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## COMMISSION FOR ELECTRICITY AND GAS REGULATION

### **STUDY SUMMARY**

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of the

*"Operation and price evolution on the  
Belgian wholesale electricity market -  
2013 Monitoring Report"*

Written in application of Article 23, section 2, para.  
two, 2° and 19 °of the Act of 29 April 1999 on the  
organisation of the electricity market.

30 April 2014

# EXECUTIVE SUMMARY

This study covers the operation of and the price evolution on the Belgian wholesale electricity market in 2013. The wholesale market is the electricity market on which purchases and sales of energy (OTC market excluded) are negotiated before delivery to end customers, whether they are residential customers or companies.

In order to provide a better understanding of market changes in 2013, the "period under review" - from 2007 to 2013 – will often be referred to in the study.

1. The energy balance of the Elia grid is summarised in table 1; more detail is provided throughout the study and some of the data is analysed in greater depth.

Table 1 provides a summary (GWh) by year for the period from 2007 to 2013 of:

- gross physical flows<sup>1</sup> of imports and exports by country;
- the Elia grid load and its losses;
- injections into the Elia grid in Belgium from connected plants (pumping included) and net injections from distribution grids and local generation (> 30 kV);
- balance when "offtake - net injections" are added to "exports – imports".

Import (GWh)	2007	2008	2009	2010	2011	2012	2013		2007	2008	2009	2010	2011	2012	2013	Export (GWh)
France	8.332	7.386	1.832	3.167	7.221	7.453	8.777		2.322	2.039	6.643	5.409	2.330	2.341	2.435	France
Luxemburg	2.084	1.629	1.868	1.846	1.532	1.386	702		1.631	1.518	910	1.122	1.318	879	786	Luxemburg
The Netherlands	5.266	8.119	5.787	7.383	4.515	8.010	7.765		5.084	3.005	3.769	5.313	7.004	3.692	4.382	The Netherlands
<b>Total</b>	<b>15.681</b>	<b>17.133</b>	<b>9.486</b>	<b>12.395</b>	<b>13.267</b>	<b>16.849</b>	<b>17.243</b>		<b>9.037</b>	<b>6.561</b>	<b>11.322</b>	<b>11.844</b>	<b>10.652</b>	<b>6.911</b>	<b>7.603</b>	<b>Total</b>
<b>Net export (+) / import (-) (GWh)</b>																
2007 2008 2009 2010 2011 2012 2013																
-6.644 -10.572 1.835 -552 -2.615 -9.937 -9.641																
6.644 10.572 -1.835 552 2.615 9.937 9.641																
2007 2008 2009 2010 2011 2012 2013																
<b>Net offtakes - injections (GWh)</b>																
Net injections (generation)	2007	2008	2009	2010	2011	2012	2013		2007	2008	2009	2010	2011	2012	2013	Offtakes (consumption)
Plants	74.908	70.480	76.192	76.545	70.747	61.661	62.051		29.848	29.198	25.740	29.177	28.939	28.596	28.175	Direct customers
Local generation	6.842	6.640	7.214	9.069	9.647	9.905	8.941		57.047	57.060	55.109	56.111	53.265	52.248	51.844	Distribution
Injection from the DSO	77	194	679	697	654	786	850		86.895	86.258	80.850	85.288	82.203	80.844	80.019	Total
<b>Total</b>	<b>81.826</b>	<b>77.315</b>	<b>84.085</b>	<b>86.311</b>	<b>81.047</b>	<b>72.352</b>	<b>71.842</b>		<b>1.575</b>	<b>1.629</b>	<b>1.401</b>	<b>1.575</b>	<b>1.459</b>	<b>1.446</b>	<b>1.464</b>	<b>Energy losses</b>

**Table 1:** Elia grid energy balance from 2007 to 2013 (GWh)

Sources: Elia

Statistical differences appear between this energy balance and some of the numbers used in this study, notably due to the fact that, depending on the topic covered, some data may or may not be aggregated at a given time; for example, whether or not pumping plants are taken into account in the data or grid losses. The definition of "Elia grid load" at the bottom of the page of the second chapter "B. Electricity consumption" is another example. To the extent possible, the statistical differences covered by the same term are defined and/or documented.

<sup>1</sup> See section D.3. Use of interconnection capacity, D.3.1 Physical use, page 118.

## A. Generation

2. CREG estimates the **total 2013 generation**<sup>2</sup> in the Elia control area at 70.6 TWh compared to 71.7 TWh in 2012 and 80.1 TWh in 2011. This is a decrease of 1.5% compared to 2012 and of 11.9% compared to 2011. **Electrabel's market share** of energy produced was 69.3% in 2013, slightly lower than in 2012 (69.6%). The market share lost by Electrabel over the past years has been partially absorbed by smaller players (< 2%) who have seen their joint market share increase by 6.2%. Electrabel still had an 86.1% generation market share in 2007. Despite the decrease, the generation market is **still very highly concentrated**.

Nuclear plants produced 40.9 TWh in 2013, an increase of 2.2 TWh over 2012. However, the figures for these two years are not comparable to previous years because two nuclear power plants, Doel 3<sup>3</sup> and Tihange 2<sup>4</sup>, accounting together for just over 2000 MW, were unavailable for nearly a year in 2012 and 2013. Despite this special situation, the share of nuclear power generation was 57.9% due to the decrease in overall generation in Belgium. Total gas plant generation was 17.6 TWh in 2013, a decrease of 3.7 TWh compared to 2012 whereas coal plants generated 4.3 TWh in 2013, also down (-0.8 TWh) compared to 2012. Gas and coal plant generation reached their lowest level of the 2007-2013 period. Other types of fuel contributed to a little less than 11.1% of electricity generation.

Eleven CCGT were available in the Elia control area in 2013. Together they nominated 12.5 TWh, a 32.6% decrease in generation compared to 2007 despite the fact that three additional CCGT were connected since that year. This explains why average nominated day-ahead generation per CCGT contracted from 2.3 TWh in 2007 to 1.1 TWh in 2013, that is, a decrease of nearly 51.0%.

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<sup>2</sup> Only the generation plants connected to the Elia grid, with voltage of 30 kV or more, are taken into account. The data are excerpted from table 6 and table 8. Based on the energy balance, total generation in 2013 consists of net injections minus injections from DSOs and pumping.

<sup>3</sup> Stoppage from 01/06/2012 until 05/06/2013.

<sup>4</sup> Stoppage from 17/08/2012 until 07/06/2013.

## B. Consumption

3. In 2013, total **electricity offtake**<sup>5</sup> in the Elia control area was 80.6 TWh, a decrease of 1.4% compared to 2012. The maximum offtake was 13.446 MW, that is, a little more than in 2012 but less than in 2007 (14.033 MW). Overall, the CREG observed a **slowing trend in electricity offtake**. In addition, the variability of electricity offtake decreased both during the day and between two consecutive quarter-hours. A slight increase in variability between two consecutive days was observed following several years of consistent decreases.

Weather does not, on average, appear to have had an impact on electricity consumption in 2013. The average temperature in 2013 was 10.1°C. For the period under review, 2013 falls within an average between the coldest year – 2010 at 9.7°C – and the warmest year – 2011 at 11.6°C. The first half of 2013 was below average with the coldest March of the past 50 years. The second half, on the other hand, experienced temperatures above seasonal normals in July, August, October and December.

The CREG counts non-dispatchable decentralised generation, such as solar panel generation, as negative consumption. The impact of **solar panel generation** on consumption is increasingly significant although still at a marginal level. Average generation around 1:00 pm was 880 MW compared to an estimated 620 MW for 2012. Maximum generation at the same time was 2020 MW in 2013 compared to an estimated 1371 MW in 2012. Minimal generation was under 35 MW.

In 2013, all **offshore wind farms** combined injected 1.5 TWh into the transmission grid, an increase of 75.5% compared to 2012. If **onshore** generation is added to offshore generation, total wind generation in 2013 was 1.8 TWh, an increase of 61.0 % over 2012.

The CREG notes that the quality of Elia's next day offtake forecasts, which had improved in 2012, deteriorated slightly in 2013.

## C. Electricity exchange

4. The average annual price of electricity on the **Belpex Day-Ahead short-term market** was 47.45 €/MWh in 2013; that is, 0.47 €/MWh more than a year earlier. Although the Netherlands are most expensive at 51.95 €/MWh, France (43.24 €/MWh) and especially Germany (37.78 €/MWh) saw lower prices than in previous years.

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<sup>5</sup> See the definition in the footnote of paragraph 40.

Despite the gradual coupling of markets, price convergence in the CWE<sup>6</sup> region has clearly not followed suite, particularly over the past two years. Several factors are involved in this observation, including the stoppage of two Belgian nuclear plants for nearly a year and the lack of renewable energy integration due to insufficient interconnections between the four countries.

Prices were identical in France, Belgium, the Netherlands and Germany for 16.2% of the time in 2013 compared to 49.7% in 2012. We should point out that the frequency of negative prices in Germany increased again in 2013 compared to 2012 and that, thanks to price market coupling, there have been negative prices in all CWE region countries simultaneously since 2012.

A total of **17.1 TWh was negotiated** on the Belpex DAM, that is, **21% of the Elia grid's annual electricity offtake**. This is a new record. The Belpex DAM's market resilience, which measures **liquidity**, decreased in 2013 compared to 2012. With an additional demand of 500 MW, the price would have increased by 2.9 €/MWh on average in 2013. The first semester of 2013 contrasted with December 2012, showing an improvement in resilience. The first semester also shows a deterioration in market robustness linked to the lowest nominated monthly generation at Belgian nuclear plants during the months of April and May. June experienced the greatest level of price sensitivity even though both plants restarted during the first days of the month.

The total volume handled by the Belpex DAM reached a record for the period under review in 2013 for both the purchase and sales markets. The **market share** of the three largest buyers on the Belpex DAM has been greater than 45% since 2007, except in 2009. Their share moved from 53% in 2012 to 45% in 2013. The share of the top three sellers was 34% of the total volume handled, a slight increase over 2012 (28%), but much lower than the level reached in 2009 (56%). 60% of total volume was purchased by buyers on the Belpex DAM via *LimitOrders* for a maximum price of 3000 €/MWh. The remainder was purchased at a price under 3000 €/MWh.

The price of electricity on the **long-term Endex BE market** is allocated by contract type. During the 2007-2013 period, 48.8 €/MWh was paid on average for a day-ahead contract (Belpex DAM), 51.6 €/MWh on average for a month-ahead contract, 54.0 €/MWh for a quarter-ahead contract and 56.9 €/MWh for a year-ahead contract. In other words, during the 2007-2013 period, month-ahead, quarter-ahead and year-ahead contracts were, respectively

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<sup>6</sup> The CWE region includes France, Belgium, the Netherlands and Germany.

5.3%, 9.5% and 14.2% more expensive than on the Belpex DAM. The variations over these seven years tend to indicate that the sooner the price is fixed, the higher the average price will be and, therefore, the longer the contract periods will be.

5. When long-term year-ahead prices in Belgium are compared with those in France, the Netherlands and Germany, it is apparent that the prices in the four countries were similar during previous years until the third quarter of 2012. While German prices effectively started to fall in June 2012 compared to the other three countries, price divergences became more acute starting at the end of 2012. In December 2012, the average German year-ahead prices were 49.3 €/MWh for delivery in 2013 whereas the average prices in the Netherlands were 51.9 €/MWh. The price differential between the Netherlands and Germany, which was 2.6 €/MWh in December 2012 continued to increase to reach 8.4 €/MWh in December 2013. Prices in Belgium decreased from 50.5 €/MWh in December 2012 to 43.6 €/MWh in December 2013. During this period, the price differential with Germany moved from 1.2 to 4.5 €/MWh.

Both short- and medium-term electricity prices are impacted in part by the price of the fuels used to power generation plants. The price on the Dutch exchange is impacted by the price of TTF gas over the medium-to-long term. In Belgium, the price of electricity on the exchange is strongly impacted by the price of gas and coal. In France, the price is highly dependent on the price of coal tied to inexpensive electricity imports from Germany produced with wind and coal. The German price is significantly impacted by the price of coal. This seems logical given that, in addition to its wind-generated electricity, Germany has produced most of its electricity with coal since the nuclear power moratorium.

#### D. Interconnections

6. The average Belgian commercial import capacity in 2013 was 3932 MW and the average commercial export capacity was 2821 MW. These figures confirm that **Belgium is a highly interconnected country**. The average import capacity was a little over 40% of the average consumption and a little less than 30% of the peak consumption in the Elia control area.

Commercial and physical flows were often very different in 2013. In 2013, commercial congestion at the Dutch border was recorded during 489 hours (482 in 2012) in day-ahead, while the physical flow moved in the *opposite* direction in real time. **This may be a sign of inefficient use of interconnection capacity**. At the end of 2012, the CREG asked Elia to

provide it with a capacity calculation proposal for the Belgian-Dutch border. In 2010 and 2011, the CREG had already rejected Elia's proposals for capacity calculations at Belgian borders. The CREG's decision regarding the new calculation proposal submitted by Elia in 2013 is expected during the first half of 2014.

In 2013, **net commercial imports** to the Elia control area were 1124 MW on average and 9.8 TWh in total (that is 11% of the total electricity offtake). This is a slight increase over 2012. Belgium was a net exporter in 2010 and, especially, in 2009. Belgium also imported large quantities in 2007 and 2008. The exchanges are highly dependent on market conditions, which clearly vary considerably. Belgium imported 4.9 net TWh via the day-ahead market, the Netherlands, 18.0 TWh, and France, 2.1 TWh. Germany, alone, exported 25.0 net TWh.

From September 2012 through June 2013, an average of over 2000 MW were imported physically, reaching a peak of 4028 MW in November 2012.

The complete unavailability of 2000 MW of nuclear capacity from August 2012 through June 2013 had a significant impact on the commercial use of import interconnections. **The CREG estimates that, on average, 75% of unavailable nuclear capacity is compensated for by greater imports.** The rate increased to 100% while the two nuclear plants were closed. On the other hand, it seems that there was little to no connection between the availability of nuclear capacity and the CCGT generation.

In 2013, **daily congestion revenue** taken together at all borders (a good measure of price convergence) was € 128.1 million, a very significant increase over 2012 which had already experienced a large increase compared to the years preceding the period under review.

#### E. Balancing

7. On average, the system operator had to **regulate** 97 MW **upward** in 2013 (due to a deficit) and 121 MW **downward** (due to a surplus). The average upward and downward regulation volumes were slightly less than in 2012 (108 MW and 138 MW respectively). In all, excluding its participation in the IGCC, Elia regulated balancing for 932 GWh, a decrease of 22% compared to the preceding year (1.2 TWh). The total regulation volume had been increasing for a number of years through 2012. A drop in volume was seen in 2013 for the first time since 2007. The downward regulation volume decreased significantly (29%) whereas the upward regulation decrease was more moderate (5%).

After a drop of price volatility between 2007 and 2009, the overall trend on the Belpex DAM has been downward (excluding 2010) while there has been an upward swing in the market for imbalance compensation (balancing tariff). This trend was confirmed in 2013 although Belpex DAM volatility increased slightly.

The number of quarter-hours during which the downward regulation price was less than or equal to -100 €/MWh - which indicates a surplus which is difficult to regulate - experienced a peak in July 2012 and, surprisingly, in December 2012. The peaks occurred in June, August and December (also) in 2013. Most of these quarter-hours occurred during the night in 2012 and not during the noon-time peak. When the period from June to December 2013 is compared to that of 2012, night and early evening peaks tend to flatten out and an increase in the number of these quarter-hours is seen in the time period between 7:00 am and 1:00 pm. The night peak is, however, still present. This would tend to indicate that **photovoltaic generation is not the only cause of difficult-to-regulate surpluses.**

An analysis of the **activation of interruptible customers** by the system operator reveals that this is rather exceptional (two days in 2012, three days in 2013). This is confirmed by the average volume (572 MWh in 2013) and the average duration (1.0 hour).



## CONCLUSIONS

242. The downward trend in gas plant operating hours continued in 2013. The shutdown of two nuclear plants totalling 2000 MW did not lead to a significant increase in the number of hours of operation of gas plants in Belgium. Imports from other countries remain possible and cheaper under normal conditions. Greater gas plant generation was seen during periods of high demand, for example, during the cold snap of February 2012 when France also had to import. The outcome of this situation has been the announcement of additional gas plant closings. This means that (peak) demand compensation will be more difficult.

243. Unexpected generation plant failures are a significant aspect of maintaining grid balance. Under normal weather conditions, breakdowns are not mutually connected while this appears to be the case during cold spells. On 17 January 2013, three generation units failed nearly simultaneously putting pressure on the balance of the Elia area grid. The CREG will ask producers if they are taking all reasonable measures to avoid failures during cold snaps.

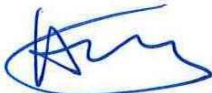
244. In 2013, the trend to lower peak consumption ended without being followed, however, by a significant increase. Average consumption decreased again slightly. The CREG did not carry out an in-depth analysis of the possible reasons for changes in electricity consumption in this study. However, it maintains that it would be reasonable for consumption forecasts to take into account the fact that electricity consumption in Belgium may decrease or at least be stagnant.

245. The increased price gap on day-ahead markets in the CWE region is a significant change in 2013 which had already begun in mid-2012. The increase in physical interconnection capacity seems, at first sight, to be the right response to reduce the price gap. However, the CREG believes that it is also necessary to study whether higher day-ahead and intra-day commercial capacity cannot already be made available with current physical interconnection capacity. In addition, Elia and certain other system operators are currently using a total import limit which is already regularly reducing commercial imports. For Elia the import limit is 3500 MW. The total import limit could prevent the use of additional physical interconnection capacity. The CREG will closely study the need for an import limit and its level. The system operator must, in any event, communicate transparently with the market about this limit.

246. The volumes the system operator must use to maintain grid balance have decreased for the first time since the CREG started calculating them (2007). However, imbalance prices are more volatile from year to year indicating that the economic value of flexibility is increasing. The system operator should consider the development of special storage balancing products to which the market can subscribe.

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