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Successful diversification strategies of electricity companies: An explorative empirical study on the success of different diversification strategies of German electricity companies in the wake of the European market liberalization ☆

Ralf Müller[a], Martin Steinert[b,*], Stephanie Teufel[b]

[a]*KPMG, Switzerland*
[b]*University of Fribourg, Switzerland*

Abstract

Based on the EC directive 96/92, the liberalization of electricity markets is forcing electricity companies, to rethink their product and market strategy. However, neither the level of the initiated diversification efforts of former monopolies, nor their direction or their success are known or have been analyzed before. Therefore, Müller [2006. Diversifikationsstrategien von Stromversorgungsunternehmen: Handlungsempfehlungen für schweizerische Stromversorgungsunternehmen auf der Basis einer empirischen Analyse des liberalisierten deutschen Strommarktes. IIMT University Press, Fribourg] has quantitatively determined the extent and direction of the diversification efforts in the electricity sector. Additionally, based on an exploratory case study research, successful diversification strategies have been identified and incorporated into 73 observations which form the basis of a set of normative recommendations for diversifying electricity companies. Since the analyses are based on the German electricity market, which fully liberalized earlier than most of its continental European counterparts, the results may especially guide other European electricity companies in their strategic diversification decisions. This paper publishes both the quantitative analysis on the degree and extents of diversification (sample time frame 1995–2000) as well as the qualitative analysis on the success of diversification strategies (sample time frame 1995–2003). Additionally, based on the obtained explorative observations, the diversification strategy of an idealized-electricity company is firstly presented for practitioners as normative recommendation, and secondly for academics, as starting point for future quantitative analysis framework.

Keywords: Diversification strategies; Diversification measurements; Electricity market liberalization

1. Introduction—liberalizing European electricity markets

In 1996, the European Commission passed the directive 96/92/EG, initiating the process of creating a single European liberalized electricity market (European Parlament, 1996).[1] The aim was to lower electricity tariffs by increasing the competitive pressure on electricity companies. For the former monopolies, this decision, in combination with long-term low-to-zero growth of overall electricity consumption, implied almost certainly declining

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*Corresponding author. Tel.: +41 26 300 8433; fax: +41 26 300 9794.
E-mail address: martin.steinert@unifr.ch (M. Steinert).

[1]The directive asked for an average of 25% of all European energy markets to be opened for competition by 1999 and fully liberalized by 2007.

turnover and loss of profits. To counter this development, electricity companies across Europe have to come up with strategies which would increase their electricity turnover or generate turnover in other businesses—electricity companies have to diversify.

Diversification into new electricity products, markets or businesses is a new challenge for the former monopoly companies which were used to act in a protected economic environment. In their seller's market, it was not necessary to consistently implement modern strategy and marketing know-how. Consequently, much like telecommunication companies after their liberalization, electricity companies feature little experience in terms of diversification strategy. Little is known about which diversification strategies are the most promising in this particular sector. It is also not quite clear to which extent electricity companies have already diversified in the wake of the liberalization.

To tackle these questions, a doctoral study has analyzed the diversification strategies of German electricity companies based on an overall explorative research design (Müller, 2006). In comparison to the other big continental European markets, Germany, which has passed its new law on electricity in 1998, has been European avant-garde in liberalizing early on (Bundesrepublik Deutschland, 1998). As such, German electricity companies are a showcase on the future development and may act as examples for other European markets.

The concrete aims of this study are to find out:

1. Whether German electricity companies have diversified, how, and to what extent.
2. Which diversification strategies have proved to be successful?

The answers to these questions are to be synthesized into normative recommendations for diversifying electricity companies. Whereas the first question is engaged with a quantitative analysis on the degree of diversification, the second question is approached by the means of an explorative case study research in order to gain first insights. The composition of this paper, which presents the results of Müller (2006), is as follows.

The first part of the paper, Section 2, aims to quantitatively verify whether the liberalization of the German electricity market in 1998 has indeed sparked increased diversification efforts. The analysis, ranging from 1995 to 2000, differentiates between diversification within electricity, market diversification of electricity and diversification beyond the electricity sector.

After it could be affirmed that there was indeed a strong diversification movement in this period, Section 3 attempts to unveil what contributed to a successful diversification. Methodologically, case studies ranging from 1995 to 2002/2003 of nine sample companies form the foundation of 73 crosschecked observations on the success of diversifying electricity companies.

These observations are next, in Section 4, translated into a virtual company'. That way, the findings of this study are combined in an idealized strategy that may act as a normative recommendation for practitioners and/or foundation for a quantitative research design for academics.

Concluding remarks and an outlook, especially in terms of future research are presented in the last section.

2. Quantitative analysis of the degree of diversification amongst German electricity companies

Section 2 describes a quantitative analysis on the degree of diversification amongst German electricity companies. The primary aim of this part of the study is to uncover quantitatively, to which degree German electricity companies have diversified. The results consequently intend to show, whether there actually has been a general trend towards diversification rather than just some anecdotal evidence. In case a trend may be uncovered, the quantitative study aims to determine, to which degree German electricity companies have diversified. The secondary aim is to obtain a thorough understanding of the diversification activities of German electricity companies between 1995 and 2000, in order to lay the foundation of the more in-depth qualitative analysis which follows in Section 3.

2.1. Methodology—quantitative study on the degree of diversification

Methodologically, the quantitative analysis is based on comparing the static diversification level of a sample of 40 selected electricity companies in 1995 and 2000.

Besides quantitatively counting product (i) and market (ii) diversifications inside the core segment electricity, diversification activities into the non-electricity sector (iii) are registered and analyzed. This differentiation is based on an adapted Ansoff Matrix (Ansoff, 1957):

Instead of the typical four field matrix, the authors have decided to merge the classical Ansoff fields III and IV, i.e. 'new products in existing markets' and 'new products in new markets' into a new field (iii), diversification beyond electricity. The main reason is that other products' markets are rarely if ever geographically congruent with the existing power grids. Insurance services, gas or heating for example usually have a different geographical diffusion area or grid area than the core businesses power grid. A market differentiation into existing and new markets for new product would not be comparable to the market differentiation of existing and new markets for electricity.

Concerning field (i), product diversification within electricity,[2] the following product categories are distinguished:

- Code 10: Production and external procurement of electricity, based on coal, oil, gas, nuclear power and

[2]Electricity as a product existed before, but since the liberalization it represents a new kind of product since electricity may be sold without owning a network. As such it may even be described as commodity.

water which in turn is sold to the customer (normal electricity).
- Code 20: Production and external procurement of electricity based on renewable or environmentally friendly energy sources which are sold to the customer with a premium of 10% or more (e.g. green electricity).
- Code 30: Transmission/distribution of electricity over the company owned power transmission grid, including all applicable network services (transmission grid).
- Code 40: Transmission/distribution of electricity over the company-owned power distribution grid, including all applicable network services (distribution grid).
- Code 50: Trading of electricity over power exchanges (electricity trading).
- Code 100: Electricity products with a specific product or brand name (product name).
- Code 110: Extra value services around normal and green electricity such as Internet or telephony (extra value services).
- Code 120: Multi element products such as electricity, heating and gas (multi element products).
- Code 130: Call Center (call center).

Concerning field (ii), additionally to the product categories mentioned previously, market diversifications are distinguished between

- none,
- regional,
- national,
- international,

Concerning field (iii), diversification beyond electricity, 30 businesses beyond electricity have been observed. They may be consulted in Table 5.

For the sake of clarity, the product classifications are adapted, based on the official German and European standard NACE/NOGA, nomenclature générale des activités économiques (European Parlament, 1996) (Federal Statistical Office Germany, 2002).

2.1.1. Time frame

The first step towards a liberalized German electricity market had been taken in April 1998. Consequently, the study covers the time span between 1995 and 2000. By choosing December 31, 1995 and December 31, 2000 as temporal cornerstones, i.e. ~2.5 years before and after the liberalization, the study intends to uncover strategic diversification moves which had already been put into action as the liberalization was on the horizon. Also, the study aims to identify mid-term diversification activities. Consequently, due to the chosen time frame of 5 years, any short-lived diversification experiment, which had e.g. been undone before 2000, will not appear in the study.

Specifically, the annual reports dated December 31, 1995 and 2000 have been consulted for 34 of the 40 electricity companies. For two companies, the annual reports were published on September 30, 1995 and 2000; for four companies, the annual reports were published on June 30, 1995 and 2000. These reports were used accordingly.

2.1.2. The German electricity market and the data sample

Around 765 companies are operating on the German electricity market. Due to prohibitive costs of a full census, it has been decided to concentrate on a sample of 40 companies, which represents a sample size of ~5.23% compared to the total number of companies. The selection has been based on two criteria: type of electricity company and innovativeness of the company.

Generally, electricity companies may be grouped into three different archetypes of companies:

- transmission system operators (TSOs),
- regional supplier,
- municipal utility,

TSOs are the few utilities owning overland transmission lines besides regional grids. They are tightly integrated with each other and international TSOs, since they have to ensure electricity transmission even in cases of grid failures and other incidents. The 36,000 km transmission grid of extra high voltage, i.e. 220 and 380 kV are owned by four companies in Germany, E.ON, RWE, EnBW and Vattenfall (VDN, 2006). They also control around 80% of power production.

Regional Suppliers are often owned communally and are mostly located in sparsely populated areas. They operate grids ranging from 16 to 170 kV. Typically, they do not own large electricity production capabilities. The liberalization of the German electricity market has resulted in M&A activities so that there remain 35 Regional Suppliers, down from 70 (Weidler, 2003, p. 4).

Municipal Utilities constitute the large majority of German electricity companies. The around 725 Municipal Utilities run grids from 400 V to 16 kV. In 1999, based on a calculation of all activities, that includes gas, water and heat as well as electricity, Municipal Utilities accounted for around 130,000 employees and a turnover of around 36,000 million EUR (Anonymous, 2000).

The second consideration concerning the sample choice has been the innovativeness of the electricity companies in terms of product development. Based on an analysis of the journals "Stromtip"[3] and "Strommagazin",[4] companies caught the authors' attention by offering new product combinations or extra value services such as power failure insurances. The following companies were selected for the sample:

Transmission System Operators (TSO) (Five companies)

- E.ON
- RWE

[3] www.stromtip.de
[4] www.strommagazin.de

- EnBW
- HEW (later bought by Vattenfall)
- BEWAG (later bought by Vattenfall)

Regional Suppliers (six companies)

- EWE
- envia
- e.dis
- EAM
- Lech-Elektrizitätswerke
- KWR/KWL (later bought by Vattenfall)

Municipal Utilities (29 companies)

- GEW Köln
- Stadtwerke München
- HEAG
- Stadtwerke Mainz
- Stadtwerke Düsseldorf
- MVV
- Mainova
- EMR
- Energie- und Wasserversorgung Mittleres Ruhrgebiet
- EWAG
- DEW
- Stadtwerke Bielefeld
- DREWAG
- Stadtwerke Karlsruhe
- Stadtwerke Leipzig
- Stadtwerke Bonn
- Stadtwerke Freiburg
- Stadtwerke Trier
- Stadtwerke Pforzheim
- Energieversorgung Potsdam
- Stadtwerke Gütersloh
- Stadtwerke Ratingen
- Stadtwerke Tübingen
- GGEW
- Stadtwerke Villingen-Schwenningen
- EGT
- Stadtwerke Frankfurt (Oder)
- Stadtwerke Rostock
- Stadtwerke Waldshut-Tiengen

It must be mentioned that the sample is statistically not representative due to the inherent selection bias. Nevertheless, the chosen companies accounted for 361 TWh in the year 2000 which translates into a market share of ~77%. In the opinion of the authors, any results may therefore be held as valid explorative indicator of the diversification degree amongst German electricity companies.

2.1.3. Data source

The data to be analyzed originate, when available, from the annual reports of the electricity companies. In cases where this procedure has not been possible, the data have been derived from other company's publications, information on the company's website or it has been based on a telephone interview.

In total, 18 of the 40 sample companies published their own consolidated accounts. Of the remaining 22 companies that all published an annual report, 12 were integrated into the annual report of another company as fully consolidated investment.

2.1.4. Diversification measurement

Concerning field (i), product diversification within electricity, and field (ii), market diversification within electricity, diversification is measured by simply counting the differences between the number of active business areas in 1995 and 2000.

Concerning field (iii), diversification beyond electricity, the level of diversification is measured based on the diversification measurement after Berry and the Entropy measurement after Jacquemin and Berry (Berry, 1971) (Fey, 2000, p. 41 et seq.). In his first version of a diversification measurement, Berry suggests to evaluate the turnover of the diversified business units and to divide their sum by the total turnover of the company. That way, the economic leverage of the diversification in relation to the total economic activities of a company is displayed:

$$D_B = 1 - \sum_{i=1}^{n} p_i^2,$$

where D_B is the Berry's diversification measurement, p_i the share of turnover of business i, and n the number of diversified businesses.

The more businesses a company diversifies and the higher the share of the diversified business in relation to the total turnover, the higher Berry's diversification measurement. Theoretically, it may reach a maximum of 1 which implies that all businesses of a company are diversified. If a company does not engage in a diversification strategy and has only one business, Berry's diversification measurement may take the value of 0. A common criticism is that the influence of businesses with a large share of the total turnover is, due to the square function, diluted.

To counter this criticism, Jacquemin and Berry introduced the Entropy measurement which weighs the share of turnover on the basis of a natural logarithm function (Jacquemin and Berry, 1979):

$$D_E = \sum_{i=1}^{n} p_i \ln\left(\frac{1}{p_i}\right),$$

where D_E is the Entropy diversification measurement, p_i the share of turnover of business i, and n the number of diversified businesses.

The relative share of total turnover is thus included more differentiated which increases the sensitivity of the Entropy diversification measurement compared to Berry's simple diversification measurement. The results of the quantitative

markets / products	area of the existing power grid	area beyond the existing power grid
electricity	*field (i)* product diversification within electricity	*field (ii)* market diversification within electricity
non-electricity	*field (iii)* diversification beyond electricity	

Fig. 1. Modified Ansoff Matrix for the diversification activities of electricity companies.

analysis on the diversification level of German electricity companies are presented next.

2.2. Results of the quantitative analysis on the degree of diversification

The results are presented, analogue to the modified Ansoff matrix for the diversification activities of electricity companies, see Fig. 1.

2.2.1. Field (i), product diversification within electricity

The first results concern the diversification activities within the traditional product and market boundaries of the former mostly public electricity companies. Table 1 presents the electricity business segments the companies were engaged in, in 2000.

Table 1 shows, that in their traditional business segment, the 40 German electricity companies generally used the market liberalization of 1998 to diversify the range and sophistication of their electricity products in their home market.

2.2.2. Field (ii), market diversification within electricity

These results depict the geographical expansion of the 40 electricity companies, i.e. their market diversification within electricity strategy as of 2000 (Table 2).

Contrary to the previous results, a market diversification strategy within electricity has been conducted only selectively. Especially a national or international expansion has been rare for the municipal utilities. Concerning expansion strategies, the companies opted for the following:

- Acquisition of equity (13),
- Contract to supply major corporate costumers (12),
- Expansion of the distribution grid area, by means of acquisition(4),
- Merger (2).

As might have been expected, the liberalization of the electricity market has indeed, to a certain extent, triggered a concentration process.

Table 1
Companies that followed a product diversification within electricity strategy

Product code	Product	Number of companies	In percent of the total amount of companies (40)
10a	Normal electricity	40	100.0
20	Green electricity	39	97.5
30	Transmission grid	5	12.5
40	Distribution grid	40	100.0
50	Electricity trading	15	37.5
100	Product name	38	95.0
110	Extra value services	16	40.0
120	Multi element products	9	22.5
130	Call center	20	50.0

Table 2
Companies that followed a market diversification within electricity strategy

Geographical dimension	Number of companies	In percent of the total amount of companies (40)
Non	7	17.5
Regional	21	52.5
National	8	20.0
International	4	10.0

Of special concern are the four TSOs since all four opted to expand nationally as well as internationally:

- In 1995, the following markets were served by one (varying) of the five TSOs in 1995:
  - Czech Republic,
  - France,
  - Hungary,
  - Luxembourg,
  - Sweden,
  - Switzerland.
- Of the henceforth four TSOs in 2000, the following number of companies had expanded into the following countries:

- 3 TSOs—Hungary, Italy, Poland, Switzerland,
- 2 TSOs—Czech Republic, France, Luxembourg, Netherlands,
- 1 TSO—Austria, Belgium, Columbia, Denmark, Latvia, Russian Federation, Spain, Sweden, USA.

Summed up, concerning a market diversification within electricity, only 7 of the 40 companies in the sample have not expanded geographically. Especially the bigger municipal utilities and the TSOs have diversified to a large extent.

2.2.3. Field (iii) diversification beyond electricity

The electricity companies' diversification beyond electricity is measured based on Berry's diversification measurement and the Entropy measurement (Table 3).

Based on the depicted diversification measurements, the level of diversification of the sampled German electricity companies increased on average more than 10% between 1995 and 2000.

About 62.5% of the examined companies (25 of 40 companies) experienced an increase of diversification while 12.5% (5 of 40 companies) actually decreased their diversification efforts and concentrated on electricity instead. About 10 companies or 25% of the sample experienced an increase of the diversification measurement of 25% or more. The figures for each company are depicted next (Table 4).

The analysis shows that the liberalization did indeed trigger some diversification into non-electricity segments. However, the picture is ambiguous. Some companies such as EnBW (3) have put considerable resources into expanding their product and market portfolio. On the other extreme, there are companies such as EDIS (8) that disengaged from any diversification beyond electricity.

Table 5 gives an overview over all types of businesses, the electricity companies in the sample have been active in, in 2000.

Of the 40 companies in the sample, 21 diversified into non-electricity businesses, 16 have not further diversified and three actually decreased their non-electricity activities. The complete results of the quantitative analysis, split for type of electricity company, may be consulted in Müller (2006, pp. 175–195).

Table 3
Average level of diversifications beyond electricity of the 40 sample companies

Diversification measurement	Berry's	Entropy
1995	0.5217	1.0194
2000	0.5770	1.1466
Difference	0.0553	0.1272
Rate of increase	10.6%	12.5%

2.2.4. Summary, quantitative analysis on the degree of diversification

Based on analyzing the sample of 40 German electricity companies representing ~77% of the total market in terms of end consumer sales in kWh, it may be summarized that the liberalization of the German electricity market in 1998 has indeed triggered amplified diversification activities among the sample.

Whereas all companies, 100%, chose to diversify further within electricity in their home market, field (i), more than 80% also chose to expand geographically, field (ii). The results for a diversification into completely new segment with new products, field (iii), are mixed but also clearly indicate an increased level of diversification for 62.5% of the companies. The following diversification strategies could be discerned in the sample of the 40 electricity companies:

- Four companies chose to diversify within and beyond electricity, i.e. fields (i) and (iii).
- Three companies chose to diversify within and beyond electricity, i.e. fields (i) and (iii) but switched some of their non-electricity businesses in the examined time period.
- 10 companies chose to expand in terms of products beyond electricity and geographically, i.e. (i), (ii) and (iii).
- 23 companies chose to expand in terms of products beyond electricity and geographically, i.e. (i), (ii) and (iii), but also switched some of their non-electricity businesses in the examined time period.

These results are inline with observations from other liberalized sectors such as railways (transport logistics), post (transport logistics), telecommunications (new products, markets) and specific sector studies on the diversification efforts of ex monopolies or regulated monopolies such as Palmer (1991), Brennan and Palmer (1994) but also Hale (1950).

3. Qualitative analysis on the diversification success amongst German electricity companies

After having established that electricity companies in Germany have indeed used the liberalization of the electricity market in 1998 to diversify, the question remains whether these diversification activities were flourishing or not. Accordingly, the qualitative analysis of this section aims to exploratively determine, if the diversifications were successful or not.

To do that, Section 3 describes a qualitative case-based analysis on the diversification success amongst German electricity companies. The results are indented to be used as normative guidelines, especially for other European electricity companies which are active in markets not yet fully liberalized, such as France and Switzerland. Also, the insights gained exploratively may be integrated in a future quantitative research design.

After reviewing the applied methodology in Section 3.1, the results of the analysis are presented in Section 3.2.

Table 4
level of diversifications beyond electricity for the 40 examined German electricity companies

	Company	Berry (1995)	Diversified (berry)	Berry (2000)	Increase in percent, berry	Entropy (1995)	Diversified (entropy)	Entropy (2000)	Increase in percent, entropy
1	E.ON	0.7336	Yes	0.7902	7.7	1.5341	Yes	1.7207	12.2
2	RWE	0.8024	Yes	0.8406	4.8	1.8777	Yes	2.0075	6.9
3	EnBW	0.1324	Yes	0.4514	240.9	0.3094	Yes	0.9326	201.4
4	HEW	0.3538	Yes	0.5992	69.4	0.6593	Yes	1.1311	71.6
5	BEWAG	0.3318	Yes	0.3432	3.4	0.5140	Yes	0.5269	2.5
6	EWE	0.5438	Yes	0.5626	3.5	0.8544	Yes	0.9434	10.4
7	Envia	0.1146	No	0.0392	−65.8	0.2686	No	0.0980	−63.5
8	EDIS	0.0958	No	0.0000	−100.0	0.2235	No	0.0000	−100.0
9	EAM	0.2942	Yes	0.4296	46.0	0.5589	Yes	0.7384	32.1
10	Lech-Elektrizitätswerke	0.1128	No	0.1128	0.0	0.2270	No	0.2270	0.0
11	KWL/KWR	0.0000	Yes	0.0950	N/A	0.0000	Yes	0.1985	N/A
12	GEW Köln	0.4998	Yes	0.6626	32.6	0.9967	Yes	1.3686	37.3
13	Stadtwerke München	0.7330	Yes	0.7824	6.7	1.5397	Yes	1.6751	8.8
14	HEAG	0.1678	Yes	0.2506	49.3	0.3644	Yes	0.5020	37.8
15	Stadtwerke Mainz	0.5424	Yes	0.6170	13.8	1.079	Yes	1.2064	11.8
16	Stadtwerke Düsseldorf	0.6068	Yes	0.6766	11.5	1.2467	Yes	1.3727	10.1
17	MVV	0.7418	Yes	0.7604	2.5	1.5676	Yes	1.6343	4.2
18	Mainova	0.7250	No	0.6770	−6.2	1.4779	No	1.3645	−7.7
19	EW Minden-Ravensburg	0.1326	Yes	0.1332	0.5	0.3014	Yes	0.3339	7.5
20	Mittleres Ruhrgebiet	0.6846	Yes	0.7296	6.6	1.4097	Yes	1.5583	10.5
21	EWAG	0.6270	Yes	0.6786	8.2	1.2022	Yes	1.3063	8.7
22	DEW	0.6534	Yes	0.7008	7.3	1.2539	Yes	1.3564	8.2
23	Stadtwerke Bielefeld	0.6400	Yes	0.6826	6.7	1.2547	Yes	1.3924	11.0
24	DREWAG	0.7086	Yes	0.7090	3.2	1.3760	Yes	1.3773	2.3
25	Stadtwerke Karlsruhe	0.6674	No	0.6432	−3.6	1.3745	No	1.2183	−11.4
26	Stadtwerke Leipzig	0.6088	Yes	0.7258	19.2	1.0932	Yes	1.4222	30.1
27	Stadtwerke Bonn	0.7374	Yes	0.7988	8.3	1.4845	Yes	1.7107	15.2
28	Stadtwerke Freiburg	0.6608	Yes	0.6808	3.0	1.2648	Yes	1.3101	3.6
29	Stadtwerke Trier	0.6666	Yes	0.6960	4.4	1.3562	Yes	1.3790	1.7
30	Stadtwerke Pforzheim	0.7270	Yes	0.7382	1.5	1.4755	Yes	1.5442	4.7
31	Energieversorgung Potsdam	0.5774	Yes	0.6214	7.6	0.9471	Yes	1.0644	12.4
32	Stadtwerke Gütersloh	0.5604	Yes	0.6358	13.5	1.0236	Yes	1.2188	19.1
33	Stadtwerke Ratingen	0.6162	Yes	0.6218	0.9	1.1803	Yes	1.1904	0.9
34	Stadtwerke Tübingen	0.6426	Yes	0.7114	10.7	1.2995	Yes	1.4567	12.1
35	GGEW	0.5022	Yes	0.6020	19.9	0.7796	Yes	1.0423	33.7
36	Stadtwerke Villingen-Schwenningen	0.5934	Yes	0.6102	2.8	0.9712	Yes	1.0575	8.9
37	EGT	0.5938	Yes	0.6826	15.0	0.9969	Yes	1.2715	27.6
38	Stadtwerke Frankfurt	0.7698	Yes	0.7898	2.6	1.6635	Yes	1.7429	4.8
39	Stadtwerke Rostock	0.5986	Yes	0.7080	18.3	1.0310	Yes	1.3041	26.5
40	Stadtwerke Waldshut-Tiengen	0.3918	Yes	0.4896	25.0	0.7715	Yes	0.9693	25.6
	Sum	20.8692		23.0792	10.6	40.7769		45.8635	12.5
	Average per company	0.5217		0.5770	10.6	1.0194		1.1466	12.5

Based on these results, the following Section 4 will present an "ideal" diversification strategy based on the combined results of the entire project.

3.1. Methodology—qualitative study on the success of diversification

Historically, analyses on the success of diversifications have been conducted quantitatively. However, the results, especially in terms of correlation of company success and diversification have not been satisfactory. Meta-analyses on these shortcomings have been conducted by Schüle (1992), including 43 studies and Fey (2000), including 100 studies. In the literature, four main weaknesses are specified:

- diversification measurement,
- company success measurement,
- cause–effect relationship,
- strategic grasp.

The explanatory power of the measurements numerated is limited. Concerning diversification, a quantitative-continuous method is limited in terms of validity; a discrete-

Table 5
Overview of the business segments where the electricity companies have been active in, in 2000

Business segment	Number of businesses in 1995	In percent of the sample	Number of businesses in 2000	In percent of the sample	Absolute change	Change in percent
Electricity	40	100.0	40	100.0	0	0.0
Gas	35	87.5	36	90.0	1	2.9
Water	29	72.5	31	77.5	2	6.9
Heat	39	97.5	39	97.5	0	0.0
Waste	13	32.5	15	37.5	2	15.4
Telecommunication	12	30.0	23	57.5	11	91.7
Traffic	17	42.5	14	35.0	−3	−17.6
Swimming pools	7	17.5	9	22.5	2	28.6
Ports	4	10.0	3	7.5	−1	−25.0
IT	0	0.0	7	17.5	7	N/A
Parking	3	7.5	5	12.5	2	66.6
Shoes	0	0.0	1	2.5	1	100.0
Maintenance	0	0.0	1	2.5	1	100.0
Cable TV	1	2.5	1	2.5	0	0.0
Oil	2	5.0	2	5.0	0	0.0
Aluminium/silicon waver	1	2.5	1	2.5	0	0.0
Chemistry	2	5.0	2	5.0	0	0.0
Trade/logistics	1	2.5	1	2.5	0	0.0
Property	2	5.0	3	7.5	1	50.0
Consulting/contracting	4	10.0	11	27.5	7	175.0
Building services	2	5.0	3	7.5	1	50.0
Facility management	4	10.0	5	12.5	1	25.0
Coal	1	2.5	1	2.5	0	0.0
Energy technology	2	5.0	1	2.5	−1	−50.0
Construction	1	2.5	1	2.5	0	0.0
Print systems	1	2.5	1	2.5	0	0.0
Shipping	1	2.5	1	2.5	0	0.0
Radio	1	2.5	1	2.5	0	0.0
Airports	1	2.5	0	0.0	−1	−100.0
Development agency	1	2.5	3	7.5	2	200.0
Types of businesses	27		29		2	7.4
Number of businesses	227		262		35	15.4
Number of businesses per company	5.7		6.6			15.8

categorical method is limited in terms of reliability (Fey, 2000, p. 181 et seq.). Concerning success, capital market success measurements such as the Sharpe measurement, Treynor measurement, Jensen's Alpha and Tobin's q or company value oriented measurements such as the discounted cash flow are not available for non-quoted companies-also the markets do not always reflect the true success of a company (Fey, 2000, p. 199 et seq.) (Schüle, 1992, p. 106 et seq.). The relationship between diversification activities and company success has not yet been satisfactorily modeled, especially due to the time delay problem and the existence of other endogenous and exogenous factors influencing a company's success. Based on Grant et al. (1988, p. 788 et seq.), it may be assumed that there exists a time delay between diversification activity and the indication of its success of 4 years and more. Last but not least, the question if and especially how a company succeeded from diversification can only be answered when taking the company-specific situation into account.

Due to these four known shortcomings of quantitatively measuring diversification success, the authors decided to methodologically base the success analysis on a explorative case study research design (Yin, 1989). This methodological approach is in line with newer studies on the diversification success topic: Szeless (2001), Urech (2001) and Witte (1995).

3.1.1. *Time frame*

Contrary to the quantitative analysis in the previous section, the case studies of this section's qualitative analysis cover the time span from 1995 to 2002/2003. As such, the analysis includes a time span that is 2–3 years longer than the one presented in Section 2. The qualitative case studies include a longer story and consequently generate more insights into the diversification success of the German electricity companies. Also the chosen time frame follows the minimum time delay requirement of four years mentioned in the previous sub-section.

3.1.2. Data sample

Since case study research consumes plenty of resources, the number of cases in the sample is limited. For this study, the authors decided to concentrate on the diversification stories of nine German electricity companies:

Transmission System Operators (TSO)

- EnBW

Regional Supplier

- Energiedienst
- EWE

Municipal Utility

- badenova
- EGT
- GGEW
- HEAG
- Stadtwerke Villingen-Schwenningen
- Stadtwerke Waldshut-Tiengen

The sample covers all three archetypes of electricity companies. Every selected company has distinguished itself as innovative in the previous quantitative analysis in terms of diversification activities beyond electricity, i.e. field (iii). They may be considered as innovation leaders for diversification.

A comparison of the case study sample to the previous sample of 40 electricity companies shows, that in terms of diversification level and activities, measured additively and based on Berry's and the Entropy measurement, the nine case study companies have a comparable, sometimes higher diversification level (Müller, 2006, pp. 213–217).

This sample selection bias somewhat hinders the generalization of the results in terms of representatives. However, since the task of an exploratory case study design is to uncover 'success stories', in this cases diversification stories,[5] the combined results act as guidelines for other companies and further academic research.

3.1.3. Data source

The qualitative analysis of the nine cases has been based firstly on a content analysis of documents and secondly on personal and phone interviews with managers of the sample companies.

The content analysis[6] concentrates on business and annual report as well as other information material from the selected companies. The aim is to supplement and prepare the following personal interviews. Also, diversification aspects uncovered by the analysis of the secondary material has been used to trigger follow-up questions.

The personal interviews[7] aim to enable the researcher of the case study to understand and reproduce the diversification activities of the electricity companies. The phone interview is an instrument of secondary nature.[8] It has been used to follow up on the personal interview to clarify certain aspects. Both interviews have been semi-structured. In a first step, interview protocols were produced. The data were then coded according to the analytical dimensions (Barothy, 1997, p. 115 et seq.).

Appendix A gives the names and the interview details of the 15 managers of the case study sample companies.[9]

3.1.4. Measuring diversification success—case study research design

As mentioned in Section 3.1, the authors followed the example of newer diversification success studies and refrained from using capital market success measurements or company value oriented measurements. Instead, covering four dimensions (D1–D4, see below), the primary advantages and disadvantages as experienced by the case study sample companies have been collected and analyzed based on:

- answer frequency,
- critical crosscase comparison,
- plausibility test and
- comprising case particularities.

As a result, 73 observations on the success of diversification activities have been elaborated. Although it is not possible to state an absolute value on the success level, especially profitable constellations and diversifications creating substantial synergy gains may be identified. The concrete research aims of the case study are to:

- elaborate normative recommendations for diversifying electricity companies,
- elaborate an theoretical electricity companies which has diversified ideally, and
- determine the limit of a diversification strategy for electricity companies.

The foundations of all case studies are semi-structured interviews on the diversification induced by the market liberalization of 1998. The questions resp. proceedings that have been guiding the interviews can be found in Appendix B; the 102 questions and sub-questions are structured in four dimensions.

[5]The authors decided not to follow the other extreme since non-diversifying companies do not deliver any new insights into diversification strategies.

[6]For information on the technique of a content analysis, consult e.g. Atteslander (1991, p. 226 et. seq.), Kromrey (1998, p. 298 et seq.), Stier (1999, p. 162 et seq.).

[7]For information on the technique of personal interviews, consult e.g. Hayman (1975, p. 57 et seq.), Bortz and Bongers (1984, p. 174 et seq.).

[8]In the case of BreisNet, by his preference, the interview with Mr. Hans-Peter Genzwürker has been conducted via phone.

[9]The difference between the number of companies, 9, and the number of interviews, 15, is based on the need to clarify certain aspects with a follow-up interview.

Equipped with this semi-structure, the nine case studies were prepared in fall/winter 2002–2003, the last in June 2003.

3.2. Results of the qualitative analysis on the success of diversification

The nine case studies, including the elaborated observations on aspects relevant for the success (or failure) of diversification efforts made in the wake of the 1998 market liberalization may be consulted in Müller (2006, pp. 236–387). They are available only in German.

Concerning each item of the semi-structured interview, the experience of the nine case study sample companies have been combined to obtain a common picture on the aspect. After a case study sample internal comparison and a crosscheck with two experts, observations of explorative nature were generated, linking diversification activities of electricity companies and the success thereof. The two experts who were asked to falsify or support the observations were:

- R. Kastner; EGT, CEO,
- H. Schmidle, Stadtwerke Waldshut-Tiengen, authorized officer.

In total, 73 crosschecked observations of explorative nature have been generated and survived the four measuring criteria (see Section 3.1.4). They are presented next in Tables 6–8.

These 73 crosschecked observations of explorative nature form the foundation of the resulting idealized strategy of a diversifying electricity company which is presented next.

4. The resulting ideal strategy of a diversifying electricity company

Based on the generated and on plausibility tested explorative observations, the picture of an idealized strategy for the diversification of an electricity company in the wake of liberalization emerges.

Firstly and most importantly, the 'ideal electricity company' diversifies further into electricity within the range of its grid, i.e. field (i). It is thus building upon its existing network and customer relationships. The ideal electricity company does offer green electricity, keeping the investments to a minimum so. Energy trading is only considered if the company turns over 5 TWh or more. Branding efforts stop at the product level—individual product names for tariffs are not implemented. Extra value services are considered as the cases arise. At a certain size, a call center may be set up.

The second and strategically most important pillar concerns diversification activities beyond electricity, field (iii). In the wake of the liberalization of its national energy market, this virtual ideal electricity company implements a strategy focusing on network related businesses. To be more precise, besides electricity, the ideal company diversifies into:

- telecommunications,
- cable TV,
- public lightning,
- heat,
- gas,
- water,
- sewage.

The company does not only focus on these related networks but becomes active in buying and selling gas, in purifying water and running clarification plants. That way, the electricity company is able to sell all of these products to its customers out of one hand. This may minimize the administrative costs as well as the transaction costs for the customers.

The market for all of these businesses is limited by the area of the electricity grid. Most importantly, all cables, pipes, fibers and tubes are physically lying in the same trench. Fig. 2 gives an impression of the combined networks.

The virtual ideal electricity thus morphs into a network utility and operates all eight networks. A more detailed cost and investment analysis may be obtained in Müller (2006, pp. 360–380).

Additionally, the electricity company pushes the business segments of contracting and consulting (energy). This reflects the demand from the side of the corporate customers and strengthens the innovativeness and the marketing punch of the electricity company. Also the electricity company may choose to become active in the development business though without offering to finance projects or engage into selling any other financial services.

Third and last, concerning a possible market diversification, field (ii), the ideal electricity company concentrates on M&A, especially in order to enlarge the power distribution grid. If economically feasible, large corporate customers are also supplied nationally, using contracting.

More concrete normative recommendations including further comments and details can be consulted in Müller (2006, pp. 265–403).

This idealized company strategy is broadly inline with the key ideas/findings of Backaitis et al. (1984), Bettis (1981), Lecraw (1984), Roberts and Berry (1985), Salter and Weinhold (1979) and Song (1983).

5. Concluding remarks and outlook

The study has analyzed the development in the German electricity sector before and after the liberalization of the market in 1998. Based on a quantitative analysis, stretching from 1995 to 2000 and including companies representing ~77% of the market, it has been shown, that the diversification level increased in the wake of the liberalization.

Table 6
Elaborated explorative observations D2, product diversification within electricity, field (i)

Id	Elaborated explorative observations D2, product diversification within electricity, field (i)
1	If regulated markets of homogenous goods such as electricity are liberalized, the development and communication of low residential tariffs is crucial for corporate profits.
2	If electricity markets are liberalized, the profit share of residential and small and medium business customers increases relative to large customers.
3	A simple, straightforward structure of 4–6 different electricity tariffs induces cost saving for the electricity company as well as for the consumers.
4	The liberalization leads to a simplification of the accounting by e.g. abolishing internal cost allocation and the differentiation between high and low tariffs for the residential segment. As a result, the electricity bill is clearly and readably arranged.
5	The liberalization leads to improvements reducing the costs of reading the electricity meters.
6	The sales potential of green electricity is limited to residential customers and some corporate customers such as churches and municipalities.
7	On average, less than 1% of all residential customers choose green electricity.
8	Corporate customers buy green electricity only, if they can gain by communicating this fact to their customers.
9	The majority of the profits are gained in combination with the power grid. Therefore, few players are interested in selling their network.
10	The majority of electricity-grid owners do not have to invest into measurement technology since most companies have been sufficiently up to date prior to the liberalization.
11	A minimum of 5 TWh sales volume is necessary to cover the costs of setting up an energy trading unit.
12	It is not mandatory to offer existing clients a product name enhanced electricity tariff.
13	Electricity companies push customer retention programs.
14	Introducing a customer card leads to an increase of the customer loyalty. This may tip the balance in cases of competing suppliers with equal electricity tariffs.
15	Corporate customers do not react positively to the introduction of customer cards.
16	The introduction of non-electricity articles, even when low cost, does not lead to higher electricity tariffs.
17	Combined products (electricity plus) increase customer retention and acquisition as well as the brand image.
18	Combined products must be priced lower than the added prices of each individual product in order to attract customers.
19	Combined products increase the complexity of the accounting system.
20	Combining electricity with telecommunication leads especially to the recruitment of new telecommunication customers.
21	Combined products focusing on rather different or heterogeneous needs are not successful.
22	Combined products are usually confined to the area of the owned electricity grid.
23	At a certain size, the set up of call centers may lower administrative costs. The cost reductions are related positively to the number of products supported in the call center.
24	A consequent unbundling increases the image and cost transparency but decreases network effects and efficiency.
25	A centralised sales organization lowers HR costs and the transaction costs of the customers (single point of contact).
26	The liberalization leads to an increase in sales costs related to HR, by a minimum of 30-35%.
27	The communication costs especially for the residential segment tend to ''run out of the rudder''.
28	The marketing costs depend on the market diversification strategy for electricity.

Table 7
Elaborated observations D3: market diversification within electricity, field (ii)

Id	Elaborated explorative observations D3, market diversification within electricity, field (ii)
29	The aim of a market diversification is to increase turnover or to counter a loss of customers.
30	There is no substantial increase of residential customers for individual companies.
31	The price elasticity of new customers is similar to the one of old customers. New customers are more expensive than previously thought.
32	The sticking price of residential customers is around 8–10% (~50 EUR) and 0–5% for corporate customers, before they switch supplier.
33	A successful direct approach on a residential customer costs on average 200–250 EUR.
34	In order to win corporate customers, besides a low price, personal contacts are mandatory.
35	The collaboration with sales partners such as associations, intermediaries and old customers are cheaper and more successful than to directly approach new customers.
36	Well defined and tested products as well as tested processes in the administration and accounting are prerequisite to successfully diversify beyond the existing market in terms of gird area.
37	In Germany, only some 50%plus companies opted for an active market diversification strategy.
38	The reasons for opting for a passive market diversification strategy are good contacts to neighboring electricity companies, high cost for acquiring new customers and unsatisfactorily electricity access regulations.
39	The scale of the market diversification relates to the size of the companies.
40	A market diversification by M&A is more cost efficient and successful in terms of new customers than a direct acquisition of customers.
41	Parallel to conducting a market diversification, it is necessary to build a brand name.
42	The new marketing costs relate to the sizes of the market diversification.
43	It is not possible to price differentiate between new customers (market diversification) and old customers since the latter would not accept these tariffs.
44	The profit of new customers is significantly less than for existing customers due to acquisition costs.
45	Proprietary account systems better fulfil the needs of the electricity companies, esp. concerning stability.

Table 8
Elaborated observations D4: product or market diversification beyond electricity, field (iii)

Id	elaborated explorative observations D4: product or market diversification beyond electricity, field (iii)
46	A diversification into gas results in substantial synergy gains on the network and administration side.
47	A diversification into heating results in synergies on the network side.
48	A diversification into contracting and consulting (energy) increases the customer retention of the existing electricity customers.
49	A diversification into contracting and consulting (energy) does not account for a significant share of total turnover.
50	A diversification into water results in high synergy gains on the network and administration side.
51	A diversification into sewage results in high synergy gains on the network and administration side.
52	A diversification into telecommunications does not create the expected administrative synergies.
53	A diversification into telecommunications may result in synergy gains on the network side.
54	The broadband Powerline access technology is unlikely to gain large market shares since ADSL is superior in terms of both, capacity and costs. Also, electromagnetic waves disturb the transmission grids.
55	One niche market for Powerline is to equip existing facilities and buildings with telephony without having to conduct large scale construction works.
56	A diversification into Powerline may result in synergy gains on the network and administration side.
57	A diversification into cable TV results especially in synergy gains on the network side.
58	A diversification into facility technology does not result in synergy gains with the exception of security technology in combination with the electricity grid.
59	A diversification into facility technology may result in sales synergies as well as the possibility to employ surplus personal.
60	A diversification into facility management only seldom results in small synergy gains.
61	A selling of in-house IT services to third parties results in efficiency and effectiveness gains due to market pressure.
62	A diversification into the development business may result in reducing costs up to 40% by running the electricity, gas, water, telecommunication and cable network in one hand.
63	A diversification into waste may only realize synergy gains by producing electricity form waste (e.g. incineration).
64	A diversification into parking does not result in synergy gains.
65	A diversification into industrial maintenance does not result in synergy gains (surplus personal or existing business contacts)
66	A diversification into shoes does not create any synergies.
67	A diversification into financial services is compromised by the fact that customers do not attribute sufficient professional competence to the electricity company.
68	A diversification into financial services does not create synergies. It must be kept in mind that financial services require a higher share of expensive consulting activities.
69	A diversification into other network related businesses may result in synergy gains of up to 30% on the network side.
70	Generally, a diversification into other businesses may, under certain circumstances, result in 5–30% synergy gains in administration and sales.
71	Any diversification into other businesses creates start up investments which must be counted as negative synergies.
72	The limit of diversification is drawn where electricity companies are not able to transfer knowledge based on electricity or networks or other core competences into the new business.
73	From the point of view of the customer, an electricity company only has competences in energy or related network businesses. A borderline case is the diversification into telecommunications.

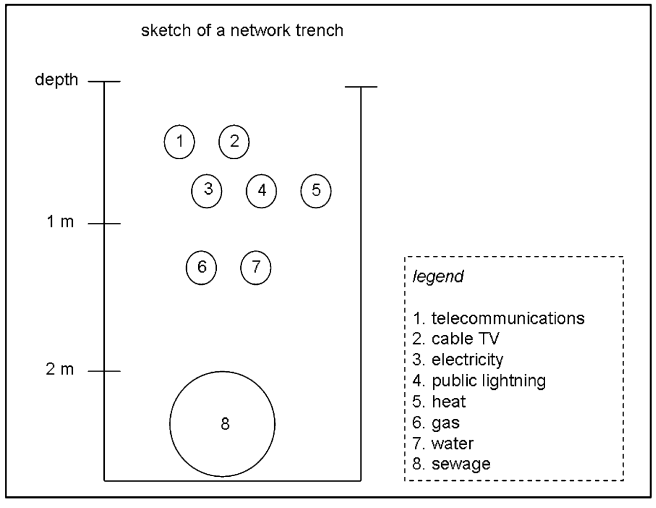

Fig. 2. sketch of a roadside trench, combining eight networks.

Building on this foundation, a qualitative analysis based on nine case studies further analyzed the evolution of the diversification efforts. This analysis conducted in 2003, resulted in 73 observations on the success of diversification. Based on these insights, an ideal strategy for an electricity company diversifying in a liberating market has been drawn up, giving concrete recommendations for (i) diversification within electricity, (ii) market diversification of electricity and (iii) diversification beyond electricity. These recommendations may guide other European electricity companies which all have to adapt to liberalized electricity markets sooner or later.

The main critique of previous, mostly quantitative diversification studies, i.e. due to the methodological reasons, the explanatory power of the indices or the study itself remains unsatisfactory, has been countered by combing a quantitative with a qualitative approach. As with all case studies, an element of subjectivity does pose a

problem in terms of study reliability. Therefore, the authors propose to consult this study's primary source (Müller, 2006) and offer to send the interview protocols to interested parties, provided a non-disclosure agreement is signed beforehand. To increase study validity, which also poses an inherent problem of case study research in terms of and sample selection, the authors have included nine electricity companies, representing all three archetypes. Furthermore, the results have been verified by two independent experts.

The necessary next step in the research of successful diversification strategies within the utility sector is to test the elaborated explorative observations quantitatively, based on a broader sample.

Also, the quantitative results described in Section 2 may be tested by comparing the entropy values with data obtained from a non-liberalized market.

As a whole, the results are comparable to the results and key findings of other publications on diversification. However, the literature is mixed on the topic. For example, a clear paradigm for related diversifications in comparison to unrelated diversifications has not evolved yet. Also, the industry particulars of the liberalizing utility sector are quite specific. For a review on the opposing views on diversification which would be beyond the scope of this paper, the authors suggest to consult Ramanujam and Varadarajan (1989).

Regarding future research, the need to study in depth the economics of a network in general and of roadside trench-based networks in particular, also becomes obvious (public monopoly vs. company ownership vs. customer ownership, transfer of synergy gains, etc.). Hitherto untouched but also highly relevant is the question of the organization of the transmission grids (oligopoly, surveillance). Last but not least, contrary to studies on the optimum size of power plants, the question of an optimum network size or area or optimum size in terms of customers, remains yet unexplored.

Appendix A. Interview partners of the nine case study sample companies analyzed in Section 3

- Brinker, Werner; EWE AG; CEO (Hannover, October 23, 2002, 17.30–18.30)
- Genzwürker, Hans-Peter; BreisNet; administration (via phone interview, January 14, 07.45–08.15)
- Haury, Gerhard; Energiedienst/Naturenergie AG; board of directors (Rheinfelden, September 12, 2002, 10.30–11.30)
- Jöchl, Helmut; badenova AG & Co. KG; head of sales (Freiburg im Breisgau, July 15, 2002, 10.00–11.00)
- Jungbluth, Christian; entega GmbH; head product management/product development (Darmstadt, October 10, 2002, 09.50–11.10)
- Kastner, Rudolf; EGT Holding AG; CEO (Triberg and via phone, September 20, 2002 and November 15, 2002, 14.00–17.00 and 11.00–11.30)
- Köngeter, Ulrich; Stadtwerke Villingen-Schwenningen GmbH; CEO (Villingen, October 18, 2002, 15.00–15.20)
- Lais, Peter; baden IT (daughter of badenova AG & Co. KG); CEO (via phone, February 2, 2003, 12.30–13.00)
- Müller, Peter; GGEW AG; board of directors (Bensheim, October 24, 2002, 14.00–16.00)
- Niemann, Mathias; badenova AG & Co. KG; head of energy trading (Freiburg im Breisgau, July 15, 2002, 13.00–14.00)
- Preiser, Klaus; badenova AG & Co. KG; head of enegy and heat contracting (Freiburg im Breisgau; July 15, 2002, 17.30–18.00)
- Schilling, Karl-Heinz; Stadtwerke Waldshut-Tiengen; CEO (Tiengen, July 16, 2002, 15.00–16.00)
- Schmidle, Horst; Stadtwerke Waldshut-Tiengen; authorized officer (via Email, December 7, 2005)
- Wertel, Klaus; EnBW AG; corporation spokesman (Karlsruhe, October 9, 2002, 13.10–14.50)
- Zimmermann, Petra; Stadtwerke Villingen-Schwenningen; sales/marketing (Villingen and via phone, July 17, 2002 and October 18, 2002, 17.00–17.30 and 14.00–16.30)

Appendix B. Interview questions resp. proceedings

- D1: company presentation and development
  - What are the ownership structure, history and relevant past events of the company?
  - To-Do: Recheck of the data already obtained within the quantitative analysis.
  - To-Do: Check the development of the diversification activities between 2000 and the time of the interview.
- D2: product diversification within electricity, field (i)
  - Normal electricity
    - What is your company's price strategy for normal electricity, residential customers? State advantages and disadvantages.
    - What is your company's strategy for business customers? Are there lessons learned?
    - How have the gross margins developed?
    - What are the used pricing models and the optimum number of tariffs?
    - Has the tariff calculation has been facilitated (residential)?
    - How are the meters read—has there been facilitations?
  - Green electricity
    - How many customers, absolute and percentage, are buying green electricity?
    - Why is the demand that weak?
    - How is the price elasticity of green electricity?
    - Are there business customers for green electricity?
    - Does green electricity have a future without subsidies?
  - Power grid (transmission and distribution)

  - What is the importance of the grids after the liberalization?
  - Is it planned to sell grids?
  - Have there been extra costs induced by the liberalization?
  - What margin is expected for the grid component of the business?
- Energy trading
  - Is your company active in energy trading? If so, are you also using leveraged financial instruments?
  - Does the decision to do energy trading correlate positively with the company size?
  - What is the reason for the existence of a minimum size for energy trading companies?
  - What is this minimum size?
- Product name
  - Has your company actively strengthened the company's brand image?
  - (ex-post) Was it necessary?
  - (If applicable) Why are you following a two or more brand strategy?
- Extra services
  - Which extra value service to normal electricity is your company offering?
  - What are the advantage/disadvantage of a costumer card?
  - Is there a tradeoff between low price an extra value services, especially for large corporate customers?
  - What are the cost of running a customer card program?
- Combined products
  - What is the main reason to offer multi element products?
  - What is the ROI thereof?
  - How many customers purchase multi element products?
  - Is it possible to obtain a higher price-level by offering multi-element products?
  - Are there possible synergies?
  - Is it possible to lower the transaction cots via multi-element products?
  - Are there settlement problems?
  - Are combined products offered beyond the area of your grid?
  - Will you continue to offer multi-element products?
- Call center
  - Have you set up a call center?
  - Why did you do so?
  - What are your experiences with call centers?
  - (if applicable) Why have you not introduced call centers?
  - At which company size is it profitable to set up call centers?
- Excursus
  - Do you have a centralized or decentralized sales organization?
  - What are the advantages/disadvantages of your sales organization?
  - How much have the sales costs increased due to the liberalization?
  - How is your product development organized?

- D3: market diversification within electricity, field (ii)
  - Why have you diversified beyond the area of your electricity grid?
    - Fundamental conditions?
    - Technological advances?
    - Competition?
    - Market attractiveness?
    - Change in demand?
    - Other?
  - How many customers did you lose in each segment due to the liberalization?
  - (if applicable) Was it possible to acquire new customers? How many?
  - What is the sticking price of your competitors' customers?
  - How faithful are newly gained customers?
  - What are the costs of acquiring one new customer when directly approached?
  - What are the costs using other sales channels?
  - What were the main cost drivers in the administration?
  - How did you diversify (regionally, nationally or internationally)?
  - What are the reasons for the large number of regional market diversifications?
  - (if applicable) Why did you not diversify beyond your power grid?
  - What are key aspects concerning marketing and sales for this diversification strategy?
  - How are the tariffs for the new customers calculated?
  - Did you diversify by M&A?
  - What is your experience concerning M&A?
  - Have there been accounting changes induced by the liberalization?
- D4: product or market diversification beyond electricity, field (iii)
  - In which businesses did you diversify?
  - How did you diversify? M&A? Joint Venture? Company intern?
  - Why did you diversify beyond electricity?
    - Fundamental conditions?
    - Technological advances?
    - Competition?
    - Market attractiveness?
    - Change in demand?
    - Other?
  - What were the advantages and disadvantages of this strategy, including negative synergies?
  - Concerning the value chain—what do the businesses have in common?
  - Where and how have you been able to save costs?
  - What are the similarities of the new and the old businesses?

- Was it possible to transfer resources into the new businesses?
- Was it possible to transfer resources from the new businesses to electricity?
- How much is it possible to save by diversifying into other network-based businesses?
- What were cost savings on the network side?
- What is the diversification advantage for the customer?
- Are there transaction costs savings for the customer?
- How is your network business organized? Centralized or decentralized?
- Did you change your sales organization due to the diversification?
- What is your company's branding strategy in the new business segments?
- What is the envisioned share of turnover for the new businesses?
- What is your company's market share of each business?
- Are you planning to invest beyond electricity?
- Did you plan to also become active in the financial or insurance sector?
- Would you diversify again beyond electricity?
- What are the next business segments targeted?
- What are the limits of diversifying beyond electricity?
- What is your company's vision for 2010/2020?

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