building Act handles many conflicting interests of which the environment is one. The PBA committee states that the Planning and Building Act offers fitting means to balance the pillars of sustainable development (SOU 2005:77, p 197f.).

“The concluding judgment of the committee is that the planning and building legislations’ purpose, fundamental structure, responsibility distribution and decision processes in high extent correspond with the fundamental components for sustainable development, and that the legislation offers suitable instruments for treating different goals and interests, mainly at municipal level.” (SOU 2005:77 p 197)

The question of whether or not the electromagnetic radiation is hazardous is of interest here. When a phenomenon like the radiation is debated, it is the expert knowledge of the natural sciences that is given the task to tell if it is hazardous or not, or to which extent and in which cases it is etc. When the effect is undetermined, risk levels are put up, as a way to handle the issue, and to communicate it to decision-makers facing the issue of having to make decisions based on if the radiation is dangerous or not. This is when the precautionary principle of environmental law can be introduced. This principle expresses the idea of being cautious when there is an uncertainty whether or not an activity is hazardous or not. This has been discussed in relation to long term effects of the electromagnetic radiation from mobile

telephone masts. It is however likely that the aspects of being cautious competes with other values or driving forces in a political arena.

Emmelin and Lerman (2006) conclude in a report to the “Responsibility Committee” (Ansvarkommittén), a parliamentary commission, that the term “sustainable development” is used to create a comprehensive consensus regarding the development of society. The idea is that consensus of where we are going simplifies the issues to become a matter of knowledge production, to the remedy the problem. A problem with “sustainable development” as a term to create consensus around is therefore its ambiguousness, the various meanings tied to the term, that “...consensus regarding ‘sustainable development’ does not bring consensus regarding the character of the problems and even less regarding concrete measures” (ibid p 61). Emmelin and Lerman criticize the fact that the term is handed over to expert’s interpretation and influence, where an “environmental engineering” is developed as a successor to *social engineering*, rather than in interplay between politics and science.

The plan paradigm and the environmental paradigm do not necessarily share the same view of sustainable development (Emmelin & Lerman 2006 p 21 ff.). For instance, the PBA committee regarded the balancing of sustainable development to be fitting well with the Planning and Building Act (SOU 2005:77, p 197f.), and the Environmental Code focus the ecological aspects of the sustainable development. (Emmelin & Lerman 2006 p 115). The PBA controls the process, *the form*, rendering in the question of whether or not this process has been followed. This allows social norms to be represented within the process. This can be seen in contrast to the natural scientific segments of knowledge represented in the environmentalist paradigm, represented by the Environmental Code, and the radiation issue when handled as in the appealed building permit cases under PBA controlled permit process, where the natural scientific norms take over, becomes the legitimate knowledge communicated into the legal sphere, attempting to display *the content* of the matter (as opposed to the form), answering the question of what is hazardous and what is not to human health and the environment. The radiation issue displays how the environmentalist expert based paradigm excludes a question from the assessment of the 3G masts.

The precautionary principle expresses a decision making strategy that borders both science and politics, both calculating rationality and deliberative rationality. When applied, the precautionary principle listens to the public opinion, the not yet completely corroborated beliefs, and the evidence pointing in a direction without being scientifically beyond all doubts certified. With it follows a slight displacement of who has to prove what is hazardous, meaning that the active part, the entrepreneur has to prove (or corroborate) that the activity is not hazardous. That is, if it is applied.

The handling of the precautionary principle in the 3G case lies with the calculating, expert base, rather than the deliberative, communicative paradigm. This accentuates the political element of when and how the precautionary principle should be applicable. There is a part of the radiation issue that is rationality defining. The legal system contributes in defining what knowledge is to be used, pointing at the environmentalist paradigms, which decides the adequate knowledge for being the basic data for the decision making. One could say that the inherent norms of the paradigms of governance form an epistemological forefinger, pointing at the desired knowledge. This is an expression of a power struggle of whose version of reality that should apply, and reach legal legitimacy. What is regarded as true is one thing, and what is true is another. The two can be more or less closely related. The precautionary principle, it seems, could be applied in the 3G case, but is not. There is therefore not only a

scientific matter if the principle should be applied or not, and neither is it mere a legal interpretation that can answer if it should be applied or not.

Part of the problem concerns the communication between social norms, natural scientific norms, and the legal norms: all of which of different epistemological representation, written, calculated or socially present, and different norms seems to reach legitimacy at different levels of the planning and environmental administration. This can for instance be illustrated by the question of *where* in the permit process *what* knowledge is legitimate. The balancing aspects of the plan paradigm decreases as the matter becomes a legal case, the participatory knowledge is left out, to the benefit of expert based knowledge and the binary ruling of the judicial system.

When it comes to the handling of the radiation issue above the local level the norm, in its sociological sense, is that knowledge for a correct decision can only be found in the results of natural scientific research (which on its hand can be both contradictive and heterogeneous). This norm gives the imperative for the action that this is the way to retrieve the answer, in this case meaning that the chosen expertise (the National Radiation Protection Agency) sets up radiation levels which the court interpret as when not exceeded, the radiation is not dangerous, and hence the fear of radiation not a legitimate reason for denial of mast building permit.

The norm for decision making at the local level of the permit process is that knowledge for a correct and good decision in part has to be retrieved from the public, and the opinions of the concerned parties, such as neighbours and others. This leads to a balancing of sometimes conflicting values, wills, and attempts to run the process, an attempt of a consensus based decision, rather than an expert based.

The conclusion is that the radiation issue has not been handled in the 3G case. It has rather been shut out, and avoided by all means. The question has been handled as an expert decision, not as a deliberative. From the Swedish environmental management and planning point of view the radiation fearing simply are wrong.

The extreme coverage requirement for the 3G system in combination with the inherent inflexibility of the radio planning can partly explain the inflexibility of the roll out. This combination has given no room for the local planning to be flexible of where to locate the base stations. This is likely a part of the setting that has put the radiation issue at its edge.

From a socio-legal point of view one can say that this is a hesitating matter, existing law could choose either way, and the outcome of this choice may well depend on non legal factors such as politics. It may be a matter of what is considered the most important for the time being, economical growth and development, or environmental and human health concern.

Those who feel that they have been overrun by the first, and wish the decision had leaned towards the latter can perhaps take a little comfort in that they are not alone. The trend is global. Research shows that despite community protests against installation of base stations, the authorities tend to decide in favour of telecom companies because the radiation levels used by these masts are usually under formal legal limits (Castells et al. 2006, p 115).

9.1.3 Unregulated base station activities

Base station activities that are not handled or assessed under any regulation seem to point out an inconsistency in the legal framework. It is only the base stations on masts that need a building permit (under the PBA) or have a “significant impact on the natural environment” (12:6 consultation under the Environmental Code) are formally assessed in terms of the radiation levels (which never affect the decision). As long as neither the PBA nor the Environmental Code is applicable on the base station, how are the radiation levels certified to be under the recommended threshold values of the Radiation Protection Authorities? In addition to this, why are not the fact that the threshold values are exceeded on a few metres distance from the radiating surface of the antenna a reason for an assessment of the façade mounted base stations, which could be the only base stations that in fact could be in a range for individuals to be affected within the few metres (compare this to the decision of the Environmental Court of Appeal Case nr M 7485-04 of 12 Oct 2005)?

With the radiation been legally defined out of the permit system, with reference to the Swedish Radiation Protection Authorities, as well as the 12:6 consultation of the Environmental Code, and there are base stations that are not visible enough to be an object of legal interest and therefore not assessed from a radiation perspective, an interesting conflict appears from the fact that the radiation has been such a big issue for the public - both as a reason for appeal, and as a basis for debate and protest. This alerts not the least the question of public participation in the 3G infrastructure development in Sweden.

9.1.4 The Utility Easement Act facilitating the roll out

When the government initiated an investigation on whether utility easement could be used to facilitate the 3G infrastructure roll out in 7 Feb 2002 it lead to the changes in the Utility Easement Act by 1 Aug 2004. This is of interest from the perspective of law and politics (remember the picture of a box of the legal order in 6.3). Traditionally property rights are a stronghold in society. With ownership follows the rights to do whatever the owner pleases with its property, the owner can rent it out, forbid trespassers on it (although this right is limited by the right of common access in Sweden – “Allemansrätten”), and even sell it (and lose these rights over it). The idea of property is constitutionally protected in chapter 2, section 18 of the Instrument of Government, which was significantly expanded in the review in 1994, in order to harmonize the regulation to the protection of property that the European Convention states, and therefore an important right.⁸⁸

There are however always a few exceptions to this rule. One is when public interest, from a societal perspective, can be said to be so important that the public interest weighs more than the private interest of ownership. Generally such exceptions are delicately used, and when the control over the property that follows ownership is reduced due to public interests the property owner is to be compensated for it. The keyword here is “public interest”. From a spatial planning perspective, what projects and changes in the landscape that should be counted as of public interest, is often a complex matter. On the practical side of this stands the fact that public interests, and hence benefits of a certain project, rarely can be generally spread

⁸⁸ The Convention for the Protection of Human Rights and Fundamental Freedoms, also known as the European Convention on Human Rights (ECHR),

over the population. Some private interests benefits more than others, at the expense of some private interests more than others.

A topic of interest in addition to the changed power relations of the negotiation situation is related to the fact that the regulations of compensation for expropriation are sprung in a society different from today, in this case especially when it comes to infrastructure development. Such enterprises used to be governmentally controlled and monopolistic in its character. This has changed, and a privatisation trend brings new questions to how compensation for such enterprises should be measured. The clear dichotomy of public interest versus private is not clear in the same sense anymore, which is actualized in the case of utility easement for 3G mast infrastructure.

9.1.5 Public interest versus private interest?

An aspect principal interest of the case is the fact that some land areas are more desirable from a mast position perspective, due to topographic reasons. This was before the regulatory change in the Utility Easement Act of 1 August 2004 to the benefit of the land owner, from a negotiation perspective. The value of the land is raised, also from the competition of several operators aspiring to construct a mast at such a particular site. The rental contract that the operator likely has to sign would have a time limit, and the price would be the subject for negotiation. This would give the land owner the benefit, and the land owner could after the time of the rental contract make other use of the land, if the land owner would not want to prolong the leasing. This beneficiary position is lessened with the operators' possibility to apply for utility easement for the mast site. This can be seen as an example of when regulatory means distort a market situation, to the loss of the private interest, in the name of the public interest (of telecommunications).

In order to discuss a principal problem with the compensation levels of the utility easement for 3G mast sites we can return to a case mentioned in chapter 4.6 above. The case regarded a property in the municipality of Ronneby, in Blekinge and the Land Surveying Agency set the compensation for the mast site intrusion on the property to SEK 3000. This is the sum that was set to compensate for the reduction of the market value of the property, as a result of the utility easement (Section 13 of the Utility Easement Act referring to chapter 4 of the Expropriation Act). The property owners appealed the utility easement decision to the Land Court, which raised the compensation to SEK 171 000 (Case nr F 750-05, 14 Dec 2005). The operator appealed this decision to the Court of Appeal over Skåne and Blekinge, which lowered the compensation back to the original level of SEK 3000 (Case Ö 152-06, 24 Oct 2006). The case was closed on 24 October 2006 and the Court stated, in relation to how to measure the value of the property:

“...when deciding the compensatory level, it shall not be taken into account that a land area is of particular interest for those seeking utility easement for a mast. In this context it should be observed that the development and preservation of networks for electronic communication is founded in a strong public interest. It is, not the least from an environmental and planning and building perspective, important that the infrastructure that is being used for electronic communications is collaboratively used to as high extent as possible. This is clear from both the Electronic Communications Act as well as the Utility Easement Act (compare prop. 2003/04:136, p 18 f.). There is, given this background, no reason when measuring the compensatory level of letting

the market value to be influenced by the fact that there may be many competing network owners that are interested in a certain property for the same purpose” (Skåne and Blekinge Court of Appeals, 24 Oct 2006, p 7, author’s translation).

When it comes to the valuation of land, the fact that there may be a competitive situation regarding a specific part of property that is extra desirable in a radio communication sense, can not be accounted for when measuring the level of compensation to the property owner for having a mast put up on the property. This favourable market position the property owner is denied with references to the strong public interest in telecom infrastructure. The idea is easy to understand, any infrastructure development of public interest falling under the Utility Easement Act would run the risk of being hindered by a few land owners antagonistic attitude. The interesting part lies here in what is included in the “public interest” that justifies this degradation of land owners’ rights.

The 3G development, including the mentioned case, is an example of when the “strong public interest” is in line with operator interest. The case is in line with the law (although Land Court judge Andersson was of a different opinion regarding the compensatory level, developing a statement in a legal dogmatic balance act of highest proportions), in this case the regulation for compensation levels in the Expropriation Act.

The changes in the Utility Easement Act by 1 Aug 2004 can be seen as an example of how the government teams up with private interest in shape of operators trying to fulfil coverage conditions for an activity that is aimed to benefit their interests, on behalf of property rights and the ones owning land that happen to be of a strategically important location in the operator roll out. This is done under the dichotomies of private versus public interests, but it is a fact that part of the public interest in this case includes operator interests.

The Swedish Constitution states that property right can not be the subject for expropriation other than “where necessary to satisfy pressing public interests” (Ch 2, art. 18, the Instrument of Government). And the public interest, in the case of 3G masts included in the Utility Easement Act, is mixed with operator interest.

In the case of a granted utility easement for a mast, the operator may use the designated land area without time limit, and to a compensation measured from how the land has been used before, for instance as pasture land, which renders a low compensation. The land owner loses the control over the future use, and ends up in a worse negotiating position, to the benefit of public interest, and the operator. One can imagine the reaction of the land owners that do not want a telecommunications mast on the property, to a low one time compensation gets stuck with the mast forever, no matter their opinion. The Utility Easement Act was changed and the property owners in the negotiation position lost

- a) the possibility to say no, and the strength in negotiation that goes with it;
- b) the time limit of usage; which includes both the possibility of a future chance to say no, and future chance to change use of the land;
- c) the rental possibility, which means less income, or compensation; and
- d) the benefit of being able to rent to the highest bidder if having a topographically important position.

This is the reason the LSA handling officers do not favour these types of utility easements, because of the possible conflicts. What is the issue of interest here, from a planning point of view, is perhaps not as much the expansion of the utility easement to include wireless

telecommunications masts – which can be seen as a matter of technological development – but when infrastructure development are transferred to private interests, with a money making agenda of their own – which is a matter of societal transformation.

A legal institute of expropriation shaped in an era of monopolistic governmental control over infrastructure development has problems with coping to the new reality of public interests entangled with private owned companies. It is not the societal change that is criticized here, it is the unmodified legal instruments of compensation. The law supplies one private interest with power tools in relation to another private interest.

Competition has been a keyword during this infrastructure development. For the sake of competition between the service providers in the 3G network, as well as competition between the infrastructure owners, legal changes have been made. Therefore is it interesting to see that competition is limited when it comes to the property owners' position. The property owner can not benefit from having a property that is of special interest as mast site. The possible market situation that could exist for operators to bid on land, the competition that could benefit the land owner, is effectively controlled under the pretext of public interest of telecommunications. That is what the changes in the Utility Easement Act mean, when it comes to the compensation levels of the Expropriation Act.

Infrastructure development in the name of public interest is a strong armament for any developer that gets to carry it. It therefore accentuates the importance of taking well-assessed decisions on what infrastructure are to be developed where, and by whom. As private interests take part in the developing function, the “public interest”-armament has to be evaluated, some legislation runs the risk of adding strength and power in an unjust way to one of the parts of two private interests in conflict.

Whether or not there is a trend amongst the operators to lower their costs on at the property owners' expense can not be answered here, but could be a question for further study.

9.2 The game of 3G

Even if the discussion and analysis of the relation between the operators and the land owners in the thesis lies under the subchapter of inconsistencies of a complex legislation it bears interesting aspects for what could be described as *the game of 3G* as well. The relation between the operators and the land owners was changed by changes in the legal regulations relevant for their situation. The rules of the game were changed in this sense, by the game leader, who as well is a participant in the game, namely the State. This had its own particular implications for the relation, outlined above, and it was made partly as a consequence from a roll out that was not rolling out as fast as it was intended to do, or at least legitimized by these reasons. This subchapter however mainly seeks to focus another relation of great importance to the roll out, a relation especially relevant in describing the difference between the intended roll out that was the result of the design of the 3G development and the way it was implemented: the relation between PTA and the operators. Much of the story is told in chapter 4.1. This story is addressed for further analysis and discussion in this subchapter.

9.2.1 The PTA and the operators

One of the important relations in the game lies between the State and the licence holders, between the PTA and the operators. This refers mainly to the big difference between the design of the so called beauty contest and the implementation of the licence conditions.

The mantra of the operators can be said to have been: Apply, appeal, delay! The PTA stressed several times, especially after the operators failed to reach the coverage in time, the importance of not changing the licence conditions, which the operators so eagerly tried, and applied for. From a formal perspective the licence conditions were only changed to a lesser degree, in the lowered requirements on the pilot signal in some areas, in favour for the operators striving towards the promised high coverage. The EU Commission statement from 2002 stressing the importance of a “predictable environment” were cited in multiple PTA decisions and reports (3.1 of COM(2002) 0301), the PTA turned down several applications from the operators to change the licence conditions based on the importance of the competition on the market. From an informal or practical point of view, the licence conditions may not have been more than slightly formally changed but practically they were. The operators received licenses based on the promises to reach full coverage by the end of 2003. Three out of the four had reached it by 2007. The fourth pulled out of the infrastructure construction in Sweden, and was allowed to do so by a PTA decision in November 2004, without any sanctions, no matter the “importance of the competition in the market”.

Prior to the PTA decision of 21 Oct 2005 the PTA wanted a technical investigation, referred to in the decision. In the decision, turning down the Vodafone and Hi3G request, regarding the WCDMA technique competitive aspects of the construction are once again stressed:

“The investigation shows – in spite of the societal economic downside of constructing parallel UMTS nets – that stable set of rules is a prerequisite for investments and a well functioning, long-term competition. A change in the licence conditions can on the contrary distort competition” (p 8, author’s translation).

This is nothing out of the ordinary, but when it can be argued that the conditions have not remained unchanged, from a practical point of view, the content of the statement is a bit thin. In fact, it is hard to argue that the conditions have not been changed, given that the operators reached the coverage in 2007, and the conditions state that it should be reached by 31 December 2003. To lean on formally legitimate grounds, operators appealing for instance, supporting that a change has not been done in the conditions does not change the fact of the delayed construction. And from a competitive point of view, it makes little difference if the licence conditions are being changed or if they stay formally the same, but practically delayed. The sum would then be that the PTA repeatedly formally pronounces the importance of competition, but practically looks the other way when it comes to sanctioning licence breaches. From this point of view the competition has been distorted. If the applicants would have understood the lack of PTA sanctions when applying for the 3G licenses the promises of the applications would most likely have been different.

The sum of all the postponement of time limits, both from the PTA and the operators, which also appealed PTA decisions further delaying the sanction from the PTA, is that the contracted licence conditions, in fact, never applied to the operators. It is in this perspective one can argue that the licence conditions were renegotiated, not formally, but factually. The coverage was to be reached by 31 December 2003, but was still three years later not fully reached. No sanctions were ever addressed to the operators, and one of the operators, Orange, was relieved from its duties along the way (fall 2004). From a contractual perspective

this is not a “predictable environment” when it comes to competitive aspects, especially from the perspective of the other applicants that never received the licence. The ones that received the licences were not the ones promising the most reasonable and rational time limits and coverage levels, based on the resources of the operator, and the manifest formal rules of the contract and the PTA powers.

The ones receiving licences were simply the ones promising the most, either guessing that there would be a possibility to delay the time limits without sanctions, or perhaps foreseeing the chances to avoid sanctions, or just taking a chance, based on the strong belief in the 3G market’s future, present at the time.

A report from the Regulation investigation (Regelutredningen) states that inefficiency on the markets connected to the Electronic Communications Act can come from:

- Deficiencies in the consumer position on the market.
- Risk for worsened market efficiency due to many appeals.
- The occurrence of dual nets, meaning that parallel and competing nets are developed (SOU 2005:4, p 614 ff.).

The consumer perspective has been emphasized by the PTA every time an operator has applied for a change in the licence conditions. Given the fact that the reach of coverage was delayed with more than three years (more than double the agreed time) the consumer position has de facto been degraded in relation to how the development was presented before the roll out. In the 3G case the operators’ appeals has postponed the deadline. This is an example of “worsened market efficiency”. A clearer regulatory impact analysis could have been made – or perhaps should have been, which also has been discussed elsewhere (SOU 2007:29, p 216 f.), in order to more clearly paint the picture of pro’s and con’s when it comes to the design of the beauty contest for instance. The statement of competing nets is a two-sided issue with competition aspects on one side and environmental aspects on the other. Remember here that no environmental authorities were given the chance to comment on the provisions of the beauty contest, meaning that the competitive side was the only side emphasized, prior to the infrastructure roll out (Emmelin & Söderblom 2002, p 48-50).

The PTA could have put more pressure on the operators, all within the legal provisions of the Electronic Communications Act and the principle of legal security. By not being able to have a parallel readiness for supervision actions, such as issuing sanctioned orders, at the same time as investigating an operator application for a change in the licence conditions, the PTA opens up for the operator strategy of delaying the coverage deadline through applications and appeal. The former CEO of the PTA, Nils Gunnar Billinger, said in retrospect:

“The operators have deliberately delayed the development by applying for changes in the licence conditions and through appeals of the PTA decisions. It is fully legal and a way to reduce the costs and to benefit the owners. But we consumers suffer as a consequence of the late development.” (Interview in Affärsvärlden 16 Oct 2006, author’s translation).⁸⁹

⁸⁹ ”Operatörerna har medvetet fördröjt utbyggnaden genom att begära tillståndändringar och genom att överklaga PTS beslut. Det är helt lagligt och ett sätt att minska kostnaderna och gynna ägarna. Men vi konsumenter blir lidande på grund av den sena utbyggnaden”.

What the former head of the PTA neglects to address is the soft treatment the operators received from the PTA in the handling of the failure to fulfil the licence conditions. The PTA puts the blame on the operators, while the operators put the blame on the municipal permit handling and the radiation fearing public.

The delayed full reach of coverage was in the interest of the operators. An interesting question regards the operators' awareness of the time aspects. When did they realize they needed more time to reach the coverage? How clear was the strategy of pushing the deadline in the first year, when only a relatively few mast building permits were applied for? How clear was the picture before the so called beauty contest? The conditions regarding the fast reach of almost full coverage was a result of the design of the beauty contest, and this design was referred to the operators, as well as others, for consideration prior to the contest, in early 2000.

Telenordia considered the proposed selection process to be a "qualitative auction", a process that "risks leading to considerable promises that later can be hard to fulfil". It is also Telenordia that in its consideration states:

"Environmental care, both regarding worry for electromagnetic radiation as well as the aesthetic environment, means that the Post and Telecommunications Agency ought to stimulate a sharing of resources." (PTA 13 Mar 2000, p 13, author's translation).

This is written in February or March 2000, long before the mast sharing debates and changes in the Electronic Communications Act, and long before the radiation was debated in national newspapers, and long before the roll out struck the municipal context. This shows that the awareness of what the so called beauty contest would mean was high, at least by some applicants.

Telenordia is one of the five applicants that passed the first test (the one Telia failed, regarding "technical feasibility"), but the only one of the five that did not receive a 3G licence, because it promised a lower coverage and a slower roll out rate (8 651 521 by 31 Dec 2003 instead of the 8 860 000 of the winning four). The difference between the operators is extremely small, but in retrospect Telenordia was the applicant that at least suggested the most realistic roll out speed of the five, in relation to the actual. For this they did not receive a licence.

Another interesting comment comes from Europolitan (later Vodafone, now Telenor), one of the 3G licence winners, which asks for clear and apparent sanctions for the operator that does not reach the promised coverage in time, in order to prevent from too high bids (PTA 13 March 2000). This shows that the operator knew that the design of the licence allocation could stimulate too high bids, and perhaps feared that other applicants would bid higher. Bearing in mind that Europolitan actually made the highest possible bid regarding coverage and time limit, just months later, this may have been a tactical manoeuvre, or perhaps became a strategy the moment the company realized that no heavy sanctions would be clearly stated in the conditions, even though the company had asked for it. This operator later fulfilled the coverage conditions by 1 June 2007 instead of the promised 31 December 2003 (PTS fact sheet of 1 June 2007, PTS-F-2005:5, p 6).

This can – all in all – be interpreted as that the operators must have been quite aware of the consequences the so called beauty contest would bring. Perhaps due to the lack of clear sanctions Europolitan saw no hindrance in promising as much as possible as a strategic

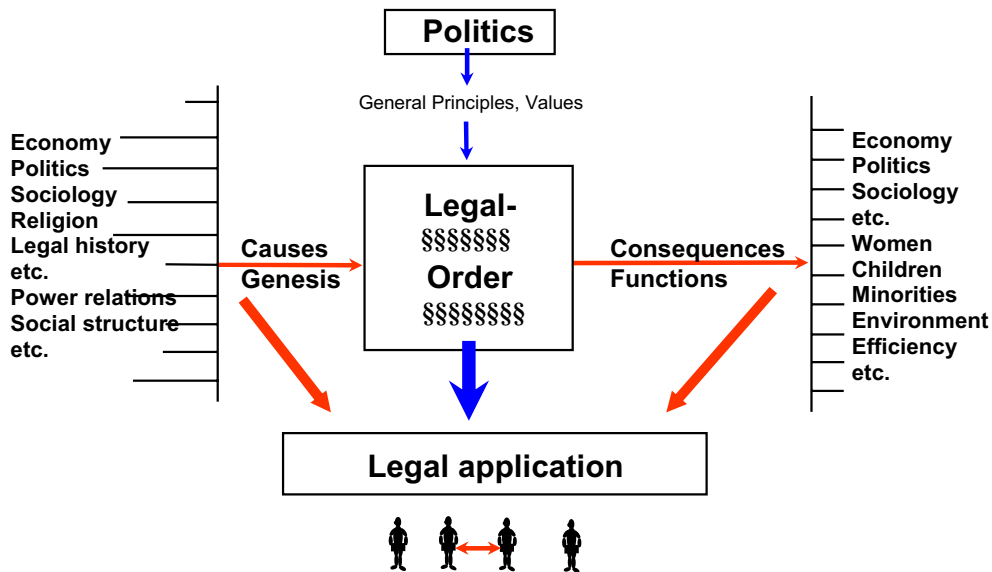
manoeuvre in order to receive a licence rather than making a reasonable pledge in contact with what Europolitan could invest in the infrastructure development in the three years to come. Had the sanctions been clearer, perhaps the promises would have been more in line with investment capabilities and a reasonable development. And, again, no environmental authorities criticized the design because no environmental agencies were consulted (PTA 13 March 2000, Emmelin & Söderblom 2002, p 48f.).

Had not the 3G project in Sweden been such a heavy investment burden by the time Orange withdrew their participation in the infrastructure development it is likely that the other operators and consortia, that did not get a licence, with a louder voice would have criticized the fact that Orange, and later the other three operators, failed its duties under the licence conditions without any sanctions from the PTA. The only sanction for Orange came from the breach of agreement within the 3GIS collaboration between the operators. It cost Orange 1 billion SEK to get out of the contract (Björkdahl & Bohlin 2003, p 16). This in a way shows the difference in how contracts have applied to the situation between the market actors themselves and between the market actors and the State.

The unsanctioned operators' lack of coverage according to what had been agreed upon illustrate a lack of transparency in the governmental steering of a billion dollar project, which shows the incrementalist approach; where the way is made up as it is walked. The question is to what extent not only the operators but also the PTA were, informally, comfortable to find ways out of the formal statements and pressured time limits of the year 2000. Formally, the PTA in any case has to refer to legitimate delays. When focusing on the appeals and new operator applications, this can speculatively be seen as a method for not putting too much pressure on the operators, and to make up for the mistakes made in the so called beauty contest that became obvious a little too late.

9.3 Non legal aspects in legally regulated decision making

A way to approach an explanation on some of the legally controlled decisions in the 3G case is to return to the horizontal perspective of sociology of law in relation to the vertical perspective of legal dogmatics. When having strict and clear conditions attached to the allocated 3G-licences and a governmental authority to enforce these conditions armed with legal tools of making it possible to order substantial fines one would think that alternatives would be clear. Either the conditions are fulfilled, or they are not fulfilled and sanctions are delivered. Although the picture is not all that simple, there are legally legitimate ways to stall the deadline as well, a certain space for actions. And some PTA actions can be explained in the vertical perspective, for instance giving the operators a chance to correct the lack of coverage within "reasonable time", but not all. Some of the delay of the PTA enforcement seems to be without explanation in the vertical, legal dogmatic, perspective. This is when we turn to the horizontal perspective.



After Hydén 2002b, p 16.⁹⁰

The picture from chapter 6.3 can be added with arrows pointing at the legal application, symbolizing the influence from economy, politics etc. The PTA, is the “applier” of the legal order describing and setting the stage for the legitimate PTA actions towards the operators. The PTA role is mainly regulated in the Electronic Communications Act, the ECA. As an applier the PTA has to follow the legal order, and if deviating from this in some sense, the PTA will most likely still formulate and legitimate this deviance in the manners of the legal order. The ECA sets the frames for the PTA, meaning that the PTA can have different strategies for how hard the PTA will control the operators, all within this framework. This is where it is likely to assume that both political values (IT-nation, development) as well as causes like an IT-sector in a period of decline will affect the PTA application within the legal framework. The PTA has in other words some strategic freedom within the legal framework, and the application will be ad hoc (there is only one 3G development in Sweden) and including non-legal aspects to a decision-making that will be defended by legal rhetoric. This means that the actions are affected by values that are never outspoken. This can be described as the societal forces in the horizontal dimension become so strong in the individual case that they push aside the legal regulation. It is in this sense that the PTA can both accept a delay in reaching of coverage, and at the same time claim that the licence conditions has not changed, and blame the operators for stalling the infrastructure development by referring to the legal order. The operators can, at the same time, point their fingers at the municipalities unexpectedly slow permit process to be the reason for the lack of coverage, which at least partly is not a fact.

Such an analysis of the PTA/operator relation suggests a PTA handling of the operators’ responsibilities in consensus with the operators, as two participants in a game teaming up in a way the rules of the game does not intend them to. But, isn’t it a good thing that the PTA can be flexible enough to let the operators’ roll out depend on reasonable investment strategies and fluctuations in the market? From a beauty contest and licence allocation perspective it is not a good thing, because a “yes” to this question means that the licence allocation would be nothing but a charade, and the promises made by the contestants would not be followed by a

⁹⁰ For more on this discussion see Hydén & Wickenberg (eds.) 2008 a forthcoming anthology.

duty to fulfil these promises later. Such a system is neither transparent nor predictable and just. If what is stated in the licence conditions is not what later will be fulfilled, the conditions are not transparent. The transparency of the 3G licence allocation in Europe was prior to the allocation especially emphasized in the EU directive of 97/13/EG (see chapter 2.1 above). Predictability is “one of the basic values in democracy and a state governed by law” (Peczenik 1995, p 89f.). Many legal theorists hold the norm of “jurisdiction and the actions of public authorities in a democratic state should be predictable” (ibid, p 90) as the very essence of legal security. The licence conditions of the 3G development can also be judged in the light of the most basic principle of civil law, described by the Latin phrase *pacta sunt servanda*, - pacts must be respected.

There were three basic alternatives for the PTA to handle the operator breach of fulfilling the licence conditions. One was the “the hard way”, meaning issuing heavy sanctions on the operators in order to make them comply with the licence conditions. Another was “the honest way”, meaning that the PTA would have confessed that the results of the so called beauty contest were not reasonable in the light of the changed market conditions of 2001 and 2002 and hence allowing changes in the conditions risking to be sued by other applicants as well as being criticized for not sustaining a predictable environment, transparent and non-discriminatory handling. The PTA chose a third alternative, a middle path, the balance act of not formally changing the licence conditions, which (formally) sustains the above said, and not sanctioning the operators for their breaches but from several aspects informally leads to an application that is not predictable, transparent and non-discriminatory.

When the Commission communicated to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions in June 2002 the matter of the 3G roll out in Europe, it stressed the importance of a predictable environment in the sector, and any modifications in the licence conditions should be “proportional, transparent and non-discriminatory” (Section 3.1 of COM(2002) 0301). The environment can not likely be said to have been predictable in the sense the Commission had intended. In fact, the PTA handling of the operators is not *predictable* – the licence conditions have *actually* not been upheld, nor formally, when it comes to the pilot signal. This means that the handling has not been *transparent*, in the sense that the formal documents did not describe the actual outcome, and *discriminatory* towards the other applicants as regards to the lack of demanded realism in the promises made in order to get the licence.

This horizontal perspective can also be discussed in relation to the totality of the infrastructure development taking place in a system for environmental management and spatial planning. There is something contradictory in that the legal application and assessment of the infrastructure is done one site at a time in the vertical perspective when the infrastructure development is managed as wide-ranging politics, as a more horizontal movement according to the picture above. It is therefore likely that causes like economy and politics have affected the application of law (PTA vs. operators, radiation and courts) above the more legitimate influence on the legislative process (utility easement and 3G masts) in order to create an application that gives the “right” consequences. “Right” is here seen from a perspective of 3G development and political will connected to technology optimism and visions of growth. On top of this, what delayed the implementation were to high degree not likely judicially legitimate reasons from the one-site-at-a-time-handling, but once again consequences of an IT market in decline, giving diminished operator investment will or ability, and the PTA avoiding clear confrontation from reasons not explainable in a strict legal dogmatic perspective.

9.4 Final words

The specific case of the 3G infrastructure development has been studied, which has offered knowledge regarding Swedish spatial planning in general. The thesis has shown how different aspects of sustainable development have been handled or not handled in the 3G case. The difference between the design of the 3G development and the implementation has been exposed, along with the important conclusion that a slow municipal permit process can not explain the lack of coverage in some areas of Sweden. This suggests that this was not an all legitimate reason for being excused from sanctions when failing to fulfil the licence conditions. This, in turn, shows that the PTA handling of the operators was lenient and therefore hardly predictable, transparent and non-discriminatory towards the applicants that did not receive a permit.

Public participation was mainly found in the local context tied to the legal concept of being a concerned party in the permit process or the 12:6 consultation. In spite of this, the much debated radiation issue was during roll out legally defined as not relevant in the building permit handling and the precautionary principle not regarded as applicable by legal practice. Although the fear of radiation found some legal acknowledgement in late 2005 under the Environmental Code, the practical consequences of this were rather insignificant.

The differences between how the 3G infrastructure development was designed and how it was rolled out can likely to a high degree be explained from the radical transformation of the IT and telecom market from late 1999 and into the early years of the new millennium. Still the approach of the thesis has not been economics or market fluctuations but from a socio-legal and spatial planning point of view. The focus has not been the players of the market as much as it has been the public handling of different key aspects, including the actions of the government, the PTA and other authorities, the Country Administrations, municipalities as well as legal courts of different kinds. The combination of the two disciplines has been useful, much from the fact that the steering and control of such a spatially located activity as rolling out telecom infrastructure is done by legal means.

The 3G case shows a system that has been governed in a way that on one hand meant that it gives way for lessened operator investment will and ability – contrary to formal agreements and law – and on the other puts pressure on the legal system, the municipal permit handling as well as changing laws in order to make the roll out run more easily. This is in part contradictory; the remedy partly misses the wrong.

The development of the 3G-system has offered insights into the conflict between strategic decision making at national policy level and the careful analysis of alternatives and their consequences: the classic strategic dilemma of “daring versus deliberating”.⁹¹ What a comprehensive assessment of the impact of the system, done before roll out, would have given has however not been analyzed in the thesis. This counterfactual perspective will be further addressed in the MiSt project this study has been part of.

⁹¹ This mode of looking at the strategic dilemma comes from the classic military theorist Clausewitz and his writings in *Vom Kriege*. It is explored briefly in Emmelin, Lars & Söderblom, Ingmarie (2002).

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Appendix

Screen dump from the Access data base with Blekinge permit processes.

Bygglöv : Formulär

Län: Blekinge Kommun: Karlskrona

Färdigt införd

* Ärende införd: 2004-05-30

* Senast uppdaterad:

Asarum 12:5

Allmänt | Ärendebeskrivning | Samråd | Beslut angående bygglöv | **Överklaganden** | Följd

* Diarienummer: 004/2002-239

* Sökanden: 3000

* Objekt: Asarum 12:5

* Uppläggningsdatum: 2002-06-10

Sammanträdesdatum: 02-06-26

Avslutat datum: 2004-02-25

Gällande planer el dyl: []

Ömbud: S & H Consulting AB, Motala

Info till ev sökare: Brev Dagpress

Överklagad

Byggansökan

Skräpbevis

Åklöverord

Ansökan återkallad av operatören

Ej avslutat ärende

Prövning enligt Ledningsrättslagen

Bilagat material till bygglövsansökan:

Situationsplan

Fasadritningar

Fullmakt

Översiktskarta

Fotomontage

Bygglöv beviljat av:

Byggnadsnämnden

Delegationsbeslut enligt allmänna riktlinjer

Delegationsbeslut för specifikt fall

Återremiss / bordläggning

Avslag

Samrådshandling med Länsstyrelsen

Lägg till nytt ärende

Sök ärende

Föregående ärende

Nästa ärende

This is the list of instances to which the Post and Telecommunications Agency proposal on how to design the 3G beauty contest is referred for consideration in February 2000. The list holds no environmental authorities. The list is from the appendix of Emmelin & Söderblom 2002, which received it as a photo copy from Registrator at PTA.

Sändlista

1. Kommunikationsforskningsberedningen
2. Ekonomistyrningsverket
3. Näringslivets nämnd för regelgranskning
4. Statskontoret
5. Glesbygdsverket
6. Kommunförbundet
7. Konkurrensverket
8. Närings- och teknikutvecklingsverket (NUTEK)
9. Konsumentverket
10. IT-kommissionen
11. Näringslivets telekommitté
12. Sveriges industriförbund
13. Svenska IT-företagens organisation (SITO) x
14. Banverket
15. AB Stokab
16. CallMedia Telecom CMT AB
17. Facilicom International Sweden AB
18. TietoEnator AB
19. Europolitan AB
20. Glocalnet AB
21. MCI WorldCom AB
22. Tele2 AB
23. Nokia Telecommunications AB
24. R.R.R.C. Ltd
25. NETnet International S.A
26. Sonera Sverige AB
27. Telenor AB
28. StjärnTV nätet AB
29. Svenska kraftnät AB
30. Svenska stadsnätets förening
31. Tele1 Europe Holding ABAB
32. Telefonaktiebolaget LM Ericsson
33. Telenordia AB
34. Telia AB
35. Teracom AB
36. Telitel AB
37. Global One Services AB
38. RSLcom Sweden AB
39. Utfors
40. Vattenfall
41. Västbo Kraft AB

42. DeTe Mobil GmbH
43. Sense Communications International A/S
44. BTCellnet
45. Mobilix A/S
46. Sonofon

47. Finnet Group
48. OY radiolinja
49. Tele Danmark Mobil A/S
50. France Telecom Mobile
51. E-Plus Mobilfunk GmbH
52. Viag Interkom
53. Telenor Mobil A/S
54. Telecom Italia Mobile S.p.a
55. Airtouch Belgium S.A
56. Qualcomm Europe

ABSTRACT

The thesis shows how different aspects of sustainable development have been handled or not handled in the third generation infrastructure development in Sweden. The difference between the design of the 3G development - emphasizing competition, growth and regional access, based on a strong technological optimism - and the implementation, as the roll out struck the landscape, including the non-handled radiation issue and the legal changes in order to facilitate the roll out, is discussed and analyzed.

The roll out formally started in late 2000 as the licence allocation process, the so called beauty contest, was finished. Four operators were to build partly competing systems within three years, each covering 8 860 000 persons, more than 99,98 percent of the populated areas. The Post and Telecommunications Agency can sanction operators not fulfilling licence conditions by a considerable fine. The coverage by the end of the period was between 66 and 74 percent of the promised 8 860 000, with only three remaining operators still participating. Not until 1 December 2006 did the first operator report the required coverage, followed by the two remaining operators by 1 June 2007. The municipal permit handling was blamed for the delay, a reason that “could not have been foreseen”, which helped the operators avoid sanctions from the PTA. The thesis shows that a slow municipal permit process can not explain the lack of coverage in some areas of Sweden.

Environmental aspects were not handled at national level but assessed locally in the building permit handling, as well as the regional 12:6 consultations at the County Administrations. This is why the municipal permit process holds many of the keys regarding environmental management and planning. Therefore the permit processes regarding 3G masts has been charted as they developed in time and screened for main issues and conflicts. Public participation can be found in the local context tied to the legal concept of being a concerned party in the permit process, or the 12:6 consultation. In spite of this, the much debated radiation issue is lifted from the participative aspects and legally defined as not relevant.

The theoretical basis of the analysis combines spatial planning and sociology of law, applying the sociological concept of norms as entities controlling action on the discussion of two different paradigms of governance derived from planning theory. The thesis project has been a part of a study within the MiSt programme, an interdisciplinary research programme on tools for environmental assessment in strategic decision making funded by the Swedish Environmental Protection Agency.

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