German energy suppliers from the perspective of business model dynamics

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Currently energy is a hot topic in the German society. This is due to the so called "Energiewende" which can be understood as a process towards a society without reliance on nuclear power. In order to reach this goal, energy is going to be produced by renewables for the major part. In the course of the "Energiewende", Germany records a fast expansion of renewable energy generation in the recent decades. The fast extension has several consequences for the German energy sector. This paper tries to describe how the external environment of German energy suppliers have changed in recent years and how these changes affect the dominant energy business model of energy suppliers. Therefore a macro analyses was conducted and linked to the real world business models of the RWE AG and the Naturstrom AG. RWE is in this comparison a representative of a dominant energy supplier. The Naturstrom AG represents a rather small competitor to RWE which peruses the "Energiewende" since its foundation. The RWE AG and the Naturstrom AG present significantly different energy suppliers with different business models. Due to their different business models, the companies show different successes. Whereas the RWE AG struggles with the current situation, the Naturstrom AG profits from the changes in the macro environment. Results show that changes in the macro environment lead to a receding importance of conventional energy supply. Changes which drive the energy transition takes place in social, legal or technical respect, for instance. This in turn leads to changes in the dominant business model of energy suppliers. Business models of energy suppliers seem to become greener in general. Products, services, the customer relationship and infrastructure management are coined by the development towards a more environmental friendly energy production.

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1. INTRODUCTION

The energy industry in Germany has faced and is currently facing big challenges. The EU-directive on energy market liberalization completely changed the formerly strictly regulated and monopolistic market environment (Marko, 2014). Müller (2012) concludes that with the opening of the German energy markets in April 1998 a kind of revolution was initiated. Today, competition among energy providers is taken for granted however (Müller 2012). In recent years another substantial modification of the German energy sector is forced by the so-called ”Energiewende”.

The “Energiewende” in Germany is understood as a process which marks a path to the future without nuclear power (bmwi, 2014). Therefore a society has to be created, dedicated to the idea of sustainability and responsibility for future generations (bmwi, 2014). Pursuing this idea, energy production should rely more on ‘green’ sources. By the end of 2050, power is intended to be generated with a share of 80% of renewable sources (bmwi, 2014).

A significant movement in German energy policy took place in the year 2011. After the nuclear disaster of Fukushima, the German government decided to shut down 9 nuclear power plants immediately with the goal to phase out all the nuclear power by 2022 (Bohl et al., 2013). This accelerated elimination of nuclear power plants was not predictable, since the German government legitimated extended run times of nuclear power plants, in October 2010 (Bohl et al., 2013)

Looking at facts and figures makes it obvious of how fast the share of renewables in Germany has increased (destatis, 2014). 24% of gross electricity consumption was contributed by renewable energies in 2013 (destatis, 2014). Thirteen years ago this share equaled 7% (destatis, 2014). Today wind power (8%), biomass (7%) and photovoltaic (5%) are the most important renewable energy sources in Germany’s power production (destatis, 2014). In contrast, waterpower with a share of 4 % was the main source in 2000 (destatis, 2014).

As figure 1 indicates is renewable energy production dominated by private people in Germany.

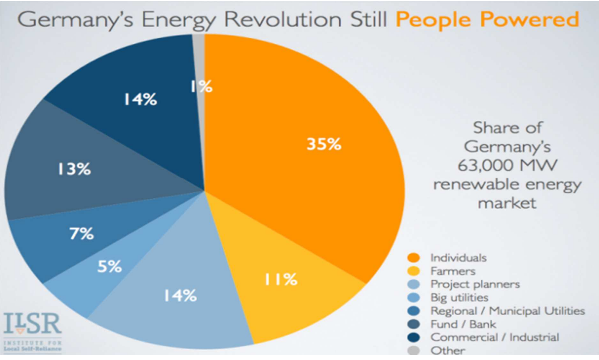

Figure1: Source (ilsr, 2014)

Renewable decentralized energy thus represents competition from the perspective of established utilities and energy suppliers in the market. Still the German energy market is dominated by the so called big 4 (E.ON, RWE, Vattenfall and EnBW) which produced 73% of the conventional power in 2013 (Berkel, 2013).

Based on the assumption that the use of fossil sources will further decrease in future, established German utilities and energy suppliers have to adapt their business model. The goal of this research is to describe the evolution of the German energy supplier industry with a focus on their business model in relation to the “Energiewende”. In doing so, influences from customers, policies, and technics are considered. In order to give examples from the real world, the current business models of RWE and Naturstrom are compared and analyzed by means of Osterwalder’s four pillars model.

The research question of this thesis therefore reads as follows: How are business models changing in the German energy supplier industry with respect to the “Energiewende”.

2. GREEN ENERGY = RENEWABLE ENERGY = SUSTAINABLE ENERGY

“Green energy is typically defined as energy produced and used in ways that are not damaging to the environment” (Harmon & Cowan, 2009, p.205). The term green energy is often interchangeably used with sustainable energy, alternative energy and renewable energy. Green energy use technologies that protect the environment by not producing so called “greenhouse gases” (Harmon & Cowan, 2009). According to Omer (2008), using alternative approaches to energy generation and exploitation is the key factor in reducing and controlling CO_2, since CO_2 is a major contributor to global warming. Green energy or renewable energy is directly or indirectly derived from the sun, is naturally recurring and includes energy such as photovoltaic, wind, hydro or geothermal power (treia, 2014). Nuclear energy takes a special position from this point of view, because it does not belong to the category of green energy, although its production does not induce greenhouse gases (Harmon & Cowan, 2009). A further major difference between conventional and renewable energies consists in the way they are diffused. Whereas conventional energy is usually generated in big central power plants, renewable energy is basically yielded by decentralized small scale facilities (Elliot, 2000). Dincer (2000), states that renewable energy sources have massive energy potential compared to conventional energy sources. This is principally evident since renewable energy is unlimited and the plenty of renewables is thus no constraint itself. However, renewable energy sources are diffuse, not fully accessible, partly intermittent and distinct through regional inconsistencies (Dincer, 2000). In general technological, economical and institutional issues are the main challenges with respect to the use of renewable energy (Dincer, 2000). To be able to incorporate renewable energy technologies in the existing energy system, an innovative and sustainable approach is needed, which is characterized by consequences for the whole system (Tsoutsosa & Stamboulis, 2005).

3. THEORETICAL FRAMEWORK

3.1 The Business Model Terminology

This paper analyses business models. In order to be able to use and understand this term it is important to look at the literature. What this term exactly means is unfortunately not that clear as one would think. Actually there coexist various descriptions which lead to ambiguity about this term. The academic origin of the term business model can be traced back to 1957, the year in which the term was used firstly in an academic article by Bellman, Clark et al.(Osterwalder, Pigneur & Tucci, 2005). From this year on, several researchers have developed their own definition of what a business model is. Above all in the last two decades the term has become very famous and is one of the most used terms in business conversations (Margretta, 2002). The widespread use of the term “business model” was heavily pushed by the emergence of internet companies and was used to disguise the often poor ideas behind their businesses (DaSilva & Trkman, 2013). Some definitions which emerged during this timeframe are: “A BM answers the question: ‘who is offering what to whom and expects what in return?’ A BM explains the creation and addition of value in a multi-party stakeholder network, as well as the exchange of value between stakeholders." (Gordijn, Akkermans, & Van Vliet, 2000, p.41). Hedmann & Kalling (2003) argue that a "Business model is a term often used to describe the key components of a given business. That is customers, competitors, offering, activities and organization, resources, supply of factors and production inputs as well as longitudinal process components to cover the dynamics of the business model over time." (pp.49, 52-53). Osterwalder and Pigneur (2010) in turn think that "A business model describes the rationale of how an organization creates, delivers, and captures value" (p.14). Business model definitions are also quite different. Still, there are constantly recurring thoughts and terms which can be observed in business model definitions. Al –Debei and Avison (2010) identified thematic indicators like, architecture, value proposition, business actors and roles, revenue sources, customers, network, business logic or technology.

Evaluating and reviewing a firm's business model is crucial due to many reasons. The importance of the business model is inherent in the great diversity of the functions it fulfills. According to Chesbrough (2010) the business model of an organization enables it to:

- Define the value proposition
- Detect market segments and thereby states how revenues will be generated and paid
- Identify and pinpoint the value chain which is required to deliver the offer to the customer. It also lists the needed complementary assets the organization needs to keep its position In the value chain
- Depict a picture of the position the firm is holding in the network with suppliers, customers, complementors and competitors.

A good business model is therefore invaluable. It gives the audience the possibility to understand how the system of a firm functions as a whole. It is a manager's tool to look at the critical elements, and to think of the right strategies needed to create a viable future for the firm. Researchers have developed various frameworks, to present and to identify a firm's business model. A famous example is the business model canvas by Osterwalder and Pigneur (2010). The business model canvas builds on Osterwalder's four pillars:" product, customer interface, infrastructure management and financial aspects". These four pillars in turn entail the so called nine basic building blocks: value proposition; target customer, distribution channel, relationship, value configuration, capability, partnership, cost structure, and revenue model (Osterwalder, 2004,). Thus the nine blocks of the business model canvas are quite similar to the building blocks from Osterwalder's four pillars: customer segments, value proposition, channels, customer relationship, revenue streams, key resources, key activities, key partnerships, and cost structure (Osterwalder & Pigneur, 2010). One of the most important insights a business model should provide, is the uniqueness in the way, value is created by a firm. Kindström & Kowalkowski (2014), notice that there is a dominant generic business model perspective, albeit each firm has its very own business model by which it describes how it generates and delivers value to its customers. Since there is usually competition, a good business model makes clear why it will exist not only today but also in the future. Differentiation is the key to survive and when a business model revolutionizes the known rules of an industry and is hard to copy, it delivers accompanying a competitive advantage (Margretta, 2002). Business model innovation is not only a tool to react to changes but should rather employed as a proactive method to stimulate a proper future what can be measured in financial as well as non-financial results like better products, or more efficient processes (Nair & Paulose, 2014). Since business models not only link production and consumption, but also functions as mediators which include stakeholder's expectations, business models provide access to innovation (Boons & Lüdecke-Freund, 2013).

3.2 The Link between Sustainability and Business Models

The urgency of business model innovation is not only forced by internal drivers like incongruities, process and system needs, changes in industry practice and strategy, but is also triggered by external changes which consist for instance of political dynamics, economic factors, social issues, technological progresses, regulatory and legislative determinations, ecological concerns, industry and market alterations or future scenarios (Fasnacht, 2009). This can be seen especially the interest in ecological factors which have been steadily increasing in the recent years and sustainable technologies are now challenging prevailing business models. The debate on the interaction between business and sustainability with the purpose of finding solutions to create a long-term future has become a central theme in developed as well as undeveloped countries and those who take a position between them (Wells, 2013). Once a company has introduced a sustainable business model, the company has built the foundation of evaluation with respect to sustainable actions which should match diverse stakeholder perceptions(Stelvia & Silvestre, 2013). Sustainability might be seen as a separate feature in a business model but should be understood as a holistic approach to create more value (Verhulst & Boks, 2012). Gutberlet (2000) supports this thought and states that sustainability means a mental shift in the society, where leading people relate sustainability with more than better technologies, processes or products. In the western world, where we are used to believing that everything is abundant, the term sustainability may sound restrictive. Nevertheless sustainability should be recognized by managers as a chance to redefine their management goals, with an emphasis on critical stakeholders and thereby establishing their organizations as sustainable leading companies which are able to turn sustainability into economic success (E. G. Carayannis et al., 2014). According to Bohnsack et al. (2012) there is a necessity to progress business models which are able to overcome barriers to sustainable technologies and thereby allow sustainable technologies to finally penetrate and exploit the markets. Whether sustainability is perceived as a mere ad-on or leads to deep changes in a firm's business model depend on the sort of innovation approach. Verhulst el al. (2012) argue that efforts on product or process innovation do not lead to significant sustainable business model innovations, whereas an emphasis which exceeds the product or process view would well activate a change towards integrated sustainable business models. There are several methods for businesses to become sustainable organizations. One of the most renowned frameworks used to promote and to assess the sustainable performance of companies is the so called "triple bottom line". The term triple bottom line was coined by John Elkington and considers economic, environmental and social aspects of firms (Hall & Slaper, 2011). Slaper and Hall (2011), claim that there is a problem to measure the triple bottom line, since ecological and social performance could not be assessed in a unified manner. In their recent literature review, Bocken et al. (2014, p.42) identified eight different architectural types for organizations to become sustainable actors: "Maximize material and energy efficiency; Create value from 'waste'; Substitute with renewables and natural processes; Deliver functionality, rather than ownership; Adopt a stewardship role;

Encourage sufficiency; Re-purpose the business for society/environment; Develop scale-up solutions." Obviously there are different opportunities to generate a sustainable way of business. To be able to reach the shift into a sustainable organization, managers need to apply multiple approaches and allow their stakeholders to participate in order to overcome obstacles to change (Stelvia & Silvestre, 2013).

3.3 The Four Pillars by Osterwalder 2004 and the Building Blocks of the Business Model Canvas

To compare the two business models of the case companies in this thesis, the so called four pillars model by Osterwalder (2004) is used. Similarities to other business model frameworks can be explained by the fact that Osterwalder's four pillars are influenced by the famous Balanced Scorecard of Kaplan & Norton (1992) (Osterwalder, 2004). The four pillars give a very simplified depiction of the way a company functions. This is not surprising since the logic behind a model is to facilitate complex proceedings. Offering a systematic approach and a clear structure, the model allows for analyzing and comparing business models. The four pillars are product, infrastructure management, customer interface and financial aspects. These pillars in turn correspond with the nine interrelated building blocks of the business model canvas of Osterwalder & Pigneur (2010).

Product: The first pillar called product deals with a firm's value proposition. Managers should keep in mind that value propositions can't be made or delivered; they only can be offered (Vargo & Lusch, 2004). The value proposition refers to products and services provided by a firm to its customers. Thus the value proposition is the attribute which ultimately enables a firm to turn prospects into customers. Lindic & Da Silva (2011) state that the value proposition explains why customers choose certain firm offers instead considering competitors alternatives. Hence, a company has always to reflect whether the provided products and services actually add value to its customers. That is, perceived value is crucial, not only for customers but also for firms. Perceived value is broadly separates into perceived benefits and perceived costs (Lindic & da Silva, 2011). According to Frow & Payne (2008) should firms make value propositions which satisfy all their stakeholders (Frow & Payne, 2008)

Infrastructure management: The third pillar deals with suppliers, partners, resources, activities and capabilities in order to turn value propositions into real services and products (Osterwalder, 2004). Teece (2010) argues that technological innovations won't be successful if they do not match the required resourcefulness of a firm. In order to comprehend how a firm can reach a competitive advantage towards competitors it is important to realize how product strategies as well as internal structures, resources and capabilities are adjusted (Rindoca & Kotha, 2001). Corresponding building blocks are key resources, key activities and key partnerships.

Customer interface: Within the customer interface it will be clarified which target segment of customers is important, which distribution channels are used and how the relationship with the customer functions (Osterwalder 2004). "The key goal in segmentation is identifying and reaching profitable segments with products and services that meet the common needs of these customers. However, a fundamental issue needing rigorous attention is that customers' needs are dynamic and can induce segment instability." (Blocker and Flint, 2010, p.810). In order to establish a closer customer relationship, customer relationship management (CRM) serves as valuable technique, since CRM gathers and structures relevant information on customer requests and manners (Slack, Chambers & Johnston, 2010).

Financial aspects: Financial factors determine business success to a vast extent. Within the scope of the four pillar model and likewise in the business model canvas, revenue streams and the firm's cost structure are emphasized financial aspects (Osterwalder 2004, Osterwalder & Pigneur, 2010). It is important that the cost structure of a firm matches the ideas behind its business model (Fritschner & Pigneur 2010). Moreover, Fritscher & Pigneur (2010) argue that revenue streams reflect the value customers are willing to pay.

3.4 Business Models and their Environments

Business models are as suggested before not independent concepts, yet are interactive with their particular environments. Osterwalder & Pigneur (2010, p.200) state that it is more important than ever before to observe the firm's environment due to the ever "growing complexity of the economic landscape". In a growing sophisticated society like Germany, the German energy sector is noted for growth and increased shares in renewable energy. The established big players have lost market shares and are exposed to changes in actually all external aspects. Within this research the PESTEL framework is used to show how external issues have changed and influence the German energy industry. The PESTEL framework analyzes the macro-environment and thereby illustrates the, political, economic, social, technological, environmental (green) and legal factors (Johnson et al, 2011). Figure 2 shows the interplay between the macro environment and business models.

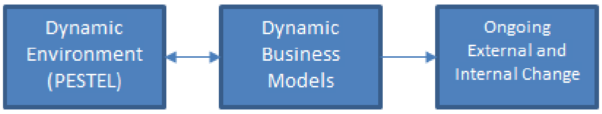

Figure 2: Interplay between the macro environment and business models

Both, the macro environment and business models are dynamic and should be seen as interdependent variables. From the perspective of companies this means an ongoing internal and external change.

4. METHOD

This research uses the desk-research method in order to gain relevant information. Important sources of information are scientific articles, annual reports, reports written by institutions, interviews from heads of energy companies, studies accomplished by consultancy firms and online data bases. The focus of this study is on Germany. This country reflects an interesting example for the analysis of business model dynamics in the energy sector due to the fact that the energy market in Germany perceives tremendous changes along with the 'Energiewende'.

The purpose of this study is to describe general developments in the external environment of energy suppliers in Germany in the course of the 'Energiewende'. Therefore driving forces towards the energy transition are analyzed. The structure of the external environment analysis follows the PESTEL framework as shown in the table below.

Table 1: Focus components in the PESTEL analysis

Political	International political situation regarding energy providers.
Economic	Costs of renewable technologies; energy prices; employment effects
Social	Environmental awareness; new customer segments; number of prosumers
Technological	General technical improvements; cost reductions; smart grids; the internet as communication asset
Environmental	CO2 emissions; climate change; natural disasters
Legal	EEG and the feed-in tariff instrument

Since this research is descriptive, the case-oriented method is used. Case oriented, in general, means to understand "a particular case or several cases by looking closely at the details of each" (Babbie, 2007,p.395). Thus to link the external developments with real world cases, the business models of the RWE and the Naturstrom group are compared to find out how different companies in the energy sector plan to tackle the challenges of the energy transition.

RWE is one of the biggest energy suppliers in Europe and portrays a large concern which operates in several countries and seems to struggle with the recent developments in its home country. The company was originally founded as Rheinisch Westfälisches Elektrizitätswerk AG in 1898 (rwe, 2014). From its beginning until today the company experienced two world wars and many other events of historical importance. The company is active on all stages of the energy value chain including production, power generation, supply and trading, transmission and distribution and products and services (rwe, 2014). Today RWE is a multinational company which had a turnover of 54 billion euro in 2013 (RWE AG, 2014). 66.000 employees served 16 million customers (RWE AG, 2014). Despite the 54 billion euro turnover and tremendous market shares, RWE had to post a net loss of -2,8 billion euro for 2013 (RWE AG, 2014).

In contrast there is the Naturstrom group, which is a niche provider of 100% green energy. The Naturstrom group was founded in 1998 when the energy market was opened (Naturstrom Gruppe 2013). Nowadays the Naturstrom group is one of the largest green energy suppliers in Germany (Naturstrom Gruppe 2013). By the end of year 2012 the group reported a turnover of 220 million euro (Naturstrom Gruppe 2013). The EBIT was 10,76 million Euro (Naturstrom Gruppe, 2013). The consortium serves 240.000 clients with green power and biogas and has 170 employees (Naturstrom Gruppe, 2013). Green power and biogas are the types of green energy delivered by Naturstrom (Naturstrom Gruppe, 2013).

The two cases in this study are not random samples but systematically selected. Firstly RWE portrays a multinational and dominant energy supplier which seems to suffer under the "Energiewende". Naturstrom is in contrast to RWE much smaller and can be understood as a niche provider which fully relies on green energy. As both companies are publicly listed firms they have to publish annual reports which give useful information in many respects.

The comparison of the two business models is done by means of the four pillars model by Osterwalder & Pigneur (2010) which is outlined above. Describing the respective business models in this way gives a cohesive structure and is beneficial in order to detect similarities and contrasts. But before the PESTEL analysis and the business model analysis are addressed, a brief literature review will give evidence about how renewable energy technologies can be integrated in energy suppliers' business models.

5. LITERATURE ON BUSINESS MODELS FOR RENEWABLE ENERGY SUPPLIERS

Würtenberger et al, (2012) identified several ways for energy suppliers to act as service companies. As the name indicates, Energy Service Companies (ESCOs) core competences are embedded in the service domain. They are basically contractors and implement customized service packages including aspects like financing, operation & maintenance or optimization of energy concepts to building owners (Würtenberger et al., 2012). The ESCOs' business model can be further subdivided into three different variants. The first variant focuses on the supply of energy and is called Energy Supply Contracting (ESC) (Würtenberger et al., 2012). The second business model of the Energy Service Company focuses energy savings to the end user and is known as Energy Performance Contracting (EPC) (Würtenberger et al., 2012). The Integrated Energy Contracting (IEC) is the third variant and is a mixture of the business models mentioned above. The IEC combines energy supply from renewable sources and applies conservation measures (Würtenberger et al., 2012). Würtenberger et al. (2012) further propose business models based on financing schemes. Firstly feed-in remuneration schemes can be used as a basis for a business model. Producers of renewable energy receive payments per unit of energy produced and can thereby rely on guaranteed revenues in a long term view (Würtenberger et al., 2012).A second variant is the On-bill financing business model. In this model, utilities pre-finance renewable energy technologies and energy efficiency measures to building owners (Würtenberger et al., 2012). The preliminary financing by utilities is paid back through a surcharge on their bills (Würtenberger et al., 2012). Moreover provides leasing a way to diversify energy suppliers' business models. In leasing models, the renewable energy technics are typically owed by a financial institution (Würtenberger et al., 2012). In this way, ESCOs with limited access to capital can nevertheless offer their comprehensive service packages for renewable energies. Another basis for business models is offered by Energy Saving Obligations which "are a policy instrument that obliges energy companies to realize energy savings at the level of end users" (Würtenberger et al., 2012, p.8). The concept focuses on financial incentives of energy suppliers offered to their customers.

Brusnelli et al. (2012) present four additional types of business models. The upcoming trend of so called smart homes are emphasized by the authors and offer opportunities and threats to incumbent utilities which have to select suitable business models in order to be able to cope with a future which will probably yield in decreasing returns from traditional business models. Choosing the Distributor model, utilities are able to leverage relationships with existing customers as utilities develop energy-efficient products and services (Brusnelli et al., 2012). Being After-sales specialists, utilities could provide services with respect to maintenance of many types of equipment like boilers or central heating units (Brusnelli et al., 2012). Another business model option is that of Lead generators in which, utilities get fees for placing existing customers with companies that sell energy-efficient products and services (Brusnelli et al., 2012). Lastly, the authors present the Aggregator model which is the most comprehensive business model and comprises the coordination of all activities for customers, including the offer of products as well as services. (Brusnelli et al., 2012).

Richter (2013) distinguishes between the utilitiy-side renewable energy business model and the customer-side renewable energy business model. The utility–side renewable energy business model is comparable to the traditional business model of utilities, since the production of energy happens centrally and is generated by large-scale projects from one megawatt to some hundred megawatts (Richter, 2013). Renewable energy technologies under this business model encompass on – and offshore wind energy, large scale photovoltaic systems, biomass and biogas plants and large –scale solar thermal plants (Richter, 2013).. The author claims that the customer interface of the utility- side model consists rather of power purchase agreements on a B2B level rather than that of close relationships to the end-consumer. The customer-side renewable energy business model in contrast comprises small-scale energy production close to the point of consumption (Richter, 2013). Numerous variations of the utilitiy –side and customer side renewable energy business models are conceivable (Richter, 2013).

Marko (2014) developed five business models in the field of small-scale distributed renewable energy generation (DREG) which can be integrated by European utilities. The five business models focus on combinations of technologies (Marco, 2014). The business models are either suggested for mass customers or individual customers (Marco, 2014). The Combined Heat and Power (CHP) Plant Contracting business model is based on the idea of financing a biomass or biogas fueled CHP on the site of the customer (Marco, 2014). According to the author, the utility gets revenues for the installation, fuel, service and maintenance and is able to establish a long-term relationship with the customer in this model. The Fuel Cell Contracting business model is also a contracting model but addresses users with high-tech and high ecological passion (Marco, 2014). This business model adapts a full service approach (Marco, 2014). In contrast to the combined Heat and Power model, the utility also undertakes the operation of the system, since the technology involved in this model is quite complex (Marco, 2014). Even more service is provided within the Complete Service Package business model which includes all kinds of services such as services for energy analysis, adequate planning of energy systems, installation, operation, monitoring and maintenance (Marco, 2014). Moreover, utilities could benefit from consultant services with respect to financial, legal, or economical topics (Marco, 2014). Customized packages are offered to potential customers with medium-sized properties, owners of multiple buildings, trade and small-industry as well as municipalities (Marco, 2014). Next to this, the author suggests the Heat Intensive business model. Keynote of this business model is the establishment of a distributed energy system which involves multiple technologies and thereby optimizes energy efficiency, storage capacities and energetic waste use (Marco, 2014). Finally there is the Power Intensive business model, which is a concept for electricity intensive businesses (Marco, 2014). The core competence of utilities within this business model is embedded in energy consulting and planning activities (Marco, 2014).

6. PESTEL ANALYSIS

6.1 Political

Crucial issues of policies in the energy sector are the security of supply, environmental impacts and costs (Lund, 2009). Even if this paper addresses only Germany, the promotion of renewables and the above mentioned issues are directly linked to foreign politics. This PESTEL analysis though addresses only the aspect of energy security from a foreign political point of view. This is due to Germany’s relatively strong dependency on energy imports. Germany imports 71 % of its energy from foreign countries (Energiebilanzen, 2014). With 38% of all energy imports, Russia is the most important energy supplier for Germany. Duffield (2009) highlights Germany’s dependency on Russia’s energy in general and even then referred to the tense situation between the Ukraine and Russia which again could become problematic to Germany as much Russian gas passes pipelines in the Ukraine. Now 5 years later the relationship between Russia and the Ukraine is very dramatic. With the crisis in the Ukraine Europe’s gas supplies from Russia aroused new public interest (bundesregierung, 2014). Germany’s high dependency on foreign energy, and thereby implicitly on Russia’s energy supplies could be contained by means of the expansion of renewable energy (bundesregierung, 2014). The economist Hans Werner Sinn argues however, that Germany is not able to realize the energy transition without Russian gas supplies, since there would not be enough capacity from renewable energies in Germany at this point (focus, 2014).

6.2 Environmental

Clearly, environmental issues are main the triggers towards a more conscious use of energy and renewable energy in general. (Lehr, Lutz, & Edle, 2012) assert that the positive effects on the climate are unquestionable. Global warming is a permanent topic in this context as further global warming will have disastrous impacts on the planet. Global warming in turn is attributed to C02 emissions and the German government has articulated ambitious goals in order to protect the climate. Governmental plans want to reduce C02 emissions sharply. A decrease of 40 % compared to 1990 is required by 2020 and further decreases up to 80% based on 1990 are scheduled for 2050 (bmub, 2014). These governmental requirements seem to be reasonable as global warming can have severe consequences for the energy production. Power plants use water from rivers to cool down for instance, but through further global warming , there might be a lack of water from rivers or the water could be simply too warm to function as a cooling liquid (umweltbundesamt, 2014). Next to the permanent debate on global warming, several single events impact the debate towards a more green energy production and consumption. The nuclear disasters of Chernobel in 1986 and of Fukushima in 2011 are outstanding examples since their ecological consequences are incomparable to other catastrophes. Glaser & Mian (2012) argue that the Fukushima disaster occurred at a critical time in the German energy and climate debate. The radical response from the German government which included the nuclear phase out supports Glaser’s hypothesis.

6.3 Social

The roots of the anti-nuclear movement have their origins in the founding of the Green Party in the 1970s and since 1998 this party is permanently represented in the German Bundestag (Wüstenhagen & Bilharz, 2004). Chernobel in 1986 has increased the number of public opponents of nuclear power and led to a strengthened environmental awareness of the Germans. Nevertheless, nuclear power plants were in the following decades built and run times repeatedly extended. This is that consumers at that time did not have a strong position in relation to the energy production, as this is the case today. Yet in 2011, reports on the disaster in Fukushima were more extensive and more dominant than in the case of the nuclear accident in Chernobel (Wittneben, 2012). Therefore, the public were able to require more transparent information about the operation of nuclear power plants in Germany (Wittneben, 2012).

It can be noted that the environmental awareness of the society is also reflected in their purchasing behavior. According to Wüstenhagen & Bilharz (2006), customers who support the green movement have the goal to ensure that their money is not used to support unsustainable energy resources. Customers want to contribute to the energy turnaround and the climate protection, using their purchasing decisions and their acceptance to higher prices (Wüstenhagen & Bilharz, 2006). Gerpott & Mahmudova (2010) however found empirical evidence, that 75% of German residents either accept no surcharge or only an additional payment of up 2% for green electricity. This indicates that people in Germany are sensible to prices and rather unwilling to accept higher energy costs due to renewable energy. This contrasts with claims for a cleaner energy production since a cleaner energy production requires investments in the energy infrastructure which have to be paid.

Another very substantial difference between the energy consumers of the past and today is that they are not only consumers but in many cases also producers of energy. So consumers today are prosumers (Toffler, 1980). Prosumers generally focus on green energy production at their domestic location and thereby consume, store, share and lastly also sell excess energy savings to other market participants (Rathnayaka et al., 2011). Specific reasons why ordinary customers are willing to become prosumers in the energy sector are presented by Marko (2004) who cites Fischer (2003) and Leenheer et al. (2011). They identified the desire for independence, environmental awareness, technological affinity, energy affinity and the image of the utility as the main triggers for prosumers to build up own home power plants. In a nutshell, prosumers in the energy sector are still customers of the energy suppliers, through the demand of their energy and their grids for example, but on the other hand they are also competitors.

6.4 Technological

As Henry Cheshbrough has put it straight: "Technology by itself has no single value." (Chesbrough, 2010, p.354). In regard to business model development, though technology pushes business model development (Teece, 2010). The fast emergent renewable energy sector in Germany in recent years is accompanied by some major technological improvements which have led to the wide diffusion of renewables. Distributed generation, distributed storage and demand side load management will not only change consumption and production patterns of energy, but these new technologies will also enable reduced greenhouse emissions and improved grid stability through optimized energy streams and are likely to make the whole energy supply chain more efficient (Molderink et al., 2010). The range of innovations is tremendous (Dürschmitt, Böhme & Hammer, 2011). Enormous improvements have already been realized in a technological as well as in an economical point of view. Wind turbines today are for example until 3 times higher and approximately 10 times more powerful than the wind turbines the 1990s (Dürrschmitt et al, 2011). Future improvements for wind turbines are expected through aerodynamic innovations (Dürrschmitt et al., 2011). Similar successes are considerable for photovoltaic power. The total system price for one kW out of photovoltaic was about 14000€ in 1990 (Dürschmitt et al., 2011). Today the system price varies between 1000 and 1800€ per kW (Kost et al., 2013). In the same time span, the efficiency of photovoltaic modules has increased from below 10% up to between 20% to 25% depending on the silicon used (Dürrschmitt et al, 2011). Photovoltaic and onshore-wind power turbines will be cost leaders in future (ise-fraunhofer, 2014). The study conducted by Dürrschmitt et al. (2011), reveals that costs of renewable energy production are near to conventional energy currently and the costs inherited to produce energy by photovoltaic and wind power technology will be even lower than energy produced by conventional technologies through 2030 (ise-fraunhofer, 2014). All these developments have led to an increased share of renewables. Chicco & Mancarella (2009) argue that the ongoing changes significantly influence the electrical system infrastructure. The rise of prosumers connected to the grid will follow their own feed-in preferences. The problem is that an increased share of electricity which is fed-in from renewables will not automatically support grid stability (Schleicher-Tappeser, 2012). However smart grids offer sustainable solutions to cope with an increased share of renewables (Farhangi, 2010). Intelligence is added to the grid via independent processors which are linked to sensors and are able to communicate and to cooperate which each other and thereby form large distributed grids (Amin & Wollenberg, 2005). Smart grids differ fundamentally to existing grids in many aspects..

Table 2: Source Farhangi (2010)

Existing Grid	Intelligent Grid
Electromechanical	Digital
One-Way Communication	Two-Way Communication
Centralized Generation	Distributed Generation
Hierarchical	Network
Few Sensors	Sensors Throughout
Blind	Self-Monitoring
Manual Restoration	Self-Healing
Failures and Blackouts	Adaptive and Islanding
Manual Check/Test	Remote Check/Test
Limited Control	Pervasive Control
Few Customer Choices	Many Customer Choices

Due to the integration of independent processors and sensors, smart grids will be able to react much faster and more intelligent to emergencies than conventional grids (Amin & Wollenberg, 2005). Other benefits from smart grids are outlined below by Roncero:

- "Reduced blackout probability, and forced outages/interruptions." (2008, p.2)
- New options for consumers to manage their electricity use and costs." (2008, p.2)
- Environmental benefits gained by increased asset utilization" (2008, p.2)

Critical components in the smart grid are smart meters, since they are able to measure electrical consumption on the one hand, and on the other hand they are able to provide additional information (Depuru, Wang, & Devabhaktuni, 2011). End-consumers are expected to actively monitor their smart meters and are likely to change their consumption patterns (Torriti, 2014). By analyzing energy consumption with means of smart metering, utilities and ESCOs can offer advice services which for example concern the use of domestic appliances (Klopfert & Wallenborn, 2011). In addition to smart meters, energy storage systems are crucial to integrate renewable energy in the (smart) grids. Energy storage systems allow the decoupling of energy production from energy demand (Carasco et al., 2006). In this way storage systems offer solutions to overcome obstacles in regard to renewable energy integration due to the intermittent character of renewable energy generation. Depending on the weather conditions, there is excessive or insufficient energy. This has consequences for energy security, grid stability and energy prices.

Next to renewable energy technology itself, innovations outside the scope of renewable energy technology also influences the energy sector. Dürschmitt et al, 2011 argue that renewable energy innovations are triggered by new actors, new market structures and by research & development. With the introduction of the internet, basically all markets have been re-structured. The internet nowadays is omnipresent and provides masses of information (Rezabakhsh et al., 2006). Comparative information on the price is according to the authors probably the most critical information for customers Pitt et al, (2002). Web pages which compare prices and tariffs for energy in Germany are for instance www.stromanbieterverleich.de, www.toptarif.de, www.verivox.de . Yet many consumers do not simply seek information from the internet, they also add information to it. The use of social media enables discussions of current affairs in complete anonymity. The nuclear accident in Fukushima is an excellent example in the context of energy debates. The accident did not only reveal a significant increase of social media use but also provides evidence about people's concerns on the use nuclear power (Doan et al., 2011).

6.5 Economic

The effects of renewable energy promotion in economic terms are positive as well as negative. Lehr et al. (2012) identify two negative effects: Firstly, through the substitution of fossil fuels by renewable sources, investments in fossil fuel sectors are decreasing and consequently these sectors become less profitable. Secondly, renewable energy causes additional costs to firms and private citizens who in turn may have less funds for other expenditures which in turn could lead to job losses in the respective sectors.

Indeed, the price of energy in Germany has relatively strong increased in the last few years. Brost & Vorholz (2014) explains that the negative aspect of price development from a customer's point of view is partly caused through the promotion of renewable energies, since formerly high feed-in tariffs, especially for solar power, increase the electricity bill of German citizens as well as of many German companies. The allocation of funds induced by renewable energy is called EEG-Umlage. While the apportionment in 2012 was 3,59 cent per kwh, it now amounts for 6,24 cent per kwh (tagesschau, 2014). Currently an average private household with a demand of 4000 kwh per year pays 28,30 cent per kwh (verivox, 2014). Thus the portion of the 'EEG-Umlage' equals 22% of the current electricity price.

Yet next to the investment effects and energy price effects there are some other aspects which influence the energy market through an economic lens when renewable energy is included into the market. Considering the economic influence of renewable integration, there are differences regarding the source of energy. Rió & Burguillo (2008) suggest that most employment by wind energy for instance is temporary and takes place in the stage of equipment and manufacturing, whereas jobs created in the biomass sector would be more permanent. With 381600, individuals employed in the renewable energy sector in 2011,it can be noted that it reached a peak during that year (erneuerbare-energien, 2014). Compared to 2011 a slight decrease was apparent in 2013. Last year about 371400 people were employed in the renewable energy sector whereof 261500 jobs directly can be attributed to the EEG (bmwi, 2014). O'Sullivan et al., (2014) indicate future prospects for the renewable energy sector in Germany and come to the conclusion that the overall employment in the renewable energy sector will further decline in the recent future. However the authors also assume that the employment level will become more stable later, since the existing assets save jobs with respect to operation and maintenance activities (O'Sullivan et al., 2014). In addition, further jobs will emerge due to innovation and service offers which will help to integrate renewable sources (O'Sullivan et al.2014).

6.6 Legal

By formulating laws, governmental agencies are able to set conditions for industries. In doing so, the government pushes or restricts certain developments in the economy (Pearson & Foxon, 2008). Particularly the energy market and investment decisions in this sector are highly dependent on regulatory conditions (Bürer & Wüstenhagen, 2009). Omer (2008) argues that the most important step governments could take in order to increase renewable energy sources are to enable access to the energy markets. The key incentive structure in the renewable energy industry is the country's feed-in tariff system, which is acknowledged due to predictable and attractive rates (Mabee et al., 2012). The instrument of feed-in tariffs is frequently applied to trigger the development of renewable electricity by creating favorable conditions with respect to investment in this highly dynamic sector (Mabee et al., 2012). Germany's feed-in tariffs proved the consensus among German parliamentarians that a change towards renewables is needed to become a serious competitor in the energy industry (Laird & Stefes, 2009). According to Couture and Gagnon (2010, p.955) "the central principle of feed-in tariffs is to offer guaranteed prices for fixed periods of time for electricity produced from renewable energy sources (RES)". Applying feed-in tariffs means intervention in the market and therefore involves risks. Such a risk originates from the tariff level for example. Fagiani et al. (2014) notice, that the tariff level has a strong impact on its effectiveness. If the level is too low, it keep investors from investing in renewables, whereas a high level is effective in encouraging investors to spend money for renewables and results in superfluously high costs to society (Fagiani et al., 2014). Originally, the feed- in tariffs in Germany were enacted in 1991 with the feed-in law (StrEG) (Wüstenhagen & Bilharz, 2006). The StrEG had a deep impact on the energy market. It forced the utilities not only to connect renewable energy generators to their grids, but from that time on, utility companies were also forced to buy electricity produced with renewables, at fixed rates, varying between 65% and 90% of the average prices that utility companies charged their own customers (Laird & Stefes, 2009). This has led to the frustration of the big players in the market who formed an opposition to the new law (Wüstenhagen & Bilharz, 2004) The successor of the StrEG is the EEG and was introduced in the year 2000. From its introduction until now, the law was amended many times. The latest amendment was done in April 2014. The essential difference compared to the previous amendments concerns the limited support for wind-offshore, wind- onshore and biomass energy extension (derenergieblog, 2014). This mechanism is already used for photovoltaic installations (derenergieblog, 2014). This means that facilities which come into operation, after a certain capacity (dependent on resource) is reached, are paid reduced feed- in tariffs (derenergieblog, 2014). Excluded from this limited capacity corridors are facilities driven by hydro and geothermal energy (derenergieblog, 2014). Most likely feed-in tariffs will continue to be a future tool to enhance renewable energies (Couture & Gagnon, 2010). Despite its success in terms of relative strong expansion of renewables, the EEG and thereby the feed-in tariffs are heavily criticized. A counter argument to the use of feed-in tariffs is that they do not create enough competition (Butler & Neuhoff, 2008).

7. CASE STUDY ANALYSIS

In this section the RWE AG and the Naturstrom AG are analyzed in terms of their business model. This analysis is rather broad due to the complexity of both business models. Thus the goal is not to present an in depth analysis but rather to grasp the dominant logic behind them.

7.1 RWE AG

Product: Added value is mainly provided by energy from conventional power production. RWE wants to deliver reliable products and services which are payable and sustainable (RWE AG, 2014). The company offers a huge range of energy related products and services. Since the launch of RWE SmartHome in 2011, the company offers products and services which for instance enable remote control of household appliances by means of smart phones (RWE AG, 2014). Being able to monitor and to control electrical loads, the consumers have the capacity to save energy (RWE AG, 2014). Added value is also provided through more convenience and safety for customers (RWE AG, 2014). The product range consists of rather simple sockets for example but also entails complex storage systems for renewable energy.

Considering the ongoing changes in the external environment, Peter Terium, CEO of RWE affirmed that: "Fundamental changes are taking place in Europe's energy markets: moving away from the large conventional power stations and towards decentralized plants and renewables. However, the conventional plants will be needed as back-up stations for a long time to come." (RWE AG, 2014). As revenues from energy production will be remarkably lower, RWE will increase its efforts in energy management and other service operations. (Henning & Engelmann, 2013). This is in line with another statement from RWE's management: "In the future RWE's competitive edge will be determined by our ability to be a service company applying energy supply capabilities and information technologies intelligently" (energypost, 2014). In doing so, the company hopes to become a "project enabler", taking a "capital light approach". (energypost, 2014).

Customer Interface: RWE's target segments are B2B as well as B2C customers in Europe. In Germany the company serves 6,7 million customers (RWE AG, 2014) In order to reach customers, RWE uses multiple interfaces. A pervasive marketing campaign is conducted in print media, commercials and the internet. RWE sees itself as a leading player in the energy sector and measures its success against the duration of their customer relationships (rwe, 2014). Public relations are carried out in several ways. Cracker-barrels or e-bike tours are e-bike tours are examples (noz, 2014), (rwe, 2014).

Infrastructure: In 2013 RWE produced in total 216,7 billion kWh of electricity. Figure 3 shows the respective shares by source.

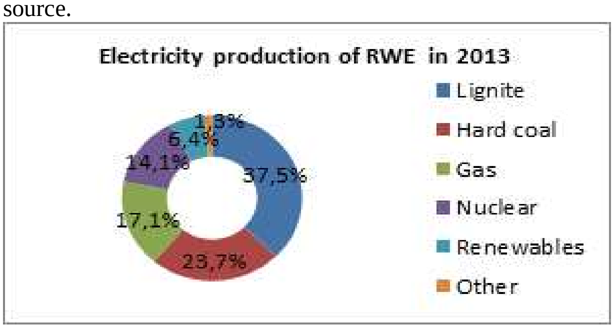

Figure 3: Data based on RWE-Annual-tables-2013.

The diagram above reveals that RWE mainly relies on lignite and hard coal, followed by gas and nuclear power. Renewables only play a minor role in the electricity production. An essential change in resources, specifically in power plants took place in 2011 when RWE was forced to shut down two nuclear power plants. Even if renewables expressed as a percentage play a minor role, renewables with the introduction of RWE Innogy in 2008 create a stronger position in RWE's infrastructure (rwe, 2014). Within this subsidiary, RWE pools all activities and competences concerning renewables (rwe, 2014). RWE Innogy focuses on large scale wind onshore and wind offshore projects but other renewable technologies like photovoltaic or biomass complement the resource portfolio of RWE Innogy (rwe, 2014). Thus RWE Innogy can be understood as the response to green marketers like Naturstrom, and as a response to general changes in RWE's macro environment. Further key resources of RWE are its electricity grids. As the PESTEL analysis reveals, is the grid management strongly influenced through electricity which is fed in by renewable energies. Advantages through technological innovation as well as disadvantages through intermittent energy loads could be identified. In order to make better use of their grids, RWE established joint efforts with the several partners. In a joint project between RWE and the Deutsche Telekom, 15000 smart meters were installed (Weber, 2013). In another project called "Smart Operator", RWE cooperates with the University of Aachen, the IT-firm PSI AG and several mechanical engineering companies (RWE AG, 2014).

Key activities are hard to define in such a large concern, since all activities along the value chain are important. In order to shape the energy transition RWE looks for new business models and potential donors, particularly potential partners (RWE AG, 2014). Moreover the company is concerned with several divestments (RWE AG, 2014). Today, key partners for conventional energy production take a critical role. Gazprom is such an example. Key partners against the background of the energy transition are telecommunication companies, universities, mechanical engineering companies and IT-firms.

Financial aspects: Revenues of RWE are generated by trading and selling energy, smart products and energy services. Customers can chose between different tariffs for energy (rwe, 2014). Additionally a 100 % green energy tariff is available (rwe, 2014).

Pushed and subsidized via the EEG, distributed energy generation negatively influences the revenue streams of RWE. This is due to bad prices when much green power is fed into the grid and because of a suboptimal capacity utilization of conventional power plants (sueddeutsche, 2014). Therefore the RWE had to shut down several conventional power plants in Germany and in the Netherlands (sueddeutsche, 2014). Moreover RWE has suffered from economic loss due to the disused nuclear power plants. The closed power plants lead to increased depreciations. Increasing expenditures for emission rights are another critical cost factor (RWE AG, 2014).

Already in the middle of 2011, RWE was downgraded by powerful rating agencies. Thereupon, RWE decided to strengthen its financial power by a historical high capital increase (RWE AG, 2012). Moreover began RWE with divestments. In 2011 the company sold about 75% of its electrical system operator Amprion. In addition the company announced further divestments of NET4GAS, some German sales and RWE Dea (RWE AG, 2012). RWE Dea explores and produces oil and gas (RWE AG, 2014). In 2014 the subsidiary was sold for 5,1 billion euro to the Russian LetterOne group. Despite these financial measures weakened the financial performance recent years. For 2013, RWE had to announce a net result of -2,8 billion euro (RWE AG, 2014). This is the first negative result since 1945 (berliner-zeitung, 2014).

7.2 Naturstrom Group

Product: 100% green energy production and supply are the basis for the value proposition. In 1999 the company was the first provider of a 100% green electricity tariff (Naturstrom Gruppe, 2013). Added value is created by giving German residents the possibility to be participants in the energy transition process (Naturstrom Gruppe, 2013). This is possible through the exclusive use of green energy sources on the one hand and through the financial support of a special fund, called naturstrom-Förder pool (Naturstrom Gruppe, 2013). This means that one cent per delivered kwh is gathered in the fund which in turn is used to build up power plants which are driven by renewable energies (Naturstrom Gruppe, 2013). The vision of the company is a hundred percent green energy production for Germany by 2050 (Naturstrom Gruppe, 2013). Next to the trading of green power and biogas, the company offers the certification of green power (Naturstrom Gruppe, 2013).

Customer Interface: The target segment of Naturstrom is green energy customers in Germany. B2B as well as B2C customers (Naturstrom Gruppe, 2013). Interaction with the customer takes place via the telephone, the internet or personal contact. A special relationship with customers is created by the common idea of sustainable energy production. Together with German residents, the company establishes and operates sustainable power plants and thereby drives the energy transition (Naturstrom Gruppe, 2013).

Infrastructure Management: Key resources for Natursrom are on-shore wind power plants, biogas power plants and photovoltaic power plants (Naturstrom Gruppe, 2013). The focus here lies on small to medium scale power plants (Naturstrom Gruppe, 2013). To implement the energy transition, collaborative projects with residents and local authorities are key activities next to the trading of green energy. Narturstrom has above all minor shares in distributed power plants (Naturstrom Gruppe, 2013). At the purchase of energy, the company makes use of 230 key partners which operate distributed small to medium scale power plants. (Naturstrom Gruppe, 2013).

Financial Aspects: First, revenues of Naturstrom are yielded via a 100% green power or 100% biogas tariff. The 100% green power tariff consists of a base at the height of 7,95 euro per month and variable costs of 26,95 cent per kwh. For biogas, the company requires a base fee of 9,90 euro per month and 6,6 cent per kwh (naturstrom, 2014). The respective offers contain no minimum term (naturstrom, 2014). Green power certifications are a further pillar of revenues (Naturstrom Gruppe, 2013). In this sector 7,2 million euro turnover could be recorded by the end of 2012 (Naturstrom Gruppe, 2013). Yet the backbone of revenues is energy supply. Overall about 210 million euro turnover could be record for 2012. The major share of costs emerges at the material input with about 183 million euro in 2012 (Naturstrom Gruppe, 2013). Due to the overall positive economic situation, more and more banks are willing to cooperate with Naturstrom (Naturstrom Gruppe, 2013).

8. COMPARISON

Product: The major difference between RWE and Naturstrom lies in the range of product and services. RWE provides next to energy supply a wide range of energy related products and services. Naturstrom is heavily focused on the trading of green power and biogas. Currently the production and disposal of green energy rather rounds off the product portfolio of RWE. This means that the product energy of both companies is similar. In both cases it is energy. However the production and therefore subsequent steps in the value chain are different. The final added value for the customer is manifold in both cases and derives from the device which transforms the energy into heat or kinetic energy for instance. Yet the special added value of green energy is due to environmental friendly aspects.

Customer interface: Naturstrom addresses green customers in the target market Germany. RWE in contrast focuses on Europe as a whole including private and public customers. Similarities exist in the way they market their products and service to customers. However RWE uses, in contrast to Naturstrom, commercials to gain attention. This is probably due to the fact that they have access to a larger marketing budget. Special public relations activities of RWE are for example E-bike tours (noz, 2014). RWE claims that the duration of relationships to customers is an essential measure for success. Naturstrom form relationships with customers based on the common idea. The common idea in this case is the energy transition. RWE also markets products and services with respect to the energy transition, yet the infrastructure is just partly sustainable.

Infrastructure management: The Naturstrom Group relies on 100% on renewable energy. For RWE renewable energy expressed in percentages rather take a minor role. This contrasts RWE's commitment to the energy transition process. Due to the different focuses on sources, different types of power plants are used. While RWE primarily operates large scale conventional power plants, Naturstrom's capacity is solely based on renewable power plants. The focus of Naturstrom is on small to medium scale power plants. Another major difference between Naturstum and RWE lies in the fact that RWE also operates grids. On key activities one can say that RWE simply has many more key activities to manage and shapes activities towards sustainability. The introduction of RWE Innogy is an example.

Financial Aspects:

Table 3: Financial data based on (RWE AG, 2012), (RWE AG, 2013), (RWE AG, 2014), (Naturstrom Gruppe, 2013), (Naturstrom Gruppe, 2012)

		RWE AG			Naturstrom AG		
		2013	2012	2011	2013	2012	2011
Employees		66.341	70.208	72.068	n.a.	128	93
Turnover	in million EUR	52.269	51.488	50.004	n.a.	210	135
EBIT		-1.487	2.230	3.024	n.a.	11	9
Operating result		5.881	6.416	5.814	n.a.	11	9
Net income		-2.757	1.306	1.806	n.a.	7	5
Depreciations		7.655	5.356	3.443	n.a.	4	1
Debt		30.666	30.015	29.948	n.a.	52	28
Leverage		3,50	3,50	3,50	n.a.	2,80	2,30
Profit margin in %		-5,3	2,5	3,6	n.a.	3,3	3,8

The table above reveals some key figures of the financial performance on RWE and Naturstrom. Data from 2013 are only available for RWE since as of now 2013 data has not been published. Comparing the financial performance of both companies, it is noticeable that the performance of RWE has become weaker in general, whereas the performance of Naturstrom has become better in some respects. Positive developments of Naturstrom can be seen above all in an increased turnover and in an in increased net income. Even if RWE was able to increase turnovers slightly, the net incomes became negative. Both companies record relatively high leverage ratios. This can become critical in regard to capital access. The profit margins of the respective companies are similar for 2011, yet RWE's profitability obviously became weaker in 2012 and 2013.

9. CONCLUSION

The aim of this paper was to identify how business models in the energy supplier industry are changing due the "Energiewende". Therefore business models of the energy supplier industry were described. Furthermore, relevant external factors were analyzed by means of the PESTEL framework. Finally two case studies by means of the four pillars framework were conducted and compared. Several conclusions can be drawn from this research. The essential conclusion is that a shift in key resources, triggered through the external environment, implies further shifts in the dominant energy business model. Conclusions and implications, composed according to the four pillars of Osterwalder (2004), are presented in table 3.

Table 3: Changes in the dominant business model of energy suppliers

Pillar	Change and implications
Product	Energy supply by means of large scale conventional power plants is receding in importance due to distributed energy production by renewable energy techniques. The literature and also RWE as a representative of a real world player propose customized energy services and products to establish new business models and to add value to customers. Smart technologies are an example to introduce new products and services.
Customer Interface	Naturstrom proves that focusing on green customers as an example for a specific customer segment can be successful. Yet the main change in the customer interface can be experienced in the customer relationship. The relationship is coined by an awareness of sustainability. Customized solutions (business models) shall develop stronger relationships. The internet as a distribution channel is not new, but with smart phones it has become more mobile. Apps enable diverse possibilities to market energy products and services.
Infra-structure Manage-ment	Conventional large scale power plants, especially nuclear power plants are replaced by small to medium scale power plants which are driven by renewable sources. Operators of these small scale power plants are often prosumers. Former grid management was in line with conventional energy production and dominated by energy suppliers. This top down approach has to consider behaviors from prosumers which fed energy into the grid by renewables. Thus the top down grid management meets a bottom up grid management. Likewise the one way communication is replaced by a two way communication system. As a result, grid management becomes more sophisticated. In order to integrate more renewable energy, storage systems become more important, because renewable energy is intermittent and storage systems allow decoupling energy supply from demand. Key partnerships in regard with the energy transition emerge through cooperation in renewable energy projects. Either on a B2B or on a B2C level. On a B2B level corporations with telecommunication companies or IT-firms become important in order to develop smart solutions. On a B2C level, the integration of private citizens means a shift in the allocation of influence and responsibilities.
Financial Aspects	Conventional power plants were former cash cows. Yet today they are partly financial burdens. This is especially true for nuclear power plants. Energy services and energy related products shall help to compensate financial losses due to an increased share of renewables.

10. RECOMMENDATIONS

The findings from previous sections can be used to make general recommendations for energy suppliers in Germany. First of all German energy suppliers should try to use the "Energiewende" to give their companies a unique profile. In order to become unique, energy suppliers could focus on a specific customer segment or technology for example. To understand the customer as a resource within a fully customer-integrated business model (CIBM) is a further recommendation, since consumers of energy are often also energy producers. Fully integrating the customer in the business model can have several positive effects. The full integration of the customer can be used to learn about and address consumers' needs and desires along with exchanging information beneficial for both clients and companies as well as to reduce costs, which in turn leads to increased profit margins (Plé et al., 2010). Moreover, energy suppliers should check each of their business model components and control whether the components are in line with demands which emerge due to the external environment. If the components are not aligned with the "Energiewende", energy suppliers should adapt the particular components. However not only external factors should trigger business model innovations, energy suppliers should undertake business model research independent from external forces.

11. DISCUSSION

11.1 Comments on RWE and Naturstrom

In case of RWE one can note that there are conflicting goals. On the one hand they want to shape the energy transition as a leading company and on the other hand the company has to slow down investments. It is questionable if a leading position in the energy transition process is possible for RWE due its financial situation. Moreover the infrastructure of RWE is coined by the conventional energy production. Considering that the overall share of renewable energy in Germany has increased fast in recent years, and is on average much higher than RWE's share of renewables, RWE has to catch up on. However it is not surprisingly that RWE is adapting its business model slowly in order to align it with the energy transition. From 1945 until 2013 the company constantly has record positive net incomes. Thus the established business model which is dependent on non-renewable sources of energy was a guarantee for positive results. Yet the dominant logic of the business model and its success hindered the company to detect and implement new ideas (Chesbrough & Rosenbloom, 2002).

To focus on green energy seemed to be a clever idea of Naturstrom when the company entered the German energy market in 1998. Naturstroms businesses developed positive in recent years and allowed the company to grow. Seemingly the company did not make significant changes of its business model over the years. This is in contrast with recommendations of the literature on business models. That Naturstrom did not significantly change its business model can be explained by the fact that the company was ahead of one's time. Renewable energy will most likely mark the path of the German energy future. Hence Naturstrom is probably on the right track. The question is whether 100% green energy tariffs are enough in an energy sector which becomes steadily greener. Thus also Naturstom reveals a dependency on its business model instead of looking and integrating new ideas.

11.2 Practical Relevance

The practical relevance of this study is given due to the comparison of two energy suppliers in Germany. Against the background of the "Energiewende", topics around energy are present in the German media and intensively discussed. Energy suppliers take a critical position towards the energy turnaround, since they conduct activities in the whole value chain and are required to ensure an undisturbed energy supply. Business model research in this context is relevant, since a shift towards renewables cannibalize the traditional business model. To synthesize the PESTEL framework and the four pillars model has been reasonable, as both models offer a structured approach for analysis. In this way, changes in the external environment of German energy suppliers and the responses of Naturstrom and of RWE in terms of their business models could be featured. Managers of companies in the same industry can also use this approach in order to create a clear picture of their business environments as well as their business models. Moreover this approach can serve managers as a first step to evaluate their current business models by means of a SWOT analysis for instance.

11.3 Scientific Relevance

Within this research the PESTEL framework and the four pillars model by Osterwalder (2004) were used as a scientific approach to gain information about the German energy industry. This paper is as far as I know the first paper which follows this approach in this specific field and is also the first paper which compares the business models of RWE and Naturstrom. In this way, this paper contributes to the field of business models in the energy sector.

11.4 Limitations

Due to the time constraints and page length restrictions of this thesis, the topic could not be as thoroughly investigated as needed to provide more robust findings. These two principle limitations substantially influenced this research. In general, the energy industry is a complex business. Every single aspect in the external environment offers information which can be used for issue-specific papers. Regarding the case studies, especially a full length case study of RWE AG was not possible, since RWE AG just functions as a holding and is subdivided into many subsidiaries. Thus, there exists much more information in general and in regard to RWE than considered in this paper. Due to the limitation of time a qualitative approach based on secondary data was followed. This approach does not allow for generalization of the specific findings.

11.5 Recommendations for further research

The "Energiewende" in Germany is a done deal. This research has shown how the external aspects change the energy industry. A critical issue for energy suppliers as well as for customers is an environmental friendly and a payable energy production. Thus further research should above all address technological subjects which offer the potential to combine both aspects. A further result of this research is that RWE plans to become a service company. Service companies in general are not innovations in themselves, yet the change from a traditional energy supplier whose business model is based on conventional energy production towards a service company which focuses on customized solutions, can be seen as an innovation for traditional energy suppliers in Germany. In regard to this development, further research could examine the expectations and wishes of customers with respect to energy services. Finally, further research should address potentially new business models for energy suppliers to overcome the shift towards renewables.

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