Capacity management in infrastructures: deregulation or deregulation revisited

The cases of electricity and mobile telephony[1]

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Abstract:

In this paper, we intend to investigate and extend Steven Vogel's (1996) paradoxical proposition in *Freer markets, More Rules* that freer markets and regulatory reforms in advanced industrial countries in effect create more rules and thus cause reregulation, rather than deregulation. After discussing the application of Vogel's argument to the regulation of infrastructure capacity management, we compare capacity management regimes in the Dutch and EU electricity and mobile telephony industries and analyse their development. The detailed studies of capacity management in infrastructure industries show how despite EU and national efforts to develop capacity management regimes in most liberalized European infrastructures, negative effects (e.g., congestion, strategic behavior) have persistently plagued infrastructure industries. Based on our analysis, we show that although deregulation may have taken place at one institutional level, reregulation actually takes place at another institutional level. This analysis enhances and elaborates upon Vogel's famous *freer markets, more rules* paradox and provides additional insights into the effects of (de)regulation on capacity management.

Keywords:

capacity management, telecommunications, electricity, European Union, deregulation, reregulation, the Netherlands

1 Introduction

Over the past decades, the European Union (EU) was engaged in the liberalization of a large number of infrastructure industries, which radically restructured the management of markets and accompanying regulatory frameworks (European Commission, 1999; Kessides, 2004). However, despite efforts to develop properly functioning markets in the liberalized European infrastructures, many problems seem to plague these infrastructure industries persistently. Problems regarding capacity management feature prominently among them.

Throughout Europe, and across different infrastructure industries, capacity has been identified as a major barrier to the development of competitive and viable European markets. By far the most important reason is that capacity in many infrastructure industries has become increasingly scarce. Capacity management regimes determine under what rules and conditions companies gain the right to transport goods across infrastructures to customers. However, since their liberalization, capacity management regimes in many European infrastructure industries have been plagued by conflicts and problems. Examples include strategic behaviour, relatively high market entrance barriers for potential new competitors, and market dominance of former incumbents.

We argue that capacity management governance structures in European network industries may be considered as examples that show that although deregulation may have taken place at one institutional level, reregulation actually takes place at another institutional level. This analysis enhances and elaborates upon Vogel's famous *freer markets, more rules* paradox and provides additional insights into the effects of (de)regulation on capacity management. We briefly introduce Vogel's propositions regarding deregulation and reregulation in section two. In section three, we discuss our analytical framework. In sections four and five, the case studies of electricity and mobile telephony are presented. In both case

studies, we discuss the sector-specific issues that are related to capacity management and describe the respective development of these regimes on both the European and national (Dutch) level. Finally, we provide a brief overview of the current negative effects in the capacity management regimes, such as obstacles to a properly functioning market. In section six, our analysis and preliminary conclusions are presented. We argue that capacity regimes in infrastructure sectors have been increasingly developed with a market orientation, which in itself was considered to result in deregulation. However, this market orientation has not been able to deal with a number of persisting problems such as the market dominance of incumbents and the strategic behaviour of companies. These shortcomings have been addressed in additional rules and regulations in both cases.

Although these rules and regulations are derived from universal European rules and regulations and seek to strive towards harmonization, our analysis concludes that until recently national rules and regulations resulted in different management regimes to deal with the aforementioned negative effects. On the basis of our analysis, we conclude that local rules and regulations therefore resulted in differences in capacity management regimes in infrastructure sectors.

The aim of this article is to enhance and elaborate upon Vogel's 'freer markets, more rules' paradox. We investigate how relevant Vogel's observations are for capacity management regulation in network industries. To what extent does Vogel's proposition 'freer markets, more rules' apply in this area and, if it does, in which way and how could it be extended?

2 Vogel's argument on deregulation or reregulation

From the late 1980s deregulation and the introduction of liberalization in network industries emerged as one of the key issues on the agenda in the policies of the European Commission to reach its ultimate goal: a fully functioning and integrated competitive European free internal market. By the early 1990s, it had become "[w]idely accepted that the vertically integrated monopoly model no longer applied to all network utilities" (Kessides, 2004:36). The EU created a set of regulatory frameworks that set out to create harmonized, liberalized infrastructure markets throughout the Union (Coutard, 1994; European Commission, 1999; Kessides, 2004). Central in this approach was the identification of which functions in infrastructures could be opened to competition and which would have to continue to be provided by monopolies (Klein, 1996; European Commission, 1999; OECD, 2001a; 2001b; Kessides, 2004). The introduction of competition in turn affected the management of infrastructure industries and identified capacity management as one of the key issues.

In these years, the EU made progressive steps to unbundle several network industries and to introduce competition in all but the transmission parts. Competition has been introduced in one after the other part of infrastructures and eventually also in transmission. Consequently, capacity management becomes an important means to stimulate competition in infrastructures.

In the middle of these developments, an influential study into regulatory economics emerged that sought to provide more insight in the causes and consequences of deregulation. In his study *'Freer markets, more rules'*, Steven Vogel analyzed the developments following deregulation in the financial and telecommunications industries in the United Kingdom and Japan in the late 1980s until the early 1990s. His analysis was mainly based on a qualitative analysis of the effects of deregulation on the way the governance of these industries took

place and he concluded that although the countries faced roughly similar challenges in the governance of their industries, they responded very differently.

Based upon his research, Vogel posited three propositions that appeared quite paradoxical when compared to the original policy goals that led to the implementation of deregulation.

The first, and the most important from the perspective of this article was that "what we have witnessed has been reregulation, not deregulation. That is, the governments of the advanced industrial countries have reorganized their control of private sector behavior, but not substantially reduced the level of regulation" (Vogel 1996, p. 3). Instead, according to Vogel (1996:3) "in most cases of "deregulation", governments have combined liberalization with *reregulation*, the reformulation of old rules and the creation of new ones. Hence we have wound up with freer markets and *more* rules. In fact, there is often a logical link: liberalization requires reregulation."

As such, Vogel argued that there was no antagonistic relation between the level of competition in an industry and the level of government control. Both conditions should be considered separately in the analysis of industries.

Secondly, instead of considering liberalization processes as uniform events, Vogel (1996:40) argued that "governments of the advanced industrial countries have not converged in a common trend toward deregulation, but have combined liberalization and reregulation in markedly different ways. These governments have achieved different degrees of liberalization, adopted particular types of reregulation, and developed distinctive new styles of regulation."

Third, Vogel (1996:4) argues that "states themselves, even more than private interest groups, have driven the reform process. In other words, state actors have powerfully shaped the reforms. This proposition contrasts with the predominant school of thought on the politics

of regulation, which suggests that interest group pressures are behind both regulation and deregulation." Rather than discarding these notions about when or what drove reregulation, Vogel (1996:268/269) incorporated them in his 'model' about the sources of deregulation which accounts for the "ideological and institutional context in which state actors operate powerfully shapes how they interpret public interest and how they pursue it."

Vogels' observations provide a powerful message. Since then, Vogel's conclusions have been reiterated and reaffirmed. For instance, Coen and Thatcher refer to Vogel's claim and add to his observations that, in their opinion, a new governance of markets has been introduced:

> "Most cross-national studies have focused on the worldwide spread of privatization and liberalization […]. Such a focus might lead to the belief that markets have been "deregulated" (Coen and Thatcher 2005, p. 329). "For views that liberalization engendered more regulation, see Majone 1996; Vogel" (Coen and Thatcher 2005, p. 343). "However, this special issue shows that in fact a new governance of markets has been introduced. In particular, new intermediaries between national governments and private suppliers and consumers have grown in number and significance, namely non-majoritarian regulators" (Coen and Thatcher 2005, p. 329).

Majone argues that European integration has resulted in new and generally better rules at both the national as well as the international level. He compares the European with the national level and observes that the EU is more prone to regulation than the EU member states. He illustrates his claim with the example that, in 1991, the European authorities in Brussels issued 1,564 directives and regulations as against 1,417 pieces of legislation (laws, ordinances and decrees) issued by Paris. Moreover, he notes that only 20 to 25 percent of the legal texts applicable in France are produced by the parliament or the government without previous consultation in Brussels (Majone 1996).

3 Analyzing capacity management from Vogel's perspective

In the next sections, we will analyse developments in capacity management regimes for electricity and mobile telephony. In order to structure our empirical material, we have studied developments in their governance regimes. What framework will we use to analyse these developments?

In order to provide a structure to our empirical material, we took these notions and combined them with a framework that was developed by Williamson (2000) to provide a more detailed framework and undertake a rich longitudinal analysis of the changes in the capacity management regimes in different infrastructures: First of all, the 'resource allocation level' describes the actual property rights regime[2] and describes who has the right to transport goods over infrastructures under what conditions. 'Governance', describes the framework that surrounds the property rights regime and focuses on the organizational environment in which the laws and regulations are applied. The governance regime to a large extent determines 'the play of the game'. Third, the 'institutional environment' describes the formal rules: the laws and regulations. Finally the capacity management regime is completed by 'embeddedness': the generic customs and traditions. Together, the four levels of analysis provide a rich and detailed framework for analyzing the capacity management regimes of infrastructure industries.

4 Capacity management in the electricity industry

4.1 A short introduction to electricity and the need for congestion management

Electricity infrastructures can analytically be divided into electricity production (i.e. power plants, wind farms), high-voltage electricity transmission grids, and finally the distribution networks (cf. Georghe et al., 2006). Electricity is essentially an ill-controllable, instantly perishable product that needs to be provided under tight quality characteristics. Consequently, electricity systems can only be managed centrally and relatively crudely by Transmission System Operators (TSOs) which balance supply and demand and regulate the electricity flows across the high-voltage electricity grids. Another consequence is that electricity grids form an important bottleneck facility. A lack of transmission capacity in the grid can result in electricity shortages, overloads or grid instabilities that may threaten the reliability of electricity provision.

A special element in electricity grids: interconnections

In the course of the 20th century, European electricity infrastructures evolved from private local into public national systems (cf. De Bruijne, 2006:29-49; Verbong & Van der Vleuten, 2004), in which the management of the electricity system was left to national TSOs. As part of the technical growth, national electricity systems became interconnected after World War II. Interconnectors may be defined as 'transmission lines which cross or span a national border and which connect the national transmission systems of two nations'.[3] Initially, interconnections were designed and used to 'strengthen' the robustness of the electricity systems and provide mutual assistance in case of grid disturbances rather than to facilitate bulk power trade between networks (e.g. De Vries, 2001). National electricity systems

remained predominantly self-sufficient for geo-political and military reasons. Consequently, the number and capacity of interconnections grew at a relatively slow pace. At best, interconnection capacity was used to facilitate long-term supply contracts for low-cost power and thus reduce power prices for customers (Knops & De Jong, 2005:265).

Congestion

Electricity cannot flow freely and undisturbed throughout the high-voltage electricity grid. Congestion occurs when too much electricity flows over a given high-voltage transmission line. Demand is simply too big to be accommodated by the infrastructure (cf. Knops et al., 2001). The physical properties of electricity make it necessary for the owner/operator of the high-voltage grid, the TSO, to avoid congestion or risk having to cut back electricity supply to parts of the grid.[4] The operational measures which are used to change the dispatch of generation constitute congestion management.

Although congestion (management) was always an issue in the electricity industry, it manifested itself primarily *inside* the control areas of single TSOs. However, the introduction of liberalization, and the resulting increase in cross-border electricity trade made congestion management an inter-TSO issue.[5] Congestion over interconnectors occurs when 'an interconnection linking national transmission networks, cannot accommodate all physical flows resulting from international trade requested by market participants, because of a lack of capacity of the interconnectors and/or the national transmission systems concerned.'[6]

Since the mid-1990s, increased cross-border trades resulted in structural 'economic' congestion on many interconnectors and turned them into prime bottlenecks in the electricity networks (Brunekreeft et al., 2005). Apart from the apparent safety risks, '[c]ongestion of international links has a significant effect on trading possibilities, and can therefore constrain international competition for electricity, to the point that competition for electricity is reduced

to competition for access' (Knops & De Jong, 2005:265). This makes cross-border congestion a serious impediment to the development of a unified European electricity market.

4.2 EU-regulation and congestion management policies

European involvement in the electricity industry effectively commenced with the first European Commission Electricity Directive (1996)[7], which sought to achieve a common Internal Electricity Market (IEM).[8] However, the first Directive concentrated on the legal and institutional issues of liberalization yet failed to provide an exact blueprint (Giesbertz et al., 2005). As each Member State interpreted the Directive differently, this resulted in the development of more or less liberalized but isolated national electricity markets across the EU, despite Commission efforts to implement common cross-border trading rules, and stimulate interconnector expansion. Interconnection congestion thus put a brake on the EU liberalization process and became a top priority of the EU (Knops & De Jong, 2005:262).

The second European Commission Electricity Directive[9] (2003) and subsequent regulations[10] were of a more prescriptive nature and introduced a single regime designed to integrate the national electricity markets. Nevertheless, the Directive failed to provide 'any explicit provisions on the regulation of cross-border electricity trade' (Meeus et al., 2005:28), but merely provided a generic 'European framework for congestion management' (Knops & De Jong, 2005:266).

It is possible to distinguish three distinct phases in the development of EU rules with regard to cross-border trade and congestion management (See table 1). Congestion management regimes developed from a bilateral set of agreements between TSOs before liberalization to a form of negotiated access to an increasingly internationally coordinated and regulated form of congestion management since 2003.

Table 1: EU cross-border trade and congestion management regime for electricity

	common form pre-1996	1996 Directive	2003 Directive
Cross-border Trade	Monopoly	Negotiated	Regulated

Source: adapted from Jamasb & Pollitt (2005), Table 2, p. 7

Until the first Electricity Directive in 1996 congestion management consisted of the coordinated redispatching of generation resources (i.e. increasing or reducing the amount of electricity produced within the network) by TSOs of neighbouring countries. The 1996 Directive did not fundamentally change this state of affairs. Large differences remained between national congestion management policies allocation as the Directive did not provide strict rules on either capacity or congestion management (De Vries, 2001).

In 2003, the Commission harmonized the different interconnection capacity management regimes and based them on market-based criteria (cf. Meeus et al., 2005). However, despite pushing for a harmonized approach to interconnection and congestion management, a common European framework for congestion management is still absent (cf. Wangenstein et al., 2005).[11]

4.3 Electricity and capacity management: Dutch rules and regulations

On the level of the Dutch electricity industry, four distinct phases in the development of the capacity management regime may be distinguished. The first phase was characterized by a monopolized interconnection regime in which the Dutch Electricity Generating Board (Samenwerkende Energieproducenten, SEP) centrally planned, controlled and actively redispatched electricity, and effectively controlled interconnection capacity on a first-come, first-serve basis through negotiated access.

The second phase was marked by the implementation of the first Electricity Directive. A new Dutch Electricity Act (1998) introduced (phased) open access to transmission

networks to stimulate competition. The ownership and management of the high-voltage grid, including the interconnections, was unbundled from SEP to TenneT, the new Dutch Transmission System Operator (cf. Van Damme, 2005:11). The relatively high electricity prices in the Netherlands contributed to an increased import capacity demand, which quickly outran the available interconnection capacity, resulting in a near permanent state of congestion. This in turn enabled parties to use interconnection capacity reservation as a strategic asset to withhold and block access for competitors.

TenneT changed the capacity management system for the year 1999 to deal with the increased demand for interconnection capacity, and assigned priority to long-term over short-term capacity reservations. Eventual capacity reductions were taken from the short-term capacity reservations first, which caused bitter complaints from new market entrants who claimed that the regime failed to stimulate competition. In a reaction to these complaints and a badly performing electricity market, the legislator ordered the newly installed electricity regulator DTe to design a new capacity management regime for the year 2000.

Phase three saw a gradual transition towards increased competition, which was supported by a capacity management regime based on negotiated access and managed by electricity regulator DTe. The new regime distinguished three categories of electricity transmission flows: two long-term (based on contracts predating liberalization and those negotiated after liberalization) and one short-term. For the year 2000, DTe allocated priority to long-term capacity reservations, but only if the requested capacity was backed up by actual supply contracts.[12] The remainder of the available interconnection capacity was allocated to short-term flows to transmit power traded on the Amsterdam Power Exchange (APX). Any allocated but unused capacity automatically became available for spot market transports, according to the ‘use-it-or-loose-it’ principle. Furthermore, the DTe changed the procedures regarding import curtailments in case of (un)planned disturbances. TenneT was allowed to

curtail short-term capacity only before the spot-market capacity was contracted. In case of sudden disturbances, long-term transports were curtailed first.

Interconnections of the Dutch high-voltage grid

The fourth and final phase marks the most advanced form of capacity management that has been developed so far in the form of an explicit auctioning. In 2001, TenneT introduced the explicit auction as a more market-based interconnection capacity management regime (cf. Georghe et al., 2006:64-68). The explicit auction, which is conducted by TenneT-daughter company TSO Auction allocates the interconnection capacity on the national borders through yearly, monthly and daily explicit auctions (De Vries, 2001; Brunekreeft et al., 2005). If there is sufficient capacity, the interconnection price is zero. As a result of the new auctioning method, the volume of spot-market cross-border trades conducted through the APX increased substantially as capacity became a resalable commodity.

However, despite the radical changes, some elements of previous capacity management regimes were retained. Prime among them, the 'use-it, or loose-it' clause for capacity, which forfeits any reserved but unused capacity without compensation. Similarly, parties that have acquired short-term transmission rights must sell the electricity via the Dutch (APX) spot-market to prevent parties from strategically using the interconnection capacity to deny accessibility to third parties. Any unused capacity automatically forfeits to TenneT.

In January 2008, the level of coordination and regulation with regard to capacity management entered a new phase with the formation of a regional inter-TSO organization, Capacity Allocation Service Centre for the Central Westeuropean Electricity Market (CASC-CWE), which aims to optimize the interconnection capacity between Germany, France, Belgium, Luxemburg and the Netherlands and integrate their power markets. The newly formed organization was established after an agreement was reached between the Ministries, regulators, TSOs, power exchanges and representatives of the market participants of the five countries. The aim is to harmonize/standardize the rules for interconnection capacity auctions

and establish a joint auction agency for interconnection capacity.[13] It remains yet to be seen what the effects of this regionalization of capacity management rules means for the problems encountered in capacity management. Until a truly interregional market is established, the interconnection markets is plagued by a variety of different problems.

4.4 Negative effects that result from the current interconnection capacity management regime

Despite the incremental development of the interconnection capacity management regime, a number of (potential) problems have remained since the liberalization of the electricity industry, which may be analytically divided between technical and economic (policy) problems.

Technical problems

First, despite the abovementioned changes, the Dutch cross-border interconnection capacity has remained insufficient to deal with the increased demand for electricity and future studies indicate that additional interconnector capacity will not provide relief for the current capacity constraints, because of the relative weakness of the surrounding electricity grids (e.g. UCTE, 2004).

Second, since 2004, the relative predictability of interconnection capacity decreased as a result of the increased volatility of power flows in Germany's north-western power system. The unscheduled flows of large amounts of wind power during high winds in Denmark and Northern Germany forced TenneT to decrease the available interconnection capacity (TenneT, 2005:20) and resulted in curtailments or the cancelling of commercial contracts (UCTE, 2005:51).

Third, increased tensions exist between TSOs and market parties with regard to the technical rules and regulations regarding the management of interconnection capacity (Gjerde et al., 2005). What amount of interconnection capacity should be allocated to the market by system operators and national energy regulators? Too many restrictions withhold valuable capacity that might be traded in the electricity market. However, too few restrictions risks the frequent curtailment of 'firm' rights. Furthermore, the basis upon which TSOs decide to withdraw capacity rights might be less clear than the rules and regulations suggest. Conflicts may arise over the need for (emergency) capacity curtailments which may affect commercial obligations.

Economic (policy) problems

Structural interconnection congestion negatively influences the establishment of a liberalized European electricity market. The Dutch Energy Council (2004:43) argues that the auctioning of scarce interconnection capacity may lead to the manipulation of electricity prices by market parties. Furthermore, the additional incomes of the auctioning method also offer few incentives for TSOs to alleviate existing congestion problems. Despite efforts from the European Union and Member States, interconnection congestion has remained a problem (cf. Knops & De Jong, 2005).

As others have concluded before, the management of interconnection capacity 'requires careful consideration' (Knops & De Jong, 2005:265), now and in the near future.

5 Capacity management in mobile telephony

5.1 The need for capacity management in mobile telephony

Mobile telephony involves communication between a mobile phone and a base station through radio signals. The connections between the various base stations are arranged via a fixed network. The fact that mobile telephony involves the use of radio signals means that mobile telephony relies on radio spectrum, which the European Commission referred to as ‘a “raw material” in short supply’ (European Commission, 2006a). Other types of wireless communications (e.g., radio transmissions, satellite navigation) also utilize technologies that make use of the radio spectrum, which makes regulation of the use of radio spectrum highly important. Use of the same frequency by various types of wireless equipment could result in the interference between electromagnetic signals, resulting in their distortion, and making it impossible for receivers to recognize the original signal. Furthermore, it should be noted that spectrum and electromagnetic signals do not take national borders or international law into account. Thus, in order to prevent distortion of signals, it is important to make (inter)national agreements about the use of frequencies (European Commission, 2006a; Wille & De Bruijn, 2001).

The fact that radio spectrum should be increasingly regarded as a raw material in short supply can be illustrated with some figures regarding the use of this radio spectrum by mobile telephony. Worldwide revenues from mobile telecommunication services increased from 19 billion US$ in 1991 to 364 billion US$ in 2002. Over the same period, the number of mobile cellular subscribers world-wide increased from 16 million to 1,166 million (ITU 2006a); a growth that has far surpassed any technical developments that increased the efficient use of

frequencies. The demand for frequencies is thus growing faster than the supply (Wille & De Bruijn, 2001).

The increasing use of mobile telephony and, accordingly, the growing scarcity of frequencies for mobile telephony, have also influenced the allocation methods for mobile telephony licenses. Originally, frequencies for mobile telephony were often provided on a *first come, first served* basis. In the category of 'business use' of frequencies, which includes mobile telephony, up to 1995, around 90 per cent of the licenses was allocated through this mechanism. In the course of the 1990s, the growing scarcity of frequencies called for new, more market-oriented, allocation methods, such as competitive tendering or auctions, which, it was advocated, would result in more efficient use of frequencies. The importance of these market-oriented methods was also underlined by the European Union, which believed it would result in relatively high-quality services against relatively low prices (Wille & De Bruijn 2001). Accordingly, the 'first come first served' mechanism was replaced by competitive tendering, also referred to as *beauty contests*. In these beauty contests, frequencies are awarded on the basis of technical criteria, such as the ability of the applicant to provide the service. More recently, countries have made use of *auctions* to allocate frequencies for mobile telephony. In these auctions, interested parties can place a bid in order to obtain a license.

In addition to the selected allocation method for mobile telephony licenses, capacity management in this sector also involves the rights and obligations that are connected to these licenses. For instance, license holders may have a right to sell capacity on their mobile network to other service providers. The number of service providers has increased strongly since the late 1990s. Also, it may be allowed for a license holder to sell a license to another company. Finally, some licenses are combined with a roll-out obligation, which means for

instance that the network should achieve at least 90 percent national coverage after three years.

5.2 EU policies regarding spectrum management for mobile telephony

In the international context, several institutions are involved in the allocation of frequencies. The International Telecommunication Union (ITU) serves as a framework for international agreements on the division of spectrum into frequency bands and the allocation of these bands to various services. International frequency allocation agreements are described every two or three years in the Radio Regulations of the ITU at a World Radio Conference (ITU, 2006b). These Radio Regulations do not arrange frequency use around national borders but merely contain the procedures which must be followed to coordinate frequency use during bilateral negotiations (Wille & De Bruijn 2001:217). In addition to the ITU framework, agreements on the use of frequencies are made in a regional context. Within the European region, two institutions are involved in the allocation of frequencies. In the framework of the European Radio Committee of the Conférence Européenne des Administrations des Postes et des Télécommunications (CEPT), agreements are made which are of a non-binding nature. In addition, within the European Union, agreements with a binding character are made (ITU, 2006b; Wille & De Bruijn, 2001). Four phases can be distinguished in the development of EU capacity management policies for mobile telephony.

During the first phase, up to 1996, EU involvement in capacity management for mobile telephony was very limited but for the successful coordinated introduction of GSM as a European standard by the Council of Ministers in 1987 (Eliassen et al., 1999:33-34; Sandholtz, 1998:152). Capacity management was mostly a national matter. In most European countries, the market for mobile telephony was partially or completely dominated by the so-called incumbent. These incumbent operators were mostly state-owned companies, that had

been granted special and exclusive rights by national governments or that enjoyed a de facto monopoly (European Commission, 2000:332). In most European countries, licensing of mobile networks was highly restricted. If there was more than one license holder, the second mobile operator often had to pay an entrance fee, whereas the incumbent did not have to pay such a fee (Sandholtz, 1998:159).

The second phase, from 1996 until 2001, was characterized by limited involvement of the European Commission regarding the timing and allocation method of licenses. In January 1996, the Commission adopted the Mobile Directive[14], which forced EU Member States to liberalise their national mobile telecommunications markets by January 1, 1998. The directive required that mobile licenses would be allocated on the basis of competitive tender and that the so-called DCS 1800 licenses were to be allocated by January 1, 1998.[15] Accordingly, in 1997, eighteen DCS 1800 licenses were allocated through competitive tendering (Sandholtz, 1998:158-159; Eliassen et al., 1999:33-34). European involvement in the introduction of the so-called third generation of mobile technology, UMTS (Universal Mobile Telecommunications System) a few years later was of a very similar nature. According to Decision 128/1999/EC of the European Parliament and of the Council of 14 December 1998, Member States had to introduce UMTS services on their territory by 1 January 2002 and 'establish an authorization system for UMTS by no later than 1 January 2000' (European Commission, 2006c). Table three shows that there was still a rather high variety in the applied method for allocating UMTS licenses in the EU.[16]

Table 2: Third generation license allocation in the European Union

Allocation method	*EU Member States*
Auction	Austria, Belgium, Czech republic, Denmark, Germany, Greece, Italy, Poland, The Netherlands, United Kingdom

Beauty contest	Estonia, Ireland, Luxembourg, Slovakia, Sweden.
Auction & Beauty contest	Slovenia
Beauty contest & Fixed fee	Finland, France, Portugal, Spain
Unknown or allocation did not take place	Cyprus, Hungary, Latvia, Lithuania, Malta

Source: ITU (2006c)

The third phase is marked by an attempt to move towards a general EU spectrum policy and a more market-based approach. The European Commission argued that, even though Member States were voluntarily coordinating rules regarding the radio spectrum, national rules were fragmenting the EU single market (European Commission, 2006a) and that frequency scarcity dictated the need for harmonisation and rationalization of the use of the radio spectrum within the European Union (European Commission, 2005). The Radio Spectrum Decision 676/2002/ EC, which was adopted by the European Parliament and the Council on March 7, 2002 provided the foundation for the development of a general EU spectrum policy. For instance, it authorized the European Commission to mandate the CEPT to develop technical solutions to harmonize spectrum use (European Commission, 2005; 2006a). On the basis of the Radio Spectrum Decision, 'Member States must ensure that their national radio frequency allocation table and information on rights, conditions, procedures, charges and fees concerning the use of radio spectrum, are published' (European Commission 2005).

The fourth phase began in June 2006, when the European Commission launched a public consultation on policy options to update the 2002 EU 'regulatory framework for electronic communications'. The Commission argued that it was necessary 'to move towards a common, more market-based, approach to allocating the radio-spectrum needed for innovative services and devices to work EU-wide'. According to the Commission, the new rules should be fully transposed into national laws by 2010. The European Commission stressed that 'it is a competitive disadvantage for Europe that we do not have, as in the US, a

single regime for spectrum management, but 25 different ones' (European Commission, 2006b).

In November 2007, the Commission proposed to introduce a system for trading radio spectrum (European Commission 2007a, 2007b). In reaction to the proposed reform, the European Parliament presented alternative plans for reform in April 2008. The Parliament opposed the primarily market-driven approach of the Commission to radio spectrum, arguing that market mechanisms alone would not be able to serve the public interest and provide public goods that are indispensable (European Parliament 2008a, 2008b). We will have to wait and see what the reform will look like in the end, but it is not unlikely that a compromise will be reached, meaning that a more market-based approach to spectrum management will be introduced.

5.3 Dutch policies regarding spectrum management for mobile telephony

In the Netherlands, the responsibility for frequency management lies with the Directorate General for Telecommunications and Post (DGTP), which was recently transferred from the

Ministry of Transport and Public Works to Ministry for Economic Affairs. DGTP establishes a frequency plan, which determines the general frequency policy and the use of frequencies for different categories, such as vital governmental tasks or business use. For each frequency band, it indicates the designated type of use and the type of distribution mechanism that will be used to divide the frequencies over the various users. We can distinguish four phases in Dutch spectrum capacity management. As we will see, Dutch capacity management policies have developed along similar lines as EU policies, namely from administrative allocation methods towards more market-oriented methods (cf. Wille & De Bruijn 2001).

During the first phase, up to 1995, mobile telephony was one of the reserved services under PTT monopoly. The Dutch government considered introducing competition, but the different ministries did not agree on the way in which competition should be introduced (e.g., an entrance fee for a license or a profit tax measure). Finally, in June 1994, the Dutch government adopted the Law on Mobile Communications, which introduced competition.[17] The government had decided that a negligible fee would have to be paid by both the PTT and the new licensee, to cover administrative costs. The end of the PTT monopoly was also a result of pressure by the European Commission, which determined that each Member State should allocate at least two GSM900 licenses (Ubacht & Wille, 1999; Hulsink, 1996:259-262; Wille & De Bruijn, 2001:221).

The second phase, from 1995 until 1998, was marked by limited competition. In March 1995, the beauty contest was used for the first time as an allocation method to grant a second GSM-900 license to Libertel, over bids from five other consortia. Libertel could thus construct and operate an alternative mobile network. Both PTT Telecom and Libertel received a permit for fifteen years (Ubacht & Wille, 1999; Hulsink, 2001:261-262). The licenses were connected to several conditions, such as a roll-out obligation. The licenses could only be

transferred to other companies under strict conditions and with approval of the Minister (Wille & De Bruijn 2001: 222).

In 1998, the beginning of the third phase, the auction was introduced as allocation method for two national dual-band DCS-1800/GSM-900 licenses and 16 regional DCS-1800 licenses (Wille & De Bruijn, 2001:229). As discussed above, the 1996 EC Mobile Directive required that the Member States would allocate DCS-1800 licenses for mobile telephony before January 1, 1998. The government indicated it wanted to use an auction, because of the transparency of the instrument. The Minister gave approval for transfer of several of these licenses later on. In addition, several conditions such as a roll-out obligation were attached to the licenses (Ubacht & Wille, 1999; Brandenburger & Barr, 1998). In July 2000 another auction took place, this time for allocating five UMTS licenses.

The final phase began in November 2005, when the Dutch government approved the 'Nota Frequentiebeleid 2005'. This memorandum aimed to realise a more efficient use of spectrum. It states that Dutch laws and regulations should be adjusted, such that there will be less government involvement in the regulation of spectrum usage. Finally, regarding the allocation of scarce frequencies, the Ministry stated that it preferred the auction as allocation instrument, even though it should still be allowed to use competitive tendering (Ministerie van Economische Zaken, 2007). In general, the document reflected the development towards a more market-oriented capacity management and emphasized the need for a more flexible policy in order to keep pace with developments in the market and in technology.

5.4 Negative effects of the current capacity management regime for mobile telephony

European and Dutch capacity management policies regarding mobile telephony frequencies reflect a general development from administrative allocation towards more market-oriented

approaches. In spite of these developments, certain problems seem to persist. Moreover, the nature of these problems hardly appears to have changed over time.

If we consider Dutch capacity management, both the 1995 beauty contest and the 1998 and 2000 auctions were heavily criticized because of an alleged lack of transparency, which would have a negative impact on market functioning. It is frequently argued that existing market parties receive preferential treatment and that it is very difficult for new market entrants to obtain a license (Ubacht & Wille 1999; Hulsink, 2001; Brandenburger & Barr 1998; NRC, 2001). If we compare a beauty contest with the more recently applied method of auctioning, it can be expected that auctions are more transparent. For, in a beauty contest, the government is supposed to determine objectively which is 'the best' applicant. This is obviously not an easy task to fulfil (cf. Wille & De Bruijn, 2001). However, auctions need not be very transparent either and still offer room for preferential treatment. For instance, in the 2000 UMTS auction, all five licenses were allocated to existing market parties and Versatel, an entrant, did not manage to obtain a license. Furthermore, it was claimed that the Dutch government was not independent. For, the Ministry of T&PW decided about the allocation of UMTS frequencies, while at the time of the auction the Dutch state had a 43 per cent interest in one of the participants in the auction, namely KPN (NRC, 2001; Hulsink, 2001).

Another possible source of problems relates to the rules and structures that are selected once a specific allocation method has been chosen. For the DCS1800 auction, the Dutch government chose to run several rounds simultaneously. This system was criticized, because it did not allow interested parties to make a combination of several bids (Wille & De Bruijn 2001:225).

Another problem that has continued to exist relates to the financial aspects of allocating licenses. A problem with beauty contests was that they used to take a lot of time and, accordingly, were very expensive. Even though auctions usually generate revenues for

the national treasury, the fact that companies often have to pay high prices for licenses is also claimed to have a negative impact on investment levels and, consequently, on innovation efforts of the companies that obtain a license. In addition, it is feared that this also results in higher prices for mobile telephony consumers (cf. Wille & De Bruijn, 2001).

Finally, another problem relating to current capacity management regimes for mobile telephony is that of strategic behaviour of companies. During the UMTS license auctions in several European countries, companies have been accused of strategic behaviour. For instance, companies were suspected of entering an auction with the sole purpose of pushing up the prices of the licenses and, subsequently, they withdrew from the auction. Or, companies were accused of making agreements among themselves before the beginning of the auction about how they would 'divide' the licenses (cf. Van Damme, 2002; Klemperer, 2002).

6 Analysis and preliminary conclusions

A first finding is that the capacity management regimes in the two sectors show rather similar developments over the last two decades (see table 3). Furthermore, the analytical levels of 'embeddedness' and 'institutional environment' are mostly arranged at the EU level, whereas 'governance' and 'resource allocation' are mainly determined at the national level.

Table 3: Development of capacity management regimes (cf. Williamson 2000)

Level of social analysis	*Electricity*	*Telecommunications*
Embeddedness	From public national allocation towards market orientation	From public national allocation towards market orientation
Institutional environment	From bilateral TSO agreements to increased EU involvement and congestion management regulation; National rules are still fragmenting the EU market	From national monopoly to increased EU involvement and regulation; National rules are still fragmenting the EU market
Governance	From bilateral negotiations to auctioning	From 1st come, 1st served, to auctioning
Resource allocation and employment	Increasing specification of property rights	Increasing specification of property rights

The developments in both sectors on all four levels of analysis can be summarized as being characterized by an increasing focus on market-orientation. That is, governments and the European Union have attempted to introduce a more market oriented approach in their electricity congestion management and mobile telephony spectrum management regimes. The main focus in the development of EU policies for electricity and telecommunications over the

last two decades has been the establishment of a European internal market. However, both case studies also show that, so far, this increasingly market-oriented approach has not been able to deal effectively with some negative effects, such as obstacles to a properly functioning market.

Vogel's analytical framework provides an interesting contribution to the study of infrastructure capacity management. In particular, it sheds new light on those circumstances where traditional state and market regimes are insufficient to deal with persisting negative effects.

Freer markets more rules does still apply. However, the cases provide additional depth as to the nature of "more rules". In Vogel's argument, national governments have actively engaged in reregulation, in order to reorganize their control of private sector behaviour. On the basis of our analysis, two remarks with regard to this argument should be made.

First of all, we agree with Vogel that liberalization has been accompanied by reregulation. However, Vogel focuses on reregulation on the national level, whereas we contend that reregulation is not only taking place on a national level, but is being combined with shifts in governance from the national to the regional and international level.

Secondly, Vogel's argument suggests a rather active role for national governments, in the reorganisation of their control of private companies. On the basis of our analysis, we conclude that Vogel presumes a too conscious role of national governments. In our opinion, reregulation on the level of national governments has often been rather a reaction to initiatives of actors on other levels of governance, such as the European Commission, rather than proactive reorganisation by national governments.

Although Vogel's general analytical framework provides some very interesting insights, it may be concluded that the foundations of a new perspective on capacity management are perhaps not as promising as they might seem at first sight.. Our analysis has

been necessarily restricted to the analysis of capacity management regimes in a single country within the EU, but it would be interesting to test our hypothesis at a point later in time and in other EU member states.

Until then, the theoretical notions and prescriptive abilities of Vogel's propositions for the management of large-scale industries have evolved into a specification. The main contribution from Vogel's analysis lies in the rich analysis of institutional changes that provides additional insights in the consequences of infrastructure liberalization.

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[2] To be precise, Williamson places the 'formal rules of the game – esp. property' (Williamson 2000, p. 597) at the institutional level. However, by the term 'property rights regime', we refer to the more detailed specification of property rights and we have therefore placed it at the level of resource allocation.

[3] Based on: Article 2(1)Regulation (EC) 1228/2003.

[4] See Knops & De Jong (2005) for a specific description of the role of TSOs and interconnections.

[5] Furthermore, the interconnected grids are often embedded in two different legal regimes (cf. Knops et al., 2001).

[6] Article 2, Electricity Regulation (EC) no. 1228/2003, (OJ 2003 L176/1), dd. 15/07/2003.

[7] Directive 96/92/EC, OJ 1997 L 27/20.

[8] The integration of the European electricity system coincided with the creation of the Union for the Co-ordination of Transmission of Electricity (UCTE) which aimed to coordinate the reliable and efficient operation and development of the electricity transmission of the emerging supranational grid, resulting in voluntary technical rules and standards to achieve the required level of coordination from members across national boundaries.

[9] Directive 2003/54/EC, OJ 2003 L 17637.

[10] The most important regulation with regard to interconnection congestion management was Electricity Regulation (EC) no. 1228/2003, (OJ 2003 L176/1).

[11] Cf. Purchala, K., M. Shinkai, and F. Regairaz (2005) 'Practices related to internal and cross-border congestion management', *Proceedings of the CIGRE/IEEE PES International Symposium 'Congestion Management in a Market Environment'*, October 5-7, New Orleans, pp. 1-8. And ETSO (2004), *An Overview of Current Cross-border Congestion Management Methods in Europe*, Brussels, Belgium. EU efforts to create such a common approach to congestion management in the EU are underway. See for instance: http://ec.europa.eu/energy/electricity/legislation/doc/congestion_management/cm_guidelines_en_v3_track_changes.pdf, last visited on September 25, 2006.

[12] This capacity management allocation regime is also known as *pro rata* capacity allocation. However, the Electricity Act contained an article that allowed the director of electricity regulator DTe to prioritize the allocation of interconnection capacity (Slootweg, 2001:66).

[13] See: http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_INITIATIVES/ERI/Central-West/Achievements, last visited on May 15, 2008.

[14] Commission of the European Communities (1996), *Commission Directive 96/2/EC of 16 January 1996 amending Directive 90/388/EEC with regard to mobile and personal communications* (OJ L 20/59).

[15] DCS stands for Digital Communications System, which uses the 1800 MHz frequency. It is also referred to as GSM1800.

[16] The table does not include Bulgaria and Romania, the two latest EU-members..

[17] Law on mobile communications of June 16, 1994/No 628 (Wet mobiele communicatie 1994).