European energy market reform
Country profile: Belgium

Contents

Current situation

Energy consumption and trade balance

In 2012, Belgium's energy consumption amounted to 56 Mtoe; more than 70% came from fossil fuels.

Petroleum products (22 Mtoe) represent the first source of energy consumption, followed by natural gas (14 Mtoe). The share of oil products and nuclear in the energy mix remained stable during the last two decades, while natural gas consumption increased significantly, from 8 Mtoe in 1990 to 14 Mtoe in 2012.

Figure 1. Gross inland consumption in 2012 (56 Mtoe)[1]

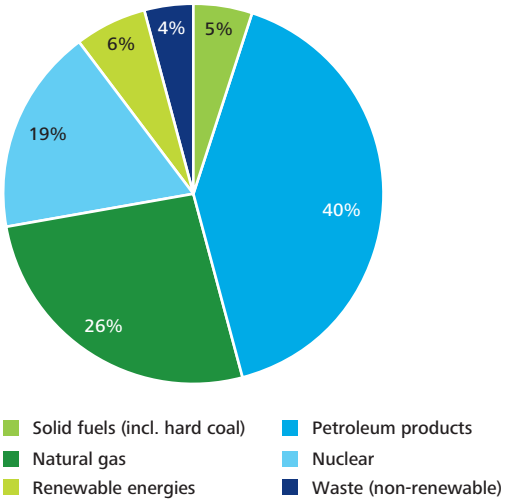
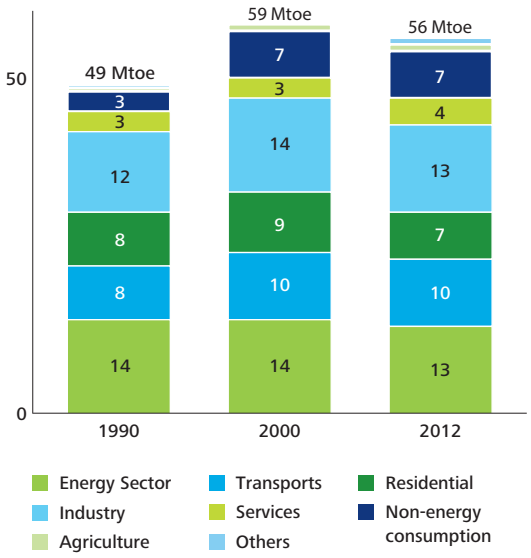


Figure 2. Gross inland consumption by sector (in Mtoe)[1]



The sharp increase in Belgium's energy consumption from 1990 to 2000 (+20%) has slowed down since 2000. Between 2000 and 2010, consumption grew by 3% and started decreasing in 2011 (-8% between 2011 and 2013).

The industrial sector accounted for 24% of energy consumption in 2012, the same share as in 2000. The energy sector was the main driver of overall consumption until 2012; while its contribution declined by 12% between 1990 and 2012, it became the second highest energy consumer (23%) in 2012, after industry. During this period, residential consumption experienced a similar decrease (-10%), while non-energy consumption[2] grew significantly (+153%), pushing up its share of energy consumption to 12%, which is almost on par with the residential sector's 13% share. As a critical hub for chemicals and plastics, Belgium is very attractive to the chemical industry. Its share of chemicals and plastics in the economy is almost twice the EU27 average, and its chemical trade balance increased by nearly 50% between 2002 and 2012.[3]

Key figures:

Population (2013):
11.2 million

GDP (2013):
382,692 bn €

GDP/capita (2013):
34,500 €

GDP/PEC (2012):
7.72 €/kgoe

PEC/capita (2012):
4.39 toe/cap.

Net Energy import:
47 Mtoe

CO_2 eq/capita:
9.46 tCO_2eq/cap

Increasing importance of natural gas in Belgium's energy mix.

Natural gas consumption nearly doubled between 1990 and 2010 before falling by 15% in 2011 and 2012. The fourth source of energy in the mix in 1990, natural gas had become the second source of energy consumption by 2012.

1 Eurostat:http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsdcc320

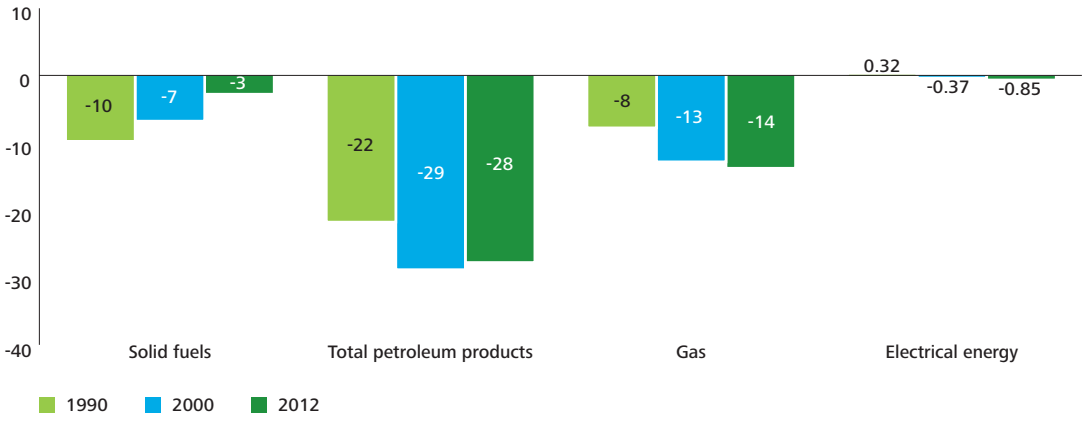
2 Non-energy consumption refers to fuels that are used as raw materials and are not consumed as fuel or transformed into other fuels

Heavily dependent on imported energy, Belgium needs to work on its energy security.

Belgium has recently taken measures to enhance its security of supply in various energy sectors, particularly electricity and gas. In the oil sector, a public stockholding agency, APETRA, was established in 2006 to manage Belgium's strategic oil stocks and help the country meet its stock obligations (4.4 Mtoe).

Source: http://www.apetra.be/en/about-us.

Figure 3. Energy trade balance (Mtoe)[1]



Belgium is heavily dependent on imported energy: oil, gas and coal. While the country's coal imbalance has decreased since 1990, its gas imbalance has almost doubled due to the growing importance of gas in the energy mix. In recent years, Belgium's energy dependency has slightly decreased (-8% since 2001), reaching 74% in 2012.[4]

However, **Belgium is still among the most energy-dependent EU countries** and ranked at eighth place in terms of energy dependency in 2012.

Nuclear energy provides over 55% of Belgian electricity. The phase-out of nuclear generation planned between 2015 and 2025 will pose a real challenge.

Renewables produced 7% of Belgium's power in 2013.

Power generation

Nuclear and gas are Belgium's main electricity sources, providing 87% of the country's electricity in 2013. Electricity capacity was 21 GW in 2013; 29% (or six GW) came from nuclear power plants that produced 57% of the country's electricity.[5] Gas holds second place in the power mix with an installed capacity of 4.3 GW (21%), contributing 29% of the electricity output, a percentage which fell in 2012 and 2013. Renewable energy represented 34% of the country's power capacity but only 7% of 2012 production; photovoltaic sources generate less than 1% of electricity output, with 13% of electricity capacity.

The phase-out of nuclear generation planned between 2015 and 2025, if pursued, will present a real challenge for Belgium and lead to major changes in the power market.

Figure 4. Electricity capacity, 20.6 GW (2013)

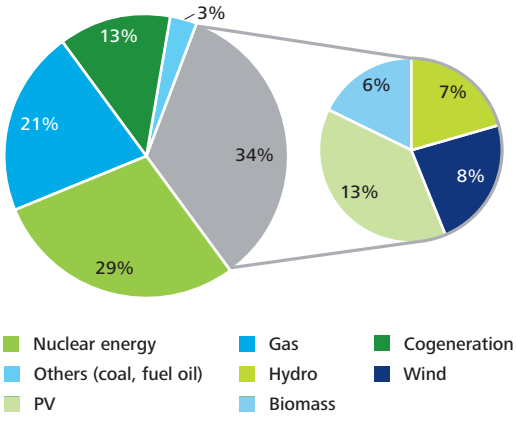
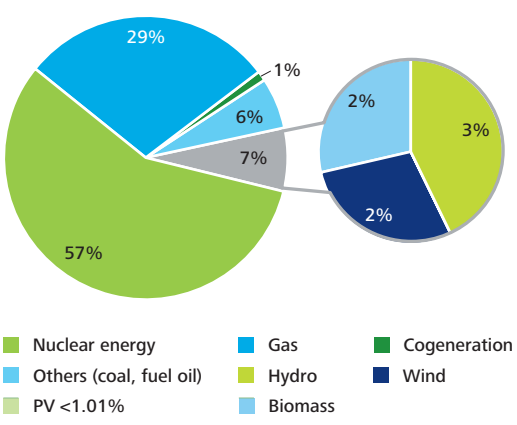


Figure 5. Net electricity production, 71 TWh (2013)



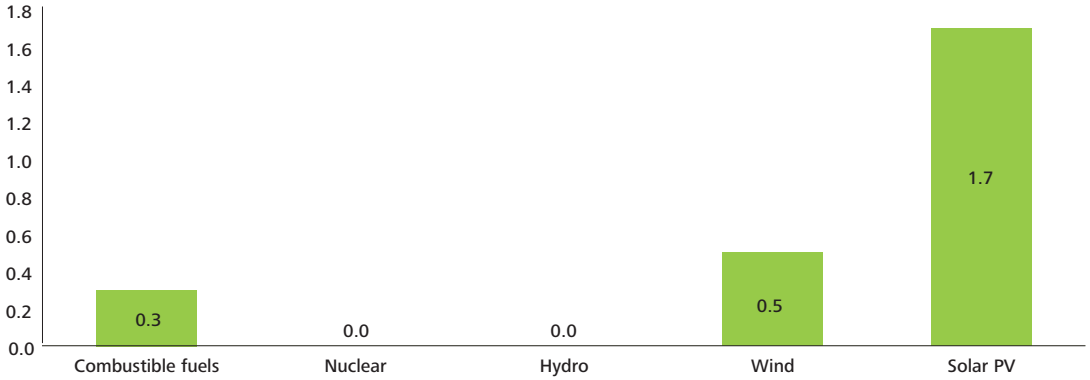
Between 2005 and 2012, Belgium added more than 4 GW of power capacity, mainly from solar and wind technologies (including 2.2 GW between 2010 and 2012).

3 Essenscia – Belgian Federation for Chemistry and Life Sciences Industries, 2013

4 Eurostat. Energy dependency shows the extent to which an economy relies upon imports in order to meet its energy needs. The indicator is calculated as net imports divided by the sum of gross inland energy consumption plus bunkers

5 ELIA, rapport annuel 2013

Figure 6. Electrical capacity change 2010-2012 (GW)[6]



Between 2010 and 2012, wind capacity grew from 0.9 to 1.4 GW and solar capacity went from 0.9 GW to 2.6 GW. However, generation from renewables is intermittent, dispersed and weather-dependent, leading to grid stability issues such as congestions and imbalances. More flexibility is needed to cope with congestion and benefit from the installed capacity.[7]

In 2007 and 2011, the Belgium Commission for Regulation of Electricity and Gas (CREG), as well as other authorities, concluded that **Belgium faces security issues due to low electricity production capacity in the face of rising demand**. The financial crisis has delayed the need for additional capacity investments; however, the country may struggle to meet demand as early as 2015. In 2012-2013, Belgium's production capacity was compromised due to cold weather, and spare production capacity was limited to 370 MW during peaks. Security of supply is also threatened by the unplanned temporary halt of three nuclear reactors since mid-2014, representing half of installed nuclear capacity. The planned shutdown of the oldest nuclear plants (in Doel and Tihange) in 2015 and additional gas plant closures (Ruien 5 & 6 and Awirs 5) will further reduce electricity capacity and threaten the country's security of supply. Moreover, imports from France are declining, as France also faces security of supply issues. Additional concerns might arise from differences in spark spreads (the gross margin of power plants from selling a unit of electricity) between gas and coal, the latter being more affordable despite generating more emissions.

Power market: market mechanism and main actors

The opening of the Belgian market to competition was completed in January 2007 (July 2003 for Flanders, and January 2007 for Wallonia and the Brussels-Capital region).

Electricity production is concentrated, and dominated by two main incumbents: Electrabel, owned by GDF SUEZ, and SPE-Luminus, majority-owned by EDF. Commercial and residential markets are **considered competitive and dynamic[8] with a number of active electricity suppliers and a high and increasing switching rate** across Belgium's three regions since 2011.

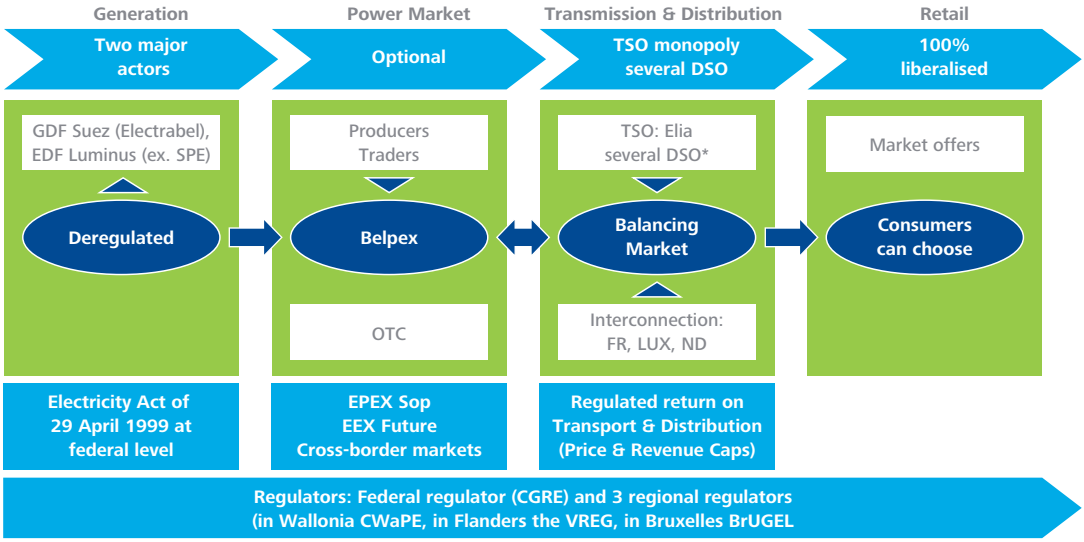
Elia, a public company listed on Euronext, is the only electricity TSO in Belgium. Publi-T, a cooperative company representing Belgian municipalities and inter-municipal companies, owns 45.2% of Elia's shares.

6 Eurostat (http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_113a&lang=en)

7 Sia Partners, The Belgian Electricity market: overview, analysis of today's issues and suggestions to fix it, 2013

8 IAE, Belgium 2009

Figure 7. Market mechanism



*ORES, Tecteo (Resa), Régie de Wavre, AIESH and AIEG in Wallonia, Sibelge in the Bruxelles Region Eandis and Infrax in Flandre

Distribution system operators (DSOs) are ORES, Tecteo, Régie de Wavre, AIESH and AIEG in Wallonia, Sibelga in the Brussels-Capital region, and Eandis and Infrax in Flanders. Together, they manage the day-to-day operations of the grid. Municipalities own the DSOs' shares.

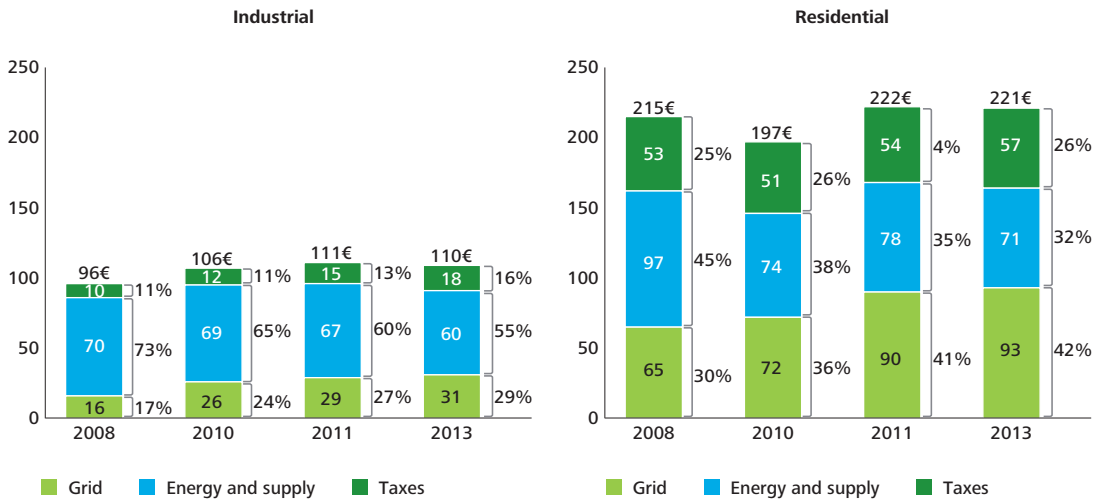
Power prices

Electricity prices are determined in the Belgian electricity spot market (Belpex), which has been coupled to the French and Dutch electricity markets, Powernext and APX, since 2007. The market price is the same in those three countries, only differing when there is insufficient interconnection capacity available on the Belgian-French or the Belgian-Dutch borders.[9] Wholesale market prices are based on Belpex and APX (Belpex has been a 100% subsidiary of APX since 2010). Domestic retail prices are not related to either wholesale price or to actual cost, but are instead indexed to, for example, fuel prices (coal and gas) and the RPI (Retail Price Index). Although retail prices are not regulated, most suppliers use a variation of cost indexation formulae calculated by CREG (the Belgian energy market regulator).[9]

In 2008, the Belgian government announced that nuclear power plant operators would have to pay a "nuclear contribution" of € 250 million. This nuclear contribution was increased to € 550m for 2011 and subsequent years. Nuclear producers are contesting the nuclear contribution and have filed several claims in the courts. To date, court decisions have not supported these claims.

9 IAE, Belgium, 2009

Figure 8. Retail prices for industrial and residential users (€/MWh)[10]



High residential electricity prices and supply issues.

Belgium's energy prices for average industrial consumers are below the EU-28 average, but consumers pay the fifth highest residential electricity prices in the EU. Insufficient interconnection capacity on the Belgian-French or Belgian-Dutch borders can make it difficult for the country to balance supply and demand.

Retail prices for residential consumers in Belgium are among the top 10 highest prices in Europe. Residential consumers pay the fifth highest retail prices in the EU (221 €/MWh in 2013), 18% above the EU-28 average (169 €/MWh in 2013). Prices for household consumers rose by 13% from 2010 to 2012, after a decrease between 2008 and 2010 (-8%). This increase was due to rising grid costs (+38%), partially offset by declining energy costs (-19%) and taxes (-1%).

In 2012, Belgium's overall policy support costs (PSC) were 29 €/MWh, both for industrial and residential users, which was higher than the European average (21 €/MWh for industrial users and 25 €/MWh for residential ones). These policy support levies are charged on three tariff components: commodity-related RES and CHP support (50%) for energy; system-related RES support (23%) for the network; and public service obligations/social policy support costs (27%) for taxes. As a result, the overall support to CHP and RES amounts to 21 €/MWh[11] (i.e. around € 1.5 billion in 2013). This means that power and grey energy (the energy hidden in a product) market prices do not necessarily reflect the real underlying cost structures and unit costs of renewables as compared to grey energy. Furthermore, not all of the policy support costs paid out to renewable energy producers have led to increased consumer tariffs and taxes, a situation likely to push up power prices in the future, regardless of energy sources. Overall, the effectiveness of the country's PSC and its (green) return on investment has been called into question, and current policies can afford to be improved.

In 2012, retail prices for average industrial users in Belgium totaled 111 €/MWh, below the EU average (125 €/MWh). The prices grew by 15% between 2008 and 2012, as a result of increasing grid costs (+81%) and taxes (+43%). Energy and supply related costs slightly decreased (-4% from 2008 to 2012) for the same period.

However, between 2011 and 2013, large industrial consumers in Flanders and Wallonia paid on average between 12% (for a 1,000 GWh profile in Flanders) **and 45%** (for a 100 GWh profile in Wallonia), **prices that were considerably higher than those charged in neighboring countries such as Germany, France and the Netherlands.** These differences are predominantly due to policy measures in neighboring countries (reductions and exemptions) that favor industrial consumers, such as lower regulated market prices (in France), lower network costs (in Germany) and lower electricity taxes (in the Netherlands and France). Electricity taxes in Flanders are relatively high, and are even more so in Wallonia.[12]

10 Eurostat: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_pc_202&lang=fr; http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_pc_203&lang=fr

11 Eurelectric, Analysis of European Power Price Increase Drivers, May 2014

12 Deloitte (2013), Benchmarking study of electricity prices between Belgium and neighboring countries

Targets for 2020

20-20-20 EU targets for Belgium:

- 18% reduction of primary energy consumption, as compared to a 2020 projection (calculated with the model PRIMES 2007).
- 13% share of renewables.
- 21% and 15% reduction of ETS and non-ETS GHG emissions, respectively, to be implemented at the regional level, requiring close coordination.

In 2009, the National Climate Plan set the main targets and action plans regarding energy and the climate. They were subsequently reviewed and updated in several other plans, and confirmed in the 2014 National Reform Program:

- An indicative energy efficiency target of an 18% reduction in primary energy consumption by 2020 (compared to a baseline projected scenario for 2020 calculated by the European energy model PRIMES 2007).
- A 13% share of gross final energy consumption from renewable energy sources by 2020.
- A 21% reduction of GHG emissions by 2020 compared to 2005 in sectors covered by the EU emission trading system (ETS).
- A 15% reduction of GHG emissions by 2020 compared to 2005 in non-ETS sectors.

Even if the 20-20-20 European targets apply to Belgium, climate and energy policies are mostly implemented at the regional level (Flanders, Wallonia and the Brussels-Capital region), a situation which can sometimes raise coordination issues. The national targets, set up in response to the European 20-20-20 targets, are translated into regional targets for each of Belgium's three regions, under the coordination of several federal agencies (Inter-ministry Conference for the Environment, Coordination Committee of International Environment Policy and National Climate Commission).

Energy efficiency: with a stable final energy consumption in recent years, Belgium needs to implement measures to reach its energy efficiency targets.

Belgium's primary energy consumption has remained almost stable since 2005. It is not clear whether Belgium will be able to reach its 2020 energy efficiency target.

Energy efficiency targets

Belgium's energy efficiency has been improving in recent years, but its energy intensity remains higher than its neighbors'. This relatively higher energy intensity can be partly explained by the particular structure of its economy and industry, which features a proportionally high share of energy-intensive activities, such as chemicals and metallurgy. While GDP in Belgium rose by 49% between 2000 and 2012, its primary energy consumption in 2012 decreased by 5% as compared to the 2000 level. However, this decline is quite recent; final energy consumption grew steadily from 1990 to 2010 (+19%).

Figure 9. Final energy consumption (Mtoe) and 2020 target[13]

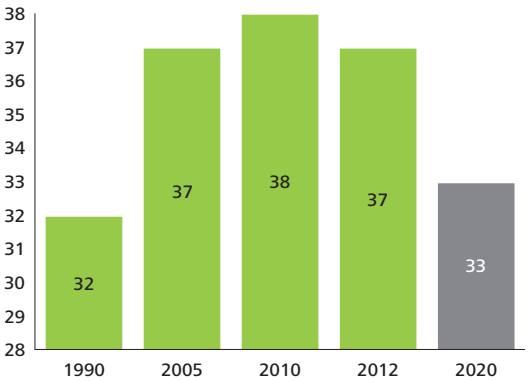
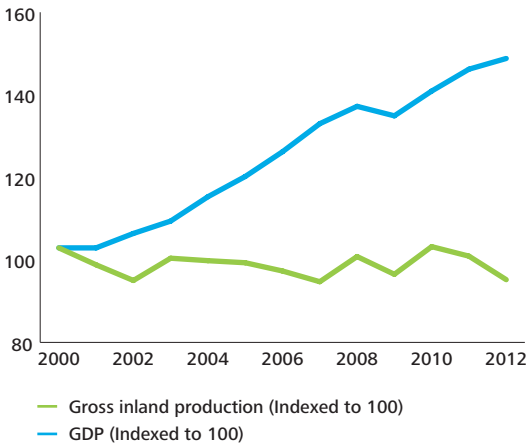


Figure 10. Energy efficiency 2000-2012



13 European Commission, http://ec.europa.eu/energy/efficiency/eed/reporting_en.htm

In April 2014, the Belgian government adopted the 2014 National Energy Efficiency Action Plan (NEEAP).[14] **The overall targeted primary energy savings fostered by existing and planned policies amount to 9.6 Mtoe by 2020** (calculated as the difference between projected gross inland consumption in 2020, without and with energy savings measures). If achieved, these savings would allow Belgium to meet its objectives of an 18% reduction in primary energy consumption in 2020. Some of the measures Belgium has adopted to meet its energy savings targets include:

- Implementation of the ecodesign and ecolabelling Directives (2.73 Mtoe) in the **residential and services sectors** to promote more energy efficient products (for building, heating, boiler, isolation, materials, etc.) and related incentives.

- Public support to **residential consumers to encourage investments in renewables and/or energy savings** (tax credits for the maintenance and replacement of heating boilers, solar water heating, installation of photovoltaic panels or installations to produce geothermal energy, etc.).

- For **transport**, measures to limit the growth of road traffic, develop other means of transport and reduce energy use in the transport sector; energy consumption from transport has not declined in the past 12 years.

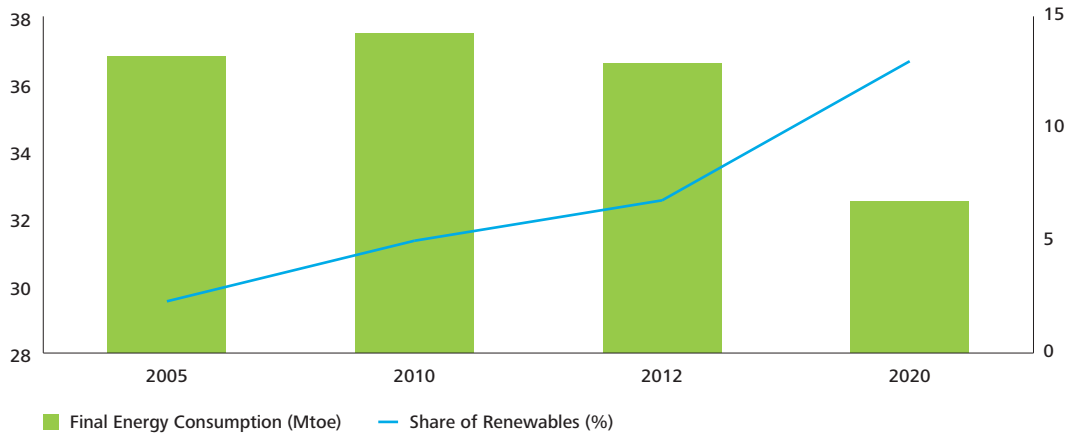
The Belgian NEEAP lacks clear sectorial targets and an overall target for the mid and long terms.[15] In the NEEAP, each region has committed itself to reach a 9% energy saving target by 2020, as part of the Energy Efficiency Directive (EED) framework. The Flemish region expects the highest savings: it is targeting a 13.9% saving by 2016 (compared to the reference scenario). For its part, Wallonia expects to save 7.9%, which will put it short of meeting the EED target. Brussels is likely to reach its 10% energy savings target in 2016.

With final energy consumption remaining stable between 2005 and 2012, it is not clear whether Belgium will be able to reach its 2020 energy efficiency target.

Renewable energy targets

Belgium's renewable energy targets aim at reaching a 13% renewables share of final energy consumption by 2020. In 2012, renewables accounted for 6.8% of final energy consumption, compared to 2.5% in 2005. This means Belgium has achieved nearly half of its target.

Figure 11. Renewable energy share of final energy use (2012)[16]



14 European Commission, http://ec.europa.eu/energy/efficiency/eed/neep_en.htm

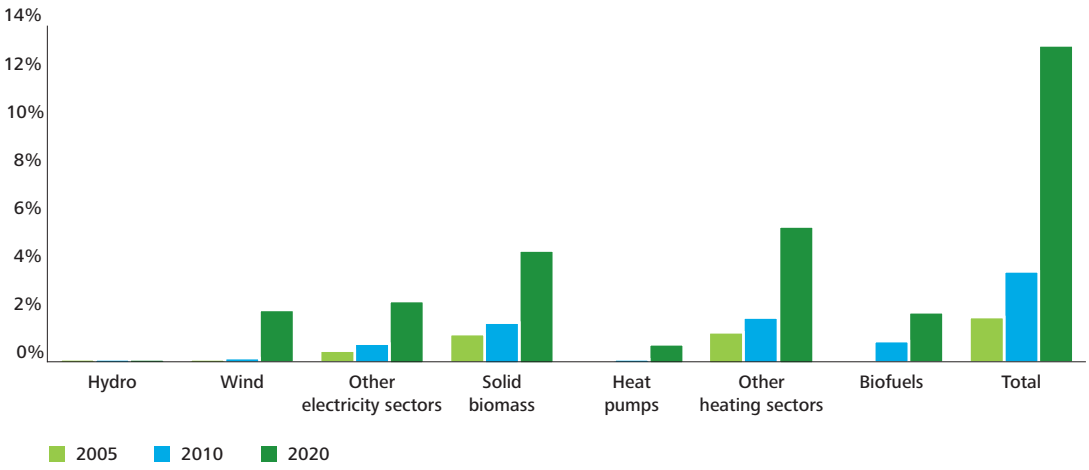
15 Assessment of Energy efficiency action plan and policies in EU Member States, Belgium Country profile Energy Efficiency Watch, http://www.energy-efficiency-watch.org/fileadmin/eew_documents/Documents/EEW2/Belgium.pdf

16 European Commission (2012): http://ec.europa.eu/energy/efficiency/eed/reporting_en.htm

Renewable energy: 51% of Belgium's target has yet to be achieved. Belgium could have difficulties reaching its 2020 targets.

Belgium is currently generating 6.8% of its final energy consumption from renewables. New capacities will come mainly from wind and, to a lesser degree, biomass. Difficulty maintaining this momentum could impede the country's ability to reach its energy efficiency targets unless more ambitious measures are implemented in the next few years.

Figure 12. Renewable energy share of final energy use by type, in 2005 and 2010, and target for 2020, in %[17]



Targeted capacity in 2020 is 8,255 MW of renewable capacities for electricity production, 2,588 ktoe for heating and cooling, and 886 ktoe for the transport sector.[18]

Total GHG emissions in Belgium: the 2020 targets have been already nearly achieved, but emissions might rise.

Belgium's GHG emissions have already decreased, but the nuclear phase-out could counterbalance the process depending on the choice of substitutes. As a result, costs are likely to rise, placing an additional burden on the economy.

To promote renewable use in the power sector, **Belgium implemented a system of green certificates** (allocated to production from renewable sources). These certificates can be traded on a dedicated market. Electricity sellers must present green certificates to meet their requirement. They are required to have a share of their sold electricity produced from renewables; a minimum price is guaranteed by the regulator.

In addition to this green certificate scheme, Belgium has prepared a roadmap that includes financial incentives, as well as regulatory and non-binding measures related to the following strategic areas:

- Offshore wind generation (reserved zone for offshore winds parks, contribution to cabling costs, etc.).
- Heating and cooling (CHP certificates, support mechanism for green heating).
- Promotion of investments in renewable energy (tax reduction for investments on ENR for companies and individuals, etc.).
- Promotion of biofuels (mandatory blending of sustainable biofuels, tax exempt quotas for sustainable biofuels, etc.).[18]

17 EEA: Renewable Energy Projections as Published in the National Renewable Energy Action Plans of the European Member States

18 National renewable energy action plan, November 2010: http://www.buildup.eu/sites/default/files/content/national_renewable_energy_action_plan_belgium_en.pdf

The costs of financing renewables in the power sector (mainly through green certificates) are passed on to consumers and are largely responsible for the country's high final electricity prices. **Overall public contributions to the CHP and RES programs amounted to 21 €/MWh,[19] i.e. around € 1.5 billion in 2013**, exceeding the European average. Similarly, the costs of subsidies and incentives to promote investment in solar photovoltaic energy are expected to reach € 750 million per year in 2020.[20] Yet, while these PV subsidies and incentives have increased Belgium's solar power installed capacity, the country's climate prevents these installations from yielding significant production.

Given the high costs of developing renewables, and lagging energy efficiency performance, **Belgium will have difficulties in reaching its 2020 targets**. To change this equation, the country may need to adopt new policies capable of delivering higher (green and cost) efficiencies.

GHG emissions and targets

Figure 13. GHG emissions[21]

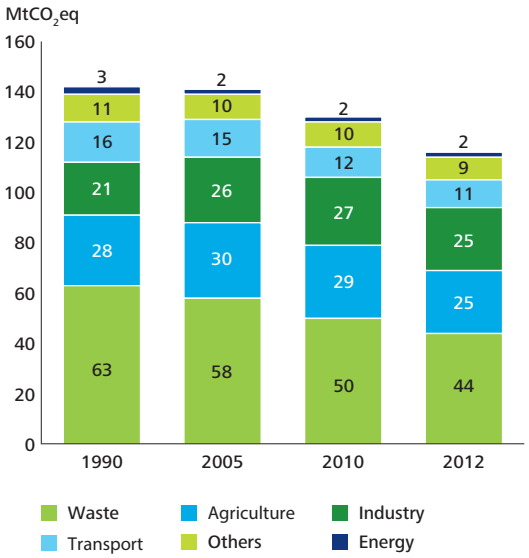
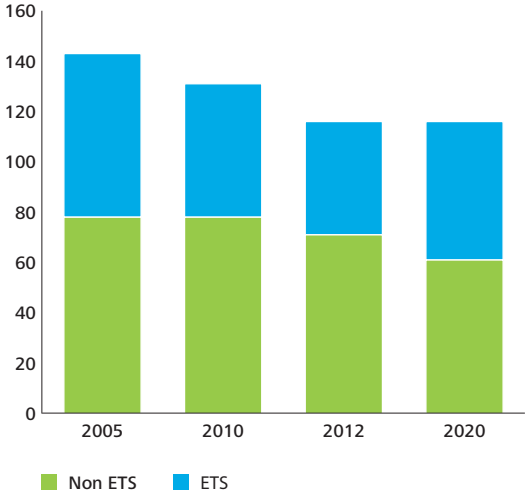


Figure 14. ETS and non-ETS GHG emissions and target[22]



Regarding GHG emissions, the targets for 2020 are a 21% reduction in the ETS sector and a 15% reduction in the non-ETS sector (both compared to 2005 levels), which means a global target of 116 Mt CO_2eq in 2020, just below the 2012 level (117 Mt CO_2eq).

Belgium's GHG emissions have been declining over the last decade, falling 18% below 1990 levels. Yet Belgium has 21% higher per capita emissions than the EU average (10.9 vs. 9.0 tCO_2eq), mainly due to the transport sector, followed by the energy use and supply, manufacturing, industrial, agricultural and waste sectors (2012).[23]

In 2012, **non-ETS GHG emissions** were 6% below the country's 2005 level and 11% above its 2020 target. According to the latest projections, and taking existing measures into account, Belgium is expected to miss its 2020 non-ETS emission target, hitting -4 % in 2020 as compared with 2005,[24] rather than its -15% goal.

In the **ETS sector**, Belgium will need to decarbonize its electricity sector to meet its 2020 target, especially if it hopes to simultaneously improve its security of supply. **GHG emissions are likely to grow in the next few years if the decision to phase out nuclear power between 2015 and 2025 is pursued, as much of the replacement is likely to come from fossil fuels.**

19 Eurelectric, Analysis of European Power Price Increase Drivers, May 2014

20 BCG, 2013

21 Eurostat: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database#

22 EEA, 2014

23 http://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2014; EUROSTAT, 2012: http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tsdcc210&language=en

24 Assessment of climate change policies in the context of the European semester, Belgium report, DG Climate action, ECOLOGIC, Eclareaon, http://ec.europa.eu/clima/policies/g-gas/progress/docs/be_2014_en.pdf

Road ahead and main challenges: the way to 2030 and beyond

Belgium is highly dependent on others.

Belgium is dependent on imports of fossil fuels and will probably need to increase dependency on gas; it is a net importer of electricity and has high electricity prices that can affect the country's competitiveness.

Belgium has an ambitious policy to develop a strong share of renewables towards 2050.

The country has put in place a system of green certificates, adopted legislation to prioritize access to the grid for electricity from renewables, and introduced subsidies and incentives for investment in renewable power. However, the costs of these measures are being passed on to final consumers.

More significantly, Belgium's climate is not ideal for the development of photovoltaic energy.

Phasing out of nuclear plants could threaten GHG emission targets and raise costs.

The currently planned withdrawal from nuclear, if maintained, involves risks for energy security, industry competitiveness and affordable energy costs to consumers.

Belgium energy dependency challenges

Since the closure of its last coal mine in 1992, Belgium is 100% dependent on imports for its consumption of fossil fuels, which constitute around 70% of its gross inland energy consumption. With the exception of 2009, Belgium has also been a (growing) **net importer of electricity**. In the wake of its decision to close all of its nuclear capacity between 2015 and 2025, Belgium needs to clarify its long-term energy policy and decide on its future energy mix, taking into account security of supply, competitiveness and environmental objectives. A substantial increase in natural gas imports will keep Belgium strongly reliant on imported fossil fuel. Also, Belgium's energy market is characterized by high electricity prices which, coupled with high labor costs, influences the competitiveness of the country in general and its industry in particular.

Proactive policy on renewables energy impacting retail prices

Renewables have been developed significantly in Belgium since 2000, reaching a generation capacity of 6.5 GW (corresponding to 34% of total capacity in 2012). Nevertheless, their global production still represents a modest 6% of gross inland consumption. The variable and intermittent nature of renewable energy sources requires electricity systems to be more flexible. Elia, Belgium's transmission system operator, has grid projects ongoing to connect renewables to a larger market to ensure their availability.

Progress in developing renewables has been made at substantial cost. Over the **short-term, this might result in a substantial increase in gas imports and use**. Notably, this would hamper Belgium's ability to meet the climate change targets established for the country by the EU, in particular for CO_2 emissions.

For 2030, Belgium aims to reach 10 GW of installed capacity from renewables. However, the proactive Belgian policy to promote renewables might encounter problems: the initiatives of the country's three regions, in addition to the federal government, have led to a **fragmented market for green certificates**.

Biomass and onshore and offshore wind seem to have the highest development potential among renewable energies due to Belgium's geographic and climatic conditions, as well as its high population density. Also, it is not yet clear whether hydro and geothermal technology can be deployed on a large scale. This limited potential increases the overall costs and challenges associated with developing renewable energy.

The planned nuclear phase-out could increase dependency on gas consumption and increase costs

Belgium is heavily dependent for its electricity on seven nuclear reactors still in operation, which generate about half of its domestic electricity production (40 TWh in 2012, 51% of the total 79 TWh production).[25] However, current policy and regulatory decisions of the Belgian government are expected to gradually curb and bring the nuclear share of electricity production to zero within 11 years. The final timing of the phase-out is as follows: **of the seven Belgian reactors, two were expected to close in 2015, one in 2022, one in 2023 and three in 2025; but the Belgian government recently decided to extend by 10 years the two reactors initially scheduled for closure in 2015**. In addition to the phasing-out decision, the annual federal tax on nuclear power generation, which in 2013 reached € 550 million, created an unfavorable financial and technical environment for the nuclear industry. In 2014, **the plants that had to close for technical reasons represented half of the country's nuclear capacity**. Given Belgium's current low rates of electricity production capacity, such technical incidents could cause shortages of supply if imports cannot fill the gap, especially in the high demand peaks of the winter season. In its efforts to replace nuclear with gas-fuelled plants to ensure baseline electricity production, Belgium may also **increase its dependence on gas import** by up to 80% of future energy supply.[26] That's especially true when you consider that many of Belgium's gas-fired power plants and investment projects are currently under water due to the negative spark spread situation. By forcing the country to increase its gas imports, this situation could have a significant negative impact on Belgium's trade deficit and would be difficult to sustain over the long term, particularly amid concerns about the rising costs – and supply insecurity – for primary resources. **Finally, replacement of nuclear with gas or coal is likely not compatible with the country's CO_2 targets**, which aim for a 15% reduction from its 2005 level by 2020. In fact, a projected additional gas-fired capacity of seven GW by 2030 would increase CO_2 emissions by 60% over the 2013 level (+9 Mt CO_2eq).[27] To compensate, Belgium might have to purchase emission allowances from the ETS, with a further substantial cost-penalty, estimated up to € 2 billion. **In essence, the currently-planned phase-out from nuclear in a relatively short period could raise significant risks for the country's energy security and industrial competitiveness, further push up energy costs to consumers and hinder Belgium's ability to meet its climate change targets**.

25 IEA Energy Statistics 2012

26 AMCHAM Belgium, Energy Security, http://www.amcham.be/policy/energy/energy-security

27 Boston Consulting Group, "Shaping a Vision for Belgium's Power Landscape", 2013

Additionally, the Belgian government will have to attract investment to replace existing capacities by introducing strong incentives and articulating a long-term vision on energy policy.

Alternatively, the extension of the operational lifetime of nuclear plants from their current 40 years to 50 or 60 years could help limit price increases and maintain security of supply, but this option would have to be balanced with nuclear technology risks.

Crucial cross-border capacity at risk of shortage

As noted earlier, Belgium is a net importer of electricity, notably from France and the Netherlands. As there is currently little direct cross-border capacity with Germany, a project is in progress (the Alegro project) to connect Belgian and German electricity markets in order to reduce the risk of shortages in case of parallel peak demand in several countries. However, the project will only become operational in 2019. The situation is similar with the UK: interconnectors are missing and investment projects are under way.

Belgium's gas transmission infrastructure is operated by a single company, Fluxys, and consists of 3,800 km of pipelines with five compressor stations and 18 interconnection points. The Fluxys network ensures both the transport of natural gas for internal consumption and the transmission to gas markets in neighboring countries. An important gas hub is situated at Zeebrugge with a terminal for gas from Norway and an interconnector terminal for gas from and to the United Kingdom, in addition to the LNG terminal and regasification plant. Zeebrugge is also one of the major spot markets for gas in Europe.

There is **limited storage capacity for natural gas in Belgium,[28] with a need to find means to ensure the necessary flexibility**. Belgium is served by a crude oil pipeline originating in Rotterdam and arriving at Antwerp. Oil products have access to the Central European Pipeline System, which is a NATO pipeline network. Belgium has over 40 oil storage facilities, which are used both for industry's operating needs and as strategic reserves. Nevertheless, Belgium does not fully comply with the obligation on strategic oil storage capacity established by EU legislation to maintain stocks of crude oil and/or petroleum products; for that reason the European Commission recently launched an infringement procedure against Belgium.

Risk of electricity shortages due to absence of cross-border capacity with Germany.

Belgium is dependent on imports of fossil fuels and will probably need to increase dependency on gas; it is a net importer of electricity and has high electricity prices that can affect the country's competitiveness.

Conclusion

The coming years will be crucial for defining the energy future of Belgium. Belgium has been able to put in place an ambitious, proactive (although rather expensive) policy on renewables and has accepted demanding targets for greenhouse gases emissions (-15% by 2020 compared to 2005) and renewables. Subsidies and incentives for renewables have, however, contributed to comparatively high electricity prices for SME and industrial consumers.

Belgium has a complex internal institutional structure and its energy policy commitments are shared by the federal government and the country's three regions. Although all three regions and the federal government have been active in the promotion of renewables, negative outcomes like the fragmentation of the green certificates market show the need to continue pushing for closer co-ordination between regional and federal levels to increase policy and regulatory efficiency.

Dependency on imports, which has been at 100% for fossil fuels since 1992, has extended to electricity in recent years. It is unclear whether the planned closure of all nuclear plants by 2025 could be absorbed at affordable costs, ensuring security of supply and preserving industry competitiveness and the achievement of climate targets. The costs and carbon emission implications of increasing reliance on gas imports should be carefully assessed. Belgium's emission path necessitates significant improvement in energy efficiencies. In the longer term, the 2050 perspective, the economics and the financial practicability for Belgium of an all-renewables energy system deserves further analysis. Priority should be given to defining a robust long-term strategy for a low-carbon future, providing a stable and enabling framework for investments on one side, while guaranteeing competitive energy costs to all affected consumers on the other.

Increasing dependency on gas imports is expected.

Natural gas consumption is expected to increase substantially to make up for the lost generation capacity of Belgium's nuclear plants, which may ultimately be replaced with gas-fired ones.

28 The main storage capacities re situated in Zeebrugge and Loenhout

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