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**Article**

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# THE UK ELECTRICITY MARKET EVOLUTION DURING THE LIBERALIZATION PROCESS

Delia Vasilica Rotaru\*

**Abstract:** *This paper offers an insight on the liberalization process that took place in the United Kingdom starting with 1990 until now. The electricity market in the United Kingdom made incredible progress in the road to reaching a full level of liberalization where customers are free to choose between suppliers and services. An analysis of the most important indicators for the electricity market evolution such as electricity price, the market share of the largest generator, the energy efficiency indicator shows that the liberalization process brought many advantages starting with 2001. Also, UK has to face new challenges in order to keep the development of the industry on the right path, challenges that are presented in the final part of the paper.*

**Keywords:** UK electricity market; liberalization; energy efficiency; deregulation; market structure.

**JEL Classification:** L16; L94; Q43.

## INTRODUCTION

The United Kingdom is one of the countries often given as a successful example for the other ones aiming to liberalize their energy markets. Being among the first countries that acted in this matter, United Kingdom managed to reach a full level of liberalization of their energy market. Every consumer is now able to freely choose their supplier and to enjoy the benefits brought by this aspect such as lower prices, freedom to choose from a variety of products, non-discriminatory rules, efficiency, consumers rights protection, budget certainty etc. There are numerous benefits that the liberalization brought including investments in the market infrastructure which represents a very important aspect for the economic development of a country. However, we can say that the large consumers have increased advantages as they can negotiate directly with the suppliers and obtain lower prices than the domestic consumers.

The liberalization experience in UK started with the adoption of *The Electricity Act* in 1989. Prior to this the generation and transmission in England was under the state's monopoly, namely the Central Electricity Generation Board as a controlling structure. Like most of the countries, UK's government held the price regulation in order to avoid the abuse of market dominant position. Acting towards liberalization came as a necessity due to the ageing power plants and the need for replacement which required huge investments. The promotion of the energy efficiency and research

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and development for penetration for renewable energy and low-carbon technology were seen as a necessity. The transition period was not an easy one; the liberalization came with its advantages and disadvantages and was hardly criticized by some other countries which have seen this as a daring experiment. However, this experiment led to a fully functional liberalized market.

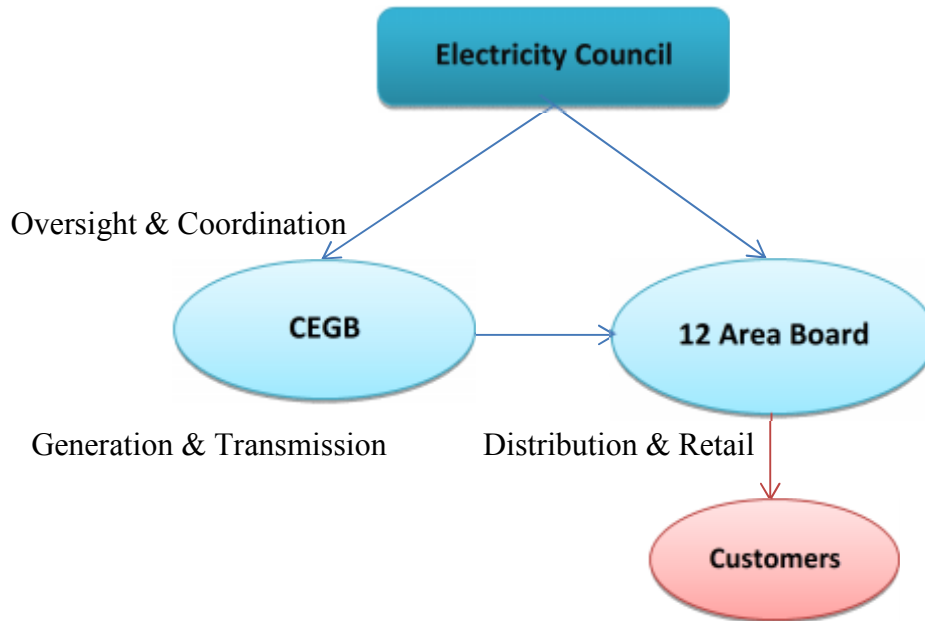
Nowadays, United Kingdom, along with all the other countries are facing new challenges as the global energy consumption tends to increase and this threatens the security of supply as the prices tend to rise as well. UK has adopted an Electricity Market Reform aiming to reduce the carbon emissions, to sustain the use of renewable resources for electricity generation and to keep the prices at an affordable level.

## **1. UK ENERGY MARKET PRE-DEREGULATION**

The electricity market in United Kingdom prior to the deregulation was characterized by the existence of the Electricity Council, the Central Electricity Generation Board and the 12 Area Boards that controlled the distribution across the country. The price controls were set by OFGEM (Office of Gas and Electricity Markets) and the market was fully regulated with no separation of supply, generation, distribution or transmission. As expected, the electricity market structure was a vertical integrated one, the prices and services that would be in favour of the consumer being decided by the OFGEM.

The Central Electricity Generation Board took birth in 1957 and was responsible with the electricity generation in England and Wales that was sold to the existing area boards responsible for distribution and supply. The Electricity Council was formed of three permanent members, the representatives of the CEGB and the chairs of the 12 area boards and had as main objective to promote and assist the maintenance and development of the industry and to provide advice to the government regarding the industry evolution (Simmonds, 2002). The figure below provides an image on the structure of the electricity market before the liberalization process:

**Figure 1 – UK’s electricity market structure prior deregulation**



Source: Horrocks, Lean (2011)

The Central Electricity Generation Board supplied electricity to the 12 Area Board at a bulk price which was different than the prices paid by the consumers as these were set up using the long run marginal cost basis which permitted their slight augmentation.

Between 1948 and 1970 several investments in the electricity infrastructure were made for building larger generation power plants in order to support the rising demand. The needed utility was obtained mostly from coal in detriment of oil, which led to shortage of coal predictions. To avoid this situation, two nuclear power stations were established in 1962 and another eleven stations in 1972. The transmission system was a very efficient one, the National Grid, which became operable in 1930, being upgraded to Super Grid by 1960s, able to run greater levels of power. In the 1970s the government had to deal with a crisis in the electricity industry brought by the competition from cheap gas that reduced the demand for electricity and the strike of the miners. The crisis revealed a lot of problems in the electricity market which lead finally to the decision that the liberalization of the market would be preferable (Horrocks and Lean, 2011).

The gas market prior deregulation was functioning mostly by the same principles as the electricity market. The market was vertically integrated, transportation and supply being operated by British Gas which was privatized in 1986 (Juris, 1998).

## 2. UK ENERGY MARKET AFTER DEREGULATION

The electricity act adopted in 1989 aimed to privatize the electricity market, to restructure the market by creating separate supply, generation, distribution and transmission entities and to remove the old Central Electricity Generation Board. The liberalization was set to be completed in three stages: in 1990 for the large companies with a demand of over 1MW, in 1994 for companies with a demand of over 100kW and in 1998-1999 for all companies and domestic consumers. The main reason for the liberalization was the change in the market and the crisis experienced, but many other benefits were expected by taking this step. The government was convinced private companies will be able to do a better job in the industry, the prices were expected to fall under the competition, a better care for the customers' needs was to be provided by the private companies and innovation was expected as well.

### 1.1. Electricity market structure after deregulation

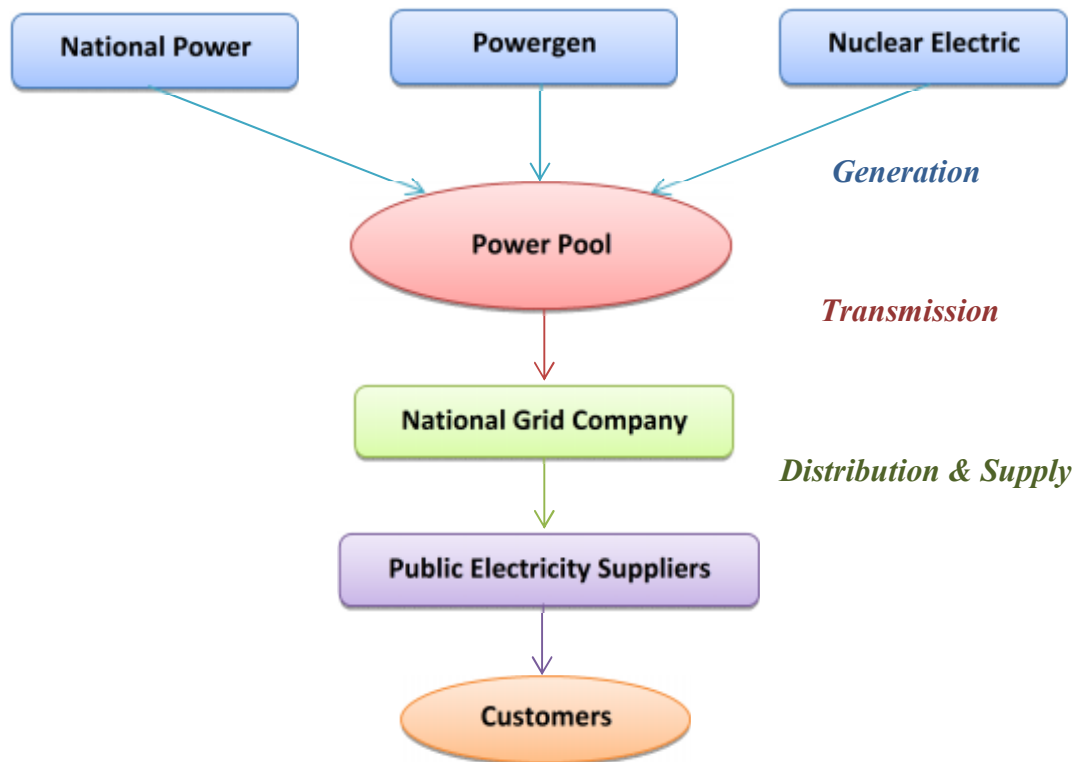
The deregulation process in the United Kingdom transformed the vertically integrated market through the separation of generation, distribution, transmission and supply in order to provide access to competitors to these segments. First of all, the separation of generation and transmission was a necessity. A new legal framework was introduced in the transmission area to offer access to third parties and to avoid the monopoly and overcharging tariffs. The transmission and distribution had to face competition by operating in an open delivery service. Bidding in the spot markets introduced competition in generation as well. The final objective was to offer numerous choices for customers when picking up their supplier of electricity (Abhyankar and Khaparde, 2009)

In order to make the liberalization process possible, United Kingdom took action in every segment of the market as following:

- a) **Distribution** - 12 regional areas were created to manage each regional zone. These were sold to private investors in December 1990.
- b) **Supply** – 12 regional areas created to provide supplier services to UK customers. The customers began to be allowed to change suppliers and the market was gradually opened;
- c) **Generation** – three separate companies responsible with electricity generation were created: Powergen, National Power and Nuclear Electric. Nuclear Electric remained under the State's control, whilst National Power and Powergen were privatized by 1995.

d) **Transmission** – National Grid Company was created to provide management of transportation in the UK which was privatized as well.

**Figure 2 – UK’s electricity market structure after deregulation**



Source: Simmonds, 2002

The power pool is a mechanism that allows the existence of the competition between generators and the calculation of the price paid by consumers. The generators sold electricity to suppliers or other buyers at a wholesale price declared at the beginning of each day. However, this mechanism was not considered a successful one given the fact that the demand was not involved in the price setting process and the wholesale price of electricity was determined by the two major generators. In 2001 a new model was introduced, the one of bilateral contracts which allowed generators and buyers to trade directly (Onaiwu, 2010).

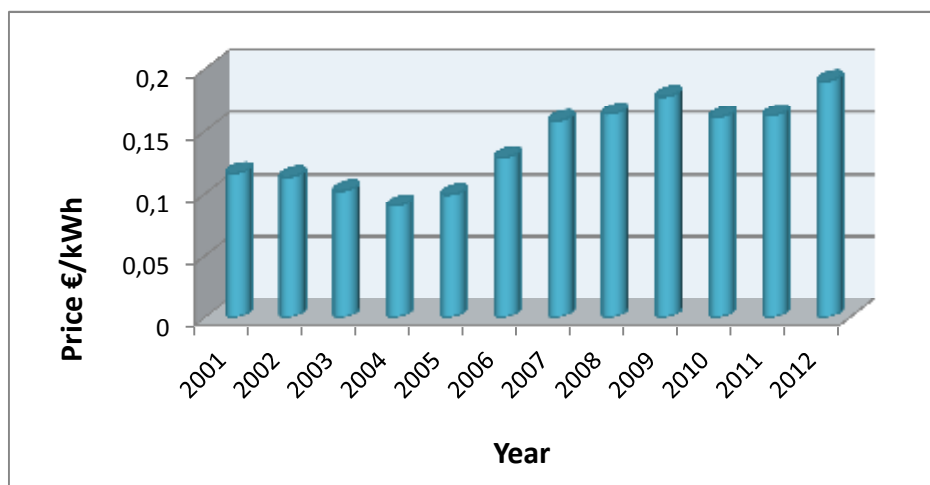
Between 1991, when the liberalization process started, and 2001 several changes on the market were seen such as supplier market evolution through consolidation and new entrants, the ownership of the regional areas now called Distribution Network Operator (DNO) and the generation market evolution through consolidation. In 2001 the first wholesale trading market for electricity went live.

## 1.2. The electricity market evolution after the deregulation process

The performance of the energy industry after liberalization was debated in many papers along the way. Newbery and Pollitt (1997) identified that in the first five years after deregulation the costs decreased by 6%, labour productivity doubled, the costs of the fuel fell and a high rate of investments occurred on the market. Another opinion on the deregulation process in UK was that the country performed admirably in the efforts to separate the regulatory process from the political process and in the promotion of competition (Berg and Blake, 1998). On the other hand, it is argued that the deregulation had brought a decrease of the private research and development expenditures and an increase of the public ones (Jamashb, Nuttal and Pollitt, 2006). Another opinion is that the liberalization process did bring cost savings but these were given mostly by the job losses both in the electricity and coal industry. The cost savings did not translate in benefits for the customers but for the shareholders who have increased their dividends in order to reduce the prices (Hall, 1999). The opinions on the UK electricity market deregulation are quite contrary but overall it is recognized that this is a needed change for the development of a country as it delivers long term economic benefits. The process is however, a long one and it requires the government commitment to resolve challenges when vested interests and cross-subsidies are involved.

In order to better understand the impact of the liberalization process on the electricity market an analysis of some important indicators like electricity price, market share of the largest generator in the electricity market, the overall energy efficiency gains needs to be done.

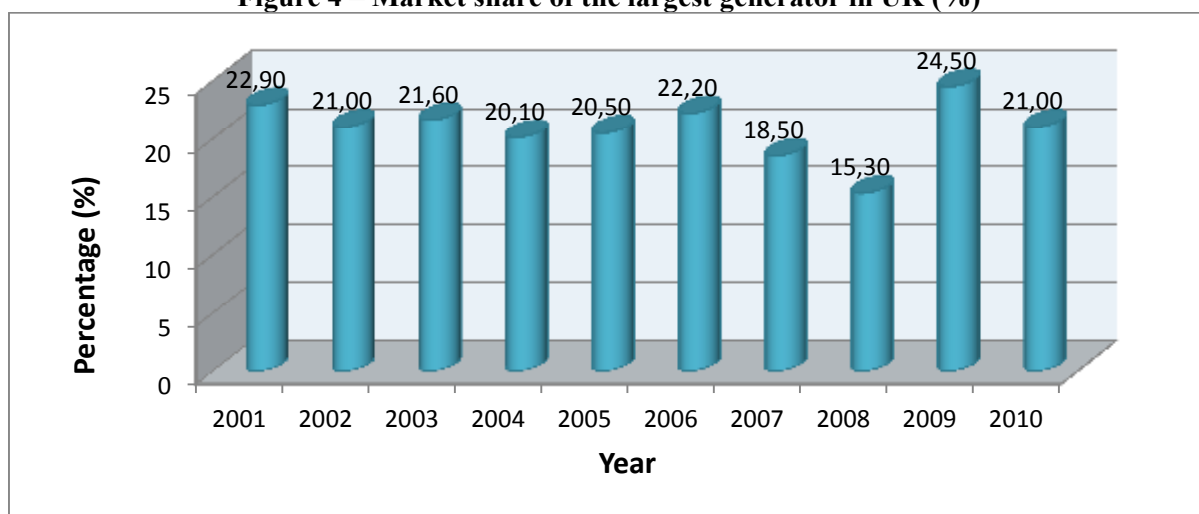
Figure 3 – Electricity price evolution in UK (group) (€ 2005)



Source: Eurostat

As seen in the figure presented above, the electricity prices in United Kingdom fell once the new electricity trading arrangements were adopted in 2001 and then rose from 2004 until 2009. The prices are calculated as the average between the prices paid by industrial consumers and domestic consumer and as the average national price in Euro per kWh. The indicator presents electricity prices charged to final customer. The figure shows that the liberalization of the energy market brought lower prices for the consumers from a 2.6% drop in 2002 to a 13.6% drop in 2004. From 2005 onwards the prices started to rise because of the climate change, the growth of the consumers around the world and the resources diminishment.

**Figure 4 – Market share of the largest generator in UK (%)**

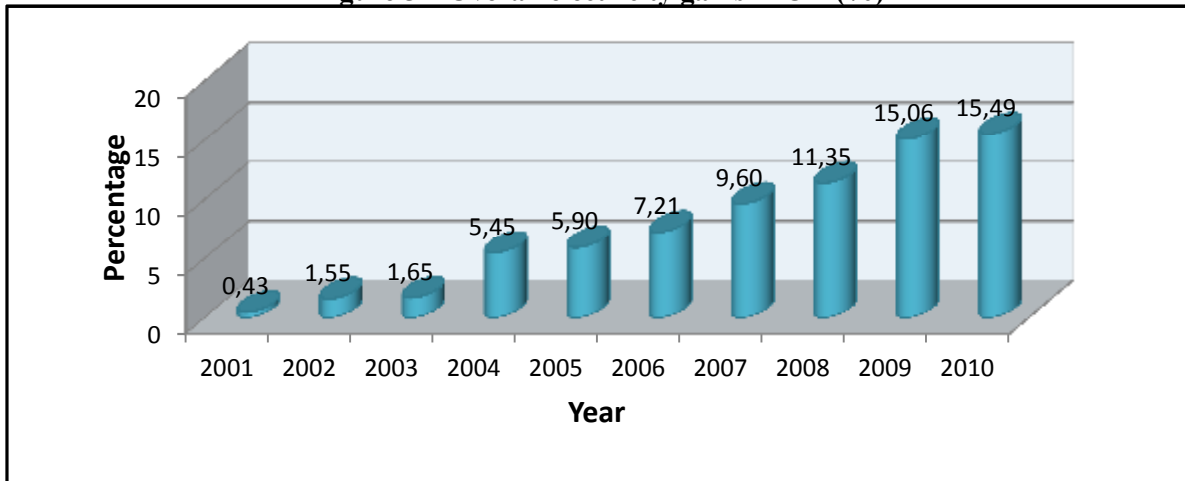


Source: Eurostat

Figure 4 shows the evolution of the market share of the largest generator in the electricity market as a percentage of the total generation. As we can see, the percentage is low, oscillating around 20% which shows that the liberalization was a success. The largest generator is National Power, known nowadays as Npower. The supplier and generator of electricity had a market share of 46% in 1990 (Wolack and Patrick, 1997) which has dropped to 21% in 2010.



**Figure 5 – Overall electricity gains in UK (%)**



Source: Odyssee Indicators

The indicator reflects the efficiency gains since 2001 and it is calculated from the ODEX indicator. The ODEX indicator is calculated as a weighted average of sub-sectorial indices of energy efficiency. The weighted average is the share of each sub-sector in the total energy consumption of the sub-sectors considered in the calculation (Definition of energy efficiency indicators, 2010, p. 4).

As seen in the figure above, the energy efficiency gains had risen each year from 2001 until 2010 when it reached a level of 15.49%. The energy efficiency generally improves with the economic growth as the technologies keep developing.

All the analysed indicators show that the liberalization process had a good impact on the electricity market, probably a better one than the vertically integrated market would have had.

### **3. NEW CHALLENGES FOR THE UK'S ENERGY MARKET**

The new challenge for the electricity market in United Kingdom is to ensure clean, secure and affordable electricity supplies on the long term. Facing the climate change represents the new step UK has to take in order to further develop their market. In fact, a new policy in the energy area was adopted by the European Union, the *Energy 2020 strategy*, which has as main objective the promotion of the efficient use of energy which translates into 20% savings achieved by 2020. As the energy consumption keeps growing, so are the greenhouse gas emissions and the pollution. The strategy proposed by the European Union involves higher investments in the energy industry in order to diversify the existing resources, to promote the use of renewable resources and to invest in technology. These actions have as final objectives: the reduction of the greenhouse gas emissions

by 20%, the increase of the share of renewable to 20% and an energy efficiency improvement of 20% by 2020.

The new energy strategy promoted by the European Union focuses on five different priorities:

- To achieve an energy-efficient Europe;
- To build a truly pan-European integrated energy market;
- To empower the customers and achieve the highest level of safety and security;
- To extend the Europe's leadership in energy technology and innovation;
- To strengthen the external dimension of the EU energy market (Energy 2020, 2011, p. 7).

UK is trying to address all of these priorities by promoting an energy efficient policy in order to achieve the goals mentioned above by 2020 if not earlier. In this matter, UK is trying to reduce the overall energy consumption, to make a technological shift, to work upon the integrated energy market, and to make infrastructure investments on the market. In the technological era we are living, the energy consumption is constantly rising. This is projected to grow with more than 30% until 2035 so an efficient energy use plan is needed. Another objective set up by UK is to reduce their global emissions by 80%. This is a very high standard to be achieved and it needs serious investments in research & development for low-carbon technologies (Oettinger, 2011).

UK has adopted her own Energy Market Reform having as objectives to insure a secure electricity supply, to ensure sufficient investment in sustainable low-carbon and to maximize benefits and minimize costs by 2020. In the future, the electricity prices are expected to grow due to the rising of fossil fuel prices. If the alternative resources are used, the electricity bills are expected to fall on average by 4% over the next two decades (Electricity Market Reform, 2012).

## CONCLUSIONS

The UK electricity market liberalization was a success and though some were sceptic about its necessity and effects, the process had a good impact on the economic development of the country bringing benefits to consumers and consolidating the country's economy. The creation of the first wholesale trading market for electricity brought lower prices by opening the competition and making possible the direct confrontation of offer and demand. Also, several investments in the infrastructure were made bringing energy efficiency gains.

The electricity market in UK is much more developed than in the countries that tried to keep the sector under the state's management. It is easy to have access to different services, to analyse your options, to choose or switch between suppliers. Also, the bureaucracy level is lower than in

other countries. There are energy consultants who are able to sign high value gas or electricity contracts in name of their clients having just an electronic letter of authority paper. Often, big companies choose such a consultant to take care of their electricity and gas contracts, offering advice on energy efficiency or checking the correctness of their invoices. This led to the market development and the creation of new jobs. There are also several Internet websites available where consumers, based on their postcode and the value of their last invoice, can see which supplier provides them the best deal in terms of price and service. Such an environment attracts foreign investors as it is easier to enter a developed market that has invested in infrastructure.

The liberalization process encouraged speeding up the business processes and the removal of inefficient procedures which wouldn't have been achieved under a regulated market. The practice of price regulation is not a fair one as it is a counterproductive one in the proper allocation of real market resources leading to administratively set prices that do not reflect reality. The prices set up in this manner are either in favour of the consumer or in favour of the operators.

At this moment there is a local authority, called the Office of Gas and Electricity Markets (OFGEM), established in 2000, having as main objective the supervision of the market and making sure there is no abusive behaviour coming from larger generators or suppliers. OFGEM also protects the consumers' interest and promotes the competition in the electricity and gas markets. It is important to have such an authority to supervise the market and to set the future objectives for the market continuous development.

United Kingdom has to face new challenges as the climate is changing and the consumption of electricity and gas is rising. By 2020 the green gas emissions must decrease, the use of renewable energy must increase and the energy efficiency must be improved. The country is heading in the right direction with the electricity market reform adopted as this addresses all the issues mentioned. Moreover, UK is already sustaining the use of renewable energy through different instruments like the climate change charge, the feed in tariffs charges and the renewable obligation charges. The climate change charge represents a tax paid by industrial consumers that use fuels for lighting, heating and electricity. This charge is only applied to business consumers and not to domestic users, charities or non-business consumers. The charge is applied to encourage the reduction in gas emissions and for increasing the energy efficiency use. The feed in tariff charges is applied since 2010 in order to sustain the use of renewable energy. If consumers generate their own energy from renewable resources and register at OFGEM, they get paid for every kilowatt produced. This led to the significant increase of use of renewable energy in UK rising from 6% in 2009 to 11% in 2012. The renewable obligation forces the suppliers to provide a part of the electricity to the clients from

renewable resources. All these taxes will help with the market to develop further and to address the problem we are facing at this moment, the climate change and the security of energy supply.

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