

**ELECTRICITY PRICES | THE
HIGHEST FOR HOUSEHOLDS
IN THE EU COUNTRIES WITH
THE “GREENEST” ENERGY
TRANSITION POLICY**

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The author | A Belgian national with a Master's degree in Electrical and Mechanical Engineering, a degree in Physics and Nuclear Chemistry and a baccalaureat in Economics from the Louvain University (Belgium), Jean-Pierre SCHAEKEN WILLEMAERS began his career as a Lecturer at the faculty of applied sciences of this University. He thereafter joined the Tracetebel and Suez-Tracetebel group. Within this group, he was Head of Trade and Marketing and a member of the Tracetebel Engineering Executive Committee. He was thereafter appointed Executive Vice President and member of the executive committee of Suez-Tracetebel EGI (Electricity and gas international), and Director of Powerfin. He was in charge of investments in Europe, Russia and the Middle East in the fields of electricity production, transmission and distribution as well as the transportation and distribution of natural gas by acquisition or project development. In this capacity, he was appointed Chairman or Director of several subsidiaries of this group in Europe and Central Asia. He was also Vice President of the Brussels Chamber of Commerce and Judge at the Brussels Commercial Court. In 2000, he founded a centre for high technology start-ups of which he is still a board member. Today, he is a board member of several industrial companies. He is Chairman of the Energy, Climate & Environment Department of the Thomas More Institute a also member of its Advisory Board.

| Introduction

In spite of the economic downturn, over the past four years, households experienced increasing energy prices in the EU. The average electricity price for households¹ has raised by 6.6% between the second semester of 2011 and 2012, after an increase of 6.3% between the second semesters of 2010 and 2011². In the EU 28, the price of electricity (including all taxes) for medium size households, during the second semester of 2013, was EUR 0.201/kWh against EUR 0.195/ kWh and EUR 0.184/kWh, during the same period, respectively in 2012 and 2011³.

In 2013, electricity prices for households were the highest in Denmark (EUR 0.294/kWh), in Germany (EUR 0.252/kWh), in Cyprus (EUR 0.248/kWh) and in Ireland (EUR 0.241/kWh). The lowest prices in the EU, are found in Bulgaria (EUR0.088/kWh), in Romania (EUR 0.128/kWh) and in Hungary (0.133/kWh)⁴.

Incumbents are still dominant with most retail markets, showing low foreign presence, which does not favor efficient competition. Increasing retail prices are mainly due to renewable energy costs, phase out of nuclear power plants where applicable and investments in electrical networks.

Although competition in retail markets is improving in many EU member states, most of European households are not switching suppliers because of:

- regulated prices;
- lack of awareness;
- loyalty to incumbents and (perceived) distrust to alternative offers;
- complexity of switching process.

¹ This average price corresponds to households with an annual consumption comprised between 2 500 and 5 000 kWh. It includes taxes and levies.

² Eurostat, Household electricity prices in the EU27 rose by 6.6% and gas prices by 10.3%, News Release 79/2013, May 27, 2013.

³ Eurostat, *Electricity and natural gas price statistics*, Data from May 2014.

⁴ *Ibid.*



The most significant contribution to the electricity price growth in the EU is the cost of the decarbonization policy, and, in some member states, the phase out of nuclear power. Indeed, the transformation of the EU energy system incurs large investments. The EU Commission Energy Roadmap 2050 estimates the aggregate costs of investments in electrical networks at EUR 1.5 to 2.2 trillion between 2011 and 2050.

| Member States' energy policies and their impact on electricity prices

| Germany

As a consequence of the Renewable Energy Act (*Erneubare Energie Gesetz*, EEG), Germany currently gets about 25% of its electricity from renewable energy. Its combined wind and solar portfolio exceeds 70 000 MW (intermittent). As already mentioned above, the average household price of electricity in Germany is among the highest in the EU with Denmark and Cyprus, more than 0.29 EUR/kWh. The average annual household bill increased from EUR 488 to EUR 1006 between 2000 and 2013⁵.

Because the promotion of intermittent renewable energy and the progressive phase-out of nuclear power plants lead to strong increases of the electricity bills which jeopardize the competitiveness of the German industry and hence their exports, some companies and among them the energy intensive industries are exempt, totally or partially, from the contribution to the energy transition (*Energie Wende*). As a consequence, a large share of the energy transition cost is financed by the households through the electricity bills, which significantly reduce their purchasing power. According to Willem Post, the EEG charge on household electricity bill grew from EUR 5.6 billions in 2006 to EUR 13.6 billions in 2011⁶.

⁵ According Patrice Geoffron, Energy Economist, Paris Dauphine University (France).

⁶ <http://theenergycollective.com>, January 16, 2012.

“The four major utilities and the Federal Network Agency and grid authority raised the surcharge that customers pay on their utility bills to fund renewable energy, by a steep 47% in 2013, from 3.592 cEUR/kWh in 2012 to 5.277 cEur/kWh. Then in October 2013, they announced a further 18% rise to 6.24 cEUR/kWh, taking the annual surcharge on consumers to about EUR 23.6 billion. This is to cover the increasing proportion from renewables and the fact that utilities are obliged to pay each renewable kWh much more than they can sell it for⁷”.

In spite of Germany’s energy transition policy intended to reduce the carbon footprint, GHG (GreenHouse Gas) emissions from fossil fuels has increased by 2% in 2013 compared to 2012⁸, after stable emissions between 2009 and 2012 of about 0.81 billion tons of CO₂ per year⁹, whereas CO₂ emissions have diminished in 22 EU member states in 2013. This increase is caused by a higher use of coal plants for electrical generation.

The *Energie Wende* not only failed to meet the GHG emissions objectives, but it is also jeopardizing the German economy and the purchasing power of the German citizens by bursting the electricity prices.

Confronted with above economic concerns, the German Chancellor Angela Merkel’s cabinet approved a reform of the country’s renewable energy law (EEG law) aiming at curbing the increase of costs associated with the participation to the EEG, slowing the growth of “green energy”, and force new investors in “green” power to take more risks. This amendment project is still to be approved by the Bundestag. Sigmar Gabriel, the Energy Minister, is talking about a new start, indicating that the energy transition is to lie within the market economy.

| Denmark

Denmark has set itself ambitious energy transition objectives: 50% wind power of total electricity production by 2020 and zero carbon by 2050. Renewable energy’s share of gross energy consumption increased from 23.4% in 2012 to 24.5% in 2013¹⁰.

Production of renewable energy grew by 2.7% in 2013 relative to 2012 whereas coal consumption increased by 26.3 % over the same period. Denmark, the renewable energy pioneer¹¹, showed the biggest increase in its CO₂ emissions in 2013 compared to 2012, in Europe, with 6.8% more emissions from fossil fuels regardless of its relatively high renewable energy share¹². Although explainable, such surge in carbon footprint is nevertheless significant of the weakness of the Danish energy transition policy.

As already mentioned above, the average price of electricity for Danish medium size households is the highest in the EU: 29.4 cEUR/kWh. For the first time since 1996, in 2013, Denmark is importing more energy than it exports. Its degree of self-sufficiency in energy fell to 93% in 2013 from 102% in 2012¹³.

⁷ World Nuclear Association, *Energy Subsidies and External Costs*, June 2014

⁸ Eurostat, *In 2013, CO₂ emissions in the EU28 estimated to have decreased by 2.5% compared with 2012*, News Release 74/2014, May 7, 2014.

⁹ Netherlands Environmental Assessment Agency, *Trends in global CO₂ emissions*, 2013 report.

¹⁰ Danish Energy Agency, March 21, 2014.

¹¹ To manage the intermittency of wind and solar power, Denmark uses coal fired power plants as well as imports or exports of electricity from and to neighbouring countries.

¹² EUROSTAT Statistics, 8-0705-2014.

¹³ Danish Energy Agency, *op. cit.*

The Danish energy model, in spite of massive subsidies at the expense of consumers, did not succeed in meeting its energy transition objectives, let alone the perpetuation of net job creation in the renewable industry. Vestas, for instance, that used to be the number one wind turbine manufacturer worldwide, is facing great difficulties. Its market capitalization dropped considerably whereas the Chinese Sinovel emerged stronger over the same period of time. In 2012, Vestas axed 3,735 jobs, essentially in Denmark.

| Ireland

“The development of renewable energy is central to overall energy policy in Ireland”¹⁴. The strategy for renewable energy 2012-2020, published in 2012, sets out five strategic goals: increasing on and offshore wind power, building a sustainable bioenergy sector, fostering R&D in renewables such as wave and tidal, growing sustainable transport and building out robust and efficient networks. The use of renewable energy sources as a proportion of total primary energy production in Ireland increased from 5% in 1990 to 58% in 2012¹⁵.

What is the actual outcome of such a policy?

Household electricity price was 22.9 cEUR/kWh at the end of 2012 or an increase of 10% compared to 2011. This price is above the EU 27 average of 19.7 cEUR/kWh (an increase of 6.6% compared to 2011). In the second semester of 2013, this price grew to 24.1 cEUR/kWh. As far as CO₂ emissions are concerned, in 2012, Ireland was 2.1 million tons of CO₂ eq. above the five year average limit set by the Kyoto protocol. Its GHG emissions per capita basis were 4th highest in the EU in 2011¹⁶ or 12 t CO₂ eq, higher than in Germany and Denmark and 40% higher than the EU average (9 t CO₂ eq.). As far as jobs creation is concerned, Ireland “witnessed the lowest employment incidence, in the renewable sector, (below 0.2% of total employment) in 2010”¹⁷.

Once more a strong “green” energy policy is not living up to its promises although Ireland is doing better than Germany and Denmark.

| Spain

“Electricity consumption in Spain has been increasing steadily until 2008, since levelled off, and in 2012 it declined 1.9% due to Spain’s economic recession. Per capita, it is about 5 200 kWh/year. Electricity production in 2012 was 297 TWh gross out of which 61.4 TWh (21%) from nuclear power, 73.2 TWh (25%) from gas, 55.9 TWh (19%) from coal, 49.1 TWh (16.5%) from wind, 24.1 TWh (8.1%) from hydro, 11.9 TWh (4%) from solar and 5.2 TWh from biofuel and wastes. Wind capacity at the end of 2011 reached 25.1 GW with a guaranteed feed-in tariff. In February 2012, wind contributed over 20% to the electricity supply and in 2013, it supplied about 21% of electricity, matching nuclear power. The country has spent an average of EUR 4.75 billion a year on renewables subsidies since 2004”¹⁸.

¹⁴ Pat Rabitt T.D., *Energy and National Resources*, Irish Minister for Communications, May 2012.

¹⁵ Central Statistics Office (CSU), *Environmental indicators*, Dublin, 2014.

¹⁶ *Ibid.*

¹⁷ European Observatory on Renewable Energy, 2011.

¹⁸ World Nuclear Association, *Nuclear Power in Spain*, August 2014.

Having learned lessons from their energy policy failures, Spain is now reconsidering its nuclear approach. The government is planning to increase nuclear power production through upgrading its nine reactors, which represents 810 MW. A new renewable energy law was passed in 2014 in order to reduce subsidies for renewables by EUR 1.7 billion a year and to control the tariff deficits which has reached 26 billion euros¹⁹.

Red Electrica de Espana's (REE) report of December 2013 revealed that greenhouse gas emissions from the country's power sector are likely to have fallen 23.1% in 2013 as power generation from wind farms and hydroelectric plants soared. In total, wind farms are estimated to have generated 53,926 GWh of electricity, up 12% on 2012, while high levels of rainfall meant hydroelectric power output was 16% higher than the historical average, climbing to 32,205 GWh.

"Spain became a world leader in clean energy, spurring projects by awarding more than 50 billion euros in subsidies in the last 25 years. At the same time, it failed to secure all the money needed to fund the incentives which accumulated and in 2013, totaled about 9 billion euros. The system modeled on Germany's in the 1990s and paid for mostly by consumers, was increasingly attacked as an unacceptable burden by traditional utilities, some consumers group and the government. A series of new laws dismantled most of it, aiming at "achieving an economic and financial stability of the electric system and avoiding the incorporation of new costs". While incentives were guaranteed to plant owners for 20 years or longer, the system failed to ensure the government set prices, or tariffs paid by consumers, at high enough levels to fund the subsidies. Such a situation created a soaring tariff deficit, a debt carried temporarily by traditional power distributors. One legacy is that Spain, like almost no other country, can supply more than half of electricity demand from clean sources during stretches of the day that are sunny and windy"²⁰.

As a consequence of such a policy, Spain's electricity price is high, although less expensive than in Germany, Denmark or Ireland thanks to its nuclear and coal fired power plants.

"Spain's electricity tariff deficit, the result of a decade long shortfall between revenues and system costs including renewable subsidies, has continued to grow despite a series of government reforms meant to close the gap. Spain's biggest electricity utilities, including Endesa, Iberdrola and Gas Natural will have to hold the tariff debt in their balance sheets for the next 15 years, weighing on their credit ratings"²¹.

| Bulgaria

"Bulgaria has two nuclear reactors generating about 35% of its electricity [...] Government commitment to the future of nuclear energy is strong though financing is lacking"²².

Two projects are being developed: one at Kosloduy. It deals with a Westinghouse AP 1000 design. Westinghouse is responsible for providing all of the equipment, design, engineering and fuel for the new unit. On August 1, 2014, Westinghouse signed an agreement to take 30% equity in the new plant. The government will hold 70% and finance will need to be secured by both parties. The shareholder agreement – including the financing terms of an engineering, procurement and construction (EPC) contract – will enter into force after approval by the new government following elections in October 2014.

¹⁹ *Ibid.*

²⁰ *Electricity rates taking effect for Spain's clean energy*, Todd White, Bloomberg, June 20, 2014.

²¹ Reuters, *Spain caps power prices, pledges fresh energy solution*, December 27, 2013.

²² World Nuclear Association, *Nuclear Power in Bulgaria*, July 2014.

Thermal generation is dominant, with large number of old power coal/lignite power plants, several oil/gas fired and Kosloduy nuclear power plant. Large number of units in existing thermal power plants is out of operation or kept in cold reserve. Bulgaria's installed power capacity is 12,000 MW, while overall demand, including exports, stands at about 5,000 MW. If over 1,000 MW kept in cold are excluded, there is over 6,000 MW out of operation due to high generation costs.

Bulgaria has been the main exporter of electricity within the Balkan region for the recent years. About 75% of the electricity export in this part of Europe was realized by NEK (State owned National Electricity Company). Due to favourable generation mix and sufficient generation capacities, Bulgaria managed to export between 5 and 10 TWh annually.

In 2013, overall electricity production in Bulgaria stood at 39.36 TWh, 2.5 TWh lower compared to 2012. Thermal power plants produced 19.1 TWh, hydro 4.6 TWh, nuclear Kozluy plant 13.2 TWh. Electricity generation from renewables stood at 2.48 TWh. Electricity consumption in 2013 stood at 32.1 TWh (32.5 TWh in 2012)²³.

Bulgaria is the country with the lowest electricity prices in the EU. However there has been an upward trend in power prices over the past 5 years due to the cost of renewables and long-term power purchase agreements, well above the generation cost of state-owned power plants²⁴. Reductions in feed-in tariffs slowed down renewable capacity additions in 2013. It is unlikely that a significant amount of the contracted new capacity becomes on-stream²⁵. Bulgaria may suspend as much as 40% of wind and solar power capacity as part of its effort to stabilize the electricity system, the intermittent power production jeopardizing the safety of Bulgaria's transmission network²⁶.

| Romania

Romania is one of the least energy dependent countries in the EU and one of the most diversified. Romania's electricity output stood, in 2013, at about 59 TWh, down 3.2% compared to 2012, out of which:

- 27 TWh from thermal power plants;
- 15 TWh from hydropower;
- 11.6 TWh from nuclear;
- 4.7 TWh from wind farms.

Electricity consumption fell by around 6% to about 50 TWh in 2013, and export rose by 114.7% on the year to about 2.5 TWh²⁷. Romania has two nuclear reactors (Candu design, of 700 MW gross capacity) at Cernavoda, generating about 20% of the country's electricity production. In July 2014, CGN, subsidiary of China Nuclear Power Engineering Ltd, signed a binding and exclusive cooperation agreement with Candu Energy inc. for the construction of two more reactors at Cernavoda (Cernavoda 3&4, of 720 MW each). There are also plans to build two nuclear reactors of 1,200 MW (or 4 of 600 MW) in Transylvania.

²³ Balkan Energy News, *Country report on Energy Business in Bulgaria*, 2013 update.

²⁴ World Bank, *Republic of Bulgaria, Power Sector Rapid Assessment*, May 27, 2013.

²⁵ *Ibid.*

²⁶ Ladka Bauerova, Bloomberg, May 27, 2013.

²⁷ SeeNews, *Power Market Review*, February 11, 2014.

In 2013, wind power capacity was about 2,600 MW thanks to (too) generous subsidies. However, the government contemplates new cuts to the country's renewable energy incentive program to curb price increases for industry and homes. The planned reduction comes after the energy regulator ANRE found investors were overcompensated by the country's current incentives. Romania's Wind Energy Association and other renewable associations are lobbying to change the law.

Electricity price for medium size household consumers during the second semester of 2013, was EUR 0.128/kWh, the second cheapest in the EU²⁸. Once more, it is worth noting that a country with low penetration of intermittent renewable electricity and with large nuclear and/or hydropower resources, can offer cheap electricity.

²⁸ Eurostat, *Electricity and natural gas price statistics, op. cit.*

| Conclusions

Electricity is an important component of any energy policy. In particular, the appropriate management of power generation and transmission/distribution in the EU is essential to sustain its economic development. The problem is that the EU's electricity system is not living up to its promises. The EU energy policy has not achieved its objectives whether on low carbon strategy, on boosting competitiveness, securing long term energy supply or creating jobs.

These failures have to be blamed on:

- lack of EU common energy policy. The EU is largely divided on important topics such as nuclear power, renewable energy, shale gas exploration and exploitation, coal and so on.
- Moreover, Germany has decided its energy scheme without concertation within the EU which lead to unbalances;
- too fast and too early decisions on the energy transition system. Resulting ill prepared programs proved to be inefficient to meet the objectives and had to be amended.
- In this regard Germany is a point in case. The transition from nuclear to "green" energies is at risk which prompted the government to adapt its policy;
- Ideological approaches to energy mix are a cause for concern. They don't integrate economic facts as well as geopolitical considerations.

EU member states that rush for wind and solar power production with significant penetration of their domestic electricity market, and/or started to phase out their nuclear power, have all to face high electricity prices which affect the competitiveness of their industry and the purchase power of households. After having spent vast amounts of public money, placed power utilities in serious difficulty and done little to reduce emissions of carbon dioxide, they did not even succeed in building a robust renewable industry. On the contrary, a number of solar panels and wind turbine makers went or are about to go bankrupt.

In Germany, Denmark and Ireland, committed to ambitious green growth strategy, even beyond the EU targets, the average price of electricity (including all taxes), during the second semester of 2013, for medium size households are the highest in the EU: EUR 0.294/kWh in Denmark, EUR

0.252/kWh in Germany and EUR 0.241/kWh in Ireland²⁹. Confronted with above economic concerns, some countries cut subsidies for solar or wind power or for both. The German government had to amend the law on renewable energy to reduce the costs of electricity resulting from the financing of the EEG and to better integrate intermittent renewables into the electricity market. This is also the case of Spain although its household electricity prices are much lower than in Germany and Denmark.

Conversely, countries with large hydro resources and/or with a high stake of nuclear power and relatively low penetration of intermittent renewables, can offer low electricity prices. The lowest electricity prices for households are found in Bulgaria (0.088 EUR/kWh), in Romania (0.128 EUR/kWh) and in Hungary (0.133 EUR/kWh), countries with significant hydraulic and/or nuclear power production and low penetration of intermittent renewables.

The electricity price in France is similarly one of the lowest in the EU. Nuclear power which accounts for 75% of the electricity production of the country, operate at a low marginal cost, the investments being depreciated. A substantial percentage of the remaining 25% is covered by hydro power plants.

However, a report of the French senate suggests that the electricity bill for French households will increase by 49% to reflect growing costs from:

- renewable energy transferred to consumers through CSPE (*Contribution au Service Public de l'électricité*);
- investments for the extension of nuclear power plants service life;
- strengthening of electrical networks.

According to Eurostat, for medium size household consumers, the electricity prices during the second semester of 2013 was EUR 0.159/kWh in France against an average of EUR 0.201/kWh in the EU 28 and EUR 0.252/kWh in Germany.

Why then should France promote a strong green power growth (essentially intermittent) whereas with nuclear and hydropower, it can keep electricity prices low with very low carbon emissions?

²⁹ With the exception of Cyprus : EUR 0.248/kWh.

