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GERMANY'S U-TURN IN ENERGY POLICY: HOW WILL IT AFFECT THE MARKET?

JEL classification: L13

Abstract

In Germany the performance of opening the electricity markets proves to be poor. While the sector's productivity nearly doubled, the customers were left out in the cold. In actuality, the generated redistribution mass remained in the firms. There, the management used the threat of competition as an instrument for rationalisation and for the moderation of wage growth, while it simultaneously and successfully made an effort to circumvent the market competition. In the end, due to the established oligopolistic structures profits approximately quadrupled.

However, at present there are indicators for a change in the market structures, brought about by a new political framework and the U-turn in Germany's Energy Policies in the aftermath of Fukushima.

This paper will analyse the market's development based on the most recent data from Germany's industry statistics. It also aims at explaining these findings and discussing the structural effects of the new environment.

Keywords: energy policies, imperfect markets

1. THE PERFORMANCE OF GERMANY’S ELECTRICITY MARKETS

In 1998, as part of the EU’s Common-Market programme, Germany opened its Electricity Markets. By doing so, German decision makers were convinced of the logic of liberalisation: electricity suppliers, which had formerly been operating as state controlled regional monopolies, were then confronted with competition for the first time. Taking this into account, they were expected to generate gains in productivity and enhance the redistribution mass on behalf of the customers. In the end, a reduction in electricity prices as well as a strengthening of the overall international competitiveness of Germany’s industry would result.

For example, a price reduction of 20 up to 30 per cent was considered realistic by Germany’s former Minster of Economics (Rexrodt cited in Handelsblatt, 1998). However, as Bontrup and Marquardt (2011) pointed out, reality looks quite different.

1.1. Stylized Facts of the Liberalisation

The following data are primarily based on the German industry statistics provided by the Federal Statistical Office. The data reflect the most recent status, which in most cases regards the year 2010, and they concentrate on companies with a key focus in adding value to electricity markets.

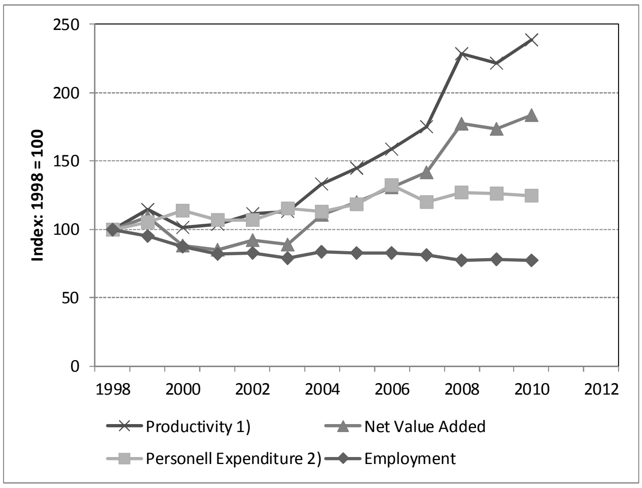

Figure 1 Productivity in the Electricity Market

Notes: 1) Net Value Added per Employee; 2) per Employee

Source: Federal Statistical Office and author’s own calculations

Regarding the productivity, the liberalisation was relatively successful (see Figure 1). Between 1998 and 2010 employment was reduced by about one fourth, i.e. by 58.000 persons in this sector. In the meantime the net value added increased by 77 per cent, leading to a more than doubled labour productivity. Although the remaining employees added more than twice as many values as before, this improvement was only passed on to them in parts. Personnel expenditures per employee merely rose by one fourth.

In principal, the remaining redistribution mass could have been assigned internally to the shareholders or externally to the suppliers of the electricity companies, the state or the customers. Indeed, externally especially the suppliers of coal and gas asked for significantly higher prices. Until the end of 2010 coal prices more than reduplicated while prices for non-liquid gas were five times higher than in 1998 (see Bontrup and Marquardt, 2012b, p.164). Moreover, the state continuously increased its dues.

In reaction to this cost-side and administrative impulses, electricity companies demanded higher prices (see Figure 2). The prices paid by the German industry increased from 1998 until 2010 by approximately 30 per cent. From 1998 until 2012 a growth rate of 50 % occurred. But, having filtered out the price components which were caused by the state, from 1998 until 2010 a decrease of about 5.5 per cent can be observed. With respect to the prices private households had to pay, the dynamics was quite similar, even though a smaller reduction remained after adjusting for the administrative components (see Bontrup and Marquardt 2012b, p.120).

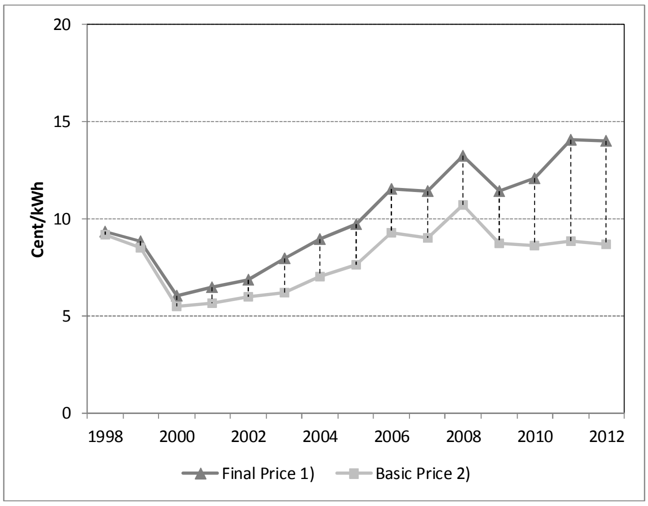

Figure 2 Electricity Prices paid by German Industry

Notes: 1) excluding VAT; 2) including costs and profits of the suppliers, excluding all administrative components
Source: BDEW, 2013

However, regarding the described improvement in productivity, even the adjusted price development is completely disappointing, since it does not only reflect remaining cost-side stimuli passing through the prices, but also an aggressive price-setting by the electricity suppliers in order to raise their own profits (see Figure 3). Between 1998 and 2010 the net operating surplus of the electricity sector in Germany grew by approximately 400 per cent compared to 50 % in the overall economy. Moreover these profits were scarcely transferred into investments but rather used for dividend payments as well as for mergers and acquisitions. Hence, against all odds, it was the shareholders who predominantly realised the gains of higher effectiveness and not the customers, as initially intended.

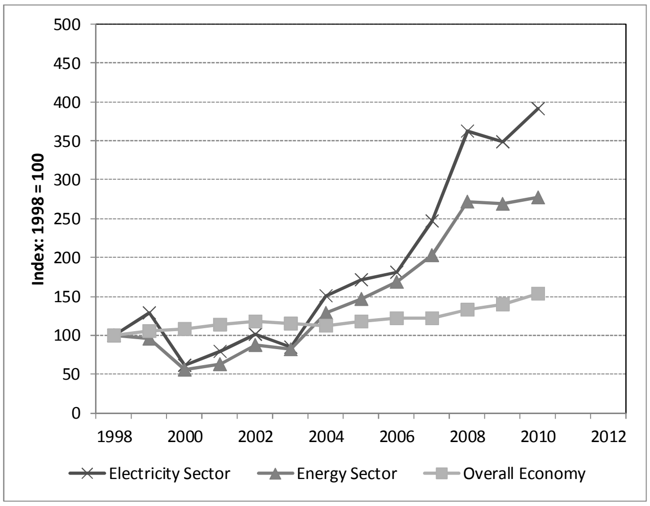

Figure 3 Development of Net Operating Surplus

Notes: The Net Operating Surplus was calculated as the difference of Gross Value Added – Depreciation – Personnel Expenditure.

Source: Federal Statistical Office and author's own calculations

1.2 Causes of the Deficits

The main reason why customers were deprived of the advantages of higher productivity was a market failure resulting from the firms' strategy in combination with deficits in the market regulation (see Bontrup and Marquardt, 2011, Chapter 2).

While on the one hand the management internally used competitive threats as an instrument for rationalization and moderation of the growth of wages, it on the other hand successfully aimed at circumventing the market competition.

When Germany opened the electricity sector, the nine regional monopolies, which had been established before, soon started to merge. From 2002 onwards, the so called “Big-4” (E.ON, RWE, EnBW and Vattenfall) remained in the market as the big players. They dominated the process of electricity generation by temporarily owning about 90 per cent of the market’s capacity (see Bundesregierung der Bundesrepublik Deutschland, 2009, p.2). Furthermore, they controlled the grid and used this to exclude competitors from their own regional submarket by artificially high fees for the transmission of electricity. Additionally, they held capital participations in more than 300 municipal electricity suppliers and thus had important influence on their own competitors` strategies.

This development was permitted by deficits in regulations. To start with, the German competition law was too weak to prevent the process of mergers and acquisitions in the beginning. Secondly, exploiting the grid was made possible by a unique path German policy makers had chosen. Instead of a state controlled regulation, they opted for a non-effective, self-regulative form of the market’s participants.

In the meantime, the framework has changed. Regarding the process of concentration in the preceding years, a limit had been reached. From then on, the antitrust agency has been operating restrictively when evaluating further mergers and acquisitions. Furthermore, in the light of an antitrust lawsuit E.ON did not only have to sell generation capacity, but also divested most of its acquisitions. With respect to the deficits in regulation German decision makers were put under pressure by the EU Commission. Germany was forced to implement a state controlled regulation authority operating with a “revenue-cap” for the grid operators (see Bontrup and Marquardt, 2010) as well as a legal unbundling of the value-added steps. This led to a massive decrease of transmission fees and to a partial selling of their grid by the “Big-4”.

2. ELEMENTS OF THE U-TURN IN GERMANY’S ELECTRICITY POLICIES

In view of the breakdown of the nuclear reactors in Fukushima, the German policy makers reversed their stance on atomic power (see Bontrup and Marquardt, 2012a). Only seven months after the government had agreed on the extension of the allowed operating time of nuclear plants, they decided to abandon the supply of electricity by atomic energy in predetermined steps completely. In 2022 all the nuclear power plants are bound to be deactivated. In addition, eight reactors were disconnected from the grid immediately.

This policy, called “Energiewende” (i.e. “Energy Turnaround Concept”), requires strenuous efforts, especially in building up renewables as well as flexible gas and steam power plants. In detail, this policy concept will stipulate an accelerated extension of renewables up to at least 35 per cent of electricity production in 2020 and from then on 15 per cent points more every ten years until a level of 80 per cent will be reached in 2050. Furthermore, a more dynamic extension of the grid will be needed, especially in order to connect the on- and off-shore wind turbines, which are primarily located in the north of Germany, down to those regions in the central and southern part of Germany, where the industrial producers and the majority of the population are concentrated.

The extension of the renewables is fostered by a system of subsidies in combination with a purchase commitment by the net operators (see Bontrup and Marquardt, 2012a, p. 29-35). The state has fixed a purchase price for each technology and for every kWh of electricity, usually guaranteed for the next 20 years by law. The price has to be paid by the operators in advance. Furthermore, the operators are legally obligated to priorly buy “green electricity”. Afterwards the difference between the given purchase price and the current price at the electricity exchange is passed on to the customers via the consumers price of electricity. Hence in the end the customers bear the burden of the turnaround concept.

In order to compensate for different investment risks and statuses of technological progress of the distinct generation technologies, the subsidies vary. They also vary in time, depending on the date of installation: the sooner the capacities are installed the higher the price will be. Depending on the expansion of renewable energies, the guarantee price can discretionally be changed for new investments.

3. FORMATION OF GERMAN WHOLESALE ELECTRICITY PRICES

Customers normally buy their electricity at retailers. Nowadays, each household and each firm is able to, on average, choose between 85 suppliers. The degree of competition at this stage of energy supply is classified as satisfying by Germany’s Monopoly Commission (see Monopolkommission, 2011). Many retailers are municipal suppliers with none or at most limited generation capacities. They therefore have to buy most of the electricity at the wholesale markets either directly from the producers or indirectly via the energy exchange. The demanded price for their customers is calculated according to this purchase price.

In the past, most of the electricity has been sold directly by means of long-term bilateral arrangements or by OTC-arrangements with intermediaries. Meanwhile, the energy exchange is gaining relevance. Due to the new generation environment (compare below) retailers increasingly prefer the flexibility in purchasing at the exchange. They usually engage in future contracts, calculating the expected electricity demand at the date of the contracts' maturity. Afterwards some fine-tuning can be done at the exchange via day-ahead purchases.

Now, a new environment is consequential at this central stage of value adding from the Energy Turnaround Concept. It induces strong effects on the formation of wholesale prices and the oligopolistic market structure.

In order to analyse this (see also Müsgens, 2004 and Ockenfels, Grimm and Zoettl 2008), let us for simplicity assume that at a certain point in time all the different arrangements which were due at this date could be aggregated to a common market where a uniform wholesale price establishes. Maybe, this assumption seems strange, since there are three different market segments (bilateral or OTC arrangements, the spot market and future contracts at the exchange). However, all the segments of the market interact and indeed will lead to a common market equilibrium which is dominated by the spot market price (see Bundeskartellamt 2011, p. 60). Due to the possibility of arbitrage even the particular form of execution arising from future contracts or bilateral arrangements depends on the exchange market spot price. For example, if the spot price at the electricity exchange is below the price agreed in the future contract or a bilateral agreement, the writer of the contract or the supplier will not have to produce the electricity physically by generating it in his own plant, but he will be able to buy it at the electricity exchange for a lower price. Hence, the generated supply of electricity all in all mainly depends on the spot market price.

The demand for electricity in the wholesale market is closely inelastic. The demanding retailers are acting as agents of their customers and they have to satisfy the needs of their customers irrespective of the price. The demand of the customers itself is barely influenced by the fluctuating wholesale price, because the customers usually have to pay a predetermined fixed rate to their retailers. Hence, the demand in the wholesale market varies throughout the year and during the time of the day and thereby primarily depends on the needs. For example, in winter, when it is dark outside, people need electricity for switching the lights on or when people start to work in the morning the companies' electricity demand increases. Consequently, the demand curve is almost vertical and its location depends on the varying needs of the customers (see Figure 4). According to Groscurth and Bode (2009, p.13) in peak times, i.e. in the evenings of November, customers demand a power output of about 80 GW per hour. In periods of low demand, i.e. in the early mornings of August, the demand drops to about 45 GWh. On average, the demand amounts to about 65 GWh. Thus, the demand for electricity fluctuates in the shaded area (see Figure 4).

With respect to the supply of electricity, the price has to cover the marginal costs, at least if we assume that there is no strategic shortening of generation capacities in order to push the price up artificially. Fixed costs are irrelevant in the short term as they have the character of sunk costs. They only influence investment decisions regarding future production capacities.

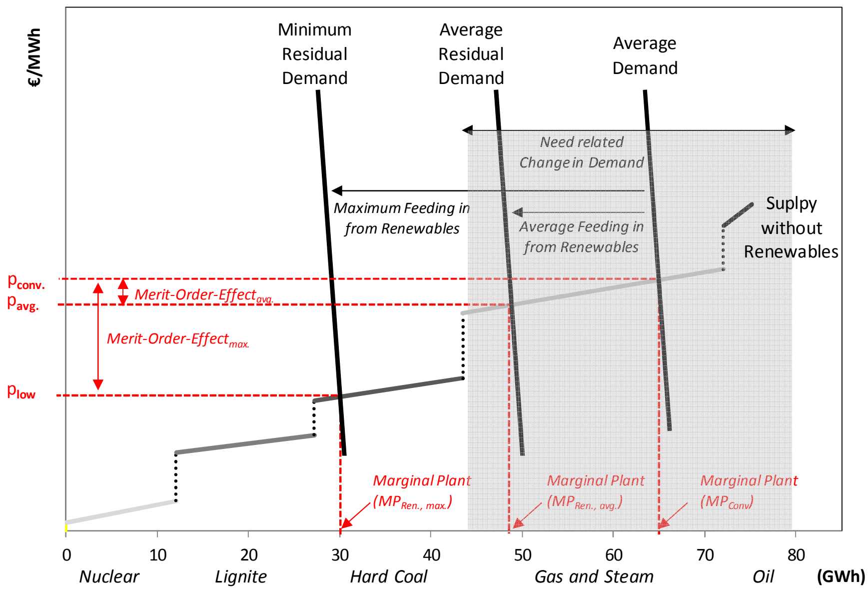

Figure 4 Model of Wholesale Price Formation

Source: Bundesnetzagentur and author's own calculations

Regarding the marginal costs, the most important items of expenditure are those for primary fuel and allowances in the EU Emission Trading Scheme. Labour costs and general expenses could be neglected. At given input prices marginal costs heavily depend on the generation technology (see Table 1) and the maturity of a given technology, which determines its power efficiency. For instance, compared to gas power plants of the same age, modern coal power plants have an advantage regarding the costs of fuel, whereas gas power plants are advantageous regarding the EU allowances. Due to the recent deterioration in the EU allowances, coal plants cause considerable lower marginal costs than gas plants. And compared to old coal plants, a new one operates with higher effectiveness at lower emissions and hence at lower marginal costs. In practice, of course a more sophisticated calculation has to be done. For example, marginal costs need not necessarily have to be constant. In addition, we should take into account the fact, that the start-up and the shut-down of plants cause considerable costs. Thus, a supplier who normally is not able to store electric power, might temporarily even be willing to provide electricity at negative prices in order to avoid a costly shut-down of plants.

Table 1

Estimation of Production Costs

	Modern Hard Coal Power Plant	Modern Gas Power Plant
Investment [Mio. EUR] 1)	1,500	750
Power [MW_el] 1)	1,000	1,000
Investment [Mio. €/MW_el] 2)	1.500	0.750
Interest Rate [WACC] 1)	8.00%	8.00%
Depreciation Period [Years] 1)	20	20
Annutiy [end of year; Mio. EUR] 2)	152.8	76.4
Equivalent of h/a in full use of capacity 1)	8,000	8,000
Production of Electricity [MWH_el/a] 1)	8,000,000	8,000,000
Costs of Capital [EUR/MWh] 2)	19.10	9.55
Power Efficency [Per Cent] 1)	46%	58%
Input of Primary Fuel [MWh/a] 2)	17,391,304	13,793,103
Equivalent of Input [Coal: t/a ; Gas TJ/a] 2)	2,136,524	49,615
Input Price per Unit [EUR/t ; €/TJ] 3)	106.97	8,391.00
Expenditure of Fuel [EUR/a] 2)	228,543,959	416,323,493
Costs of Fuel [EUR/MWh] 2)	28.57	52.04
CO2-Emissions [t/MWh Input Prim. Fuel] 1)	0.34	0.19
CO2-Emissions [t/a] 2)	5,913,043	2,620,690
CO2-Emission [t/MWh_el] 2)	0.739	0.328
CO2-Price of EUA [EUR/t] 3)	3.00	3.00
Costs of Emissions [EUR/MWh] 2)	2.22	0.98
Production Costs [EUR/MWh] 2)	49.88	62.57
Production Costs [Cent/kWh 2)	4.99	6.26
Marginal Costs [Cent/kWh] 2)	3.08	5.30

Notes: 1) Experience value or realistic value or technologically based value 2) Calculated values, 3) Recent market price

Source: Following Groscurth and Bode (2009) and author's calculations

The described differences lead to a stepwise rising supply curve of electricity, called the "merit order curve" (see Figure 4). The curve exemplarily reflects the structure of generation capacities for the year 2012 in Germany. The curve only focuses on the supply provided on the wholesale market which normally does not include electricity generated by subsidised renewables and sold to the net operators in advance. Moreover, the curve accounts for the fact that not all the capacities being installed are available for production. While nuclear power plants are supposed to operate with full capacity, here for the other plants a default rate of 15 per cent is presumed. Furthermore, the curve is constructed by assuming empirically reasonable relations of the values for the different marginal costs on the one hand and, due to different maturities, a continuous rise of marginal costs within a certain technology on the other hand. It starts with those capacities that operate at the lowest marginal costs and so on. In this model, the supply of electricity generated by nuclear plants has the lowest marginal costs per MWh. It is followed by lignite plants, then by hard coal and finally by gas power and oil plants. In practical, the different technologies are not that clearly isolated from one another in the merit order. For example, some new gas plants might have less marginal costs than old hard coal plants.

In a scenario without subsidised renewables, i.e. with only the conventional plants producing electricity, the market price ($p_{Conv.}$) would vary according to the primarily need-related change in demand (see Figure 4). The price always allows for covering the marginal costs of the marginal provider ($MP_{Conv.}$). All the other producers that additionally serve the demand are gaining rents, which allow for covering their marginal costs as well as their fixed costs and perhaps for generating profits.

However, the model is imperfect in two aspects. On the one hand the specific rule of the net operators has to be taken into account. In order to stabilise the voltage in the grid, the net operators coordinate the demand and supply side of the market while using the demand as the predetermined market side. Hence, if a lack of capacity is to be expected, they will ask the producers to expand their supply. If a surplus of supply is looming, they will ask for a reduction of electricity generation.

On the other hand the model has to be supplemented with the electricity supply by renewables. This “green electricity” is protected from the logic of the markets. Accordingly there will not be any cost orientation in supply-side decisions, since the purchase price is guaranteed and usually lies above the marginal cost as well as above the wholesale market price. In addition, the net operators have to priorly enable the unlimited feeding of the “green-electricity” into the net. This electricity is used to satisfy parts of the customers` demand in advance and is usually not sold via the wholesale market. Thus, only the unsatisfied customer demand remains in the wholesale market as a residual.

Due to the generation of renewables, the residual demand curve shows a left shift (see Figure 4). But, the amount of eco-power that will be induced into the grid and the degree to which the (residual) demand curve will move to the left usually depends on the weather conditions. During hours of sunshine the photovoltaic modules are adding considerably to the supply of electricity, whereas in times of heavy wind the wind-parks do so as well. Amongst all the subsidised residuals it is only hydro power utilisation, biogas, biomass and geothermal power plants that are able to provide electricity reliably. But, according to the data of the EEX these kinds of renewables only contribute to the generation power of renewables by only 14 per cent. Consequently, the conventional power plants are used as a stopgap primarily for the production of wind and solar energy in order to satisfy a highly fluctuating residual demand.

Indeed, the volatility of the electricity generated by those two technologies is immense. According to the Data of the EEX from April 18, 2013 a new record was set. The wind and the solar energy contributed 35.9 GW to the supply of electricity, i.e. at that point in time about 50 per cent of the demand was satisfied only by wind turbines and photovoltaic modules. On the contrary, for example on November 12, 2012 at 3 p.m. only 3.2 GW were provided by wind turbines and photovoltaic modules. On average in 2012 renewables in total generated approximately 15.4 GW per hour.

With respect to the model, in a period of regular demand the price without electric power induced by wind and solar energy would be at p_{Conv} (see Figure 4). With all the subsidised power plants producing at their average capacity, it would be at $p_{avg.}$ Producing at the historically high capacity, it would even drop to p_{low}. Hence, the renewables contribute to a price reduction at the wholesale market, which is called the “merit-order-effect” (see Sensfuß, 2011). This effect is dependent on the weather which determines the degree of capacity utilisation of the wind turbines and the photovoltaic modules. Due to several studies this effect is rising and it is estimated between 5 and 10 EUR per MWh for the year 2011 (see Bundesministerium für Wirtschaft und Technologie et al., 2012). In comparison, the average market price at the EEX totalled about 50 EUR per MWh.

Taking account of the supply provided by renewables, the price for suppliers of conventionally produced electricity is still determined by the marginal costs of the plant at the market’s margin. But the plant which is being at the margin ($MP_{Ren,\ max.}$ or $MP_{Ren,\ avg.}$) is yet another one than in the case without renewables ($MP_{Conv.}$). Thus, the renewables tend to push conventional power plants out of the market. This trend increases, since the dynamics of the generation capacities of renewables in Germany is considerable. From 1998 to 2012 the electricity provided by renewables increased with a yearly average growth rate of more than 13 per cent. During the same period the yearly average growth rate of the installed capacity amounts to 17 per cent.

4. INFLUENCE OF THE NEW ENVIRONMENT ON THE MARKET STRUCTURE

The increasing importance of the renewables together with the other elements of Germany’s U-turn in Energy Policies will significantly affect the market structure, which has already been changing slightly before (see Chapter 1). Especially the oligopolistic power of the Big-4 will gradually be undermined.

Firstly, new producers of electricity have entered the market. While the Big-4 had concentrated on centralised nuclear, lignite, hard coal or gas and steam power plants, they neglected the segment of renewables for a long time. Owners of renewables, which apart from off-shore wind-parks are less capital-intensive than conventional plants, are typically farmers, private households, private investors and public utility companies. Meanwhile, the proportion of the renewables amounts to 43 per cent of Germany`s total generation capacity and 23 per cent of the electricity production. Consequently, the market power of the Big-4 is declining. Nowadays, according to the data reported by the Bundesnetzagentur they are holding only 60 per cent of the generation capacity. Nevertheless, they are still powerful (see Bundeskartellamt, 2011), particularly in view of the fact that their contribution to the electricity supply is even more substantial, since their conventional generation capacities operate reliably as they do not depend on any weather conditions.

Secondly, the Energy Turnaround Concept causes a heavy burden especially on the profits of the Big-4 (see Figure 5) and particularly for the future success of their German electricity business. Apart from two minority participations they are the owners of the nuclear power plants. In the past, these plants worked as a profit-machinery, partly because some of them have already been depreciated and partly because some of the costs were external costs. For instance, as a result of an insurance gap the operating risk was socialized. Furthermore, as they operated with low marginal costs, they were positioned far ahead in the merit-order (see Figure 4) and could produce rents around the clock with the exception of times of maintenance work. Estimations are calculating that the Big-4 might set up claims for compensation in the total amount of EUR 15 billion due to the deactivation of their nuclear plants (see Handelsblatt, 2012a,b). However, whether they have a realistic chance to prevail in a lawsuit is highly controversial (see Bontrup and Marquardt, 2012b, p. 135-138). But there is another exposure to the policies' U-turn that acts more indirectly. Due to the expanding and priorly feeding in of “green electricity” into the grid, the conventional power plants, which are also concentrated in the hands of the Big-4, on the one hand earn less money, since the wholesale price declines via the merit-order effect. On the other hand many power plants, especially those at the end of the merit-order have diminishing operating times. This does not only lead to higher costs of capital per MWh (see calculation in Table 1), but also to less situations in which the fixed costs could be covered by a difference between a higher market price and own marginal costs. Indeed, compared to the early years of the liberalization, the performance of the Big-4 was rather poor during the last two years and the outlook for their business in Germany is comparatively gloomy (see for example Handelsblatt, 2013).

Thirdly, the Big-4 are facing unfamiliar problems in financing a strategic turnaround, which is urgently needed in view of the new market environment. In the past, instead of building reserves or making investments in fixed assets, the excessive profits were predominantly used for dividends or mergers and acquisitions. In addition, due to their performance and their market power, they found favored conditions for borrowing at the capital markets and thus accumulated debt over years. Now, confronted with the new situation in the market their ratings are downgraded. Thus, for them borrowing will be more expensive. However, financing the turnaround by cash flow is restricted by the more moderate profit situation.

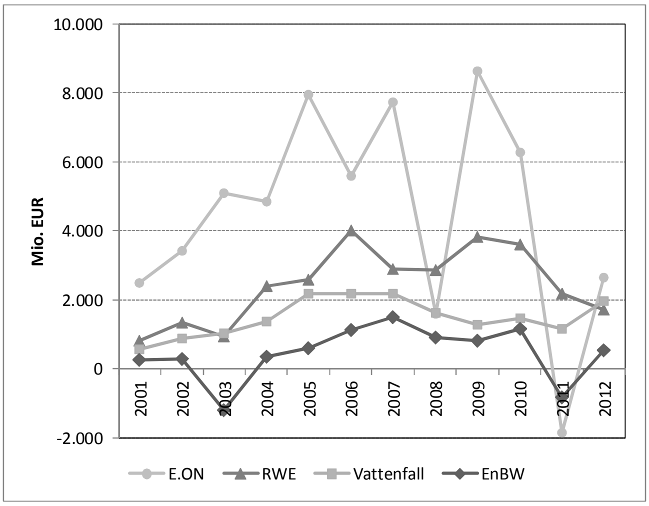

Figure 5 Profits of the Big-4 after Tax

Notes: As the data apply to the consolidated accounts of the companies, they do not only reflect the described profit situation of the Big-4 in the German electricity market but in all business fields and worldwide.

Source: Companies' Financial Statements

Fourthly, even if the problems in financing did not exist, the Big- 4 as well as all the other suppliers of conventionally produced electricity are confronted with an increasing uncertainty with respect to the calculation of future fixed investments. Hence, apart from expanding into the production of eco-electricity, they do not have a reliable plan, how to expand their conventional power capacities. On the one hand, a more dynamic capacity building of gas and steam power plants will urgently be needed, since the expanding contribution of the unreliable wind and photovoltaic plants has to be combined with new flexible gas plants as backup capacities in case of unfavourable weather conditions. On the other hand, the impressive success of the extension of renewables perversely makes the investment into gas plants unattractive: Due to the higher contribution of renewables to the supply of electricity, the sector does not need as much EU allowances as before. The decline in the demand for the allowances reduces their price. In face of this, gas power plants lose attraction compared to coal power plants (see calculation in Table 1). And as a result of the merit-order effect, a potential investor has to expect a further decline in wholesale prices and foremost markedly reduced operating times for gas plants, which will typically stand at the end of the merit order. Hence, it can be assumed that these gas plants would have only few periods for covering the fixed costs, which on top of that would rise per output unit because of the reduced operating time (see Table 1).

5. CONCLUSIONS

The story of Germany's liberalisation of the electricity markets is characterised by the dominant role of the four oligopolistic suppliers. The German policy was partly unable to circumvent this development, partly the decision makers appeared to be too naive in believing in the self-regulation of the markets. Finally, the Big-4 used their market power for distributing the gains of the improved efficiency to their own shareholders.

Due to the central elements of the Energy Turnaround Concept a gradual change is emerging. Although the Big-4 seem to discover the attractiveness of renewables, it looks like they have missed the ideal time at which a new strategy for their German business should have been created and implemented. As a result a decline of their market power is likely to occur.

REFERENCES

BDEW (2013). *Strompreisanalyse Januar 2013*. http://www.bdew.de/internet.nsf/id/123176ABDD9ECE5DC1257AA20040E368/$file/Strompreisanalyse_Jan2013.pdf. [accessed 09.05.2013].

Bontrup, H.-J. Marquardt, R.-M. (2010). Anreizregulierung in der Elektrizitätswirtschaft. In *WiSt*, Heft 12, p. 587 - 592.

Bontrup, H.-J., Marquardt, R.-M. (2011). *Kritisches Handbuch der deutschen Elektrizitätswirtschaft*. 2nd. ed. Berlin: sigma.

Bontrup, H.-J., Marquardt, R.-M. (2012a). *Chancen und Risiken der Energiewende – Arbeitspapier 252*. Hans Böckler Stiftung (ed.). Düsseldorf.

Bontrup, H.-J., Marquardt, R.-M. (2012b). *Perspektiven der STEAG GmbH als kommunales Unternehmen im Kontext der Energiewende*. Rosa Luxemburg Stiftung (ed.). Duisburg.

Bundeskartellamt (2011). *Sektoruntersuchung: Stromerzeugung, Stromgroßhandel.* Bonn.

Bundesministerium für Wirtschaft und Technologie, Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (2012). *Erster Monitoring-Bericht: „Energie der Zukunft“*. Berlin.

Bundesregierung der Bundesrepublik Deutschland (2009). A*ntwort der Bundesregierung auf die Kleine Anfrage der Abgeordneten Bärbel Höhn, Hans-Josef Fell, Kerstin Andreae, weiterer Abgeordneter und der Fraktion Bündnis 90/Die Grünen*. Deutscher Bundestag (ed.). Drucksache 16/11538 vom 05.01.2009, p. 2.

Groscurth, H., Bode, S. (2009). *Anreize für Investitionen in konventionalle Kraftwerke – Reformbedarf im liberalisierten Strommarkt.* arrhenius Institute for Energy and Climate Policy (ed.). Hamburg.

Handelsblatt (1998). Strom- und Gaskunden im Wettbewerb umworben. In *Handelsblatt*, 28.04.1998, p. 5.

Handelsblatt (2012a). Eon verlangt acht Milliarden Euro Schadenersatz. In *Handelsblatt*, 14.6.2012, p. 29.

Handelsblatt (2012b). RWE klagt gegen die Enteignung. In *Handelsblatt*, 22.6.2012, p. 22.

Handelsblatt (2013). Deutschland Kraftwerk verliert an Leistung. In *Handelsblatt*, 14.4.2013, p. 26 - 29.

Monopolkommission (2011). *Energie 2011: Wettbewerbsentwicklung mit Licht und Schatten, Sondergutachten 59*. Bonn.

Müsgens, F. (2004), *Market Power in the German Wholesale Electricity Market - EWI-Working Paper* Nr.04.03.

Ockenfels, A., Grimm, V., Zoettl, G. (2008). *Strommarktdesign: Preisbildungsmechanismen im Auktionsverfahren für Stromkundenkontrakte an der EEX*. Gutachten im Auftrag der EEX.

Sensfuß, F. (2011). *Analysen zum Merit-Order Effekt erneuerbarer Energien – Update für das Jahr 2009.*