

The role of government regulation in achievement of efficient natural monopoly markets
on the example of electricity market in European Union
with focus on Germany and the Netherlands

Master Thesis
Master of Arts (MA) “International Business and Economics”
at the Faculty of Business and Economics
University of Applied Sciences Schmalkalden

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Acknowledgements

I wish to express my deepest gratitude to my supervisor, Professor Doctor Störmann. I could not have done this work without her encouragement and readiness to support, as well as her understanding of the needs and fear of students, her friendly manner and professionalism.

I am very grateful to my husband, who inspired and encouraged me, always believes in my ability to reach my aims and who gives me self-confidence and power. Having you by my side, I know I can realise my life aims.

Above all I want to express my special thanks to my mother. Thank you for all your support through my life, your insistence to give me education, based on which I can built my future. Thanks to your belief in me I could achieve my Master Degree abroad.

The financial and ideal support of Friedrich-Ebert-Foundation is gratefully acknowledged.

Jena, 06 December 2010

Yulia Gehlhar

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Chapter 1. Introduction

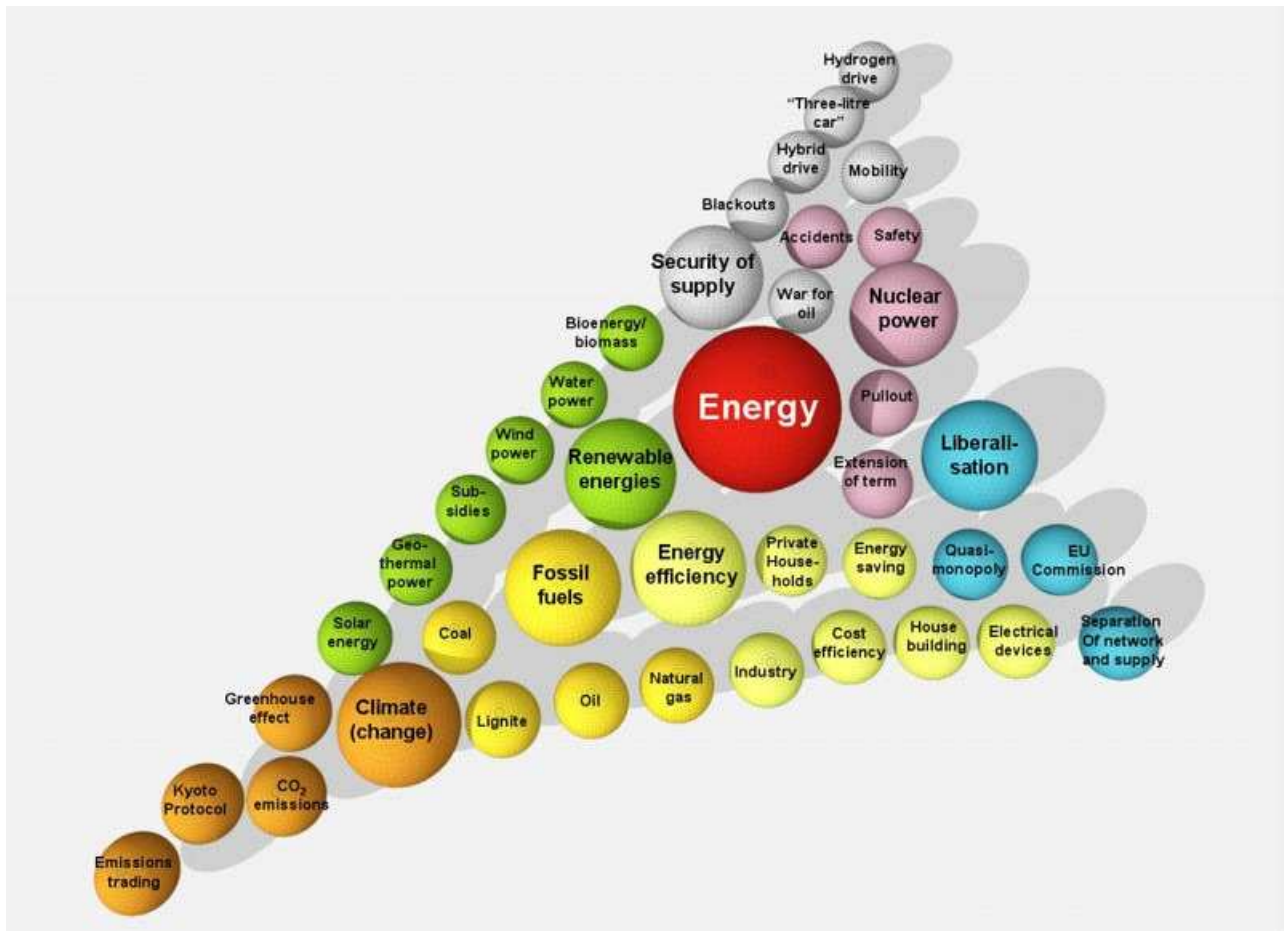
Natural monopolies play an important role in our life. They provide society with goods and services essential for human life, health, nutrition and economical development. To such goods and services belong electricity, oil and gas, telecommunications and post, airports and railway industry, water and other public utilities. Due to their high importance natural monopolies since their appearance are in the scope of particular attention of the state. Government regulation of these spheres is directed on provision of interests of society. The decisive reason for government regulation is failure of the market in natural monopoly industries. Competition in this case can not guarantee efficient provision of public goods and is even socially undesirable, menacing to exclude social-weak layer of society from provision of these basic for everybody goods.

Energy, belonging to such an essential industries, is of particular importance not only for social development of the country, but also for its economical performance and progress and, thus, for economic success of a state. Therefore energy industry and its development are under concern of every government. Since the time when national energy systems began to be built, they are under governmental observance, regulation and control. Government regulation, aimed mainly on provision of efficient functioning of energy industry, for a long time dominated the industry, regulating its production and pricing. During the time, the role of government regulation on the natural monopolies markets has changed. Governmental regulation become to be seen as inefficient and general tendency to reduction of the role of the government and finally deregulation and liberalisation of natural monopolies markets has began.

This work analyses the influence of regulatory policy on increase of the efficiency of natural monopolies with focus on electricity industry. As a practical example of modern regulation policy a liberalisation process in the European Union is chosen, practical experiences of Germany and the Netherlands are analysed.

So, from the spectrum of actual energy issues for the European, presented on the scheme below, this work includes the consideration of liberalisation (as a contemporary regulatory course aimed on the decrease of the role of regulation in the sphere of natural monopolies), quasi-monopoly, EU Commission, and separation of network and supply. This work does not include consideration of environmental issues or problems of energy sources.

Scheme 1. Modern issues of energy industry in Europe¹



The aim of the work is to analyse the effects of government regulation and liberalisation as a contemporary tendency of electricity industry in European Union directed on efficiency increase, with a focus of analysis of regulatory reforms implementation in Germany (resisting to liberalisation requests of EU legislation) and the Netherlands (with positive attitude to regulation reforms) were chosen.

The topic of this work is dictated by the high actuality of the issue of strategic change in the electricity regulation policy within the European Union and desire to show economical reasons to the (de)regulation process taking place on the electricity market in this area. This work is an attempt to evaluate regulation policy with an economic based critical view and to analyse theoretical and empirical base of energy market performance and regulation practice with further interpretation and presentation of the economical results of the analyse as a political implications.

The research questions are:

- 1) what is a role of government regulation in achievement of efficient natural monopoly market (in particular on electricity market);
- 2) what are the economic and political reasons for modern liberalisation process on the natural

¹ European Energy Forum

monopoly markets in European Union;

3) what are the practical effects of liberalisation in the EU, Germany and the Netherlands.

The questions are caused by the growing tendency to deregulation of natural monopoly markets and electricity industry in particular. Proceeding liberalisation and market opening, as well as planned for the beginning of 2011 implementation of the Third Energy Package within European member-states and acute debates on their role in efficiency increase give a work especial actuality.

In order to give a clear answer on the research questions, it is necessary first of all to determine what natural monopoly is and why government have to regulate it. Further it is defined what the possible responses of the government to the natural monopoly phenomena are, so main theories and approaches with their instruments, as well as their advantages and disadvantages are analysed. These are presented according to historical order of their development (evolution) and domination in economic theory.

Thus, it comes to disaggregated regulation, promoting a limitation of governmental regulation monopolistic bottleneck, whereas leaving parts of natural monopoly to the regulation by market forces. Further third chapter describes the reasons and expected effects of global deregulation (liberalisation) and market opening process with an accent on electricity market, as well as changing role of regulation in liberalised sectors of natural monopoly. A search for new regulatory instruments to discipline staying network specific monopoly power on liberalised markets will be also presented.

The fourth chapter presents a detailed analysis of the process of electricity industry liberalisation within the European Union. Legislation (EU Energy Directives), its implementation, as well as influence on the electricity market structure and development of regulation mechanisms on electricity markets of Germany and the Netherlands with analysis of practical effects of electricity liberalisation on efficiency increase in EU, Germany and the Netherlands are analysed.

In the conclusion the summary of realised analysis is presented.

Chapter 2. Theory of natural monopoly

In order to start analysing the influence of regulation mechanisms on efficiency of natural monopoly, it is necessary to define efficiency and the role competition plays in achievement, as well as explain a notion of natural monopoly and reasons of its government regulation.

2.1 Efficiency and natural monopoly

Competition, defined as a struggle between the firms for the profit maximisation, proved to be an application of the optimal efficient market. So, ensuring through “invisible hand” that privately motivated actions (of the firms) lead to socially desirable outcomes, competition promotes effectively performing economy.² Competition allows to reach static productive efficiency (producing at minimal costs), allocative efficiency (equilibrating post-tax marginal products of capital) and dynamic efficiency (innovativeness of the respective sector).³ So, competition ensures that firm, acting in the industry, contributes to effectiveness of the economy and fulfils public goals. But, there are also a number of industries where, due to the technological or economical reasons, such as capital intensity, technical peculiarities and network construction need, high fixed costs, high cost of infrastructure service, competition fails to provide effective performance. On such a markets one firm perform better than a number of competitive firms, so competition is socially undesirable due to the unnecessary duplication of capital equipment (nets) that would happen in the case of large number of firms on the market.⁴ Such a market is a market of natural monopoly.

The first precondition of natural monopoly creation was elaborated by John Stuart Mill in 1848. He “appears to be the first to have elaborated the possible benefits of regulated monopoly enterprises in the provision of public utilities” (Grossman 2003, p. 33). After observation of local gas and water companies he came to the conclusion that as legal monopolies these enterprises could achieve scale economies, “make lower charges”, and keep the current level of profit. Ely (1887) was the first that used the term “natural monopoly” to describe huge enterprises, that were “affected with the public interest” in particular.⁵

Energy industry, as well as other network industries, were considered to be an example of natural monopoly. It obtains a number of characteristics, “that makes it unsuitable for competition”. Energy sector is “capital intensive” and “characterised by typical peak-load problems (peak demand at

² Train 1992, p. 1

³ Welfens 1999, p. 29

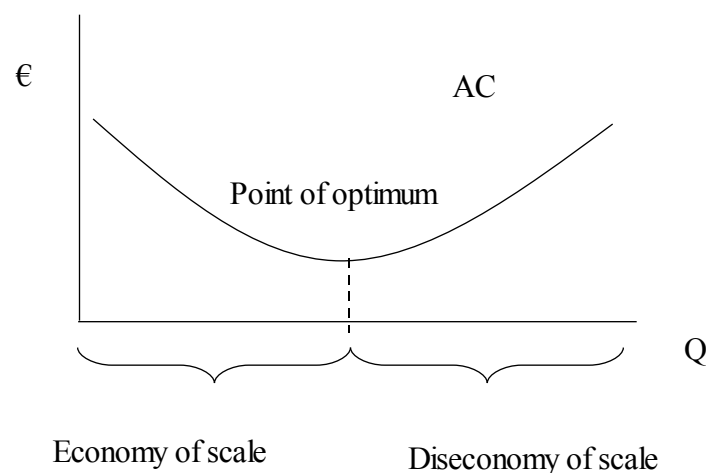
⁴ Depoorter 1999, p. 498

⁵ Grossman 2003, p. 33

certain intervals); and it is a network industry which means that there are certain technical indivisibilities.”⁶

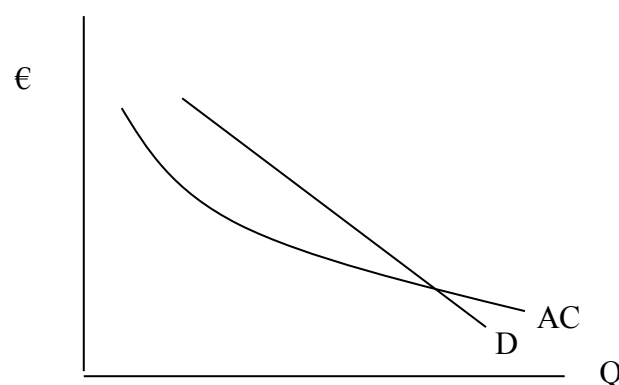
Initial construction of the energy plain and all necessary for distribution infrastructure network (pipes, lines), that form fixed assets, demands enormous initial investments as well as further constant costs, that can not be covered by the small or middle-size investors. In order to compensate these costs firm has to increase the production, till the scale, when expenses per unit are minimised, so that production becomes profitable. Such phenomena is called economies of scale, one of the common reasons of the natural monopoly appearance on the market.⁷

Graph 1. Average costs curve (based on Train 1992, p. 6)



Graph 1 shows the average cost curve (AC), that reflects the normal distribution of the average costs during production process. First curve goes down due to decrease of fixed costs per unit with the increase of the production, but once the certain point is reached the costs of the production per unit increase again, that makes production over the optimal point unprofitable.⁸

Graph 2. Relation of average costs to demand in natural monopoly (Train 1992, p.6)



⁶ Welfens 1999, p. 28

⁷ The second reason of natural monopoly is economy of scope that is not relevant for the energy industry and thus is not considered here.

⁸ see Train 1992, p. 6

In the case of natural monopoly, as the graph 2 shows, average costs decrease drastically per unit so that diseconomy of scale is not observed and production optimum covers demand of the whole market. In this situation division of production between two or more firms leads to far from optimal scales of production that reduces their effectiveness and causes customers losses due to price increase. In opposite, when one firm produces on the level that meet the demands of whole society, a decrease of the average and marginal costs of production takes place. That leads to price decrease for customers and satisfaction of public interests, that speaks for effectiveness of existing of one producer on the market.⁹

In new theory a economy of scale is considered to be not obligatory condition of natural monopoly existence. Natural monopoly is also often characterised by a subadditivity of the cost function of the firm. Subadditivity takes place when one firm can produce enough amount of product to satisfy the total demand with lower costs than two or more firms.¹⁰ So, cost function $C(y)$ is subadditive when:

$$\sum_{i=1}^m y_i = y, C(y) < \sum_{i=1}^m C(y_i); (\text{min two } y_i \neq 0);^{11}$$

Subadditivity is the base of modern definition of the natural monopoly. It is necessary to say that natural monopoly based on economy of scale effect is always subadditive, and belong to so called strong natural monopolies, when natural monopolies based just on subadditivity effect are called weak natural monopolies.¹²

The purpose of regulation is to stimulate a natural monopoly to choose a socially optimal outcome. According to Train, definition of optimal outcome relies on the concept of total surplus. "Total surplus is a money value of the benefits of product consumption minus the costs of its production. In reaching maximisation of the total surplus firm has to set prices on the level of marginal costs, to sell output demanded at this price, and to use the least costly input combination to produce the output".¹³ Pricing equal to marginal costs allows producer to cover the cost of variable resources used in production of marginal unit. Such a pricing provides allocative efficiency, that allows to get maximum use out of available resources. Minimisation of resources used in production, occurring when average costs are minimised, provides production efficiency of a firm. On normal markets with U-shape of the average cost curve, production and allocation efficiency are reached when marginal costs equal to average costs at their minimum.¹⁴

Due to downward slope of average costs curve (AC) in economies of scale the marginal costs (MC)

⁹ Train 1992, p. 7

¹⁰ Depoorter 1999, p. 499

¹¹ Knieps 2008, p. 23

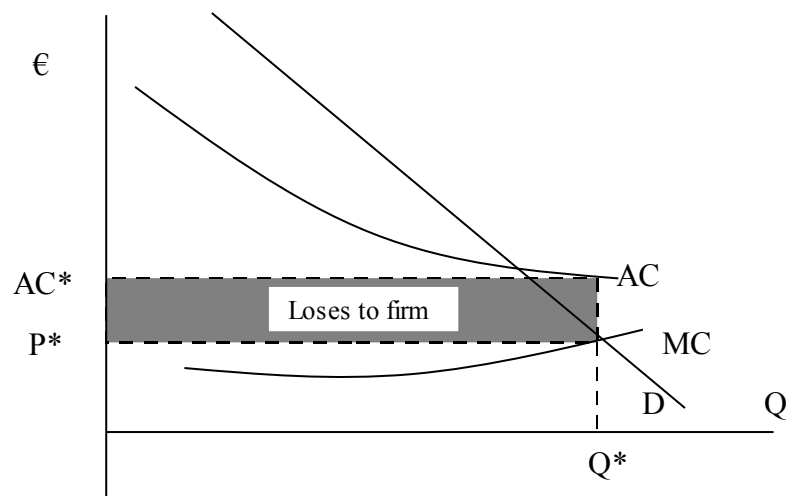
¹² Depoorter 1999, p. 500

¹³ Train 1992, p. 12

¹⁴ Bumas 1999, p. 209

are below the average costs. According to microeconomic theory, production below the average costs is unprofitable, then it makes sense for a firm to produce only when it sets prices on the level at least equal the average costs, that is zero-profit level. This means that, when pricing at the level of marginal costs firm in economy of scale losses money and production is not profitable,¹⁵ and as it can be seen on the graph 4, at this price firm will be not survive on the market. But due to the fact that optimal price level for society would be when price equals marginal costs, pricing on the level of average costs does not satisfy public-interest, because, first, the optimal demand level is not met and, second, allocative efficiency is not reached.¹⁶

Graph 3. Average and marginal cost curves of natural monopoly production (Train, 1992, p.12)



Thus, we can conclude that optimal output level can not be reached without regulation, that motivate a firm to produce and set prices on optimal for society level. A need for governmental support of the natural monopolist is the necessary condition of the firm existence on the market. Otherwise natural monopolist will be forced to increase the prices at least till the level of average costs.¹⁷

The compromise of the regulator here is a raise of the prices till the level of average costs, that would provide a firm with at least zero-profit and still better satisfy the public-interest than pricing of non-regulated firm, directed on profit maximisation. As it can be seen on the graph 4 the first-best for the society output and price level is F (where price is equal to marginal cost), and the second-best output is S (where price equals average costs).¹⁸

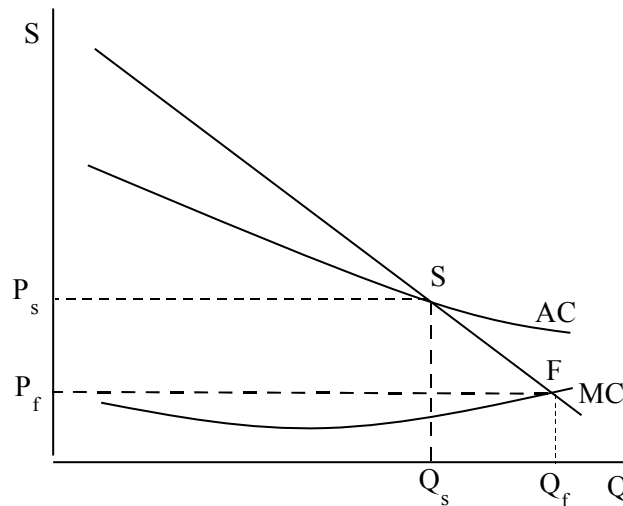
¹⁵ Bumas 1999, p. 209

¹⁶ Train 1992, p. 15

¹⁷ Train 1992, p. 15

¹⁸ Train 1992, p. 16

Graph 4. First and second best outcomes in the case of natural monopoly (Train 1992, p.16)



First-best output represents the highest total surplus, when the second-best output is the highest total surplus (welfare), that regulation is possible to achieve in the case of economy of scale. Thus point S is the optimum, as the aim of regulation in the natural monopoly industry.¹⁹

The second-best optimal price level (P_s) as an alternative to the first-best marginal costs price (P_f) is called Ramsey-price. Ramsey-price is a welfare maximising price available from benefits of economies of scale under costs recovery constraint.²⁰ Ramsey prices are often used in price regulation, when regulator set a price limit on the level of Ramsey-price.

Speaking about the optimal outcome, also the technological innovations and service quality issues have to be mentioned. Often development of technology decrease costs of production that reflects, of course, influence the level of economic welfare.²¹ Existence of competition forces a firm to invest in research and development program and promote technological development. In the case of monopoly market, firm is not interested to invest in technology development, equipment modernisation and quality increase that is reflected in quality decrease. Natural monopoly having strategic position on the market has no threat to lose its customers, that has negative influence on efficiency. Thus, to regulation aims belongs also a provision of natural monopoly with a stimulus to invest in research and development.

2.2 Economic basics of state regulations of natural monopolies

So, the activity of the monopolist due to reasons mentioned in the first point of the chapter, for the sake of efficiency has to be regulated.

¹⁹ Train 1992, p. 16

²⁰ Knieps 2000, p. 2

²¹ Depooter 1999, p. 503

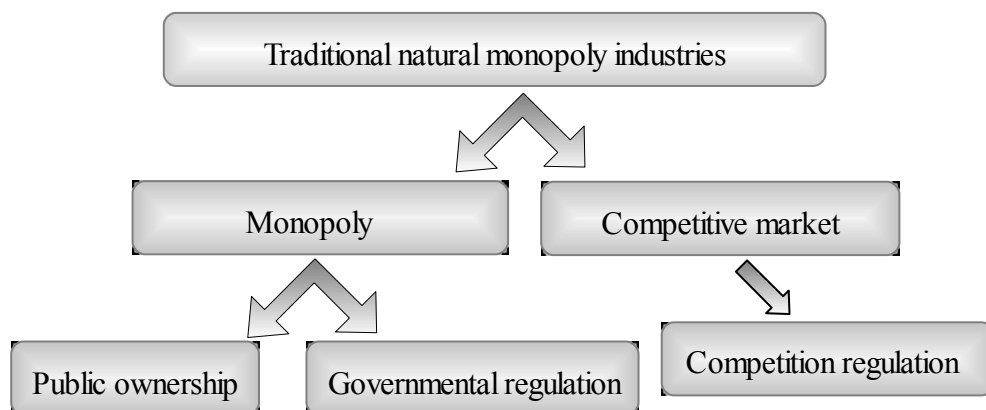
From one side natural monopoly needs to be controlled and regulated, from other side protected and supported. Thus, government has to intervene the market and exercise a regulatory policy. In the case of energy market necessity of governmental intervention regulation is even more crucial due to its strategic importance for the economic and social life of the country. For most industries, energy is essential to the cost base and competitiveness,²² but also all types of households depend on energy, that belong to one of the most important for life and health goods. Governmental regulation of the natural monopoly market has to decide a dilemma: how to preserve the interests of society, keeping available prices, but in the same time to provide a natural monopolist with a stimulus to produce on the demanded level and to stay on the market. Thus, regulation has to keep the balance between customers and natural monopoly interests. Aims, as it can be concluded from the previous part, here are:

- to cover the costs and profit norm of natural monopoly, protecting it from losses;
- to preserve reasonable prices, necessary level of production and stability of supply.

The role of the government and the degree of its interference in performance of the natural monopolies market can be seen in different ways, that influence further decision about the methods and instruments of regulation government to be used.²³

First of all, as it is presented on the scheme below, natural monopoly industry can be seen either as a monopoly or as a competitive market.

Scheme 2. Natural monopoly industry from competition view



It is necessary to say that initially contemporary natural monopolies industries performed under competition. So, Bradley in his work argues that in XIX century in USA as well as in England competition existed and flourished on the markets of utilities, such as rail roads, telephone, electricity and gas. First in the last decades of XIX century under the political pressure caused by lobby of big magnates (seeking the franchise from the government) competitive firms was consolidated into public utilities to be regulated by state. Competition on these markets was

²² Ilie et al. 2007, p. 1

²³ Knieps 2008, p. 82

declared to be inefficient, a notion of natural monopoly appeared, theory was developed.²⁴ Firms were transformed into state-enterprises or staying in private hands became to be strongly regulated by the government. Supply of gas, electricity, water and transport as a public services began to be seen as a function of the state.²⁵

Competition as a regulator of natural monopoly industries, based on the assumption that natural monopoly market is a competitive market, where numerous firms can perform, is described in the next chapter in details due to rebirth of this regulation concept in the second part of the XX century. According to the traditional theory of natural monopoly described in the previous part of the chapter, public utilities (network industries) belong to “natural monopoly” market.

So, the possible responses to the phenomena of natural monopolies are:

- State ownership;
- Governmental regulation.

Under the both regulation concepts lies a persuasion that natural monopoly markets are not competitive and therefore single firm should exist on the market as a monopoly. In order to prevent the risk of its market power abuses, that would threaten efficiency and public welfare, this monopoly should be regulated.

2.2.1 Public ownership

The most extreme method to regulate natural monopolies is public ownership, where regulator has a total control over the production, distribution and pricing of the natural monopoly through governmental ownership. Under the state ownership enterprise belongs completely to the state and is completely controlled by the government. Enterprise in that case is a kind of a governmental department and all important for the enterprise decisions are taken on the governmental level. Appointments to senior management and to the board of directors are often political decisions,²⁶ state, being responsible for the social well-being, presents public interests.

The aim of governmental ownership of natural monopoly is a “guarantee of adequate provision of essential services at a reasonable cost to the entire population”.²⁷ Being an owner of enterprise, government can easier fulfill controlling functions and guarantee a domination of public interest over the profit-maximizing principle.²⁸

The positive features of state ownership are presented in the following table.

²⁴ Bradley 2003, pp. 41-53

²⁵ Parker 2009, p. 2

²⁶ Hillman 2003, p. 559

²⁷ Mahoobi 2003, p. 73

²⁸ Depoorter 1999, p. 514

Table 1. Advantages of governmental ownership

Subject	Advantages/gains
Society	<ul style="list-style-type: none"> ➤ performance of the enterprise with appropriate for the society pricing and production level ➤ domination of public interests over profit-maximising one ➤ avoidance of asymmetry of information problem (government as an owner of the enterprise is a direct controller and manager) ➤ social protection of the certain groups and layers of population (protection by beneficial tariff policy)²⁹ ➤ protection of the employees of the state enterprise from unfair firing policy³⁰
Monopoly	<ul style="list-style-type: none"> ➤ prevention other firms from entering the market ➤ tax benefits ➤ facilitation of contracts between natural monopoly and government ➤ governmental protection on national and international markets

Natural monopoly as a firm under state ownership get also a number of benefits. Most of them have a form of anti-competition legislative norms, increasing dominating position of the monopoly on the market. Government compensates also eventual losses of the monopoly through the governmental budget, provides low credit rates for investments and tax benefits, facilitates the contracts with other state-owned economic units. All these measures in general protect the stable position of the firm on the market. So, as it is presented in the table, in ideal cases both society and natural monopolist can gain from the state ownership.

In spite of the fact that negative aspects of state ownership influence on a market were mentioned already by Adam Smith in 1776 in his book *An Inquiry into the Nature and Causes of the Wealth of Nations*, where he criticised the institute of state ownership, and favoured free market “lassie-fair” principle³¹, state ownership had for a long time dominated the natural monopoly markets as the only way to overcome the imperfection of the market. In the end of nineteenth state ownership the sectors of natural monopolies (and often national economy as a whole) was seen as a necessity also in countries with market economies, “state enterprises slowly increased in number and state regulation expanded”.³² After the Second World War economists with a new force advocated nationalisation, underlining that “the state should face the necessity of actually taking over, owning,

²⁹ Ilie et al. 2007, p. 6

³⁰ Ilie et al. 2007, p. 6

³¹ Smith 1776, p. 11

³² Parker 2009, p. 2

and managing directly, both the rail roads and the utilities, and all other industries in which it is impossible to maintain effectively competitive conditions.”³³

However, starting from the second half of the XX century a number of shortcomings from the practice of state ownership were revealed. To them refer the following:

1) domination of politic interests over business ones

Managers of state owned enterprises aim to reach politically but not business efficient decisions, that often can lead to “excessive employment, poor choices of products and location, and inefficient investment”.³⁴ Often natural monopolies in energy industry are used as political instruments in reaching of some geopolitical or relational aim of the government. So, effective price and trade policy in natural monopolies yields realisation of governmental targets.

2) excessive budget burden

Often state compensate the losses of inefficient enterprise. In the case of natural monopolies, that can reach tremendous sizes, it causes excessive budget burdens.

3) poor incentives for manager → inferior and inefficient performance

State owned enterprise is usually not presented on stock market, thus there is no need to take care about reputation of the enterprise in order to keep its stock prices on a high level, takeover cannot happen because state has total control.³⁵ Moreover, absence of competition causes a lack of usage of modern managerial systems (such as corporate governance). Structure of natural monopolies with hundreds of departments, that easily become bureaucratic and ineffective, demands perfect management systems of coordination and control in particular.³⁶

4) inefficiency due to lack of competition and governmental protectionism

Government provides the firm with necessary support, preserving its dominating position on the market. Other firms cannot enter the market even if they could be more competitive, efficient and produce at lower price or better quality. Without competitive pressure public firm performs even being ineffective, that leads to huge inefficiency and low quality.

5) Low orientation on innovations and research

Due to protection of the market position by government state-owned natural monopolies are less involved in research, innovations and modernisation. Complicated hierarchical system makes the whole process extreme bureaucratic and disturbs flexible and fast reaction on the market changes.

³³ Shleifer 1998, p. 134

³⁴ Chong/Lopez-de-Silanes 2003, p. 7

³⁵ Clarke/Pitelis 1993

³⁶ Fraser 2008, p. 23

6) Low competitiveness of companies on international market

In its turn low quality and old technologies, that firms use on internal market can hinder its international competitiveness in comparison with foreign private innovative firms.

So, even in spite of strategic importance of natural monopolies “advantages of private ownership over governmental bureaucracy” was recognised and declared.³⁷ Public ownership of natural monopolies began to loose its implicit power as an efficient regulatory instrument.

On its place came a concept of government as external regulator. Particular concepts and instruments of efficiency oriented government regulation applied to natural monopolies out of public ownership, are described in the next part of the chapter.

2.2.2 Development of regulatory instruments

“In theory, regulation of the electric power system [as well as any other natural monopoly system] would allow society to gain the benefits of natural monopoly, while forcing firms to charge competitive prices to customers,” that would allow to maximise efficiency of natural monopoly performance.³⁸ This assumption gives a base to the theory of government regulation.

There are three main concepts here. First one is a so called **public-interest-theory**. Based on welfare economics public-interest-theory admits that market is imperfect, and pure competition can not exist. Therefore, regulation is needed to correct market failures and protect interests of society. Public-interest-theory argues that such optimisation of consumer and producer aims can be reached without causing “incentive distortion” or additional costs, and regulator is able to correct the market failure completely. The target of regulation under public-interest theory is to reach Ramsey-prices (second-best outcome).³⁹

Mark-up (cost-plus) regulation belongs to cost-plus regulation approach and is directed on achievement of more efficient pricing structures. Under this method government limits the revenues of natural monopoly by a mark-up (certain charge) on real costs of production. Disadvantage here is that the method stimulate monopoly to maximise the profits only by increase of production costs, that leads to a waste of resources and inefficiency.⁴⁰

In 1962 Averch, Johnson in their book “*Behaviour of the Firm under Regulatory Constraint*” presented the first critique of the public-interest-theory. They proved that regulation has to be seen not as correction mechanism but as constraint, that gave a name for the next theory of government regulation - **regulation as constraint**. According to Averch and Johnson the public-interest-theory

³⁷ Hillman 2003, p. 559

³⁸ Grossman 2003, p. 91

³⁹ Knieps 2000, p. 2

⁴⁰ Markova 2009, p. 95

of regulation is illusive, because no method of perfect correction of market failures can exist. Presented by them method (rate-of-return regulation) is based on the admission that problem of market power can not be eliminated, but reduced.⁴¹

Rate-of-return regulation (ROR) belongs to cost-plus regulation approach, and implies a setting by government of a limit to profits (rate of return) of natural monopoly based on the marginal costs of production. Under rate-of-return regulation firm is allowed to earn not more than a “fair return” on its investments in capital. Regulated firm can still choose itself the input and output level, as well as price, but a level of profits is limited.⁴² According to Averch-Johnson model a “fair rate of return must equal or exceed the market cost of capital to the firm”. Alternative definition suggested by Supreme US Court (concerning the Hope Natural Gas & Co case) underlined that “return of the firm is “fair” if it “enables the company to operate successfully, to maintain its financial integrity, to attract capital, and to compensate its investors for the risk assumed.”⁴³

ROR was for the biggest part of the XX century the most popular method of natural monopoly regulation. Rate of return regulation has been used to regulate utilities in many countries, e.g. in Canada, Japan.⁴⁴

The disadvantage of rate-of-return regulation lies in the incentives it gives to firm to increase the capital. A study by Courville (1974), one of the first empirical test of the A-J model shows that ROR regulation can lead to the over-capitalisation of the firm. “The A-J effect states that the firm will use too much capital relative to labour, that is not consistent with the regulator's goals.”⁴⁵ So, model the rate-of-return regulation does not provide a firm with a stimulus to choose the socially optimal production outcome and, therefore, is ineffective.

In the beginning of the 1970s public-interest-theory was criticised also by Chicago school, that pointed out that regulator acts not only in the interests of society, but in his own interests, that decreases his ability of perfect market correction. “Regulations ... are a politico-economic problem in a market economy since the regulatees have an incentive to lobby for rules that protect the industry rather than contribute to competitive efficient outcomes.”⁴⁶ Also, Stigler in his writings (1971) argued that regulation proceeds in the interests of the regulated firm rather than in public interests. “Regulatory policy reflects the demands of interest groups participating in the political process,”⁴⁷ and “the main beneficiaries of regulation are the regulated firms,”⁴⁸ because regulation policy protects them from entries of new firms on the market.

⁴¹ Knieps 2000, p. 3

⁴² Train 2008, p. 54

⁴³ Klevorick 1971, p. 123

⁴⁴ Alexander/Irwin 1996, p. 2-3

⁴⁵ Train 2008, p. 54

⁴⁶ Welfens 1999, p. 29

⁴⁷ Meier 1988, p. 21

⁴⁸ Mueller 2003, p. 345

An important disadvantage of the public-interest theory methods is also a problem of information asymmetry between regulator and natural monopolist. According to Vogelsang-Finsinger-Mechanismus regulator has no complete information about the cost and demand functions of the firm.⁴⁹ Taking into consideration that the firm under rate-of-return regulation does not benefit from any “efficiency gains” (if firm can lower the costs the consumer will get the benefit “in the form of lower prices”, but not the firm, because revenue is anyway limited)⁵⁰, natural monopoly is interested to hide important information from the regulator that gives it an opportunity to earn more. Neglecting of this information gap leads to inefficiency of regulation.

That become an impulse for development of a new regulation paradigm, based on so called **agency theory** or **principal-agent-problem**. In terms of principal-agent-problem state as a “principal” has no complete information about production and cost function, technology and other conditions of production of “agent” - natural monopoly. Management of natural monopoly and state have different aims: first is concentrated on profit maximisation, second on optimal output and pricing possibly on the first-best for the society outcome level. Under regulation “agent” has to produce appropriate to demands and subscriptions of the “principle”, but firm will use each opportunity to act in its own interests. Due to inability of regulator to monitor and control the activity of natural monopoly, firm will not be interested to disclose all the information to the regulator. Such an information gap is a source of additional profit for an “agent” and a cause of inefficiency for a “principle”.⁵¹ In order to increase efficiency of regulation, regulator should not force the natural monopolist to be effective by restrictions, but have to trust a natural monopolist and stimulate it to be effective, keeping opportunity for profit increase. The aim of regulation is then to motivate the firm in spite of “imperfect monitoring” from the regulator “to act in the public interests”.⁵²

Understanding of a necessity to give a natural monopolist incentives to produce on social optimum is a core point of **incentive regulation concept**. Basic here is “a persuasion that there is no perfect regulation instrument and that regulation can never lead to perfect correction of the market fail,”⁵³ but regulator can motivate a natural monopolist to produce and price on the optimal for society level. To achieve it, government has to give more freedom to a firm, giving an opportunity to keep the profits the firm get. The aim here is also Ramsey-pricing. A method based on this concept is a **price-cap regulation**, the main alternative to rate-of-return regulation.⁵⁴ Under price-cap approach regulator defines an upper limit of pricing, setting a formula, according to which the annual rate of price is allowed to change.

⁴⁹ Knieps, 2008, p. 82

⁵⁰ Markova 2009, p. 96

⁵¹ Vickers 1997, pp. 92-99

⁵² Vickers 1997, p. 99

⁵³ Knieps 2008, p. 172

⁵⁴ Alexander/Irwin 1996, p. 1

Increase of a price level is restricted by:

$$RPI - X,$$

where:

RPI – “weighted average of prices in the firm’s product basket corrected for general inflation” (deflator);

X – factor of productivity increase (efficiency factor), that reflects the level of expected from this firm growth of productivity and innovations.⁵⁵

The value of X factor is determined by estimation of the possible productivity gains the firm can reach and is based on analysis of production function of the natural monopoly.

Decisive advantage of this method is a stability of prices on the product of natural monopoly. In ideal case price increases only on the rate of inflation, that allows the customers to buy the same amount of the good every year.⁵⁶

Price-cap regulation promotes efficiency by providing a firm with more possibilities to get profit through cost minimisation, because it does not restrict profits as rate-of-return on capital. “If, during the course of a regulatory period, a corporation manages to lower its production costs below the level of initial calculation of tariffs, it can keep these profits”.⁵⁷ Therefore, by adopting price-cap approach government provides natural monopolist with incentives to be efficient.

Price-cap approach has gained popularity since the second part of the 1980s when it was used in United Kingdom after the privatisation of the natural monopolies. Later this method was successfully accepted in USA, that is used by Federal Communications Commission (FCC) in regulation of long-distance telephone company American Telephone and Telegraph. Alike methods are used in definition of tariffs of natural monopolies in New Zealand, Malaysia, Mexico, Peru and Argentina.⁵⁸

In electricity industry usage of incentive regulation in UK “led to increases in efficiency, reductions in prices, and improvements rather than reductions in reliability” and capital investments increase, that in general benefited consumers and investors.⁵⁹

Problems of the price-cap approach:

- initially determination of optimal price. Price cap approach describes just the mechanisms of price changes form year to year, but not on which level price has to be set initially;
- a necessity to review the price cap periodically, in order to consider the changes in firm

⁵⁵ Brunekreeft 2002, p. 72

⁵⁶ Knieps 2000, p. 8-9

⁵⁷ Danwitz 2007, p. 448

⁵⁸ Alexander/Irwin 1996, p. 1

⁵⁹ Littlechild 2006, p. XXVI

productivity.⁶⁰

- impediment to invest, to increase or maintain quality-of supply and to introduce innovations.⁶¹

The income of natural monopoly in electricity sector depends too much on the amount of kilowatt consumed, that in the case of price-cap regulation become often the only source of possible income. So, natural monopoly is interested to stimulate consumers to waste as much energy as possible, that do not meet the efficiency requirement and is opposite to regulation aims. Alternative here is to combine price-cap regulation with **a revenue-cap regulation**, that sets an upper limit on the income of the company, but not on the price level. A revenue-cap method takes also into account a changes in Consumer Price Index, and “companies have the opportunity to outperform regulatory targets by lowering their costs below the levels set by regulator”.⁶² This method allows to avoid the problem of information asymmetry, because no “detailed examination of tariffs” is required and companies are interested to reveal relating to efficient costs structures information, due to “the prospect of increased profitability from outperforming targets”.⁶³ An optimal result can be usually reached by a combination of price-cap and revenue-cap regulation. Such a combination can be founded e.g. in United Kingdom.⁶⁴

Price-cap, as well as other methods of incentive regulation “can not dramatically enhance the performance of electric utilities”, but in the case of proper use and design “can produce some improvements.”⁶⁵ So, incentive regulation comprise a danger that the companies would try to minimise the costs by decreasing the level of investments e.g. “in the maintenance and further development of their network infrastructure”⁶⁶ in the case of electricity companies. “Therefore, regulation by incentives must go hand in hand with a regulation of the quality of the networks.”⁶⁷ Under incentive regulation also underestimation of competitive power of the market takes place. Competition that also in the sphere of network industries can lead to more the economic efficiency than over-regulation.⁶⁸

So, due to technical and economical peculiarities of natural monopoly its efficient performance can not be provided by competition, and, therefore, government regulation is a need. However, governmental regulation also can not provide appropriate level of efficiency of natural monopoly performance. As it can be concluded from the historical development overview, starting from state

⁶⁰ Alexander/Irwin 1996, p. 1

⁶¹ Brunekreeft 2002, p. 87

⁶² Holt 2007, p. 2

⁶³ Ibid.

⁶⁴ Alexander et al. 1996, p. 18

⁶⁵ Joskow/Schmalensee 1986, p. 46

⁶⁶ Danwitz 2007, p. 449

⁶⁷ Danwitz 2007, p. 449

⁶⁸ Knieps 2000, p. 5

ownership to such regulatory approaches as public-interest-theory, regulation as constraint and agent-theory, no governmental regulation response to the phenomena of natural monopoly proved to be efficient.

Natural monopoly being itself a market failure, under the condition of competition restriction and monopolistic privileges (franchise) turns out to be a “monopoly failure” as well. Moreover, governmental regulation tending to overcome these failures also does not succeed perfectly, proved to become “governmental failure” of excessive political control.⁶⁹

So, the views on the regulation of natural monopoly markets and furthermore on natural monopoly itself began to change. These tendencies are described in the next chapter.

⁶⁹ Bradley 2003, p. 56

Chapter 3. Deregulation of natural monopolies as a way to efficiency increase

Contemporary regulation policy, dominating natural monopoly market regulation all over the world, started with the appearance of disaggregated regulation theory.

3.1 Disaggregated regulation theory

According to it increase of efficiency of natural monopoly performance can be reached by a combination of state regulation and competition. Such combination is possible through a restriction of government regulation to a, so called, **bottleneck regulation**. Traditionally in regulatory economic the regulation was applied to the natural monopoly as the whole. However, in the frames of disaggregated regulation theory in the last decades it was proven that it is more efficient to apply regulation just to monopolistic bottleneck. Bottleneck is formed by the parts of natural monopoly, where the market power constantly observed and existence of competition is not possible,⁷⁰ and the parts of natural monopoly, that are able to function under the competition. The last were determined as a contestable markets, where potential competition can influence the disciplining of natural monopoly behaviour.⁷¹ In order to provide the maximum efficiency, a possibility for potential competition should be introduced. Regulation of natural monopoly bottleneck is based on the following principles:

- **minimal regulation basis** – decrease of state regulation of the natural monopoly industry just to bottleneck services regulation (network service part). Regulation here can use the above described methods of regulation, such as rate-of-return regulation or price-cap regulation.
- **symmetric regulation principle** - provision of symmetric access of competitive firms to the “capacities of monopolistic bottleneck on terms of the non-discriminatory access”.
- Also free entry for new firms and exist conditions (“absence of irreversible cost: The investment necessary for market entry can be fully recovered in the case of exit”, no costs by market exit) have be preserved.⁷²

So, disaggregated regulation demands that “only bottleneck facilities are regulated”⁷³, whereas others are regulated by a competitive pressure. In general, competitive potential has to be used on the deregulated markets as far as symmetric regulation principle is provided. Regulation have to be

⁷⁰ Knieps 2008, p. 95

⁷¹ Markova 2009, p. 70

⁷² Markova 2009, p. 71

⁷³ Knieps 2000, p. 6

limited to the parts of public network industries where market power can be really localised.⁷⁴

Advantages of this regulatory approach are avoidance of “over-regulation”, use of competition power in combination with a detailed regulation that allow to increase efficiency in natural monopoly industry.⁷⁵

“Modern economic theory has shown that monopolies can be disciplined by potential competition in cases where there are no sunk costs (case of contestable monopoly), and scientific reasoning argues that unbundling of activities in a way that isolates uncontested natural monopolies is a way to achieve more competition and hence efficiency in a market economy. Specific regulations are necessary only in the case of an uncontestable monopoly.”⁷⁶

3.2 Deregulation of natural monopoly market

More and more economists (Grossman 2003, p. 35) began to argue that even in spheres, traditionally referring to natural monopolies, there is a possibility to create competition and, therefore, governmental regulation is not necessary any more.

“Some economists in the second half of the XX century began to point out the shortcomings in the theory of natural monopoly and a few questioned the existence, or even the idea, of natural monopoly altogether and particularly its application to electric power.”⁷⁷ Some even pointed that the term “natural monopoly” and economy of scale theory itself do not reflect the reality and that these branches along with all the others can function also without being monopoly.⁷⁸

The arguments that competition provides efficiency growth⁷⁹, whereas excessive regulation, prohibiting new enterprises to enter the market, disturbs economic entities from achievement of economies of scale and operation on optimal economic conditions,⁸⁰ began to be applied to the traditional natural monopoly markets. “The excessive regulation restricts competition, affecting in negative way efficiency.”⁸¹ It was admitted that only through competition static production efficiency, allocation efficiency and dynamic efficiency (providing innovativeness) can be reached.⁸²

Since that time more and more economists began to criticise ineffectiveness of governmental control, regulation and intervention in the economy. Domination of governmental regulation began

⁷⁴ Knieps 2000, p. 6

⁷⁵ Knieps 2006, p.68

⁷⁶ Welfens 1999, p. 28

⁷⁷ Grossman 2003, p. 35

⁷⁸ Grossman 2003, p. 35

⁷⁹ Ilie, et al. 2007, p. 3

⁸⁰ Ilie, et al. 2007, p. 3

⁸¹ Anon (EU-Japan Centre for Industrial Cooperation) 2005

⁸² Welfens 1999, p. 29

to be substituted by more trust to competition forces. Liberalisation began to be seen as a remedy against over-regulation and a way to increase the efficiency of natural monopoly performance.

So, in 1979 privatisation in Britain, initiated by Margaret Thatcher (so called Thatcherism) comprises a set of policies, directed on purchase of state-owned enterprises and competition development.⁸³ Since that time “many countries all over the globe have followed in Britain’s footsteps, initiating major privatisation programs of their own”.⁸⁴

In a theory of economics competition even in the sphere of natural monopolies began to be regarded as an instrument that allows to overcome the problems of inefficiency, direct enterprises to efficient performance and provide proper performance of economy in general. It was the beginning of the liberalisation era.

Liberalisation consists of the following elements:

➤ Demonopolisation

A first step in such restructure is so called demonopolisation, a vertical disintegration of the branches of the monopoly. The effect of high integration is typical for big enterprises that develop in huge corporations and control the whole economy. In the case of natural monopolies, which are based on economies of scale, such integration is almost always the case. “While public utilities have typically been regarded as natural monopolies, changes in technology and markets have meant that these industries are not monolithic natural monopolies but rather consist of many parts, some of which can sustain competition”.⁸⁵ That is why a structural separation of activities is considered to be a first liberalisation measure, creating a base for competition introduction and enhance.⁸⁶

➤ Market opening

Removal of barriers for market entry of new firms in contestable sectors, and introduction of free choice for end-consumers. According to the research of Boston Pacific Company in US since the beginning of competitive restructuring in the electricity industry prices charged decreases by 30% from 1985 to 1999.⁸⁷

➤ Deregulation,

Transfer of regulative functions, where it is possible, from regulation authority to market forces, and minimisation of the regulation to regulation of monopolistic bottleneck. In the case of “pure natural monopoly structure” a separation of regulatory structures from government, making them independent from political pressure is essential. Creation of transparent regulation

⁸³ Parker 2009, p. xxii

⁸⁴ Walker/Vasconcellos 1997

⁸⁵ Mahoobi 2003, p. 73

⁸⁶ Ibid.

⁸⁷ Anon (Boston Pacific Company, Inc.) 2001, p. 2

mechanisms, directed on provision of non-discriminatory access of markets subjects to the “uncontestable” parts of the industry, as well as on effective price regulation.

➤ Privatisation

Substitution of public ownership, where it necessary with private ownership or provision of ownership neutrality.⁸⁸

Due to positive experiences of deregulation in a number of developed countries a growing general tendency to further deregulation of the natural monopoly markets can be observed. Nowadays more and more states promote creation and development of the competition in different natural monopoly industries.

Till now a theory of natural monopoly regulation, development of regulation approaches over the time and finally theoretical base for contemporary deregulation process were presented. However, in order to provide better understanding and evaluation of the influence of liberalisation on efficiency of natural monopolies it is necessary to review the practical examples and liberalisation experiences. Therefore, further work focusses on the liberalisation in electricity industry.

3.3 Liberalisation of electricity industry

For a long time electricity sector was referred to a natural monopoly and was served by one or few regional acting public enterprises.

However electricity industry is not monolithic. It consists of four main activities:

- 1) generation
- 2) transmission (high voltage)
- 3) distribution (low voltage)
- 4) supply to end consumers (retail sales)⁸⁹

In the case of natural monopoly, existed on national markets before liberalisation, all these were often vertically integrated and lied either under the jurisdiction of one monopoly or a number of firms, dominating the market within one region. However, according to bottleneck theory, only in transmission and distribution activities the effects of natural monopoly (such as failing average costs, sunk costs) exist. Therefore, only these belong to monopolistic markets. Generation and retail supply (as trading) do not belong to natural monopoly.⁹⁰ The structure of the electricity industry is presented in the table 2.

⁸⁸ Competitive neutrality is particularly discussed in 3.4.2

⁸⁹ Welfens 1999, p. 30

⁹⁰ Brunekreeft 2002, p. 231

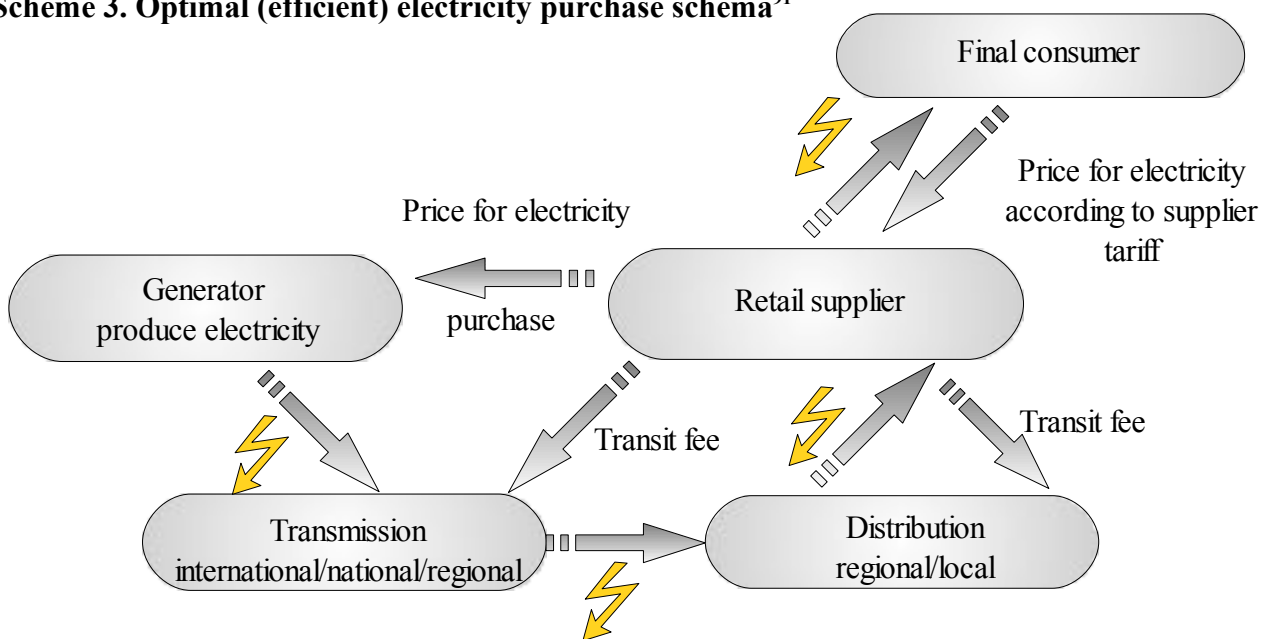
Table 2. Structure of electricity industry (Based on Brunekreeft 2002, p. 231)

Competitive market	Monopoly	
Generation	Transmission	} Monopolistic bottleneck
Retail supply (trading)	Distribution	

For retail supplier there is no need to be transporter of electricity or to produce electricity itself.

If open access to transmission and distribution provided, a supplier can purchase electricity from power generators, transport it by transmission and then distribution system for a fee and sell it to final consumers on negotiated conditions and prices, as it is presented on the schema 3.

Scheme 3. Optimal (efficient) electricity purchase schema⁹¹



Such a system, providing competition between the suppliers for the end users, guarantees high efficiency (price and quality) due to existence of competitive pressure. “The pressure of competition will push incumbent utilities as well as new entrants to look for any source of economic efficiencies in order to secure a competitive advantage and sufficient margins.”⁹² In order to provide efficient functioning of network industries, effective interconnection and transit system between transmission operators and distributors are required.⁹³

An important condition here is also a vertical disintegration. “If the electricity industry is vertically integrated one might consider the industry as a whole as an uncontestable natural monopoly that has to be regulated.”⁹⁴ Disintegration, in opposite, leads to independence of the structures from each

⁹¹ Based on Welfens 1999, p. 30

⁹² Meritet 2000, p. 2

⁹³ Welfens 1999, p. 29

⁹⁴ Welfens 1999, p. 30

other, so that uncompetitive transmission and distribution are separated from generation and supply, where competition can be created. Competition between generators, in its turn, forcing them to minimise their production costs, and suppliers, tending to improve their condition and minimise negotiated prices, provides production efficiency.

“Competitive pressure ... in electricity markets will contribute to higher degrees of technological effectiveness in generation and transmission and will save scarce resources for power generation and the network.”⁹⁵ First liberalisation reform was applied to electricity in 1978 in US with partial opening of electricity generation to new entrants, then in Chile with allowance for large end users to choose their supplier. Further in 1990 England and Wales measures permitting competition between generators was introduced. Since then the reforms of electricity sector become spread between other countries.⁹⁶

An establishment of effective competition in electricity industry consists of the following points:

- competition in generation:
 - removal of the generation entry barriers,
 - “creation of a sustainable critical mass of generators”⁹⁷;
- competition in supply:
 - ownership separation of generation and supply from high voltage transportation as well as from low voltage distribution,
 - non-discriminatory access to the transmission system,
 - full end users choice
 - in ideal case separation of distribution from supply;
- development of effective transparent wholesale market, with good legal framework;
- ownership and competitive neutrality.⁹⁸

3.4 Regulation on the liberalised market

But is it possible to reach sound natural monopoly market without regulation? What are the role of regulation on the liberalised electricity market?

As the development of regulatory economics along with practical experience shows the best solution to reach efficiency is the proper combination of both regulation and competition power. A certain level of regulation allows to get from a more efficient, innovative industry such benefits as

⁹⁵ Welfens 1999, p. 29

⁹⁶ Anon (International Energy Agency) 2001, p. 29

⁹⁷ Fraser 1998, p. 16

⁹⁸ Fraser 1998, p. 16

“lower prices, technological advances and international competitiveness for companies”⁹⁹. Regulation is not less important on the competitive markets, moreover regulation is necessary to provide the fair rules, protect innovations and create antitrust regulation – with other words to play protective role, but not hinder competition and thereby efficiency and economic growth.¹⁰⁰

Especially important role plays regulation at the transitory phase, where factual liberalisation did not lead to competitive pressure of existing firms yet. The regulator has to guarantee robust transit from regulatory system to liberalisation.

From one side, regulation comprise the measures that ensure competition in liberalised natural monopoly markets, and so fulfil a role of competition law. From the other side regulation provides the fundamental public interest.¹⁰¹ The most important here is to prevent the authorities and governmental agencies from effecting the competition process, when there is no need in regulation.¹⁰² “... effective regulation of the new market structure (combined with robust regulatory institutions) is essential to ensure the development of competitive and efficient markets.” “Regulation should contribute to competition, not impair it.”¹⁰³ “The objective should be: as much market as possible, as little regulation as necessary.”¹⁰⁴

In the case of electricity wholesale market, as well supply market for end-users are considered to be competitive and therefore should be free from regulation.¹⁰⁵ However, also such spheres of natural monopoly where competition is possible have initially to be controlled by the government that would guarantee the competition introduction here. The measures here would be rather legislative, giving the market subjects legal frames.

Those parts of natural monopoly, where competition is not possible and market power can be localised (in the case of electricity it is transmission and partially distribution), have to be regulated in any case. In transportation regulation has to “ensure non-discriminatory tariffs and terms of access to grid by all generators, suppliers and customers with choice”, regulate pricing (fair tariff policy) and prevent cross-subsidisation between transportation monopoly and the competitive generation and supply,¹⁰⁶ and so guarantee social oriented performance.

According to Danwitz there are two factors that determine the success of the energy markets regulation: the establishment of the framework in which competition may evolve freely and in which competition will not lead to dangers for the energy supply security.¹⁰⁷

⁹⁹ Ilie et al. 2007, p. 3

¹⁰⁰ Ilie et al. 2007, p. 3

¹⁰¹ Danwitz 2007, p. 424

¹⁰² Knieps 2000, p. 5

¹⁰³ Welfens 1999, p. 29

¹⁰⁴ Ilie et al. 2007, p. 3

¹⁰⁵ Brunekreeft 2002, p. 69

¹⁰⁶ Fraser 1998, p. 24

¹⁰⁷ Danwitz 2007, p. 448

So, the focus of regulation of the liberalised electricity industry lies in:

- provision of non-discriminatory third party access,
- regulation of the network access charges.¹⁰⁸

There are two possibilities here:

1. Ex-ante regulation – regulation of tariffs of network operator by setting limits or norms to be fulfilled;
2. Ex-post regulation – control of the factual implementation of the competition law with no any certain values or limits, to be reached.

Under ex-post regulation decision of prices for network access lies by companies themselves on the base of negotiations with other subjects of the natural monopoly market. An ex-ante approach implies a certain regulation instrument to be used in order to realise the regulation of the prices.¹⁰⁹

From the perspective of disaggregated regulation approach, price cap regulation can be suitable regulation instrument of monopolistic bottleneck.¹¹⁰ Also in regulatory practice price-cap remains to be the preferred instrument.¹¹¹

Price-cap regulation prove the following positive features:

- it gives to enterprise incentives to be efficient (to reduce the costs),
- it regulates excessive profits of natural monopoly (bottleneck),
- it possesses administrative simplicity/ moderate information requirements¹¹².

However, price-cap regulation is not a perfect regulation instrument. Price-based regulation is good for short-term efficiency, but has a number of negative sides:

- it impedes quality,
- it may decelerate investments (no incentives for long-term investments).¹¹³

In the last years price-cap regulation was combined with input-based profit regulation. The disadvantage here is negative influence on incentive mechanism. Such trials destroy the positive effects of price-cap regulation.¹¹⁴

Alternative to price-cap regulation is revenue-cap regulation. This type of regulation was used on liberalised electricity market in Germany. In this case regulator limit the growth of revenue of network company by Consumer Price Index and individual X factor, a “catch up” measuring “the company's cost efficiency relative to other network operators”. This method can be combined with

¹⁰⁸ Brunekreeft 2002, p. 231

¹⁰⁹ Ibid.

¹¹⁰ Knieps 2000, p. 9

¹¹¹ Brunekreeft 2002, p. 87

¹¹² Ibid.

¹¹³ Brunekreeft 2010, p. 12

¹¹⁴ Knieps 2000, p. 10

“reward/penalty system”, allowing to adjust “revenue from exceeding/failing quality of service”.¹¹⁵

The most popular method of regulation is based on the UK regulation system, combining price-cap regulation with yardstick regulation.¹¹⁶ According to it, the allowed price changes of the firms are determined on the base of the companies' costs in the beginning of regulatory period by benchmarking, comparing the costs of the firms in the industry. The negative side of this system is that implied partial base of the allowed price levels on the companies' own costs stimulate firms “to increase theirs costs at the end of regulatory periods” that allows them to avoid high starting cost level leaving them “insufficient scope for outperformance over the following regulatory period”.¹¹⁷

Pure yardstick competition imply an set of an allowed revenue and outperformance on the level of agreed target (average industry costs as a rule), and so the revenues of the companies do not depend on their actual costs. This, however, demands high level of convergence between the companies in the industry and increases the risk for a companies financial viability in the case of uncertain yardstick setting. Moreover, a danger of pure yardstick competition lies also in difficulty of determinance of a degree of convergence enough to provide the wockability of the method.¹¹⁸

The most effective measure of regulation of liberalised natural monopolies' markets assumed to be a mixture of price/revenue-cap and yardstick regulation, allowing to overcome the negatives sides of each other.¹¹⁹

Nevertheless it should be underline that there is no universally correct instrument of regulation, and each of them or their combinations have to be adapt to the national conditions and a structures of the appropriate industry.

3.4.1 Ownership and competitive neutrality

Competitive neutrality means that all the firms on the mixed market have equal competitive position and no competitive advantages based on ownership. “Where state-owned enterprises, private firms and third sector organisations might be competing alongside each other, competition should not be affected by ownership.”¹²⁰

“It is often assumed that privatised companies will necessarily be more efficient and cost-effective than public ones.”¹²¹ This, however, is not the indisputable fact. So, a study of Pollitt (1995) showed

¹¹⁵ Holt 2007, p. 2

¹¹⁶ Under yardstick regulation prices of a utility are based not on its own costs, but on the benchmarking - evaluating the cost function of other comparable utility “operating under similar conditions” (Joskow/Schmalensee 1996, p. 37)

¹¹⁷ Holt 2007, p. 3

¹¹⁸ Holt 2007, p. 3

¹¹⁹ Holt 2007, p. 3

¹²⁰ Anon (Office of Fair Trading) 2010, p. 10

¹²¹ Hall 1997, p. 19

that at least in electricity industry there is no difference between relative efficiency of public and privately-owned enterprises.¹²²

Theoretically competition can take place also between public and private enterprises. However, as it was already mentioned in the first chapter, public enterprises get a lot of support from the government. This, under the condition of competition with private enterprises that do not have support from the government, gives to public enterprises an economic advantage.

“Public ownership in the electricity sector is a major impediment to effective reform over the long run.” Private ownership base guarantees more efficiency from competition introduction, because it “ensures competitive neutrality within the market place with other private sector companies”.¹²³

Under the existence of public ownerships the process of liberalisation (demonopolisation and competition introduction) is possible only under the condition of provided “competitive neutrality with private sector entrants”. In such a system “publicly-owned utilities should therefore pay taxes at the same rate, have equivalent cost of capital and dividend policies and generally be subject to an equivalent regulatory framework as private companies.” In other case public companies would finance their debts and investment needs from the state budget, instead of requiring shareholders or private sector partners to realise equity infusion.¹²⁴

Moreover, often public enterprises find themselves in a competitive disadvantage in comparison with their private competitiveness. The reason for it is a so called “management problem”, when managers obtain no “sound business judgement”, because they are just appointed by the government to fulfil the managing functions without being skilled enough for it.¹²⁵ Or, also because private firms can fast and flexible react on changing conditions, adapting to any market situation and having short-term orientation, whereas state owned enterprises have to coordinate their actions with government. This fact often due to bureaucratic apparatus decrease the speed of taking important for business decisions. Moreover, political interests, often dominating the public owned firms, can undermine business stimuli and decrease economic efficiency of the enterprise. Therefore, as a first preposition of efficient coexistence of private and public firms, a domination of business over political interests, and separation of decision-making process at least in operational areas from the government.

Often within the market with mixed enterprises, following problems can appear:

- social and public service problem

Natural monopolies have often social responsibilities, promoted by the government and dictated by the intention to protect socially weak layers of population. So, electric companies often have

¹²² Hall 1997, p. 19

¹²³ Jacobs 1999, p. 230

¹²⁴ Ibid.

¹²⁵ Ibid.

“service responsibilities that might not be voluntary undertaken by competitive firms operating in a free market”.¹²⁶ These can include discounted rates for certain groups, obligation of universal service, equity of tariffs independent of the region and territory (remote/close to generator territories). Under transition to competitive markets such obligations have to be rejected or a transparent mechanism of additional cost compensations have to be introduced for all market participants.¹²⁷

➤ management problem

If companies “remain publicly owned, the boards of directors must be selected on the basis of business skills relevant to the new competitive market”, that could “ensure their managers have proper incentives to maximise profits, minimise costs and to operate under hard budget constraints just as private sector firms.”¹²⁸

So, competition between public and private owned enterprises on the same market is possible, under the fulfilment by the government a condition not to interfere the economic activity of its enterprise and provision of competitive neutrality other market players and newcomers.

Summarising the third chapter it is necessary to say, that disaggregated approach of natural monopoly regulation, splitting it into competitive and monopolistic parts and introducing liberalisation, gain popularity in the last decades. Promoting competition introduction on contestable parts of traditionally natural monopoly markets and limiting governmental regulation only to monopolistic bottleneck, liberalisation is expected to be a way to the most efficient performance of natural monopoly.

Nevertheless, the strategy of liberalisation and mechanisms of implied restructure of natural monopoly system, as well as practical effects of liberalisation policy remains to be unclear. In order to analyse the effects of liberalisation on the efficiency of natural monopoly industry on practical example, the fourth chapter focuses on the practical experience of the European Union in liberalisation process on the electricity market of member-states. First general liberalisation strategy and a detailed analysis of liberalisation directed initiatives of the European Union in electricity industry regulation is presented. Then a process of its implementation in Germany and the Netherlands is described. Finally a comparison of liberalisation aims, measures and effects on efficiency increase of the both countries and EU in general is realised and final conclusion on the success of reforms held is made.

¹²⁶ Jacobs 1999, p. 235

¹²⁷ Fraser 1998, p. 29

¹²⁸ Jacobs 1999, p. 230

Chapter 4. Practical effects of modern regulation (liberalisation) on efficiency increase in electricity in the European Union

The last decades on the territory of European Union there were a numerous initiatives to liberalise energy industry (market) on national as well as on European level. EU Commission has worked out a number of Directives and legislation acts directed on competition enhance and transformation of “heavily regulated national markets into efficient European markets trough regulatory reforms.”¹²⁹ The aim of this chapter is to describe the process of European liberalisation and characterise its main aims and steps, as well as to analyse on the example of Germany and the Netherlands the effects of practical realisation of reforms on electricity market and regulation policy. The goal of this chapter is to to find out if liberalisation brought the efficiency increase and if other liberalisation aims are reached and what are the short-run effects of such a liberalisation on the electricity market of EU.

4.1 Liberalisation of electricity industry in EU

4.1.1 Historical overview

Energetic issues as a topic of international negotiations und debates were already extreme acute at the starting point of European integration. Under the First Treaty of EU establishment (1957) the European Coal and Steel Community, considering energy issues within EU member-states, was established.¹³⁰ In 1958 creation of the European Atomic Energy Community followed.¹³¹

According to research of Deutsche Bank (2003) within EU energy supply was traditionally defined as service of general interest and thus as a governmental task.¹³² In Roman Reports of 1957 the member-states underlined that state had to be responsible for the enterprises, providing public services, so the competition was restricted. In order to assure the fulfilment of public interests the energy market was the object of a special strong state regulation system.

An important step in common energy policy was a working document of the European Commission "The Internal Energy Market" in 1988, that included the description of competitive market creation for "separate sources of energy" and was part of the establishment of an overall internal market in

¹²⁹ Aune et al. 2001, p. 4

¹³⁰ Danwitz 2007, p. 433

¹³¹ Summaries of EU legislation 2007 (EEC Treaty)

¹³² Vinz 2005, p. 2

1990s.¹³³ In 1990 EU Commission issued a number of legislation acts, directed on creation of common rules on European energy sector, such as Directives on Price transparency (90/377/EEC) and Electricity transit (90/547/EG), comprising “requirements for international trading and transporting of electricity within the EU”¹³⁴

That time new technical findings and economic studies proved that not the whole electric industry, but only transmission and distribution of electricity are natural monopolies. Liberalisation, a deprivation of energy monopolies right on protection from competition started in USA and later reached Europe,¹³⁵ with majority of European scholars admitting that energy markets have to be liberalised and competition have to be introduced¹³⁶. Some European countries, such as Great Britain, Norway, Sweden and Finland, began to liberalise their electricity market by separation of generation and transmission and introduction of competition.¹³⁷

In the 1990s the European Commission launched its liberalisation campaign, consisting of the following steps:

- The Directive on transparency of electricity prices (90/377/EEC)
- The Grid Network Directive (90/547/EEC)
- The Guidelines for the Liberalisation of the Electricity Sector (96/92/EC)
- The Second Electricity Directive (2003/54/EC), which aims to accelerate the creation of a unified European electricity market¹³⁸
- The New electricity Directives (the Third Regulatory Package).

The general aims of European liberalisation legislation are:

- creation of competitive EU-wide single electricity market, „promoting competition and efficiency in the production and delivery of electricity“¹³⁹
"European member states developed distinctly divergent legal and economic frameworks in their respective national energy sectors",¹⁴⁰ that resulted in fragmentation of national markets and restrictions on the free trade within the Community.¹⁴¹ Creation of a single market promised interconnection, increase of internal trade and therefore sustainability.
- decrease of prices and freedom for all EU consumers „the opportunity to choose their supplier by 2007¹⁴²

¹³³ Danwitz 2007, p. 434

¹³⁴ Fraser 1998, p. 12

¹³⁵ Danwitz 2007, p. 423

¹³⁶ Danwitz 2007, p. 426

¹³⁷ Welfens 1999, p. 28

¹³⁸ Bonneville/Rialhe 2005, p. 7

¹³⁹ Belkin 2008, p. 25

¹⁴⁰ Danwitz 2007, p. 425

¹⁴¹ Comission of the European Communities cited Danwitz 2007, p. 426

¹⁴² Belkin 2008, p. 25

Liberalisation increasing capital and labour productivity and thereby boosting output should reduce electricity prices,¹⁴³ and bring "important benefits for consumers by offering them choice and a greater responsiveness to consumer needs".¹⁴⁴

- increase of energy security.¹⁴⁵

Realisation of these aims was complicated by the fact that the views on energy utilities and the structure of energy industry within EU varied drastically from state to state. "...there were also considerable differences among EU members in their political and social attitudes on the role of the state in supplying energy".¹⁴⁶ So, in Great Britain liberal rules-based, regulated internal energy market was promoted, in France and Italy existed tradition of state control, whereas in Germany market regulation was delegated to the companies.¹⁴⁷ Accordingly European energy market was characterised as a combination of market structures starting from full competition (United Kingdom) to regional vertical-integrated monopolies (Germany) and centralised monopoly system in France.¹⁴⁸ Therefore the European initiative to create pan-European liberalised market, based on the rule of competition, was met with different reactions. E.g. France, where "the traditional model of energy supply – characterised by monopoly suppliers – had proven to be successful" and Germany "monopoly utilities, even regulated ones, have generally been very profitable" as well as high level of security of supply was guaranteed,¹⁴⁹ tries to resist and to slow down the process of European liberalisation (in particularly privatisation and demonopolisation).

However, "although some European leaders favour the restriction of competition, the protection of the economy through rigid regulation, these are incompatible with the concept of dynamic, performing, growing economy".¹⁵⁰ So, the Commission has consistently argued that liberalisation increases the efficiency of the energy sector and the competitiveness of the European economy as a whole".¹⁵¹ Liberalisation and the introduction of competition "should lead to further efficiency gains, cost reductions and the potential for lower prices. A completely open European market will allow all consumers to benefit from the cheapest available sources of energy and will drive companies' costs down",¹⁵² that in its turn will guarantee high competitiveness of European enterprises and therefore economic growth.

A creation of the internal EU electricity market with unified system demanded national differences

¹⁴³ Fraser 1998, p. 4

¹⁴⁴ Ilie et al. 2007, p. 6

¹⁴⁵ Belkin 2008, p. 25

¹⁴⁶ Danwitz 2007, p. 432

¹⁴⁷ Grätz 2009, p. 71

¹⁴⁸ Danwitz 2007, p. 432

¹⁴⁹ Ibid.

¹⁵⁰ Ibid.

¹⁵¹ Anon (EurActiv Network) 2008

¹⁵² Ilie et al. 2007, p. 6

and unwillingness to reform to be overcome.

To the potential benefits of the liberalised market European Study of 1996 referred also:

- increase of security of supply through interconnection,
- facilitation of energy trade (with EU and non-EU members),
- improvement of efficiency of electricity industry performance,
- diversify the sources (fuel choices) of electricity generation,
- price reductions (“wholesale price reductions across the EU of 5-11%“ were expected).¹⁵³

4.1.2 The First Energy Directive

The First Electricity Directive was a significant step in creation of common rules for the internal market in electricity (boosting international trade) and become the first legislation act directed on liberalisation (boosting competition creation). "This Directive establishes common rules for generation, transmission and distribution of electricity. It lays down the legislation bases, relating to the organisation and functioning of the electricity sector",¹⁵⁴ that include:

- unbundling of generation and supply from transmission of electricity („separation of monopoly from competitive elements“¹⁵⁵),
- access of the third party to networks,
- the scheme and speed of market opening (freedom of choice of suppliers for consumers).

Admitting the "traditional classification of networks as natural monopolies" and therefore accepting the "missing possibilities of competition in transmission and distribution", the Directive was aimed at separation of the power generation and retail sale activities from the transmission in the vertically integrated companies and creation of regulatory instruments, that would protect the rights of access to existing transport network systems for other enterprises.¹⁵⁶ Transmission operator has to be separated from generation "at least as a separate business unit", whereas "distributors must have a distribution service operator, who may be the same or not, as the transmission operator".¹⁵⁷ Concerning a problem of stranded costs, the Directive allowed transitional regime for recovery, that however had to be approved by the Commission.¹⁵⁸

Three procedures for access to the networks:

- third parties network access - "the most liberal"

Tariffs for access of third party access to the networks are strictly defined by regulation

¹⁵³ Fraser 1998, p. 12

¹⁵⁴ Anon (EU-Japan Centre for Industrial Cooperation) 2000, p. 3

¹⁵⁵ Fraser 1998, p. 15

¹⁵⁶ Danwitz 2007, p. 434

¹⁵⁷ Fraser 1998, p. 11

¹⁵⁸ Fraser 1998, p. 12

policy and "are available to all parties."¹⁵⁹

- negotiated third party access (Germany, Denmark and Greece¹⁶⁰)

Generators and suppliers have to negotiate about the prices and conditions of access with transmission company (utility). As a result of negotiations annual range of transmission and distribution prices have to be published by the system operator.¹⁶¹

- single buyer system

"The single buyer purchases the electricity contracted by an eligible customer from a producer at the price offered by the single buyer to eligible customers minus tariff for network services."¹⁶²

Generating capacity can be increased (added) by the decision of the monopoly utility under regulatory approval or can be left for market forces.¹⁶³

According to the directive, electricity markets must to be opened to competition with the following increasing scheme:

Table 3. Steps of market opening in the European liberalisation process (based on Boneville/Rialhe 2005, p.6)

Measure	Freedom of choice of supplier
Term	
February 1999	A group of largest users at least 26%
2000	28% of the market
2003	35% of the market
2007	100% of the market

According to this schema "only large users would get opportunity to choose suppliers (although Member states can or have gone further (e.g. England and Wales, Sweden, Germany))".¹⁶⁴

In order to simplify the process of adoption of the Directive to the national legislation, complicated by extreme initial differences in liberalisation level the First Directive "contains significant provisions, which may delay or affect the development of open markets"¹⁶⁵ and, thus, leaves much freedom of choice for the national governments.¹⁶⁶ So, to ensure security of supply, quality and prices of suppliers national authorities were free to keep their particular energy market structure and measures of governmental protection against competition for the companies with public services

¹⁵⁹ Fraser 1998, p. 11

¹⁶⁰ Anon (EU-Japan Centre for Industrial Cooperation) 2000, p. 3

¹⁶¹ Fraser 1998, p. 11

¹⁶² Ibid.

¹⁶³ Ibid.

¹⁶⁴ Ibid.

¹⁶⁵ Ibid.

¹⁶⁶ Anon (EU-Japan Centre for Industrial Cooperation) 2000, p. 3

obligations. Thus, national governments were free to regulate the speed of market opening,¹⁶⁷ and, therefore, the level of liberalisation differed from country to country. Besides it, the Directive tried to compromise between the national traditions of energy sector regulation, so it suggested a choice between a few types of regulation procedures.

The First Electricity Directive, pointing on the necessity of liberalisation and providing an energy policy framework, had rather recommendation character.¹⁶⁸ But, inspite of liberal formulation of the First Directive, the process of liberalisation in energy markets was launched. Member states had to follow the regulations of European Commission and by September 2000 most of countries adjusted their energy sectors according to the Directives requirements. So, Sweden, Finland, Germany and United Kingdom, Denmark opened their electricity markets completely, other started the process with a delay due to the peculiarities of their electricity systems (Belgium, Ireland) and have different market opening levels ranging from 30% to 45% (Austria 30%, Italy 35%, Portugal 30%, The Netherlands 32%, Spain 42%).¹⁶⁹

4.1.3 The Second Energy Directive

In order to further the progress European Commission in 2003 adapted The Second Electricity Directive, getting in force in 2004 (2007 for some points). This Directive European Commission “intended to end distortions of competition caused by different standards of market opening among the EU member countries.”¹⁷⁰ “Compared to the First Electricity Directive, the Second Electricity directive advances and tightens regulatory instruments for achieving competition in liberalised energy markets.”¹⁷¹ To the main steps of the Second Directive refer:

- market opening

Since 2004 small-business consumers and since 2007 all consumers in all countries of EU have to get opportunity to choose their supplier for electricity according to their preference.¹⁷²

- legal unbinding of vertical integrated monopolies (disconnection of energy transmission networks from the production and supply side),

- regulation of the prices and conditions of network access “objectively, without discrimination of system users”.¹⁷³

¹⁶⁷ Danwitz 2007, p. 438

¹⁶⁸ Danwitz 2007, p. 444-445

¹⁶⁹ Anon (EU-Japan Centre for Industrial Cooperation) 2000, p. 3

¹⁷⁰ Lecher/Gundel 2001 cited Danwitz 2007, p. 438

¹⁷¹ Danwitz 2007, p. 439

¹⁷² Directive 2003/54 EC, Article 20 (1)

¹⁷³ Danwitz 2007, pp. 439-442

“The Directive offers the basis for a wide range of possibly significant measures to ensure the functioning of competitive markets,”¹⁷⁴ leaving a “broad discretion” in concern of further energy policy measures to member states.¹⁷⁵ So, the Second Electricity Directive, demanding from one side a complete market opening, “still enables the member states to grant specific or exclusive rights to companies which agree to fulfil requests for services of general economic interests”¹⁷⁶ from other side, and, therefore, also did not give a necessary legislative base to the unified European liberalised market for electricity. In a number of EU member-states consumers in the fact can not choose their provider¹⁷⁷, so “the current situation is not satisfactory, despite the significant progress realised. The level of competition between member-states, but also across borders, is not enough to ensure competitive prices. Energy markets are still largely national.”¹⁷⁸ “Despite its efforts, the European liberalisation has not put an end to protectionist state actions, nor has it created widely shared views on free competition in the energy sector.”¹⁷⁹ The level of factual liberalisation still differed from country to country.

Market analyses of the shares of European ten largest electricity companies (EdF, E.ON, RWE, ENEL, Vattenfall, Electrabel, EnBW, Endesa, Iberdrola and British Energy), realised by Greenpeace in 2005 showed that „the liberalisation process has worked in favour of these large established utilities as demonstrated by the wave of takeovers that ensued after the opening of the market.”¹⁸⁰ “Although significant progress had been made, competition was slow to take off, with markets remaining largely national, with relatively little cross-border trade, and highly concentrated”¹⁸¹.

4.1.4 The Third Energy Package

High prices and limited choice for consumers become a reason for European Commission to launch a sector inquiry in 2005 “to identify the barriers preventing more competition in these markets”.¹⁸²

The final report published in 2007 revealed the following shortcomings:

- market concentration on the national markets of the most countries (European Competition Commission)
- lack of market integration between EU member-states,
- an absence of transparent market information → distrust in pricing,

¹⁷⁴ Danwitz 2007, p. 439

¹⁷⁵ Danwitz 2007, pp. 439-442

¹⁷⁶ Danwitz 2007, pp. 444-445

¹⁷⁷ Ilie et al. 2007, p.6

¹⁷⁸ Ibid.

¹⁷⁹ Danwitz 2007, p. 432

¹⁸⁰ Anon (EurActiv) 2009

¹⁸¹ Anon (European Commission Competition) 2010

¹⁸² Goldberg 2010, p. 3

- low level of unbundling between network and supply → negative influence on investment incentives,
- long-term customer contracts → no freedom of customers in supplier choice,
- “current balancing markets and small balancing zones which favour incumbents”.¹⁸³

The network operators “were often suspected of favouring their own affiliates and thereby discriminating against other market participants” (Goldberg 2010, p. 3). Concentration of generation, imports and supply, gives the incumbents control over the wholesale market trade, and therefore create a barrier to new entrance.¹⁸⁴

To overcome the problems revealed by the inquiry Commission in 2007 initiated a third legislative package, that was adopted in 2009.¹⁸⁵ A so called "Third Energy Package" includes Directive 2009/72/EC concerning common rules for the internal market in electricity (the "New Electricity Directive"), Regulation N 713/2009 establishing an Agency for the Cooperation of Energy Regulators (ACER), Regulation N 714 on conditions for access to the network for cross-border exchanges in electricity and alike Directive and Regulation on natural gas market.¹⁸⁶

The main point here have been worked out:

- unbundling/separation of production and supply provisions from transmission networks

Vertical integrated transmission system operators do not invest in the network facilities, so that competitive generators could not benefit it, that decrease the efficiency of the whole system.¹⁸⁷ So, three options of separation of production and transmission have been suggested:

1. full ownership unbundling (generators sells transmission assets) – favoured by EU;
2. independent system operator (management separation, with commercial and investment decisions to be made by an independent company ISO and designed by national governments under Comission's approval);
3. Independent Transmission Operator (insisted by France and Germany)

Former state monopolies retain ownership over their electricity grids, "provided that they are subjected to outside supervision" realised by independent transmission operator.¹⁸⁸

Concerning privatisation representative of the EU Commision underlined that "it is up to each country to decide if the transmission network is privately or state-owned, but they have to prove that they are completely independent from the state".¹⁸⁹

- cross border collaboration and investment

¹⁸³ Goldberg 2010, p. 3

¹⁸⁴ Ibid.

¹⁸⁵ Anon (European Commission Competition) 2010

¹⁸⁶ Goldberg 2010, p. 4

¹⁸⁷ Ibid.

¹⁸⁸ Anon (EurActiv) 2009

¹⁸⁹ Ibid.

- cooperation of network operators - "establishment of an European Network for Transmission System Operators",¹⁹⁰ providing integration of electricity markets, promoting research and innovation activities directed of efficiency and security of supply, coordinating grid operation and coordinating the network investments planing.¹⁹¹
- increase of the power of national regulators/cooperation of the regulators on the European level,
 - Establishment of Agency for the Co-operation of Energy Regulators (ACER), overseeing the cross-border regulation with power of intervence and assistance to national regulators, that would promote harmonisation and strenthening of national regulators, promote their cooperation, establish framework guidelines and monitore the development of energy markets within EU;¹⁹²
 - broadening of the power of network regulatory authorities (NRA) to monitoring of transmission and distribution system operators, security and transparency, level of market opening and competition, guaranteeing consumer protection, reviewing transmission investments plans, reporting of their consistence with EU development plan.¹⁹³
- more transparency on network operation and supply – set of data record keeping obligations,
- facilitation of cross-border trade in energy.¹⁹⁴

So, Third Regulatory Package expands the competence of EU Commission, initiate a European regulator with much monitoring functions,¹⁹⁵ as well as promote the establishment of a truly competitive energy market within EU. The new electricity regulation will come into force in March 2011.¹⁹⁶

4.1.5 Summary of European liberalisation legislation

So, purpose of European legislation is a creation of efficient internal European energy market, that implies the existance of general principles of energy policy, providing high quality and low prices of electricity. Such a market, however does not suppose overall identical energy systems in all member states. The Directives give to member-states general guidelines and legislation foundation

¹⁹⁰ Ibid.

¹⁹¹ Goldberg 2010, pp. 7-8

¹⁹² Goldberg 2010, p. 6

¹⁹³ Goldberg 2010, p. 5

¹⁹⁴ European Commission Energy 2010

¹⁹⁵ Goldberg 2010, p. 9

¹⁹⁶ European Commission Energy 2010

that would create a framework "in which competition may evolve freely",¹⁹⁷ but leave freedom of a choice of particular regulation instruments and mechanisms. European Commission in its Directives, aimed on liberalisation of energy markets, has to overcome and to coherently such the differences using a step-by-step hesitant approach with a numerous yields and compromises.¹⁹⁸ But even such a mild approach within the Community law gives only certain guidelines for regulation of energy markets to member states, the level of its implementation into national law is still not enough to reach the unified internal energy market.¹⁹⁹ The realisation of energy sector liberalisation and of general energy politics differ from country to country. The aim of complete energy market liberalisation and internal European energy market is not reached yet.

Even in spite of not full implementation of European liberalisation directed legislative acts in a number of countries and the problems connected with low cooperation, liberalisation and competition have been introduced on the electricity markets of EU member-states and the change of electricity structures as a result of liberalisation process in European countries can be observed.

Still, in order to make final conclusions the practical results of factual liberalisation process on the electricity markets of the member-states are needed. The question now is what the practical effects of implementation of European liberalisation legislation on efficiency of natural monopoly performance on the electricity markets of the member states are.

In the following part of the chapter a comparison and analysis of these within the countries with historically different energy regulation policy and, therefore, different modern liberalisation experiences and level of energy market liberalisation are presented. Energy systems of Germany and the Netherlands with traditionally not alike energy sector policy were chosen as the examples.

4.2 Regulation of electricity market in Germany

"In contrast to a multitude of other industrial countries in Germany there was never a broad government monopoly in the electricity sector – compared with the former "Central Electricity Generating Board" in Great Britain or the French state-owned enterprise "Electricité de France". Instead the electricity economy in Germany is shaped traditionally by a coexistence of public, private and mixed-economy enterprises."²⁰⁰ "Even if the guarantee of a secure supply of energy was already considered a task of public interest regulation in the first phase of electrification, a natural electric monopoly was never established in Germany."²⁰¹

¹⁹⁷ Danwitz 2007, p. 448

¹⁹⁸ Danwitz 2007, p. 426

¹⁹⁹ Danwitz 2007, p. 445

²⁰⁰ Brandt 2006, p.9

²⁰¹ Löwer 1989 and Pielow 2001 cited Danwitz 2007, p.426

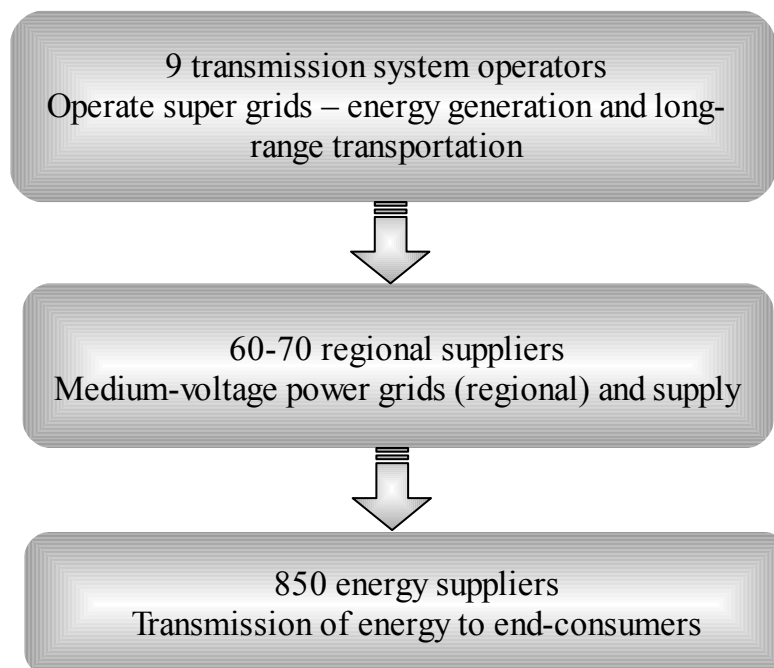
4.2.1 Initial electricity market structure

Before the liberalisation German electricity industry was organised as a combination of state, private and mixed enterprises. There were numerous power suppliers, "some privately-owned, but most either public or mixed enterprises".²⁰²

The structure of energy industry in Germany before liberalisation was based on the German Law on the Energy Industry (Energiewirtschaftsgesetz) enacted in 1935. "It took account of historically evolved mixed structure between private and public suppliers", underlining the "specific duties [of all suppliers] designed to safeguard the public interest",²⁰³ limiting "the rates that could be assessed end users to a level no higher than reasonably needed by the supplier to perform".²⁰⁴ Government regulated investments, market access, tariffs and terms of business through federal authorities.²⁰⁵

Based on these legal foundations a following three-tier structure was developed within the energy market of Germany,²⁰⁶ that inspite of liberalisation measures applied still exists almost unchanged.²⁰⁷

Scheme 4. A three-tier structure of German energy market (based on Danwitz 2007, p. 427)



Over 60 regional suppliers realised transmission to local suppliers and end-consumers, partially local power generation, as well as regional distribution of medium-voltage power grids. Further 850

²⁰² Danwitz 2007, p. 426

²⁰³ Danwitz 2007, p. 427

²⁰⁴ Schneider cited Danwitz 2007, p. 427

²⁰⁵ Schiffer 2005 cited Danwitz 2007, p. 427

²⁰⁶ Gröner 1975 cited Danwitz 2007, p. 427

²⁰⁷ Schiffer 2005 cited Danwitz 2007, p. 427

energy suppliers were engaged in the transmission of energy to end-consumers. The first level comprises the transmission system operators, that "operate super grids" and "the largest part of facilities for energy generation" mostly within certain defined areas of supply and distribution.²⁰⁸ Eight of them are united into a coordinating association Deutsche Verbundgesellschaft.²⁰⁹ The nine transmission operators, being vertical integrated, control the generation, transmission and partially distribution and supply in the particular by them dominated region.

4.2.2. Implementation of EU Directives

In Germany the First Electricity Directive was implemented in national energy legislation in 1998.

The main points here, considering electricity, were:

1. Free choice of provider (supplier) for industrial and private households²¹⁰

Immediate introduction of freedom of choice for all customers ("just formally, not factually"²¹¹).

2. Removal of regional monopolies (creation of the competition on the market)

German energy law demanded management and accounts unbinding of vertical integrated monopolies. Change of ownership or legal unbinding is not required.²¹²

3. Obligation of energy supply enterprises to provide for a reward a net access to other supply enterprises

"Germany was the only member state of the European Union to opt for the introduction of "negotiated" access to network systems under the First Electricity Directive. According the system of negotiated access "applicants had a right of access to networks" and conditions and tariffs of the use of network were defined by the agreement reached but not given by a regulatory authority. In practice such an agreement was taken on the branch level between representatives of transmission and distribution parties that laid down binding for all market subjects price of transmission."²¹³ "Network access prices were subject to ex-post control by the Federal Cartel Office according to competition law."²¹⁴ So, "the regulation of the electricity net was given over to the network energy supply companies".²¹⁵

Regulated was realised by a system of tree levels of regulatory authorities:

- Ministry of Economy as general authority;

²⁰⁸ Danwitz 2007, p. 427

²⁰⁹ Anon (EU-Japan Centre for Industrial Cooperation) 2000, p. 20

²¹⁰ Hollos 2003 cited Vinz 2005, p. 4

²¹¹ Brandt 2006, p. 6

²¹² Anon (EU-Japan Centre for Industrial Cooperation) 2000, p. 21

²¹³ Danwitz 2007, p. 440

²¹⁴ Holt 2007, p. 1

²¹⁵ Brandt 2006, p. 7

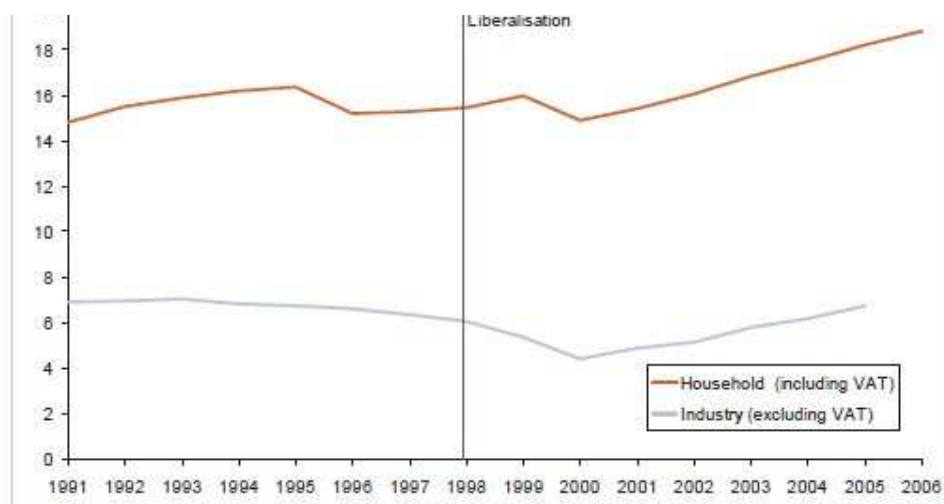
- Cartel authorities with response for network access and competition;
- Local authorities – authorisation of new generation capacities.²¹⁶

The main complication of the process of liberalisation in Germany is caused by traditionally federal character of energy suppliers supervision with an exception of the major companies active in several federal states.²¹⁷ The legislation accepted on the European level and transferred into German Law on energy industry, due to absence of common legislative structure, could have different interpretation on the federal level, that lead to "competitive distortions".²¹⁸

Results of the first liberalisation steps in Germany:

- Customers switching rates initial were low, development of competition was slow, that was explained by a lack of effective network regulation.²¹⁹
- Retail prices after the introduction of competition fell by 1,8% for households and 13,7% for industrial customers per annum. However, since 2001 tariffs rise and belong to one of the highest in Europe.²²⁰

Graph 5. Developments in German electricity prices (€ cent/KWh)²²¹



- enorm merger process

The massive merger process, started in 1997, continued in the early phase of liberalisation at national and European level, that were a sign of an "influence of large German network energy supply companies within German legislation in accordance with their own expansive market strategies".²²² So, "nine inter-regional electricity suppliers" merged into four vertical

²¹⁶ Anon (EU-Japan Centre for Industrial Cooperation) 2000, p. 21

²¹⁷ Danwitz 2007, p.445

²¹⁸ Danwitz 2007, p. 445

²¹⁹ Holt 2007, p. 1

²²⁰ Holt 2007, pp. 1-2

²²¹ Bundesministerium für Wirtschaft und Technologie (2007) cited in Holt 2007, p. 2

²²² Brandt 2006, p. 6

integrated monopolies: EnBW Energie Baden-Württemberg Ag, E.ON AG, RWE AG and Vattenfall Europe.²²³

In 2005 the new German Energy Law (Energiewirtschaftsgesetz 2005) implemented the guideline of the Second Electricity Directive of European Commission. The most important changes were:

- the abolition of "agreements of branches" (negotiated third party access to the electricity networks proved to be inefficient). Instead the German government installed a regulator (Bundesnetzagentur - BNetzA) and introduced an electricity network tariff regulation.²²⁴ As a base for determination of prices and conditions of third parties access to network and introduction of two administrative regulation mechanisms of the network tariff regulation instead of it.

1. Cost-based regulation

Calculation of the tariffs from that time on is based on "the costs of the efficient provision of services" or the costs "which occur in a well-organised and efficiently operating system". In such a system the regulatory company receives "adequate and risk-appropriate return on the invested capital stock, that makes investment in networks of energy supply attractive."²²⁵ Such a complicated regulatory concept that Germany chose leads to long regulatory procedures for the transport system operators,²²⁶ and results in "severe cuts in revenues".²²⁷

2. incentive-based or performance-based regulation (to be implemented by January 2008)

An alternative regulation, that covers all networks distinguishing several types of networks, sets "an upper limit for tariffs of network access or the resulting revenue for a fixed period of time".²²⁸ Under this regulation calculation of tariffs occurs only "once at the beginning of the fixed regulatory period", and so companies can benefit increasing the profits by lowering the production costs.

Disadvantage of this type of regulation is that firms are demotivated to invest into networks development and modernisation. Therefore, the incentive regulation must be accompanied by regulation of the quality of the networks, that would hinder the tendency of companies to minimise and neglect the necessary maintenance and development investments into their network infrastructure.²²⁹

- Considering "the obligation to give access to the network system to supply energy to every

²²³ Holt 2007, p. 1

²²⁴ Brunekreeft 2007, p. 1

²²⁵ Danwitz 2007, p. 447

²²⁶ Danwitz 2007, p. 445

²²⁷ Brunekreeft 2007, p. 1

²²⁸ Danwitz 2007, p. 447

²²⁹ Danwitz 2007, p. 448

household customer" the German energy law imposed on energy supplies, the new legislation minimises the obligation to duty of basic supply within the specified areas.²³⁰

The four main companies in 2007 accounted for 80% of power generation capacity in Germany and indirect owned "transmission grids in the four German control zones and owned large share in high fragmented "50 regional utilities and 840 local-municipality-owned utilities."²³¹

In 2009 method of ex-ante regulation revenue-cap incentive regulation, was introduced by BNetzA. Revenue-cap, setting the maximum change in revenue network companies earn with consideration of Consumer Price Index and a target level of costs lowering, was planned. in combination with yardstick regulation for the first eight-year period. In the first eight years phase the broad efficiency variance, existing between the companies, planned to be reduced through combination of the method with yardstick regulation. Further a transit to pure yardstick competition, where average for the industry allowed revenue will be set and "operators with a range of ownership structures will be threatened as comparable and therefore benchmarked against one other" is expected. This can be problematic due to "different incentives and possibly different objectives" between public and private enterprises.²³² According to Holt (2007), such a regulation may lead to the changes in market structure, "under increasing pressure from regulation and competition" smaller companies will consolidate with each other. So, it was expected that the introduced regulation of networks will improve the efficiency of conditions of "equal access at efficient prices" and will fit the German market structure, characterised by a large number of operators. An important feature of such regulatory system is an attempt to make regulation mechanisms as mechanistic as possible and so to minimise the regulatory intervention. Furthermore, an implied delegation of regulation duties to authorities of federal state allows to spread the regulatory burden.²³³

Concerning ownership unbundling, a German government in 2009 favoured a creation of a German Netz AG, that would unite four German transmission system operators.²³⁴ However, E.ON under the pressure of the launched by European Commission proceedings against it, sold its transmission grid to the Dutch operator TenneT in 2009.²³⁵ Also Vattenfall began to plan a sell of its transmission part, that finally was sold to Belgian distribution utility Elia. RWE and EnBW underlined that they will not sell their transmission grids.²³⁶ So, a network system in Germany is presented not by a united German network grid but by four large players as it is presented on the map 1.

²³⁰ Danwitz 2007, p. 446

²³¹ Holt 2007, p. 1

²³² Holt 2007, pp. 2-3

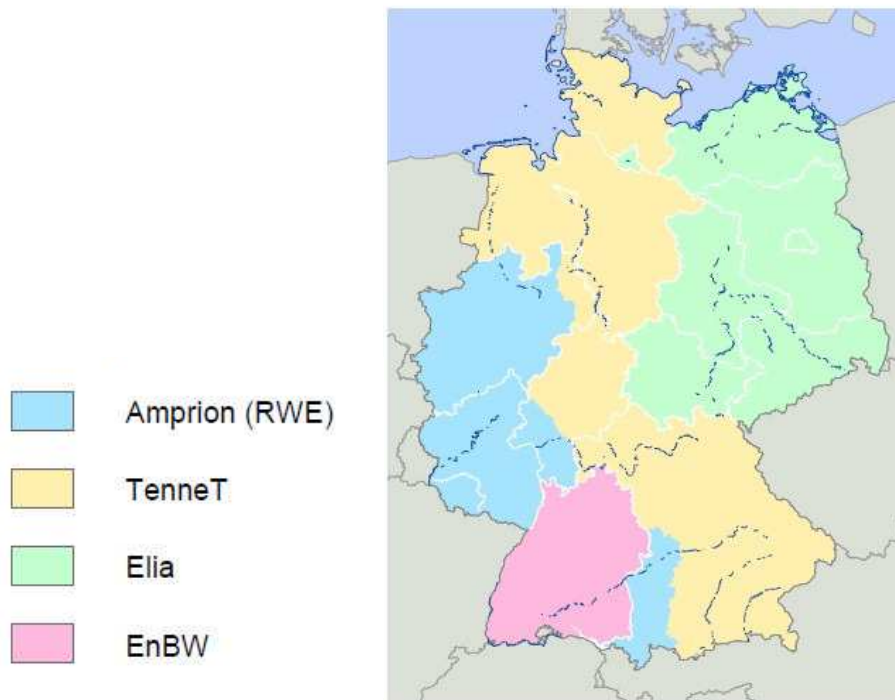
²³³ Holt 2007, p. 4

²³⁴ Linsmeier et al. 2010, p. 51

²³⁵ Linsmeier et al. 2010, p. 51

²³⁶ Anon (Spiegel Online) 2009

Map 1. German electricity grid system 2010 (Global Energy Network Institute 2010)



This, as well as the fact that two of network operators remain to be vertically integrated, increase the importance of the broadening of German regulator functions in the face of Federal Network Agency, expected from implementation of the Third Energy Package in 2011. This broadening, however, assumed to be the only change the Third Energy Package will bring to electricity system in Germany.²³⁷

4.3 Regulation of electricity market in the Netherlands

In opposite to the majority of the European countries the progress of Dutch electricity sector liberalisation is high.²³⁸ Both European Electricity Directives were implemented here in the national law within the terms given by European Commission.²³⁹

4.3.1 Initial electricity market structure

The Netherlands as well as Germany has not long tradition of liberalised electricity market. So before 1989 the electricity market was characterised by the existence of the vertically integrated local monopolies.²⁴⁰

²³⁷ Linsmeier et al. 2010, p. 51

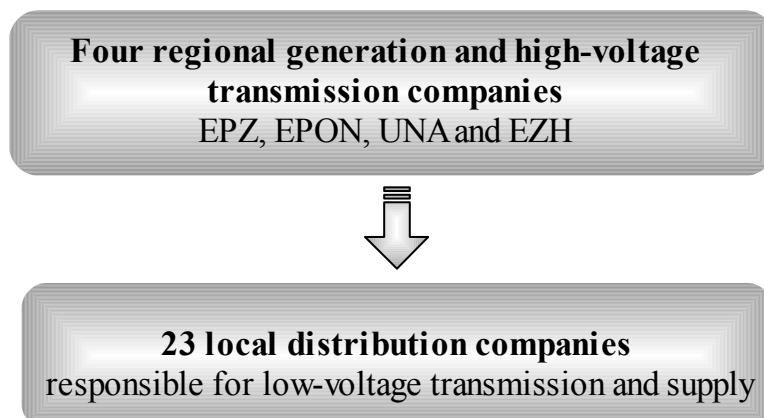
²³⁸ Van Damme 2005, p. 2

²³⁹ Van Damme 2005, p. 3

²⁴⁰ Van Damme 2005, p. 3

At that time the Dutch electricity market had the following market structure:

Scheme 5. Dutch electricity market structure²⁴¹



All distribution companies, as well as “four “production” companies responsible for central generation and high voltage transmission” were monopolies ultimately owned by municipal and provincial governments.²⁴² So, EPON was a joint partnership of distributors NUON and EDON, regional distribution companies DELTA, PNEM and MEGA from the South of Netherlands had their own generating company EPZ. Other two generating companies, UNA and EZH, were in the direct ownership of provinces and municipalities.²⁴³ Such a wide spread tradition of public ownership of electricity supply were stimulated on the governmental level e.g. with “the exemption of publicly-owned utilities from paying corporate taxes”.²⁴⁴

Generators were organised into the Association of Electricity Producing Companies allowing them to cooperate with each other. Under informal OVS agreement of cooperation existing since 1949 the generators offered their energy to SEP, that played a role of mediator between the generating and distributing companies.²⁴⁵

Distribution low voltage transportation and supply are bundled activities (within one company), there is no suppliers independent from transportation.²⁴⁶

4.3.2 Implementation of EU Directives

By issuing of the the Energy Act in 1989 the Dutch government undertakes the first step on the way to liberalisation. The main steps, directed on the efficiency increase, were:

- split of generation and transmissions from the downstream activities of distribution and

²⁴¹ Based on van Damme 2005, p. 3 and Fraser 1998, p. 6

²⁴² Fraser 1998, p. 5

²⁴³ Van Damme 2005, p. 3

²⁴⁴ Fraser 1998, p. 5

²⁴⁵ Van Damme 2005, p. 3

²⁴⁶ Fraser 1998, p. 5

supply” (Fraser 1998, p. 5),

➤ competition in generation - "decentralised production"

Industrial firms and joint ventures (involving distribution companies) were allowed to generate electricity themselves – so called "decentralised combined heat and power (CHP) generation". Distributors were forced to buy all locally generated electricity paying a "feed-in tariff" equal to the avoided costs (system price at peak).²⁴⁷

Distributors and large consumers from that time on could buy electricity from any generation company (not only from local one). However, due to uniform prices of generators, based on pooling of costs and regulation of prices this mechanism did not lead to competition.²⁴⁸

➤ coordinated production (central planning of generating capacity by the means of generators cooperation within the SEP (Central Electricity Board), created on the base of Association of Electricity Producing Companies with the idea that four producing companies will unite into “national champion” in order to reduce costs through economies of scale. Entry to central power generation was restricted by licensing system, blocking the market for newcomers.²⁴⁹

➤ establishment of “a limited amount of competition in supply”.²⁵⁰

The functions of the Central Electricity Board (SEP) were enlarged to the following:

- control of central generation,
- operation of the high voltage system, investments in its expansion,
- operation of the large-scale facilities - dispatch of energy;
- sell of electricity to suppliers “at average cost price”,
- import of electricity (mostly from France and Germany),
- mediation between the generating and distributing companies (sales of the electricity to the distributors at prices regulated by the government).²⁵¹

Regulation policy to be realised by the Minister of Economic Affairs:

- approvment of generating capacity plan,
- regulation of the following tariffs:
 - uniform transport tariffs charges by the SEP from generators,
 - the maximum energy tariffs charged by the generators from the distribution companies,
 - maximum tariffs that the distributors could charge consumers.²⁵²

²⁴⁷ Fraser 1998, p. 5

²⁴⁸ Van Damme 2005, p. 3

²⁴⁹ Fraser 1998, p. 5

²⁵⁰ Van Damme 2005, p. 3

²⁵¹ Fraser 1998, p. 5-6

²⁵² Van Damme 2005, p. 3

The realisation of the 1989 Electricity Act revealed a number of problems, where it was unsustainable and incomplete:

1. Finally such a system of centralised and decentralised generation lead to overinvestment in decentralised production, overcapacity of electricity system and therefore inefficiency,²⁵³
2. “...it had failed to create effective competition, because the functions of generation and supply (both potentially competitive) were still tied in with transportation (a natural monopoly)”;²⁵⁴
3. no cost efficiency incentives: due to cost pooling system price difference were reduced to minimum.²⁵⁵

So, in general both competition and efficiency goals of the Energy Act were not reached, and such a way organised structure of the electricity market was incompatible with the European requirements, and needed to be improved in order to reach efficiency. Therefore, in 1998 the next "Electricity Law" implementing the first Electricity Directive 96/92 and directed on the gradual liberalisation by the introduction freedom of consumer choice and improvement of network parts regulation was issued.²⁵⁶

In several aspects the E-Act 1998 went further that it was required by the Electricity Directive 96/92:

➤ speed of liberalisation

A speed of the gradual liberalisation in retail sector laid down as a base in this Act were even more fast than it was required by the European Commission.²⁵⁷

Table 4. Dutch gradual liberalisation scheme (introduction of the freedom of supplier)²⁵⁸

Market share/demand	Segment	Date of free supplier choose
33%	650 largest users	1998
29%	54 000 middle segment	January 2002
38%	7 million small business and households	July 2004 (postponed to 2007)

Moreover, while prices for captive customers were regulated by the Minister, prices for free customers were not regulated anymore.²⁵⁹

➤ Unbinding

²⁵³ Van Damme 2005, p. 4

²⁵⁴ Fraser 1998, p. 10

²⁵⁵ Fraser 1998, p. 10

²⁵⁶ Van Damme 2005, p. 5

²⁵⁷ Van Damme 2005, p. 5

²⁵⁸ Based on Fraser 1998, p. 21

²⁵⁹ Fraser 1998, p. 14

Whereas the first Electricity Directive demanded accounting separation, the E-Act imposed legal unbinding of networks. So according to the requirements of the Dutch Law network owners had "to set up special, independent, organisation units responsible for network management", that structure had to be approved by the minister. Although no ownership unbinding was required, such a scheme should guarantee the true independence of the networks. Furthermore, the E-Act "stressed the importance of horizontal integration of the transmission networks to bring these under common management", whereas privatisation was prohibited till competition and regulatory supervision system be developed.²⁶⁰

- regulated and non-discriminatory third party access to the networks

Recommended from EU in Netherland regulated third party access to the networks was insistently required.²⁶¹ "The 1998 Act forced the economic owners of the networks to set up independent network companies, with the appointment to be approved by the Minister."²⁶² At the same time the SEP (which owned the national grid) established a system operator and manager of the national transport grid, TenneT.²⁶³

TenneT acquire the following functions (see TenneT 2001):

- delegated from SEP functions of the investment into network,
- purchase of electricity on the international spot market (APX – UK),
- import of electricity,
- regulation of the liquidity on the electricity wholesale market (allocation of the interconnector capacity at the borders with Belgium and Germany, through TSO-auction subsidiary),²⁶⁴
- operation of balancing market for regulation power, that is used for short-term adjustments.²⁶⁵

Concerning generation licenses for large-scale production, import restrictions, as well as feed-in tariffs for decentrally-produced electricity and "pooling" of the price of large-scale producers were liquidated. So, the wholesale market of generated electricity is completely unregulated in the Netherlands.²⁶⁶ By an abolition of the SEP cooperative agreement of the market sharing competition between generators was introduced.

Regulation to be fulfilled by three entities:

- Dutch competition authority (NM) ex-supervisory department of the Ministry of Economic

²⁶⁰ Van Damme 2005, p. 5

²⁶¹ Van Damme 2005, p. 5

²⁶² Van Damme 2005, p. 10

²⁶³ Van Damme 2005, p. 11

²⁶⁴ Van Damme 2005, p. 11

²⁶⁵ Van Damme 2005, p. 2

²⁶⁶ Van Damme 2005, p. 10

Affairs, with controlling function of vertical and horizontal mergers agreements,

- independent regulator for the energy sector (DTE) as a chamber of NM,
- Minister of Economic Affairs.²⁶⁷

To the regulatory functions of DT belonged:

- supervision of the transmission and distribution,
- regulation of prices and terms of access to the grid (price-cap regulation),
- regulation of the prices of the captive end users,
- regulation of TenneT.²⁶⁸

The tariffs for transmission and distribution of network companies in the Netherlands are regulated by price-cap regulation.²⁶⁹ In 1996 protocol agreement, freezing the market (fixing the prices and quantities) till the end of 2000, creating a transitional period for the competition introduction, was accepted.²⁷⁰ The price-cap regulation instrument was launched in 2000, setting the prices on the "1996 = 2000 principle": prices in the year 2000 were not higher than in 1996.²⁷¹ These are allowed to be changed according to CPI-X formula, reflecting the inflation rate (CPI - consumer price index), as an increase factor, and X - decrease factor, defined for each company and reflected "the level of economic efficiency in that company".²⁷² So, providing price reductions on X factor for customers, the government also stimulates a company "to reduce its costs by more than the X factor", that let company also gain from efficiency improvements. Factor X is defined by the DT based on benchmarking (operating expenditure and total cost) and economic efficiency analysis, that allow the regulators to examine the production functions of firms.²⁷³ The danger here is that firms, expenditure of which are benchmarked against each other, will be demotivated to invest "in new technologies or managerial systems that are uncertain", that will negatively influence the innovations.²⁷⁴

Taking into consideration the high grade of public ownership in Dutch electricity sector the issue of privatisation took especial consideration in E-Act 1998. Thus, privatisation (after the merger) of generating companies, national grid TenneT, as well as of the distribution companies, was expected. Privatisation of the generators was favoured by state, promising to pay some costs of production, under the condition of not influence of national grid TenneT.²⁷⁵ In 1999 three generators were privatised, UNA by American Reliant, EZH by E.ON and EPON (changing its name into Essent) by

²⁶⁷ Fraser 1998, p. 24

²⁶⁸ Fraser 1998, p. 24

²⁶⁹ Anon (ICF Consulting) 2000, p. 1

²⁷⁰ Van Damme 2005, p. 9

²⁷¹ Van Damme 2005, p. 6

²⁷² Anon (ICF Consulting) 2000, p. 1

²⁷³ Ibid.

²⁷⁴ Wals et al. 2003, p. 28

²⁷⁵ Van Damme 2005, p. 6

Belgian Electrabel, whereas the last two were vertically integrated companies of neighbouring countries.²⁷⁶

TenneT, majority of shares of which belonged to state, in 2001 was completely nationalised for the aims of true independency of the essential grids.²⁷⁷ Since that time TenneT tried to acquire the rest of the networks that belong to the different distributing companies, in order to increase the efficiency of the national grid.

Privatisation of distributors, owned by government by lower levels, was allowed under Ministerial approval. In the period from 1999 to 2002 a part of small distributors was privatised by German companies. In 2002 the privatisation was blocked till the full market liberalisation, due to the high risks that privatised companies disturb fair competition. As a alternative to privatisation the general economic ownership unbundling of the network from generation and supply was excepted.²⁷⁸

This way Dutch government by issuing the E-Act 1998 implemented the requirements not only of the First Directive 96/92/EC, but also of the Second European Directive 2003/54/EC.²⁷⁹ However the realisation of such its measures as freedom of choice for all customers were delayed.²⁸⁰ So, after the issuing of the Second European Directive the Dutch government just had to revise the E-Act, implementing additional safeguard, ensuring the sufficiently independence of the network manager from the rest of the company in the case of integrated companies as well as strengthening the investigation powers of the regulator and approval of behavioral regulatory measures.²⁸¹

In 2004 the Dutch government issued the Implementation & Intervention Act, requiring distributors to vest beneficial networks ownerships (their shares in networks) in network operator, carrying out network activities, going therefore more far than European Directive 2003 prescribe.²⁸² Minister of Economic Affairs however, having considered this step to be insufficient introduced also “Unbundling Act”, getting into force in 2007. According to it the following changes were introduced:

→ complete ownership unbundling was introduced

Starting from January 2011 all “companies carrying out network activities in the Netherlands are not allowed to be a part of the same group as companies carrying out production, trading or supply activities”, and are also prohibited to hold any shares of these companies.²⁸³

²⁷⁶ Van Damme 2005, p. 6-7

²⁷⁷ Van Damme 2005, p. 11

²⁷⁸ Van Damme 2005, p. 2

²⁷⁹ Van Damme 2005, p. 10

²⁸⁰ Fraser 1998, p. 21

²⁸¹ Van Damme 2005, p. 13

²⁸² Braekt et al. 2010 p. 91

²⁸³ Ibid.

→ ownership of the networks was referred to be a public responsibility

The Act, prohibiting to publicly owned energy companies to give up (sell or transfer) shares in the network activities, but allowing to sell shares in production, trading and supply companies, was directed on prevention of networks privatisation. So, RWE bought all the production, trading and supply shares of Essent, whereas Vateenfall did the same with the shares of Nuon. (Remark: Nuon, Essent, Eneco and Delta belonging to the four major Dutch energy companies.)²⁸⁴

→ beneficial ownership of the distribution networks

1 July 2008 was announced to be the end term for realisation of the Implementation & Intervention Act, including beneficial ownerships of distributes to be transferred to network operator, where as since then only the last were allowed to perform “certain network activities”.²⁸⁵

→ new definition of national high voltage network

According to the Act TenneT as a national network operator is also responsible for networks operated at a level from 110kV and above, opposing to previous 220kV and above. Such an Act as it was expected “will improve the security of supply on national level”.²⁸⁶

The measures described brought the Netherlands again on more far-reaching level than it was prescribed by the New European Electricity Directive. In 2009 a new policy rule for the granting of exemptions expand an obligation of TPA also to new exemptions. So, a number of points required by the Third Energy Package are already implemented in Dutch legislation, the others planned to be implemented in the nearest time.²⁸⁷

4.4. Comparison of electricity liberalisation effects in the EU, Germany and the Netherlands

In the following table summary of the described liberalisation process in European Union and its consequences are presented.

Table 5. Comparison of liberalisation process in EU, Germany and the Netherlands

Factors	EU	Germany	Netherlands
Initial structure	-	Vertical integrated regional monopolies + small operators	Generation monopolies + mass regional operators
Initial ownership structure	numerous	mixed ownership	public ownership

²⁸⁴ Ibid.

²⁸⁵ Braekt et al. 2010, p. 92

²⁸⁶ Ibid.

²⁸⁷ Braekt et al. 2010, p. 92

Tradition of regulation	numerous	self-regulation (agreement of branches)	no
Start of liberalisation process	1988	1998	1989
Liberalisation			
Factors	EU requirements	Germany	Netherlands
Attitude to liberalisation		resistant due protectionism	positive
The First Electricity Directive		implemented in time	implemented before end-term
The Second Electricity Directive		implemented with delay	implemented before end-time
The Third Energy Package	to be implemented in 2011	start in 2011	partially implemented
Market opening strategy	gradual	immediate (1998)	gradual
Nowadays stand of liberalisation progress			
Actual legislation	The Third energy package 2006	Energiewirtschaftsg esetz 2005	Intervention and Implementation Act + Unbundling Act
Regulator	Independent from the government and electricity operators	Ministry of Economics/Cartel Office ²⁸⁸ and Bundesnetzwerk- agentur (BNetzA)	Independent network regulator (DTE), Ministry of Economic Affairs, Competition Authority (NM) ²⁸⁹
Transmission			
Network unbundling	ownership unbundling	ownership/ management unbundling	full ownership unbundling
Networks structure	consolidation	4 parts	consolidated
Transmission system operator	European Network for Transmission System Operators	several (4 regional)	one (TenneT)
Ownership	private property	mixed	public ownership
Non-discriminatory access	yes	yes	yes
Regulation of network operators	free choice	revenue- cap/yardstick	price-cap
Generation			
Creation of a sustainable critical mass of generators	promoted	4 generation/supply companies (95.6% by 4 companies) ²⁹⁰	4 production companies + decentralised CHPs

²⁸⁸ Anon (EU-Japan Centre for Industrial Cooperation) 2000, p. 8

²⁸⁹ Anon (EU-Japan Centre for Industrial Cooperation) 2000, p. 8

²⁹⁰ Brandt 2006, p. 5

Association	no	no	Association of Electricity Production companies (SEP)
Ownership	private property recommended	mixed	private ownership
Character of generation	-	decentralised	centralised and decentralised
Competition in generation (removal of the generation entry barriers)	recommended	low (domination of 4 incumbents)	partial (potential) no entry barriers
Ownership separation from high voltage transportation and supply	legal unbinding (as a separate business unit)	account separation	legal unbinding
Distribution			
Structure	no requirements	50 reg. supply firms, 700 mun.utilities ²⁹¹	-
Separation of distribution from generation and supply	full	partial ²⁹²	full
Regulation	free choice	-	price-cap
Supply			
Structure	crucial mass of suppliers	4 companies (72,8%) + municipal utilities	lots of suppliers (partially distributors)
Regulation of prices	competitive	no regulation	no regulation
Ownership			
ownership and competitive neutrality	neutrality	- ²⁹³	Gradual introduction of corporate income tax (10 years)

As it can be concluded in spite of the alike initial market structure of the electricity industry in the Netherlands and Germany the liberalisation reforms in the Netherlands started earlier and was met with more enthusiasm than in Germany. Germany remains to be a country resisting to the liberalisation process, protecting its incumbents, that leads to the delay of liberalisation in Europe.

German electricity market structure was characterised by vertical integrated incumbents and existence of a large number of small operators with a mixed ownership structure. Being one of the first EU countries that fully liberalised their electricity markets, Germany reached a partial unbundling of transmission and distribution from generation and supply and free choice of supplier for end consumers. However, factual market opening did not happen, and remaining vertical

²⁹¹ Brandt 2006, p. 5

²⁹² Generation giants own some shares of small distributors, municipal utilities realise supply

²⁹³ No data is available

integrated four German incumbents continue to increase the prices, and are not motivated to invest in network modernisation.²⁹⁴

Regulation in Germany can be characterised by favour to minimal regulatory intervention, reflected in the application of negotiated network access with ex-post regulation that however proved to be inefficient. Revenue-cap mechanism of regulation, assumed to be more effective in ensuring of "equal access at efficient prices", able to reduce the large efficiency variance and to improve the structure of electricity market, is expected to be later substituted by pure yardstick competition, involving again minimum regulatory intervention.²⁹⁵ To further important characteristics of regulations belongs also a division of the regulatory tasks between centralised regulator (BNetzA) and federal regulative authorities, that from one side allows to spread the regulatory burden, but from the other side contributes to differences in regulating requirements to regional electricity operators (unhomogeneous regulation conditions). Vertical integrated electricity monopolies are opposing the liberalisation initiatives of European Union, making a pressure on local authorities and Federal government, that delays the factual unbundling.

So, to actual problems refer not complete separation of generation and transportation, and caused thereby price increase and investments decrease.²⁹⁶

Generally efficiency improvement in performance of German electricity market demands further liberalisation and unbundling of transmission grid from generation. This, however, will take a time and efforts, first of all from the EU persisting of the liberalisation.

The reforms realised in **the Netherlands** started earlier than EU Directives were issued, they are very progressive and go above the average level in EU. There is a good potential for competition development, due to legislation frames and existing market structure. Generating sector is potentially very competitive and able to attract investments and be succesful exporter on international market. A regional cooperation is observed, further regional projects are planned. There is good coordination between the network regulator and competition authority.

There is, however, a need for to create transparent pricing mechanism and to get rid of government policies directed on protection of incumbents.²⁹⁷ Absence of first and pressure from incumbents on government results in constantly increase of the electricity price level, with prices grow on $\approx 83\%$ and reaches 0,23 €/kWh (higher than EU average).

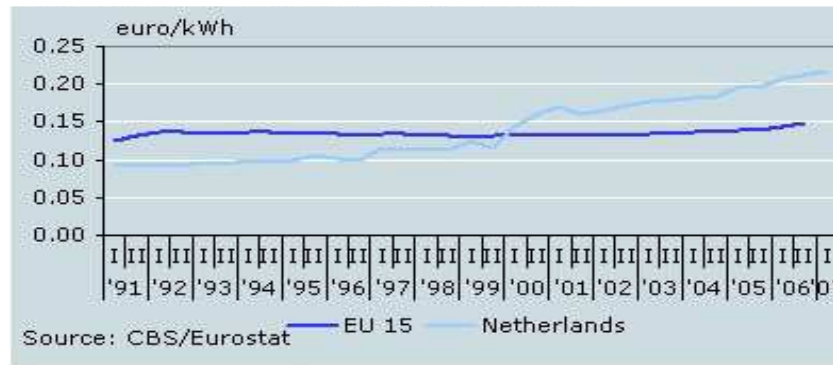
²⁹⁴ Spiegel Online 2010

²⁹⁵ Holt 2007, p. 4

²⁹⁶ Based on Danwitz 2007, p. 449

²⁹⁷ Fraser 1998, p. 18

Graph 5. Electricity prices in the Netherlands and Europe²⁹⁸



To further minuses of the Dutch liberalisation reforms belong: delay in secondary legislation implementation, not complete networks separation, limited privatisation, direct role of Minister in regulation (political rather than commercial pressure), need of vertical separation, need to reject import restrictions.²⁹⁹

4.5 Benefits, impairments and further impacts of liberalisation

As it was already mentioned before the aim of complete energy market liberalisation and internal European energy market is not reached yet. "The most significant impacts of reform are only expected to emerge in the long-term,"³⁰⁰ the results presented here can be tractated only as a short-term or intermediate. The experience of other reforming countries show "significant differences among reforming countries", in some countries positive impact of competition introduction has developed quickly while in others the impact of reforms has been modest.³⁰¹

Liberalisation process in the European Union has brought lead to following progress:

- market opening

Customers get the freedom of choice of suppliers, so that they can choose the suitable for them tariff, competition between suppliers was introduced.

- restructure of electricity market

Creation of independent (legal or ownership unbundled) network operators, provision of non-discriminatory access to networks for generators and suppliers, introduction of efficiency directed regulation mechanisms belong to the achievements of liberalisation. The structure necessary for robust functioning of competition is mostly created.

According to intermediate result the following benefits of liberalisation of electricity industry in the Netherlands and Germany can be observed:

²⁹⁸ Verduin/Huurman (CBS Statistics Netherlands) 2007

²⁹⁹ Fraser 1998, pp. 33-35

³⁰⁰ International Energy Agency 2001, p. 10

³⁰¹ Anon (International Energy Agency) 2001, p. 48

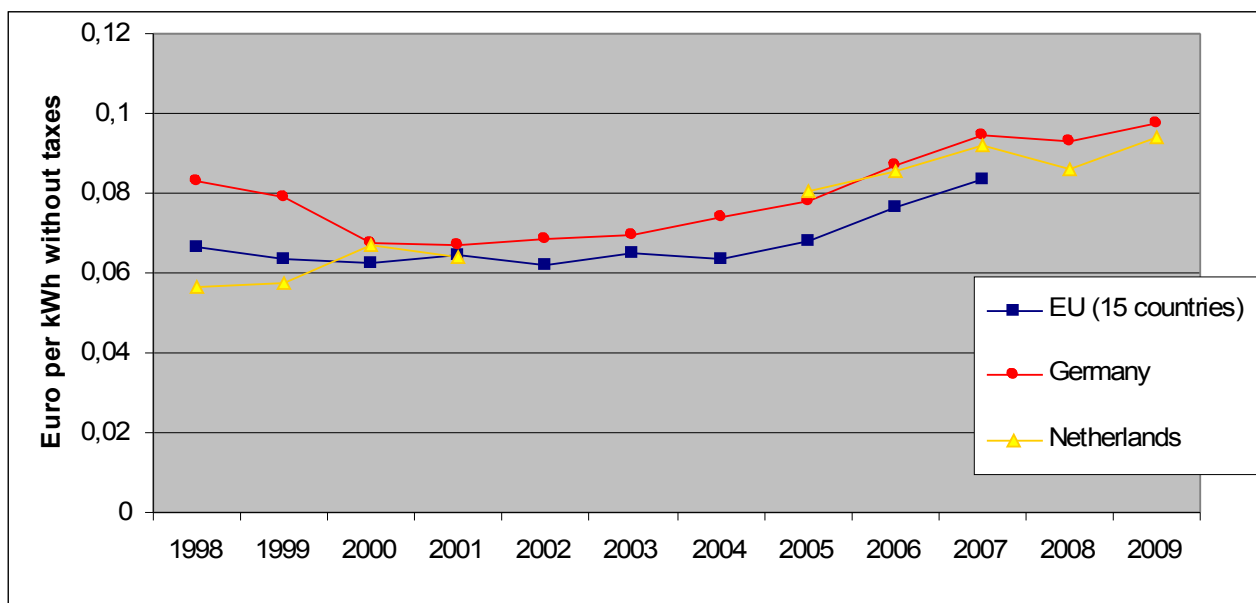
- industry average of overall satisfaction increased to 88% in the Netherlands, in Germany to 95%,³⁰²
- efficiency increase
 - labour productivity improvement for the Netherlands.³⁰³
- stability of supply
 - reliability is high (26 annual minutes per customer).³⁰⁴
 - existing interconnection systems as well as planned projects directed on creation and improvement of regional electricity markets allow to increase the security of supply.

However, there are a number of important expectations that liberalisation has not fulfilled yet on the European electricity market:

- stability and decrease of prices

Significant fall in prices, as it can be concluded from the graph 6, did not happen. In opposite electricity prices show stable grow both for industrial customers and household consumers in Germany, the Netherlands and EU member states in average.

Graph 6. Prices for industrial consumers³⁰⁵



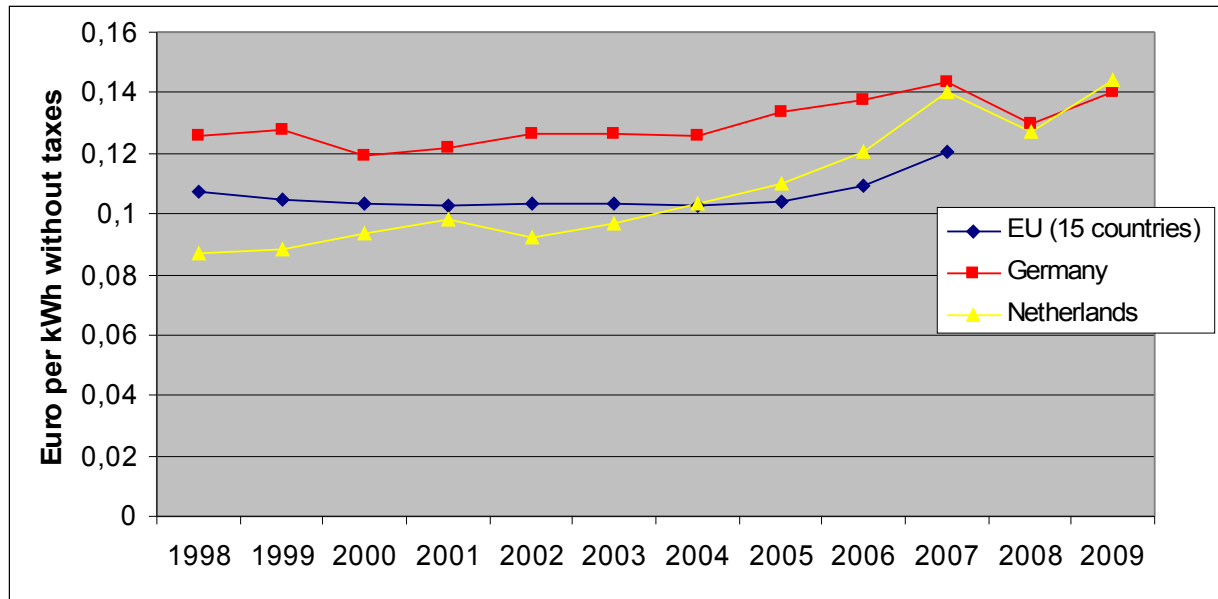
³⁰² Datamonitor 2003 cited in Van Damme 2005, p. 16

³⁰³ Fraser 1998, p. 32

³⁰⁴ Ibid.

³⁰⁵ Based on Eurostat data

Graph 7. Prices for household consumers³⁰⁶



Price decrease both for industrial and household consumers at the beginning of liberalisation period in Germany can be observed, that however changed in 2001 and since then significant tendency of price increase takes place. This, however besides the reasons connected with not complete liberalisation can be explained by the influence of such parameters as fuel prices or existing power capacity.³⁰⁷

➤ investments into network infrastructure

Most of European electricity nets are extremely old (built mainly after the Second World War) and require huge investments in order to be able to serve the European Single Energy Market efficiently.³⁰⁸ However, the investments in infrastructure felt under condition of liberalisation, that limited infrastructure development.³⁰⁹

To the reasons of the actual general problems of liberalisation reforms on the European level refer:

➤ no functioning competitive market

According to EU Commissioner for Energy Oettinger no technical, legal and economic base for the competition in electricity sector is created yet.³¹⁰

- no ownership unbundling

“Without effective separation of networks from activities of generation and supply”, there is a high risk discrimination and no guarantee of effective investment and development of the networks.³¹¹

³⁰⁶ Based on Eurostat data

³⁰⁷ Belmans, 2003 cited in Bonneville/Riahlé 2005, p. 14

³⁰⁸ Oettinger 2010, p. 2

³⁰⁹ Goldberg 2010, p. 3

³¹⁰ Spiegel Online 2010

³¹¹ Council of the European Union 2008, p. 4

- competition is not really introduced (in theory industries and private households are free to choose their supplier, factually “the number of customers who switched from their producer to another is relatively small ... 3 % for Germany, after five years of full opened market”³¹² ⇒ lack of competitive pressure
- inefficiency of regulation or regulation instruments, giving not enough stimulus to investments;
- too big influence of politics on electricity industry,
- lack of cooperation between member-states

According to Oettinger due to the lack of possibilities to electricity exchange Europe is far from internal electricity market yet.³¹³

- no harmonisation of national legislation with the European one,
 „...despite reforms to liberalise markets in some member states national energy markets remain largely under state control.“³¹⁴
- no common market

The European Commission has long argued that member states could substantially increase energy supply security and network and cost efficiency by integrating national electricity markets into the EU Common European market.³¹⁵ However, "consensus among all EU countries on a level of market opening, which is shared by all" have been reached.³¹⁶ Whereas "the Internal Energy Market could stimulate fair and competitive energy prices ..., as well as higher investments," and its absence "prevents EU citizens and the EU economy from receiving the full benefits of energy liberalisation."³¹⁷

Decision of these problems demand further liberalisation of the electricity market, as well as improvement of regulators on European as well as national level. The Third Energy Package, admitting the problem of price increase and infrastructure investment decrease, implies a creation of a European regulator, that, overseeing the cross-border regulation, would promote strengthening of national regulators. So, according to Bonneville/ Rialhe "despite its emphasis for liberalisation and its expected benefits, the [European] Commission recognizes the need to regulate the market with voluntary or mandatory instruments: the market itself will not deliver energy efficiency".³¹⁸

Summarising the overview of liberalisation legislation implementation in Germany, the Netherlands and European Union in general, it is necessary to say that liberalisation is not easy process that

³¹² Bonneville/Rialhe 2005, p. 15

³¹³ Spiegel Online, 2010

³¹⁴ Belkin 2008, p. 25

³¹⁵ Belkin 2008, p. 25

³¹⁶ Fraser 1998, p. 18

³¹⁷ Commission of the European Communities 2007, p. 4

³¹⁸ Bonneville/Rialhe 2005, p. 16

improve the efficiency of the natural monopoly performance immediately. Liberalisation of the natural monopoly industries demands complete restructuring of the sector, including demonopolisation and vertical disintegration, as well as competition introduction and change of the competition legislation. Moreover, liberalisation demands strong regulatory norms and controlling mechanisms, so that the role of government regulation in the transitory period even increases. Thus, liberalisation is a long-term process, comprising also much risks and complications on the way of its realisation.

As it can be observed the success of liberalisation depends on the initial structure of the industry and tradition of its regulation, attitude of the government to liberalisation. All these factors play important role in the speed and success of liberalisation reforms. So in Germany speed of liberalisation is lower and resistance of electricity incumbents, reflected on the position of the government, influence also the process of electricity liberalisation legislation on the European Union. In this sense Dutch government brought the liberalisation in electricity industry in the Netherlands more far, so single independent network operator is created, that is reflected in high reliability of the system, national system is interconnected with regional electricity market.

During the transitory period, when robust competition structures are not formed yet and competition pressure does not work, efficiency increase without control and regulation of the government is not possible. The effects liberalisation process bring can be positive as well as negative, that increase the role of the government regulation able to interfere the process and correct regulation policy according to efficiency demands. So, modern tendency of investments decrease requires urgent reaction of the government directed on improvement of its regulative instruments that would stimulate network operators to invest in infrastructure.

But, even when liberalisation is achieved, the state has to regulate the existing market power of monopolistic bottleneck. So, tariffs and conditions of network access have to be regulated and guarantee a fulfilment of competitive legislation for the sake of efficient performance of the natural monopoly market should be provided.

Chapter 5. Summary

So, although competition is the best efficiency directed regulation mechanism, due to technical and economical peculiarities of natural monopoly its efficient performance can not be provided by competition, and therefore government regulation is a need. However, governmental regulation also can not provide appropriate level of efficiency of natural monopoly performance. As it can be concluded from the historical development overview, starting from state ownership to such regulatory paradigms as public-interest-theory, regulation as constraint and agent-theory, no governmental regulation response to the phenomena of natural monopoly proved to be perfectly efficient. Natural monopoly being itself a market failure, under the condition of competition restriction and monopolistic privileges (franchise) turns out to be a “monopoly failure” as well. Moreover, governmental regulation designed to overcome these failures also does not succeed perfectly, proved to become “governmental failure” of excessive political control.³¹⁹

So, the views on the regulation of natural monopoly markets and furthermore on natural monopoly itself began to change. The disaggregated approach of regulation, splitting natural monopoly into competitive and monopolistic parts and introducing liberalisation, gains popularity in the last decades. Promoting competition introduction on parts of traditionally natural monopoly markets and limiting governmental regulation to monopolistic bottleneck, liberalisation is expected to be a way to the most efficient performance of natural monopoly.

This, however, does not mean the reduction of the importance of government regulation on natural monopoly industries. Liberalisation requires huge legislation efforts from the government directed on the system restructure. Legislation and government control over it have to reflect actual conditions of the market, that demands fast reaction on the changing conditions from the government. So, as it can be concluded out of the practical experience of liberalisation of electricity industry in EU, during the process of restructure and competition introduction on the market of natural monopolies the role of the government increases: state provides the competitive legislation and promotes industry restructure and competition introduction, government becomes to be the only guarantee of successful realisation of disintegration and provision of non-discriminatory conditions of third party access to monopolistic bottleneck, as well as regulator able to correct the market failures.

Although liberalisation proved to be the best regulatory approach in theory, in practice realisation of liberalisation appears to be not an easy way: it brings not only positive results but also a number of complications. Practical results of liberalisation process within EU frames show that liberalisation

³¹⁹ Bradley 2003, p. 56

can have also negative effects, such as lowering of the investments level or price increase. In order to overcome these government has to apply appropriate regulation directed on investments incentives increase and control of the further development.

Also when complete liberalisation is realised and competitive regulation instruments are working, government regulation remains to be important on the parts belonging to monopolistic bottleneck of natural monopoly industry (networks). Presented in the first chapter instruments of regulation do not die under the liberalisation, but get a new application field of monopolistic bottleneck. That required their modernisation and adaptation to new regulatory tasks. So, instruments of incentive regulation such as price-cap regulation and revenue-cap regulation become to be combined with yardstick regulation, that allow to reach maximal regulatory efficiency. However, it is necessary to admit, that there is no universally perfect regulation instrument that would suit the conditions of all liberalised natural monopoly markets. So, within EU member-states different combinations of the regulatory can be observed, whereas one is adequate for the condition of natural monopoly market in one country, but is unsuitable in the other. Nevertheless, the regulative instruments of incentive regulation approach, being restricted to regulation of monopolistic bottleneck, proved to be the most efficient ones due to incentives they give to a regulating firm to be efficient improving the cost, keeping the opportunity to get a profit. A wise combination of these methods with the competition pressure, allows to minimise the intervention of the government, and so to provide the maximal efficiency of the natural monopoly industry performance.

It is also necessary to say that liberalisation is often caused by political reasons, that in the case of the European Union is creation of the European Energy Market.

As the result of the work the answers on the initial research questions can be generalised as the following:

- 1) the role of the government regulation in achievement of efficient natural monopoly market is extreme high and its importance does not reduce also during the liberalisation;
- 2) to economical reasons of liberalisation belong a finding of monopolistic bottleneck, showing the complicated structure of natural monopoly industries, comprising competitive and monopolistic parts, and the fact that competition can increase efficiency of the parts out of bottleneck, whereas government regulation on competitive markets is less efficient than competition; to political reasons belong desire to create interconnected internal European energy market, that would allow also to increase stability of electricity supply;
- 3) to practical effects of liberalisation in the EU, Germany and the Netherlands belong separation of generation and supply from transmission, freedom of choice for consumers, creation of independent transmission operators, more interconnectivity between EU

member-states and cohesion of European legislation, that leads to more stable electricity market. To positive effects refer increase of industry of overall satisfaction, labour productivity improvements, and increased stability of supply. Such a negative intermediate effects of liberalisation as price and investments decrease prove the importance of government regulation of the natural monopoly market with an aim of efficiency increase.

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Declaration

I declare that all parts of this thesis have been written by myself and that I have only used references explicitly referred to in the text.

Jena, 06.12.2010

Yulia Gehlhar