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Larsson, Stefan; Emmelin, Lars

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LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

SUSTAINABLE DEVELOPMENT IN PRACTICE

Infrastructure for the third generation mobile telephone system in Sweden



Stefan Larsson²
Department of Sociology of Law
Lund University

Lars Emmelin
Department of Spatial Planning,
Blekinge Institute of Technology

Reference

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¹ Picture from Åryd 1:135 in Karlshamn, Blekinge, Sweden.

² Corresponding author: Stefan.Larsson@soclaw.lu.se

Abstract

The infrastructure for the third generation of mobile telephony, UMTS, is under construction in Sweden. Within three years four operators were to build competing systems to cover 99,98 % of the population.

The case of the 3G infrastructure illustrates how the sustainability issues are handled in planning and environmental management, with conflicting goals between institutional levels and competing legislation. At the national level economic and technological optimism and regional policy is in conflict with environmental and sustainability goals. No SEA was made of the entire system. The infrastructure is assessed through one permit for each mast, at the local level, giving the administrative system an extreme challenge. There are unexpected environmental and social impacts as a result from the lack of comprehensive assessment.

Based on surveys of all local planning authorities, a regional sample of permit processes and examination of legal cases the paper examines the outcomes of the fragmented assessment of the local permit process level, from a sustainability perspective, what are emerging effects and conflicts? An analysis of the potential of a comprehensive national SEA of the system to uncover unsustainabilities will be made.

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1.0 Introduction – 3G as an issue in environmental governance

It is in the study of the 3G infrastructure construction that the real side of the 3G decision of Sweden and the environmental and planning legislation can be seen. When focusing the outcomes – the actual and the emerging conflicts – handling of sustainable development can be studied in practice, and the possible legal deficiencies or systematic inconsistencies of the construction be revealed.

The paper is based on the findings in an ongoing study within the MiSt-programme.³ Parts of this study will be presented in a licentiate thesis in Spatial Planning at the Blekinge Institute of Technology later in 2007.⁴ Based on surveys of all local planning authorities, a regional sample of permit processes and examination of legal cases and documents as well as the legal regulations of importance, the paper examines the outcomes of the fragmented assessment of the local permit process level, from a sustainable development perspective.

Sustainable development is a proclaimed main goal of the Swedish government.⁵ The case of the construction of the third generation of mobile telecommunications system, 3G for short, is chosen because it offers a unique possibility for studying how national policies for growth, regional development and environment interact with the planning and environment protection systems at local and regional level in practice to 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 development of the 3G-system also offers 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 “weighting versus daring”.⁶

Spatial planning and environment protection have separate legislation which are essentially based in different paradigms. The plan paradigm and the environmental paradigm do not necessarily share the same view of sustainable development.⁷ The precautionary principle is claimed to be a cornerstone of rational ecological governance.⁸ 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 land and water administration is the conflicting goals of the national policies a) to construct the 3G infrastructure, and b) to *sustainably* construct the 3G infrastructure. These national policies decided upon centrally and nationally only meet

³ 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 See also Larsson, Stefan (2006) *3G of Sweden – Technological growth and sustainability issues*, article in Emmelin, L. (2006) [ed.] *Effective Environmental Assessment Tools - critical reflections on concepts and practice*. [Blekinge Institute of Technology Research Report 2006:3].

⁴ Larsson, Stefan, in progress. The working title of the thesis is *Infrastructure for the third generation mobile telephone system as a sustainability issue in planning and environmental administration in Sweden*.

⁵ Regeringens skrivelse 2005/06:126, p 1.

⁶ This mode of looking at the strategic dilemma is Clausewitz's classic wording. It is explored briefly for 3G in Emmelin, Lars & Söderblom, Ingmarie (2002) *Spelet om 3G – en förstudie av mastfrågan*, Blekinge Institute of Technology Research report no 2002:07

⁷ Emmelin & Lerman, in press.

⁸ Lundqvist, L. J. (2004) *Sweden and ecological governance*. Manchester University Press

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?

Land use and environmental management comprises 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 will be shown below in the case of the 3G construction. 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 main questions discussed in the paper concerns an empirical side of sustainable development. We are examining four questions:

- 1) inconsistencies or deficiencies in the environmental and planning legislation;
- 2) the difference between the design and the implementation of the 3G infrastructure construction in Sweden;
- 3) the role of the precautionary principle and how the radiation issues are handled in the processes – both radiation as a scientific issue as well as public concern over its effects as an issue of social sustainability.

These main questions are in the paper summed up and discussed in relation to a counter-factual question:

- 4) whether or not a strategic environmental assessment, SEA, in the initial phase of the process would have been beneficial in handling the three questions above.

2.0 Background – the Swedish 3G-system

The infrastructure for the third generation of mobile telephony, 3G or UMTS, is since the year of 2000 under construction 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 infrastructure for 3G. Within three years the four operators were to build competing systems to cover 99,98 % of the population giving the administrative system an extreme challenge. The licence conditions stated that each operator had to have 30 % of own infrastructure and up to 70 % collaborative, of the coverage. An estimation conducted for the the national Swedish Post and Telecommunications Agency, PTS, stated that a reasonable area coverage would be around 170 000 km², about 41 % of the total Swedish surface area.⁹ Parts of the licence conditions, such as the 70 % collaborative infrastructure condition, is following set values that were decided before the so called beauty contest, and some conditions emanates from the contest itself, such as the degree of coverage and the roll-out speed.

⁹ Björkdahl & Bohlin (2003) *3G Network Investments in Sweden*, PTS-ER-2003:9, by IMIT & Chalmers conducted for the PTS.

“The beauty contest” as a method for selecting 3G licence holders in Sweden has been discussed by Emmelin & Söderblom from a spatial planning perspective and investigated in an economic context by Andersson, Hultén and Valiente.¹⁰ 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.¹¹ On 12th May 2000, the Post and Telecommunications Agency issued an invitation to all parties wanting to provide network capacity for the third generation of mobile telecommunications system in Sweden.¹² 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.

“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.¹³ 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.¹⁴ 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.¹⁵ The four promising the most, received a licence.

PTS 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 2003. These licences apply up to and including 31 December 2015. Telia, Telenordia and Reach Out Mobile, which did not get any 3G licences, appealed the PTS decision to the County Administrative Court. The County Administrative Court confirmed the PTS 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 construction via a collaboration with Tele2, that did get a licence. The three operators Hi3G, Telenor (Europolitan at the time) and Orange signed a deal regarding collaboration.

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

¹⁰ Emmelin & Söderblom (2002). Andersson, Per, Hulthén, Staffan & Valiente, Pablo (2005) Telecommunications Policy 29, pp 577-593, *Beauty contest licensing lessons from the 3G process in Sweden*, Stockholm School of Economics, Sweden.

¹¹ Andersson, Hulthén & Valiente (2005), p 579.

¹² PTS (12 May 2000).

¹³ Lars Hultkrantz & Jan-Eric Nilsson, 2001, *Nya bud - En ESO-rapport om auktioner och upphandling*. Ds 2001:40, p 67f.

¹⁴ See PTS (12 May 2000), p 8-9 and Andersson, Hulthén & Valiente (2005), p 583.

¹⁵ See PTS (12 May 2000), p 9 and Andersson, Hulthén & Valiente (2005), p 583.

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 % within three years.¹⁶

2.1 Dimensions and indicators of sustainability in the design of the 3G infrastructure construction in Sweden

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. At the national level economic and technological optimism and regional policy is in conflict with environmental and sustainability goals. No comprehensive assessment was made of the entire system; the infrastructure is assessed through one permit for each mast, at the local level, giving the administrative system an extreme challenge, and giving unexpected environmental and social outcomes as a result from the lack of comprehensive assessment. Focused here is however the initial setting of the infrastructure development, divided in three levels: the national, the regional, and the local. This is to show internal inconsistencies – the problem of tiering can be related to this – as well as setting up a comparative analysis between the design – how it was planned – and the implementation – how it was done.

2.1.1 Sustainability at the national level

When setting up the conditions for the construction of four separate infrastructures for a telecommunications systems with a maximum of 70 % common infrastructure, but most likely much less, the emphasis is on competitive aspects, in assumed favour to the consumer. This can be questioned from the perspective of ecological sustainability, which had little emphasis in the initial discussion. Several thousands of extra 3G antennas were to be put up for the sake of competition between the operators. Although the existing possibility to share an antenna or telecommunications tower between operators, with the result of lower number of antennas and no lack of coverage or competition between operators, the premises for the construction was criticized for the impact on the environment. No environmental authorities received the draft for rules of “the beauty contest” for consideration.¹⁷ This is remarkable in view of the stated policy of “environmental integration” and sector responsibility as a major component of Swedish environmental policy.¹⁸

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 3G access (whether or not they want it), regional growth (not just big city areas) and that competition amongst several operators will benefit the consumers.

¹⁶ Hultkrantz & Nilsson (2001) p 52-53.

¹⁷ Emmelin & Söderblom (2002)

¹⁸ Lundqvist (2004)

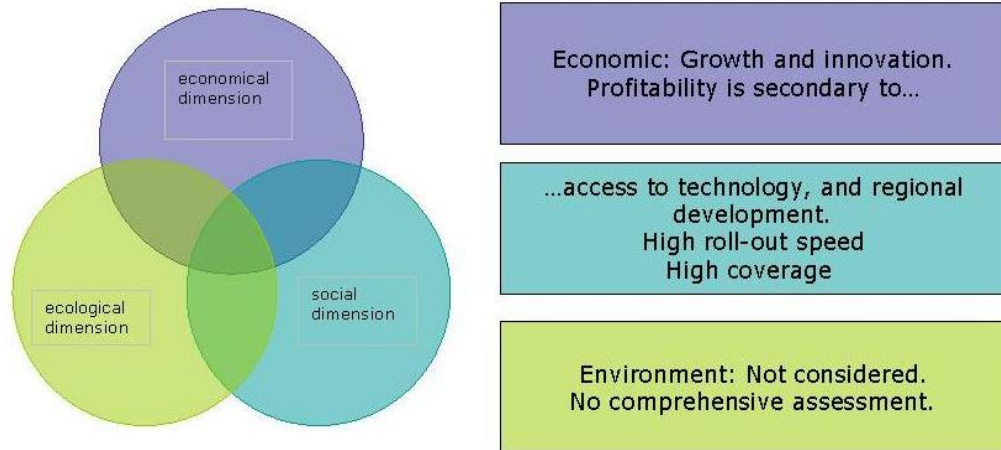


Figure 1: Summing up the sustainability of the design of the 3G infrastructure construction in Sweden.

2.1.2 Sustainability at the regional level

At regional level however the ecological perspective receives a new focus due to the legislated demand for the operators to a consultation with the regional environmental authorities in addition to the local permit process for the mast. This consultation takes part in the County Administration at a regional level (ch. 12 section 6, Environmental Code) and concerns nature conservation, heritage, landscape aesthetics and amenity values. Environmental aspects such as whether the activity to operate a transmitter on a mast is detrimental to human health or the environment can be an issue for an environmental process regarding the role in environmental monitoring by municipalities – as in the Landskrona case below. Social concerns can be dealt with in the form of appealed permit processes that are passing through the County Administration as the instance for appeal of municipal mast permit cases.

2.1.3 Sustainability at the local level

In implementing the decision on the 3G-system a discussion started regarding the large amount of masts that needed to be constructed to set up the infrastructure according to the licence conditions. The fact that the operators would not collaborate enough regarding mast sites that are of special strategic importance in the radio planning was especially stressed. In the questionnaire to the Swedish municipalities 1/3 of the municipalities reported that they had received applications for permits for masts with less than 100 meters distance of each other.¹⁹

The environmental concern that never was in focus at the stage of taking the 3G decision now emerges in different shapes. 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 PTS possibilities to intervene “when the free competition is not working”. In the beginning of the year 2005 a commission was appointed to investigate the possibilities of forcing operators to co-operate over mast location and use. This was not met with enthusiasm by some of the operators. The commission resulted in the report SOU 2005:97. Between the changes in the Electronic Communications Act, ECA, of 25 July 2003 up until the end of 2004 there were 11 applications from operators to the public authorities to force other

¹⁹ This survey was carried out for PTS and is reported in the PTS Report: TEMO-undersökningar om bygglovshandläggningen av 3G-master 2003-04-07.

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 PTS (both applications were dismissed). This instrument had been avoided by the operators. The commission resulted the 20 March 2006 in a governmental proposition regarding changes in the ECA on the forced mast co-location issue. The proposal expands the possibilities to force an operator to offer co-location on mast to a compensation adjusted to the conditions of the market and came into effect 1 July 2006.²⁰

The discussion regarding whether or not the electromagnetic radiation is dangerous has been around for as long as the construction of the system has gone on but with varying intensity. The fact that people are worried about the radiation and that this worry or fear has found no legitimate acclaim in the permit processes or the municipal planning has led to various articles, books and anti 3G web pages. The experienced lack of participation in the decision of where to set up the masts has led to that a few masts have 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. This is due to the design of the construction dealt with mainly on a local level, as appealed mast permits.

3.0 Theoretical perspectives

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.

3.1 *Environmental Management and Spatial Planning – Two Paradigms of Governance*

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 cultures²¹. It is useful to distinguish between two paradigms governing the respective elements.

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” or “pristine” ecosystems, and “natural conditions”. These figures of thought reach into the pollution and environmental health discourses and are not confined to nature conservation. Preservation of natural states is another figure of thought, often complemented with the notion of “restoration” to “original”

²⁰ Prop. 2005/06:191

²¹ Emmelin & Kleven 1999; Emmelin & Lerman 2006

or “undisturbed” conditions underlying the conservation discourse. 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 notion of “natural” regions as opposed to administratively determined regions as in the “water directive” (2000/60/EG) stems from this paradigm; being “natural” they are somehow superior to other regional divisions.²² 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. Hajer has shown how “discourse coalitions” based on different understandings and framing of an environmental problem operated e.g. in the “acid rain issue”.²³ Emmelin and Kleven demonstrate how vague concepts may give rise to a consensus illusion that does not have the form of a discourse coalition i.e. does not extend from the rhetoric of the policy level to practical measures in administration.²⁴ This reasoning can be extended to the problem of making operational standards from general goals such as the Swedish National Environmental Objectives²⁵.

The basis for the “*plan paradigm*” is that governance of changes in land use and natural resource management should rest on the weighting or balancing of legitimate but not necessarily compatible interests. A central conflict of interest is thus the one between public and private interests in land use. A 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.

These two paradigms can be illustrated as a function of two dimensions. One is the administrative cum geographic of central versus local. The other is the poles of decision rationality defined by Sager as between “calculating” and “communicative”.²⁶ The paradigms are basic to respectively the Environmental Code and the Planning and Building Act. Many of the problems and complexities of Scandinavian planning and environmental management can be analysed in terms of the tensions between the two paradigms.²⁷ The two paradigms are also 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.²⁸

The two paradigms can be simplified to positions of two opposing, weberian ideal types. The environmentalist paradigm with a base in preservation combined with the precautionary principle and a focus on environmental problems seen as threats, and until recently without goals for environmental governance easily leads to a position of general opposition to all forms of change. This is particularly clear at local level and results in the NIMBY syndrome

²² Europaparlamentets och rådets direktiv 2000/60/EG om upprättande av en ram för gemenskapens åtgärder på vattenpolitikens område (Vattendirektivet).

²³ Hajer, M. A. (1995), *The Politics of Environmental Discourse*, Oxford, Oxford University Press.

²⁴ Emmelin, L. & Kleven, T. (1999) *A paradigm of Environmental Bureaucracy? Attitudes, thought styles, and world views in the Norwegian environmental administration*. NIBR's Pluss Series. 5-99.

²⁵ Emmelin & Lerman 2007

²⁶ Sager, T. (1990) *Communicate or Calculate. Planning Theory and Social Science Concepts in a Contingency Perspective*. Dissertation 11. Stockholm: Nordic Institute for Studies in Urban and Regional Planning.

Sager, T. (1994) *Communicative Planning Theory*, Avebury.

²⁷ Emmelin & Kleven (1999); Emmelin & Lerman (2006; 2004a).

²⁸ Lars Emmelin; & Peggy Lerman (2004) *Miljöregler – Hinder för utveckling och god miljö?* Research Report 2004:9, ISSN: 1103-1581, Blekinge Institute of Technology.

(“not in my back yard”). EIA becomes a tool for opposing change rather than governing change. Measurable change in environmental parameters becomes an argument against development with little regard for the problem of significance and importance; this is the confusion of “effect” with “impact”.²⁹ The paradigm is essentially expert and top down. The rationalism of environmental assessment is founded in this view of planning and management.

The “plan-paradigm” on the other hand in its extreme form leads to a strong belief in the power of planning to shape not only the physical environment but also to fill it with social and economic content. In this view of planning sustainability appraisal is seen as possible and meaningful since planning is attributed with the power to determine development and negotiate the trade-offs between sustainability factors. Planning is depicted as “proactive” whereas impact assessment, permit processes and monitoring is seen as “reactive”. This view to a large extent disregards the fact that the state in many cases is not the leading actor of change, having instead to the regulating and reactive role.³⁰ In the Swedish context the plan-paradigm is especially clearly expressed in the spatial planning system which has only one binding level, the local, with limited guidance or steering from central or regional levels.

The view of sustainability promoted in the two paradigms in their ideal-type form is very different. In the environmentalist paradigm ecological sustainability is given priority over social and economic. Sustainability is essentially seen as a state to be achieved. Seeing sustainability as a state stems from the notion that the totality of our environmental problems can be “solved” rather than be temporarily and provisionally “resolved”. This state is in several of the NEOs described as a state of balance in Nature which is a pervasive figure of thought often found in ecologist literature. The notion of sustainability as a steady state is expressed in the NEOs, the ultimate aim of which is to solve the environmental problems within the span of one generation. In the preamble to the NEOs it is claimed that a sustainable society will then be achieved. In relation to EQS it might seem problematic, as noted above, with goals for a future sustainable state that in several cases is identical or close to EQNs which set a minimum standard for certain environmental variables. In the “plan-paradigm” sustainability is seen as a process of continuous negotiation of the three components. The committee revising the Planning and Building Act noted that the Act with its emphasis on weighting of public and private interests is a suitable instrument for this process of negotiating sustainability.

The development of legislation on planning and environment protection in Sweden in the last decades can be seen as an attempt to handle the contradictions and tensions between these two paradigms. To a considerable extent this is done by giving the “environmentalist” paradigm an overarching role. An example of this is the introduction of binding environmental quality norms/standards that essentially function to set the framework and degrees of freedom within which the weighting of interests by planning may take place. The system of National Environmental Objectives is another example of this. The NEOs have the added problem, noted above, that several of the objectives and many of the targets are not scientifically based standards for environmental or public health, but rather the values of the professions of the “environmentalist” paradigm”.

²⁹ Munn (1979); Emmelin (1996)

³⁰ Emmelin & Lerman 2006; 2004b

3.2 *Sociology of Law – Norm science*

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 are 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.

Methodologically the Sociology of Law goes backwards from 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.³¹

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.³² “The norm” is in this case not understood as synonymous to a legal norm, nor a fixed standard of the natural sciences. The norms in the norm scientific sense are recognized by the spontaneous observance of the norm.³³ 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 the most behavioural norms are simply not the object of legislation.³⁴ There are several examples of study of norms in this specific approach in a individual, institutional or structural sense, for instance about the construction of a tunnel through the ridge of Halland or the environmental awareness reaching the compulsory school.³⁵ 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.

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

³¹ Hydén, Håkan (2002) *Rättssociologi som rättsvetenskap*, Lund: Studentlitteratur, p 35 – 36.

³² Hydén 2004, *Om relationer mellan normer och regler. Kompendium i rättssociologi*, p 6.

³³ Hydén, Håkan (2002) *Rättssociologi som rättsvetenskap*, Lund: Studentlitteratur, p 30 ff.

³⁴ Hydén 2001, 2002

³⁵ Baier, Matthias (2003). *Norm och rättsregel. En undersökning av tunnelbygget genom Hallandsåsen*. Lund: Sociologiska institutionen, Wickenberg P (1999) *Normstödjande strukturer – miljötematiken börjar slå rot i skolan*. Lund Studies in Sociology of Law.

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 a purpose to control action. The legal system aim however only to control certain types of actions, which generally means that the legal system is not “activated“, other than in exceptional cases. Different legal bodies can represent different norms, having emerged in different contexts with different purposes. This means that laws can be in conflict, especially when regulating areas closely related to each other. In a legal dogmatic point of view this does not have to be seen as a problem, since the legal bodies define what law that complement the other, either explicitly or following legal principles. From a social point of view, an external perspective, such as the one of Sociology of Law, this can be problematic. In the interface between law and the individuals a too complex legal system will render a less direct connection to the norms that control the actions of the individual or other actors. If a legal provision slides away from the societal norm the purpose of law may fail.

Land use and environmental management comprises 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 with each other. This will be shown below in the case of the 3G construction.

3.3 *Inherent norms in the two paradigms of Governance*

The model or the concept of the two paradigms 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 “normativity” of the two paradigms in environmental and spatial planning has been further addressed regarding the 3G infrastructure construction by Larsson and Åström.³⁶

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. 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.³⁷

The two suggested paradigms above describing two different approaches to governance of land and water use, 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.³⁸

³⁶ Larsson, Stefan & Åström, Karsten (2007) *Spatial Planning and Sociology of Law: Sustainable development issues in constructing infrastructure for the third generation mobile telephone system in Sweden*, Sociology of Law, Lund University. Paper for the Berlin 2007 International Conference: Law and Society in the 21st Century.

³⁷ See Fog, Bröchner, Törnqvist, Åström (1992) *Makt, politik, rätt*, p 20.

³⁸ Emmelin & Lerman 2006, p 21ff

Each paradigm is “normative” in the sense that it bears judgement on what are 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 paradigm, certain expectations will be lying on the decisions taken in that context. Whether you operate within one or the other paradigm will 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.³⁹ Also, legal bodies can be differently influenced by these mind-sets and hence “normative” in different ways.

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 the 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, from an external perspective, perhaps not from an internal. The language and the terms used in the legal fields of the two different legislative bodies may sound alike but have different legal content.

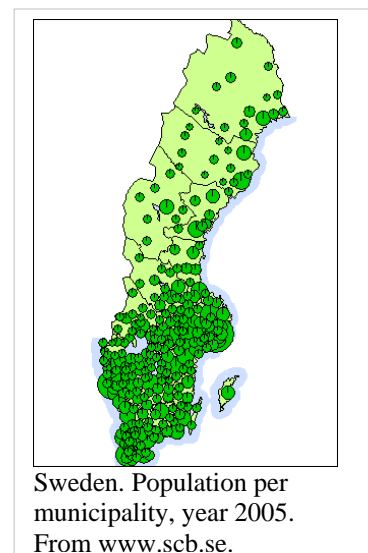
4.0 Implementing the decision

The following analysis emanates from a work in progress, within the above mentioned project of which the empirical data is deriving from. The data below shows how the construction did develop the first year of the time span of the construction, 2001, via a comparison between different regions of Sweden, and then data showing the coverage at the end of the time span, by the end of 2003, when the coverage of the licence conditions were supposed to be reached, is presented. Data of the years 2002 and 2003 are still to be processed within the study. Still, some trends and some aspects can be clearly stated based on the data, analyzed in this paper.

4.1 *A “plan economic decision” versus the logic of the free market – the actual infrastructure construction*

As shown above, the design of the 3G licence conditions bears plan economic resemblances in the coverage conditions being as high as 99,98 %, which is opposed to a market logic of constructing where it is most commercially viable to construct (see also figure 1 above). In Sweden, most people live in the south, in the three big city areas, and along the coastline.

The data below will show that the construction was built partly under the market logic, despite the licence conditions. Early in the construction period the operators defended the slow construction with pointing at the municipal permit process as being the fact that slowed the construction down. An



³⁹ The delicate borderline between the politician and the planner in the municipality has been studied by Karolina Isaksson and Sofie Storbjörk 2005.

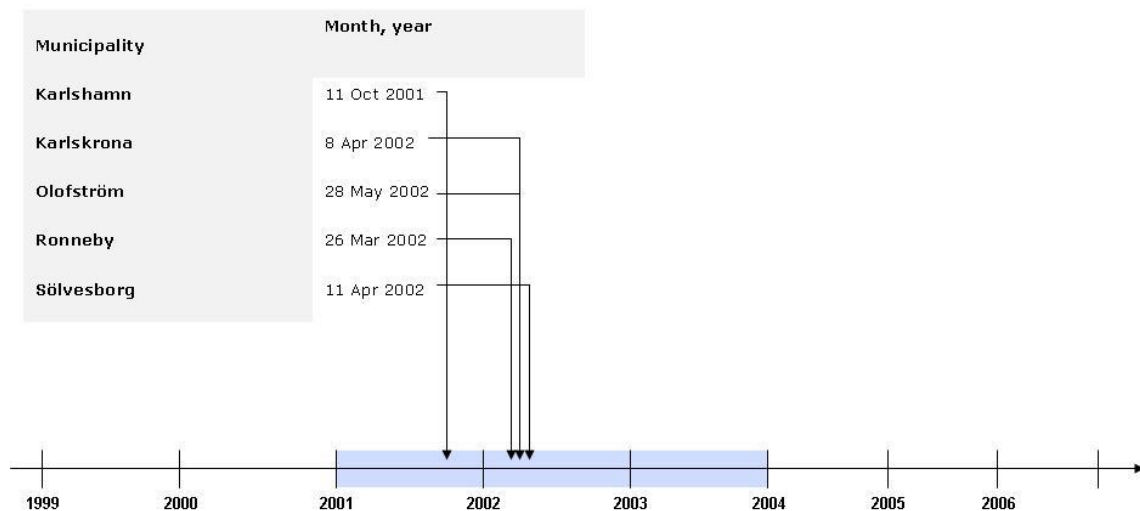
interesting remark to this is, which is developed below, that a majority of 61 % (122 of 201) of the municipalities did not receive a single building permit application during 2001.⁴⁰

Based on surveys of all local planning authorities, a regional sample of permit processes and examination of legal cases we examine the outcomes of the fragmented assessment of the local permit process level, from a sustainability perspective, what are emerging effects and conflicts? The permit processes for each 3G mast of the five municipalities of Blekinge are collected from the initial 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 PTS 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 construction.

4.1.1 First year of construction – the year of 2001

Table: First permit application received



The table above shows the first received permit application in the five municipalities of the Blekinge County. As shown, the expected wave of applications in the first year of the three did not come. The three big city areas attracted the most applications in 2001. The municipality of Gothenburg received 78 and Malmö 58.

⁴⁰ PTS questionnaire (2 April 2003) *Kommunerna om bygglovshandläggningen av 3G-master*; Kvantitativ enkät till landets kommuner, Temo AB for PTS.

Following a market logic the operators would construct 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 construction. 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 construction started in the latter. 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 5 other did not answer the PTS questionnaire of 2 April 2003), a county in the north of Sweden.⁴¹ 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 year.⁴² 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, i. e. the big city areas.

Figure 2
 Permit application for 3G antenna: Year 2001
County of Västerbotten

| Municipality | Received |
|--------------------|-----------|
| Bjurholms kommun | 0 |
| Dorotea kommun | 0 |
| Malå kommun | 0 |
| Nordmalings kommun | 0 |
| Norsjö kommun | 0 |
| Skellefteå kommun | 0 |
| Storumans kommun | 0 |
| Umeå kommun | 10 |
| Vilhelmina kommun | 0 |
| Åsele kommun | 0 |
| Total | 10 |

The licence conditions, however, state that the coverage is to be spread all over the populated areas of Sweden, no matter the population density, down to a minimum of 2 inhabitants per square km. This is a trend yet to be shown more in detail, but the sum of this can be described as that social sustainability is not the driving force for the operators, profitability is, which is interesting in relation to what the licence conditions had stated.

Figure 3
 Permit application for 3G antenna: Year 2001
Area of Gothenburg

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

⁴¹ 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*.

⁴² 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*.

4.1.2 The end of the licence period – 31 Dec 2003

The coverage of the operators infrastructure by the end of the period, 31 December 2003, was lacking between 34 and 26 % of the licence conditions, with only three operators still participating in the construction (Orange did not participate any more). With the lack of coverage by the end of the prescribed period, combined with a higher coverage in the big city areas than in the sparsely populated areas, it is likely to assume that the data of 2002 and 2003 will show a pattern of less permit applications in the sparsely populated areas.⁴³

The striking lack of coverage of the less populated of the two areas compared (see figure 4) indicates that the operators' 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 hinders the construction is in this context only a reason given in trying to avoid the sanction that the PTS could impose on the operators when not fulfilling the conditions of the licences.

On 1 December 2006, three years later, 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 fulfil the coverage of the licence conditions.⁴⁴

4.2 The radiation issue according to the Environmental Code

The public fear of radiation faces the legal system and planning administration in the appealed permit processes or in the remarks handed in to the local planning authorities by concerned neighbour when they've received notice of a permit application for a mast in their vicinity.

Figure 4
Coverage percentage of populated areas by 31 Dec 2003
County of Västerbotten

| Municipality | Hi3G | coverage Percentage | |
|--------------------|------|----------------------|-----------------------|
| | | SULAB Telia/Tele2 | Vodafone (Telenor) |
| Bjurholms kommun | 0 | 0 | 0 |
| Dorotea kommun | 0 | 0 | 0 |
| Malå kommun | 0 | 64 | 0 |
| Nordmalings kommun | 0 | 47 | 0 |
| Norsjö kommun | 0 | 35 | 0 |
| Skellefteå kommun | 53 | 71 | 54 |
| Storumans kommun | 9 | 0 | 9 |
| Umeå kommun | 72 | 87 | 72 |
| Vilhelmina kommun | 0 | 0 | 0 |
| Åsele kommun | 0 | 0 | 0 |
| Mean | 13,4 | 30,4 | 13,5 |

Figure 5
Coverage percentage of populated areas by 31 Dec 2003
Parts of Gothenburg

| Municipality | Hi3G | coverage Percentage | |
|---------------------|------|----------------------|-----------------------|
| | | SULAB Telia/Tele2 | Vodafone (Telenor) |
| Alingsås kommun | 69 | 76 | 69 |
| Göteborgs kommun | 89 | 85 | 80 |
| Härryda kommun | 85 | 77 | 82 |
| Kungälv kommun | 70 | 78 | 64 |
| Partille | 92 | 99 | 67 |
| Stenungsunds kommun | 65 | 72 | 66 |
| Öckerö kommun | 76 | 63 | 66 |
| Mean | 77,1 | 78,6 | 70,6 |

⁴³ The data in the table comes from the, by the operators to the PTS reported, population coverage of 31 Dec 2003. PTS report of 10 March 2004.

⁴⁴ <http://www.pts.se/Nyheter/nyhet.asp?Itemid=6243>

This is a process regulated under the PBA. The Environmental Code, however, regulates the environmental supervision duties of the municipalities. The municipality supervises that the activities permitted under the EC are run according to the provisions, and for instance the activities that are hazardous or detrimental to human health or the environment. *The precautionary principle* can in Swedish environmental law be seen in the provisions for someone performing activities applicable to the EC, 2 ch sect 3:

“Persons who pursue an activity or take a measure, or intend to do so, shall implement protective measures, comply with restrictions and take any other precautions that are necessary in order to prevent, hinder or combat damage or detriment to human health or the environment as a result of the activity or measure....

...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.”⁴⁵

A further definition of what environmentally hazardous activity is found in chapter 9, sect 1 of the EC, and a definition of the term *damage or detriment to human health* is found in chap 9 sect 3. The electromagnetic radiation from 3G masts, and the public fear for it, has not been regarded as applicable under the scope of the EC, as long as the radiation standards of the Swedish Radiation Protection Authority are not violated. And a fear for something that legally has been defined as something not hazardous has not been taken into account in the legal sphere. This has also been the case in the mast permit processes, falling under the Planning and Building Act, meaning that radiation, or the fear of it, has never been seen as a reason to refuse a building permit for a mast, when appealed above the municipal level.

The Environmental Court of Växjö 13 Sep 2004 ruled out the possibility of 3G antennas being regarded as an activity causing damage or detriment to the environment.⁴⁶ It stated:

“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 EC definition of environmentally hazardous activities.”

However, 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 EC.⁴⁷ The Court firstly conclude that an activity that is comprised by any of the items indicated in chapter 9, s. 1 of the EC is to be characterized as an 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 also pointed out that the base station may cause mental 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 comprised by the EC definition of environmentally hazardous activity.

⁴⁵ The Environmental Code, as published by the Ministry of the Environment in 2000.

⁴⁶ Case no M 3411-04.

⁴⁷ Case nr M 7485-04.

With the risk of the radiation being hazardous, the activity of a 3G mast is included by the Environmental Codes definition of a hazardous activity. 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.

4.3 *The radiation issue according to the Planning and Building Act*

In the Planning and Building Act, which control the mast permit processes, the radiation is not found to be hazardous activity, based on legal practise which refer to the Swedish Radiation Protection Authority's statements. It is stated in chapter 2, section 2 that:

*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.*⁴⁸

The wording in the two legislations is in Swedish more similar than it is rendered in the official translations into English.⁴⁹ Nevertheless, the sections aim in the same direction, and can, in different contexts, judge the same type of activities. And, as the case from above shows, the radiation from a 3G mast has been judged to be hazardous in one legal context (the EC) and not in another (the PBA).

Of the 28 appeals of the 248 permit applications of Blekinge, 23 were related to issues of the electromagnetic radiation. The local municipality often considered the neighbours view of rear for the radiation, but the higher courts, when a mast building permit was appealed, did not. 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. This is an exceptional case, which took 2 years, 2 months and 14 days, from the permit application of 9 Apr 2002 to the decision of the Government of 23 June 2004. The interesting result of it is however that it continued all the way through the system of appeals and that the Government found that the reasons the complainants (the neighbours) bring forward, fear for radiation among for instance, do not constitute any hindrance for a building permit. The Government referred to what is stated by the Swedish Administrative Court of Appeals in Jönköping (Kammarrätten), saying that the fear for 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 municipal building committee had however denied the permit initially, which was the action leading to the appeal.

⁴⁸ Legislation translated and released by the National Board of Housing, Building and Planning 2006.

⁴⁹ 2 Kap. 3 § st 2 MB "Dessa försiktighetsmått skall vidtas så snart det finns skäl att anta att en verksamhet eller åtgärd kan medföra skada eller *olägenhet* för människors hälsa eller miljön." Att jämföras med Kap 3, 2 § PBL "Byggnader skall placeras och utformas så att de eller deras avsedda användning inte inverkar menligt på trafiksäkerheten eller på annat sätt medför fara eller betydande *olägenheter* för omgivningen."

4.4 Conclusion concerning the legal impact on the infrastructure development

| 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) = part of the municipal supervision</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> = The public does not notice.</p> <p>Masts: Municipal building permit is required</p> |

The fact that the radiation was found to be within the scope of being detrimental or hazardous to the environment or to human health under the Environmental Code raises an interesting question in relation to the precautionary principle. Can the radiation be a hindrance for a mast permit now - post the decision of the Environmental Court of Appeal of 12 Oct 2005?

Legally, 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 sociological point of view this may cause problems. The sociologist of law can see that the individuals intervening 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 to that the rights and the obligations of the individuals are consequently taken care of.

The decision and the design of “the beauty contest” in Sweden focused growth and regional development and did not address the environmental impact of the construction. The market premises to a large extent was put out of action already by the license conditions of full coverage and short construction time-limit. The rhetoric of the initial period in Sweden emphasized the importance of reaching high coverage quickly. Still, the legal instruments for environmental assessment remained unchanged, and the assessment of the impact of the construction of the 3G infrastructure was left to the municipal permit process of each mast, causing a strain to the system, especially at a local level, with many mast permit processes under a short amount of time. The deficiencies of the legal design around a case of the size of the 3G infrastructure development in Sweden are in some ways linked to the fact that there was no comprehensive assessment made for the entire mobile systems construction. The jigsaw puzzle had to be assessed through its pieces, at a municipal level, one mast at a time, instead in the initial planning stages and comprehensive. This also means that the antennas that are put on facades in a manner that do not require a building permit falls out of the scope of any assessment at all. In these cases, which are very common, an assessment is only required for aesthetic reasons. So, if the radiation can be hazardous in the Environmental Code context, does this mean that the masts on the rooftops that only has been assessed if aesthetic reasons has required it, but not otherwise, really could require building permits? This is a systematic inconsistency following from the complex environmental and planning

legislation divided into two different legal corpuses in the Environmental Code and the Planning and Building Act.

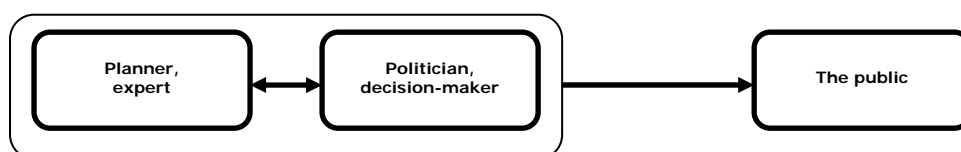
Bearing in mind the late turning point of letting the antenna activities in under the scope of the EC - most of the national infrastructure had already been built in October 2005 - is it possible that a pressure has fallen on the legal institutions to not find the radiation to be hazardous in a legal sense, forcing a more thorough assessment of each case also under the PBA, which would have lead to an even more delayed infrastructure development?

5.0 Discussion

The practical side of sustainable development means to a large extent in this paper the empirical side of law, the “real” side, the outcomes and effects, that the national questionnaires from the PTS and the permit process data from the County of Blekinge represents. The socio-legal issues of for instance the public fear for radiation meeting law and the legal system, are an example of this. Concerning conflicting levels of government or the question of where and how environmental assessment should be done all aligns the area of approaches to decision-making, often focus in the planning theory of Spatial Planning. The character of these issues all has turned the study and the paper towards an interdisciplinary field focusing the issues rather than the academic walls.

3G was never a choice to the Swedish public, due to the EU membership. Neither could anyone escape the infrastructure construction within the country due to the widespread coverage of the licence conditions following on the beauty contest and the strong belief in the technology at the time. At the national level economic and technological optimism and regional policy is in conflict with environmental and sustainability goals. No comprehensive assessment was made of the entire system; the infrastructure is assessed through one permit for each mast, at the local level, giving the administrative system an extreme challenge, and giving unexpected environmental and social outcomes as a result from the lack of comprehensive assessment.

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.⁵⁰ 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 totality of the system is not part in the planning process. The “market forces” are in a sense locked out of the construction due to the fixed total coverage of the populated areas.



⁵⁰ From Friedmann (1987) *Planning in the public domain*. “Guidance” and “transformation” Amdam and Veggeland translates to Norwegian as “samfunnsstyring” and ”samfunnsomdanning”.

The centralized decision of how the radiation shall be taken into account in the 3G infrastructure development is rationalistic (Swedish Radiation Protection Authority standards, higher court decisions) 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.

5.1 Inconsistent system – two paradigms in clash

When the Environmental Code was prepared in the Swedish legislation the possibility to incorporate the planning legislation to 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.⁵¹

The data of the permit processes of Blekinge shows that critical notice from neighbours and such, when given notice about a mast permit application, on the basis of fear for what dangers the electromagnetic radiation will bring, were often taken into account at the municipal level. Which thus lead to a denial of the permit. When this decision was appealed by the operator arguing that a fear for electromagnetic radiation is no ground to deny a mast permit the operator in most cases reached a positive ruling in the County Administration, and also higher up in the court system, whenever the neighbours would appeal this decision.

Viewing this from the paradigmatic perspective, outlined above, we can state that the local level is close to 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 think it is, which is the case with the fear for radiation in the local context.

⁵¹ Ebbesson, Jonas (2003) *Miljörätt*, Iustus Förlag, p 111.

The Environmentalist paradigm

The appealed building permit process

The EC: Until Oct 2005: "radiation can not be a hazardous activity"
Post Oct 2005: "Can in some cases",
But only in an EC context.

The PBA, above local level: Radiation, or the fear for it, is not a reason to deny a mast building permit.

The Plan paradigm

Local permit process:
Neighbours opinions can affect the decision (even if it regards radiation issues).

However, in the higher courts, the system walls thicken. The fear for an allegedly dangerous radiation is not a problem on the mere grounds that someone thinks it is. It has to be measured, and stated as dangerous objectively. Then, and only then, can it be communicated into the legal sphere making such a claim legitimate. This is when the process has reached the normativity of the environmentalist paradigm. We have here an example of two modes of constructing a social problem clashing.⁵²

Bearing in mind that the view of sustainability promoted in the two paradigms in their ideal-type form is very different. In the environmentalist paradigm ecological sustainability is given priority over social and economic. Sustainability is essentially seen as a state to be achieved. Seeing sustainability as a state stems from the notion that the totality of our environmental problems can be "solved" rather than be temporarily and provisionally "resolved".

The court decisions state that the radiation is not dangerous, and hence is the claims based on this not legitimate regarding the permit processes. There is simply nothing to be afraid of. This state is in several of the NEOs described as a state of balance in Nature which is a pervasive figure of thought often found in ecologist literature.⁵³ The notion of sustainability as a steady state is expressed in the NEOs, the ultimate aim of which is to solve the environmental problems within the span of one generation. In the preamble to the NEOs it is claimed that a sustainable society will then be achieved. In relation to EQS it might seem problematic, as noted above, with goals for a future sustainable state that in several cases is identical or close to EQNs which set a minimum standard for certain environmental variables. In the "plan-paradigm" sustainability is seen as a process of continuous negotiation of the three components. The committee revising the Planning and Building Act noted that the Act with its emphasis on weighting of public and private interests is a suitable instrument for this process of negotiating sustainability.⁵⁴

5.2 Handling the pillars of sustainability

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 –

⁵² Wynne 1996

⁵³ Emmelin 1983

⁵⁴ Emmelin & Lerman 2007

especially as they are seen in EU policies. 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 a 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 co-operation 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 relatively little substance. Telephones for the system were not available. Applications beyond conventional mobile telephony and the capacity to handle large amounts of information were largely a matter of conjecture. 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.⁵⁵

The environmental or ecological sustainability of the system was not considered at all in the initial policy decision. Environmental concerns surfaced as a result of the decision not as part of the decision.⁵⁶ 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 mitigation through efforts at reducing the number of masts through voluntary co-operation.

The issue of tiering is of course central to the problems discussed here. Conventionally tiering has been seen as an assumption of a top-down consistency of PPP to project. This view has been under attack, mainly for reasons that are both theoretically and empirically rather self-evident.

Tiering is 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 – but not of the area of Sweden – is in reality outside the competence of the lower levels of the system.

As noted the environmental component was not introduced at all at the policy level. If seen in the light of sustainable development this can at best 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 conservation aspects of the mast infrastructure. The local deals with aspects of land use. Public concern over the fear of radiation was 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. 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

⁵⁵ Emmelin & Söderblom (2002) p 22.

⁵⁶ Emmelin & Söderblom (2002) p 22 – 24.

social sustainability, where participation and of trust as factors in sustainability are often emphasised.

To reduce the number of masts in the municipality might seem attractive from the point 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 a voluntary agreement in the early stages of the development of 3G to cooperate to minimise number of masts failed.⁵⁷

Incidentally the indicator of coverage used illustrates the problem of simplistic development indicators. Covering the approximately 25 % 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 sectorisation and of the real difficulties in predicting and steering with planned development and development indicators.

5.3 *Summing up: would SEA have helped?*

3G would at first seem a perfect example of the need for SEA. The question is however what an SEA could have achieved. In a separate study at a later stage of our examination of the Swedish 3G-system development we will address this issue based in the empirical material at national, regional and local level. We will here merely indicate the lines of argument.

Strategic decision-making is done in the field of tension between “weighting and daring” or between the intuitive and the rationally deliberating.⁵⁸ Thus the truly strategic decisions do not conform well to models of rational decision making that are explicitly or implicitly at the base of EIA. The rationalist basis of EIA has been largely taken over in much SEA writing and certainly in much SEA-legislation, not least in the EU SEA directive: the rationalist assumptions of generation of alternatives, the prediction of consequences of these alternatives and the choice of the “best alternative”.⁵⁹ Etzioni, in attempting a normative compromise in the “muddling through” versus rationalism debate, argues that strategic decisions – which he terms “contextuating” – can and should be made according to a model of bounded rationalism.⁶⁰ The systems decision at national level is indeed a strategic decision of the contextuating kind. If assumptions behind the decisions were correct the context for regional development could change and economic growth be promoted.

An assessment of the consequences and impacts of a system such as the 3G could with some simplification be considered at two levels of ambition. Either an attempt at assessing the

⁵⁷ Emmelin & Söderblom 2002

⁵⁸ This central tenet of strategic decision making is based in the writings of Clausewitz, Carl von (1999) *Vom Kriege*, Berlin: Ullstein.

⁵⁹ Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment.

⁶⁰ Etzioni, Amitai (1973) *Mixed-scanning: A “third” approach to decision-making*. Public administration review. [Reprinted in Faludi, A (1973) *A reader in planning theory*. Urban and regional planning series vol. 5. Oxford: Pergamon Press]

impacts on all three pillars of sustainability could be made. Or the environmental impacts of the infrastructure of the 3G could be made. In everyday language the ambition is “to determine how to do the right thing” rather than the more modest “to do things right, and preferably from the outset”.⁶¹ In both cases scenarios for different models of developing the system would probably have to be assessed. However the problems of respective undertaking are vastly different.

Assessing the total impacts of a system at the policy level encounters several major difficulties. Defining what are “reasonable alternatives” to a system of four competing networks would depend on a rather arbitrary definition of what the purpose of the system is: economic growth, technological development, regional development etc.

If the assessment is confined to only the envisaged system there are however major problems with making meaningful predictions of the impacts other than the stimulus to the IT business that the building of the system itself would provide. The decision was taken at the height of the IT-boom. One of the operators has since left the Swedish scene and generally in Europe the UMTS system has suffered financial setbacks. Operators have tried to negotiate lowered license sums in several European countries. Decisions such as entering the competition for licenses may be couched in rationalist decision making terms but are in reality intuitive, which does not preclude an underlying business logic based on the assumption that the decision leads to success. Since the applications of the system were not known but simply described as stemming from the potential of wide coverage and high capacity other impacts would be meaningless to try to predict. Effects on energy use in society, transportation efficiencies etc would all be a matter of conjecture rather than prediction. Even the prediction of whether 3G would replace the existing GSM-system would at the time of decision be a mere guess. Thus factors such as energy and materials use even within the narrower bounds of telecommunications would be guesswork. With regards to the effects on regional development attempts at a discussion were made. Hultkrantz argued that lowering the level of ambition to a 97 % coverage would be more reasonable, referring to an estimate made by the mobile consultant company Northstream, claiming that a critical degree of coverage can be set to 97 %. Above that, it will cost more than it will benefit, judged by what could be motivated from a commercial and regional political point of view. According to this estimate, the last 2,5 % will cost “extremely much”, around 1,6 billion Euro.⁶² The environmental impacts of such a reallocation would of course depend entirely on what regional development programmes the money would be spent on.

In summary it seems that an assessment attempting to predict the consequences on all three pillars of sustainability would have been a matter of mainly guesswork of limited value to the strategic decision making. This is not to say that a systematic examination of the arguments pro et con would have been meaningless. Such examination would however mainly illustrate that the uncertainty involved in the decision is conceptual rather than epistemic, and thus that the decision ultimately is truly strategic.⁶³

⁶¹ Emmelin (2006).

⁶² Lars Hultkrantz & Jan-Eric Nilsson, 2001, *Nya bud - En ESO-rapport om auktioner och upphandling*. Ds 2001:40, p 69.

⁶³ Rolf, Bertil (2006) Decision support tools and two types of uncertainty reduction, p 134 - 157 in Emmelin, L. (2006) [ed.] *Effective Environmental Assessment Tools - critical reflections on concepts and practice*. [Blekinge Institute of Technology Research Report 2006:3].



Arguably however a more limited SEA focusing on the mast infrastructure would have been meaningful especially in pinpointing the principal planning problems. Defining “reasonable alternatives” in this case could be limited to an examination of a few levels of degree of separate systems of infrastructure and the benefits of co-operation. Our preliminary conclusion from the examination of the 3G case is that SEA focused on environmental impacts and aiming at mitigation would have been feasible and meaningful. Especially in clarifying the issues for the lower level permit system. The number of “unnecessary” masts could have been reduced, and a compromise between the competition ideology and environmental concern could have been struck. An optimal number of masts is of course a matter of judgement but one aspect is technological redundancy where one mast would serve the purpose of two or more. In the questionnaire to the Swedish municipalities one out of three of the municipalities reported that they had received applications for permits for masts with less than 100 meters distance of each other.⁶⁴

It is clear that there has 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 this soon - and on the other hand stands the interests of constructing the extensive infrastructure sustainably, accompanied by a 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.

⁶⁴ PTS Report: TEMO-undersökningar om bygglovshandläggningen av 3G-master 2003-04-07.

6.0 References

- Amdam, Jørgen & Veggeland, Noralv (1998) *Teorier om samfunnsplanlegging: lokalt, regionalt, nasjonalt, internasjonalt*, Oslo: Universitetsforlaget.
- Andersson, Per, Hulthén, Staffan & Valiente, Pablo (2005) Telecommunications Policy 29, pp 577-593, *Beauty contest licensing lessons from the 3G process in Sweden*, Stockholm School of Economics, Sweden.
- Baier, Matthias (2003). *Norm och rättsregel. En undersökning av tunnelbygget genom Hallandsåsen*. Lund: Sociologiska institutionen,
- Björkdahl & Bohlin (2003) *3G Network Investments in Sweden*, PTS-ER-2003:9, by IMIT & Chalmers conducted for the PTS.
- Brante, Thomas (1980), *Vetenskapens struktur och förändring*, Lund
- Clausewitz, Carl von (1999) *Vom Kriege*, Berlin: Ullstein.
- Fog, H. Bröchner, ?? Törnqvist, A. Åström, K. (1992) *Makt, politik, rätt*, Byggeforskningsrådet.
- Ebbesson, Jonas (2003) *Miljörätt*, Iustus Förlag
- Emmelin, L., (1983): "Ekologisk grundsyn - bidrag till en diskussion om ett begrepp." *Naturresurs- och miljökommittén. Bakgrundsmaterial nr 9*
- Emmelin, L.,(1996): "Landscape Impact Analysis: a systematic approach to landscape impacts of policy". *Landscape Research*, vol 21, no 1. 1996
- Emmelin, L. & Kleven, T. (1999): A paradigm of Environmental Bureaucracy ? Attitudes, thought styles, and world views in the Norwegian environmental administration. NIBR's Pluss Series. 5-99
- Emmelin & Lerman, in press
- Emmelin, L. & Lerman, P (2004a): "Problems of a minimalist implementation – the case of Sweden" in Michael Schmidt, Elsa João and Eike Albrecht (eds.) "Implementing Strategic Environmental Assessment (SEA)" Berlin, Springer-Verlag.
- Emmelin, L & Lerman, P (2004b) *Miljöregler – Hinder för utveckling och god miljö?* Research Report 2004:9, ISSN: 1103-1581, Blekinge Institute of Technology.
- Emmelin, L. & Lerman, P, (2006) *Styrning av markanvändning och miljön*, Ansvarskommitténs skriftserie maj 2006, Stockholm.
- Emmelin, L. & Lerman, P. (2007) Environmental quality standards as a tool in environmental governance – the case of Sweden in Schmidt, M. Glasson, J. Emmelin, L. & Helbron, H. [eds.] *Standards and Thresholds for Impact Assessment*. Springer Verlag.
- Emmelin, Lars & Söderblom, Ingmarie (2002) *Spelet om 3G – en förstudie av mastfrågan*, Blekinge Institute of Technology Research report no 2002:07
- Etzioni, Amitai (1973) *Mixed-scanning: A "third" approach to decision-making*. Public administration review. [Reprinted in Faludi, A (1973) *A reader in planning theory*. Urban and regional planning series vol. 5. Oxford: Pergamon Press]
- Friedmann (1987) *Planning in the public domain*
- Hajer, M A (1995), *The Politics of Environmental Discourse*, Oxford University Press.
- Lars Hultkrantz & Jan-Eric Nilsson, 2001, *Nya bud - En ESO-rapport om auktioner och upphandling*. Ds 2001:40. Hydén, Håkan (2002) *Normvetenskap*. Lund: Sociologiska institutionen.
- Hydén, Håkan (2004) *Om relationer mellan normer och regler. Kompendium i rättssociologi*, Sociology of Law, Lund University.
- Hydén, Håkan (2001) *Rättsregler*. 5th edition. Lund: Studentlitteratur.
- Hydén, Håkan (2002) *Rättssociologi som rättsvetenskap*, Lund: Studentlitteratur
- Isaksson, Karolina & Storbjörk, Sofie (2005), *I gränslandet mellan politik och planering – roller, relationer och avvägandets problematik*. Article published in *Hållbar utveckling i praktiken: möten, gränser, perspektiv*, Asplund, Eva & Skantze, Ann (Eds.) Stockholm: Royal Institute of Technology.
- Larsson, Stefan (2006) 3G of Sweden – Technological growth and sustainability issues, article in Emmelin, L. (2006) [ed.] *Effective Environmental Assessment Tools - critical reflections on concepts and practice*. [Blekinge Institute of Technology Research Report 2006:3].
- Larsson, Stefan & Åström, Karsten (2007) *Spatial Planning and Sociology of Law: Sustainable development issues in constructing infrastructure for the third generation mobile telephone system in Sweden*, Sociology of Law, Lund University. Paper for the Berlin 2007 International Conference: Law and Society in the 21st Century.
- Lundqvist, L.-J. (2004) *Sweden and ecological governance*. Manchester University Press
- Rolf, Bertil (2006) *Decision support tools and two types of uncertainty reduction*, p 134 - 157 in Emmelin, L. (2006) [ed.] *Effective Environmental Assessment Tools - critical reflections on concepts and practice*. [Blekinge Institute of Technology Research Report 2006:3].



- Sager, T. (1990) *Communicate or Calculate. Planning Theory and Social Science Concepts in a Contingency Perspective*. Dissertation 11. Stockholm: Nordic Institute for Studies in Urban and Regional Planning.
- Sager, T. (1994) *Communicative Planning Theory*, Avebury.
- Swedish Radiation Protection Authority, *Strålning från basstationer för mobiltelefoni*, 2001:3, Aug 2003
- Wickenberg P (1999) *Normstödjande strukturer – miljömatiken börjar slå rot i skolan*. Lund Studies in Sociology of Law.
- Wynne, B. (1996): May the Sheep Safely Graze ? A Reflexive View of the Expert-Lay Knowledge Divide. in Lash, S, Szerszynski, B, and Wynne, B, eds. *Risk, Environment & Modernity. Theory, Culture & Society*. Sage Publications

<http://www.pts.se>

<http://www.SCB.se> *Folkmängd i riket, län och kommuner 30 september 2006 och befolkningsförändringar kvartal 1 - 3 2006 and Kommunprofiler*

<http://sv.wikipedia.org>

Case no M 3411-04.

Case nr M 7485-04.

Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment.

Europaparlamentets och rådets direktiv 2000/60/EG om upprättande av en ram för gemenskapens åtgärder på vattenpolitikens område (Vattendirektivet),

Prop. 2005/06:191

Regeringens skrivelse 2005/06:126

PTS report PTS-ER-2003:9 (Feb 2003) *3G Network Investments in Sweden*. Study for the PTS, by Björkdahl, Joakim & Bohlin, Erik, IMIT & Chalmers.

PTS report, *Befolkningsäckning per kommun den 2 maj 2006 baserat på 3G-operatörernas inrapporterade uppgifter*, 8 June 2006.

PTS report, *Befolkningsäckning per kommun den 31 december 2003 baserat på UMTS-tillståndshavarnas inrapporterade uppgifter*, 10 April 2004.

PTS Decision of 16 Dec 2000.

PTS (12 May 2000) *Inbjudan till ansökan om tillstånd att tillhandahålla nätkapacitet för mobila teletjänster enligt UMTS/IMT-2000 standard samt GSM standard i Sverige*.

PTSFS 2000:5, *Post- och Telestyrelsens föreskrifter om tillstånd att tillhandahålla nätkapacitet för mobila teletjänster enligt UMTS/IMT-2000-standard respektive GSM-standard* (PTSFS 2000:5), 14 April 2000.

PTS report of 27 June 2001, *Tillståndsgivningen för UMTS i Sverige*

PTS report of 17 December 2003, *UMTS-utbyggnaden – statusrapport*.

PTS report of 10 March 2004, *population coverage by 31 Dec 2003*.

PTS report of 5 June 2006, Bohlin & Strömberg, *Utvecklingen av den svenska marknaden för telekommunikation*.

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

PTS report – qualitative research (2 April 2003) *25 kommuner om bygglovshandläggningen av 3G-master; Djupintervjuer med handläggningsansvariga tjänstemän, politiker och näringslivsansvariga*, Temo AB for PTS.

PTS questionnaire (2 April 2003) *Kommunerna om bygglovshandläggningen av 3G-master; Kvantitativ enkät till landets kommuner*, Temo AB for PTS.

PTS questionnaire (4 December 2003) *Kommunerna om bygglovshandläggningen av 3G-master; Kvantitativ enkät till landets kommuner*, by Temo AB for PTS.

PTS (12 May 2000).

PTS Report: TEMO-undersökningar om bygglovshandläggningen av 3G-master 2003-04-07