Courtesy Translation in English provided by the Translation Services of the European Commission



Draft

Belgium's Integrated National Energy and

Climate Plan

2021-2030

Version approved by the Consultation Committee on 19 December 2018

SECTION A: NATIONAL PLAN

| 1. Ove | rview and process for establishing the plan | 4 |
|----------|--|----|
| 1.1. | Executive summary | 4 |
| 1.2 | Overview of current policy situation | 15 |
| 1.3 | Consultations and involvement of national and Union entities and their outcome | |
| 1.4 | Regional cooperation in preparing the plan | 22 |
| 2. Nati | ional objectives and targets | |
| 2.1 | Dimension decarbonisation | |
| 2.1.3 | 1 GHG emissions and removals | 24 |
| 2.1.2 | 57 | |
| 2.2 Dim | ension energy efficiency | 26 |
| 2.3 | Dimension energy security | |
| 2.4 | Dimension internal energy market | |
| 2.4.: | | |
| 2.4.2 | 2 Energy transmission infrastructure | 40 |
| 2.4.3 | 3 Market integration | 42 |
| 2.4.4 | 4 Energy poverty | 44 |
| 2.5 | Dimension research, innovation and competitiveness | 45 |
| 3. Polic | cies and measures | 48 |
| 3.1 | Dimension decarbonisation | 48 |
| 3.1.3 | 1 GHG emissions and removals | 48 |
| 3.1.2 | 2 Renewable energy | 64 |
| 3.1.3 | 3 Other elements of the dimension | 68 |
| 3.2 | Dimension energy efficiency | 68 |
| 3.3 | Dimension energy security | 82 |
| 3.4 | Dimension internal energy market | 84 |
| 3.4.: | 1 Electricity and gas infrastructures | 84 |
| 3.4.2 | 2 Energy transmission infrastructure | 86 |
| 3.4.3 | 3 Market integration | 86 |
| 3.4.4 | 4 Energy poverty | 89 |
| 3.5 | Dimension research, innovation and competitiveness | 91 |
| SECTION | B: ANALYTICAL BASIS | 99 |

| 4. | Descr | iption of the current situation and projections with existing policies for each of the five dimensions | 99 |
|----|-------|--|-----|
| | 4.1 | General parameters and variables | 99 |
| | 4.2 | Dimension decarbonisation | 99 |
| | 4.2.1 | GHG emissions and removals | 99 |
| | 4.2.2 | Renewable energy sources | 102 |
| | 4.3 | Dimension energy efficiency | 104 |
| | 4.4 | Dimension energy security | |
| | 4.5 | Dimension Internal energy market | |
| | 4.6 | Dimension research, innovation and competitiveness | |
| 5. | Asses | sment of the impact of planned policies and measures | 107 |
| | 5.1. | Dimension decarbonisation | 107 |
| | 5.2. | Dimension energy efficiency | |
| | 5.3 | Dimension energy security | |

1. Overview and process for establishing the plan

1.1. Executive summary

i. Political, economic, environmental and social context of the plan

Economic context¹

Belgium is a federal state in which decision-making power is shared between a Federal Government and three Regions (Wallonia, Flanders and the Brussels-Capital Region), as well as three Communities (the Flemish Community, the Wallonia-Brussels Federation and the German-speaking Community).

The Regions are responsible for areas such as energy efficiency, the promotion of renewable energy sources, public transport, transport infrastructure, urban and rural planning, agriculture and waste management.

The Federal Government is responsible for many aspects of fiscal policy, as well as for policies on goods (standards, fuel quality, labelling and performance standards for household and industrial appliances, etc.). It has overall responsibility for nuclear energy and the security of the country's energy supply. It also oversees Belgium's territorial waters, which means that it is also responsible for the development of offshore wind farms. Through its complementary policies in areas ranging from taxation to biofuels, bicycles, product standards, energy efficient public buildings and railways, the Federal Government supports the regions in their climate and air quality policies. These complementary policies, in addition to the forecasts for offshore wind energy, represent the federal contribution to achieving Belgium's targets under the EU's 2020-2030 climate and energy package².

Responsibility for energy is shared on the basis of the law of 8 August 1980.

Given Belgium's federal structure and the division of powers, several bodies have been set up to foster cooperation and consultation among the various levels of authority and to ensure consistency between the actions of the national government and its component entities.

The three Regions and the Federal Government collaborate closely and continually on energy and climate policy. The work is coordinated within various forums, including:

- the Energy Policy Coordination Platform, known as CONCERE/ENOVER;
- the International Environmental Policy Coordination Committee;
- the National Climate Commission (CNC).

The National Climate Commission is the central coordinating body for national climate policy. Established by the cooperation agreement of 14 November 2002, the CNC is responsible for developing and monitoring the national climate plan and compliance with EU and international reporting obligations. The National Climate Commission is made up of representatives from the four entities concerned.

Under the terms of the cooperation agreement between the Federal Government and the Regions on energy coordination signed on 18 December 1991, the Federal Government and the three regional governments set up an official body for the discussion and coordination of energy-related issues, known as CONCERE/ENOVER (State/Regional Consultation Panel on Energy). This body meets once a month and has several permanent and ad hoc thematic working groups on national, European and international priorities.

In connection with the preparation of the National Energy and Climate Plan (NECP), a steering group (CONCERE-CNC e PNEC 2030) was set up to provide guidance and coordination. The steering group is

¹ Government agreement (October 2014).

² Government agreement (October 2014).

composed of representatives of the climate and energy agencies of the Federal Government and of each Region. With this aim in mind, CONCERE and the CNC adopted a working methodology that included a mandate for the steering group. A working methodology and timetable have also been approved with a view to ensuring that Belgium's initial draft integrated NECP can be submitted to the European Commission by 31 December 2018 as part of an iterative process (see Section 1.2 below). The final decision on this plan will be accompanied by a cooperation agreement defining the responsibilities and commitments of the different entities for the period 2021-2030.

Economic context³

Belgium has a very open economy, situated at the core of a region of intense economic activity. The Belgian economy is dominated by industry and the services sector. In 2017, the value of exports of goods and services amounted to 86 % of gross domestic product (GDP), while the value of imports amounted to 85 %.

Since 1990, GDP has steadily increased (despite the dip in 2008-2009 due to the financial crisis). In 2016, Belgium's GDP stood at EUR 421.611 billion (average GDP growth in 2005-2015: 1.2 %). During the same period (1990-2005), greenhouse gas (GHG) emissions stabilised and are now on a downward trend (-19.7 % in 2016 compared with 1990 levels). The main drivers of this decoupling are greater use of gaseous fuels (reduction in the use of liquid and solid fuels); increased energy efficiency; changes in the structure of the economy (fewer energy-intensive industries such as steel, and more value added in less energy-intensive sectors such as services and retail).

GHG emissions per unit of GDP were 277 tonnes per billion euros in 2016 (excluding land use, land-use change and forestry – LULUCF).

Energy

Energy intensity has been on a downward trend since 1990, reflecting the decoupling of economic growth and primary energy consumption.

In terms of the market share of total end consumption, petroleum products remain the principal source of energy (52 %), followed by natural gas (24 %) and electricity (17 %).

The residential sector is the main consumer of primary energy (32.2 %), followed by industry (25.8 %) and transport (21.5 %).

Natural gas is the dominant fuel in the industrial and residential sectors (35 % and 38 % respectively in 2015). In the transport sector, consumption is dominated by petroleum products (95 %).

Belgium has limited energy resources; its total primary energy production accounts for about 20 % of its total primary energy consumption. It is therefore highly dependent on other countries for its energy supply. Nuclear energy accounts for 73.9 % of Belgium's energy production. The proportion for renewable fuels and waste is 19.5 %.

In recent years, Belgium has made progress in developing renewable energy. In 2016, renewable energy accounted for 8.65 % of total final energy consumption.

Transport

Belgium is covered by an extensive network of inland waterways and an extremely dense communications network (road and rail). As Belgium is a transit country, transport is a fast-growing sector. Road transport is the most energy-intensive form of transport in Belgium. The number of private vehicles is growing steadily (Belgium has an extremely high level of car ownership, with 1 car for every 2

³ 40 % of the natural gas imported from the Netherlands comes from a third country and is only carried by the Dutch natural gas network, rather than produced within it.

inhabitants). Road transport still accounts for the bulk of ground freight transportation. Demand for fossil fuels in this sector is expected to continue to rise.

Industry

Although the importance of the industrial sector (particularly heavy industry) in the economy has declined since the 1960s, it remains a relatively large component of Belgium's economic activity (accounting for almost 15 % of GDP).

The principal contributing factors to industrial GHG emissions covered by the EU Emissions Trading System (EU ETS) are energy transformation (mainly attributable to electricity and heat production, but also oil refining); industrial processes (notably the chemicals, minerals and metallurgical industries) and energy combustion in manufacturing industries (iron and steel, chemicals, food and beverage production, cement).

In 2015, non-ETS industrial GHG emissions accounted for 24 % of total industrial emissions from energy combustion and industrial processes. These included nitrous oxide (N₂O), fluorinated gases (F-gases) and carbon dioxide (CO₂).

Waste

Waste production rose by 24 % between 2004 and 2014. Significant improvements in waste treatment have considerably reduced the amount of waste sent to landfill.

Housing stock

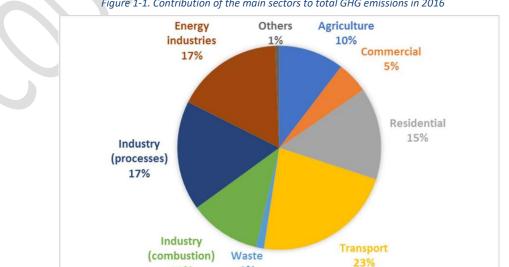
Since 1995, the number of buildings has increased by 12 %; over the same period, the number of households has risen by 20 %. Belgium's housing stock includes a high proportion of old buildings. Natural gas is the main source of heating. The number of homes with energy-consuming appliances is continuing to rise.

Agriculture

Belgium's agricultural sector specialises in vegetables and horticultural crops, cereals, potatoes, sugar beet, livestock farming and dairy production. Although more of the country's land (44 %) is used for agriculture than for any other purpose, the number of farms has continued to decline in recent years. Agriculture's share of the Belgian economy is steadily falling and now represents less than 1 % of GDP. Despite high population density, the proportion of forests and other natural habitats remains relatively stable (23 % of the land area).

Environmental context

The diagram below shows the contribution of the main sectors of the economy to Belgium's GHG emissions.



1%

11%

Figure 1-1. Contribution of the main sectors to total GHG emissions in 2016

Figure 1.2 summarises the impact of the key sectors on the national trend. It clearly shows the sharp increase in road transportation and the rise in emissions from commercial buildings.

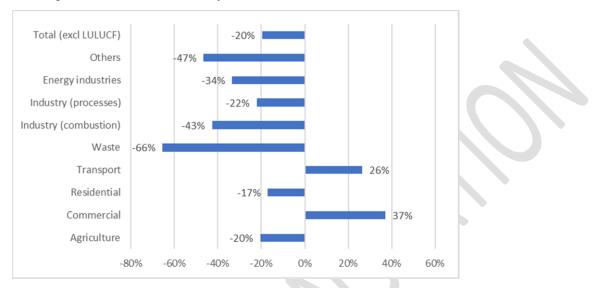


Figure 1-2. Growth in GHG emissions from the main sectors between 1990 and 2016

In Belgium as a whole, total GHG emissions (ETS and non-ETS combined) fell by 19.7 % in 2016 (compared with 1990 levels) and by 20.7 % if we take 1995 as the baseline for fluorinated gases (excluding LULUCF). The largest contribution to total emissions is that of CO_2 , which accounted for 85.1 % of emissions in 2016. Methane (CH₄) emissions make up the second-largest share at 6.8 %, while N₂O emissions represent an additional 5.1 %. In 2016, ETS and non-ETS emissions fell by 35 % and 6 % respectively relative to 2005 levels.

The energy sector (i.e. Sector 1 of the Common Reporting Framework – CRF) contributed 72.9 % to total emissions in 2016 (excluding LULUCF). Since 1990, emissions have declined by around 20 %. Emissions from the energy and manufacturing sectors have fallen by 34 % and 43 % respectively, while emissions from transport rose by 22 % between 1990 and 2016.

There has been a shift from solid fuels to gaseous fuels in the electricity generation sector and in industry. Combined with the development of biofuels in some sectors, this situation has resulted in a decrease in the level of CO_2 emissions produced for a given level of energy consumption.

Emissions from the residential and tertiary sectors fell in 2016 relative to previous years as a result of the change in the type of fuel used and better insulation. This is despite the upward trend observed for several indicators (such as the rise in the number of households and the number of workers in the tertiary and institutional sectors). Moreover, the trend for the tertiary sector shows a net increase in emissions due to the growth in activity in this sector.

Emissions from road transport have been rising steadily since 1990 due to growth in the number of cars and increasing traffic density. Nevertheless, growth in traffic has slowed considerably in recent years.

Industrial processes and product use are the second biggest source of greenhouse gases in Belgium, accounting for 17.4 % (ETS and non-ETS) of the national total in 2016. Since 1990, emissions have fallen by 25 % due to investments in alternative fuels and in energy efficiency, and as a result of carbon leakage. This applies across all sectors, although the iron and steel industry saw the sharpest decline on account of plant closures.

Agriculture accounts for 8.4 % of total emissions (mainly CH_4 and N_2O). Some CO_2 emissions are caused

by liming. Since 1990, emissions from this sector have fallen by 18 % due to a decrease in emissions from enteric fermentation (linked to the reduction in the number of livestock and the shift from dairy cattle to breeding cattle) and farmland (decline in the use of synthetic fertilisers and the reduction in the number of livestock, which in turn decreases the amount of nitrogen excreted on grazing land).

LULUCF is both a carbon sink and a source of CO₂ emissions. However, LULUCF was a net sink in 2016, as it always has been in the past. In 2016, the waste sector accounted for around 1.3 % of the national total. Emissions come from waste incineration, (solid) landfill waste and wastewater treatment. Emissions from this sector have fallen steadily; in 2016, they were 63 % below 1990 levels, mainly due to the recovery of biogas and its use in solid waste disposal.

Social context

Belgium had 11 267 910 inhabitants as of 1 January 2016, representing 2.2 % of the total population of the European Union (Belgium is the ninth most populous Member State in the EU). Belgium is very densely populated – with an average density of 363 inhabitants per km² (2015), it is the third most densely populated country in Europe. However, this density varies from one part of the country to another, with the north of the country being much more densely populated than the south. Currently, Flanders is home to 57.5 % of the population, Wallonia 32.0 % and the Brussels-Capital Region 10.5 %.

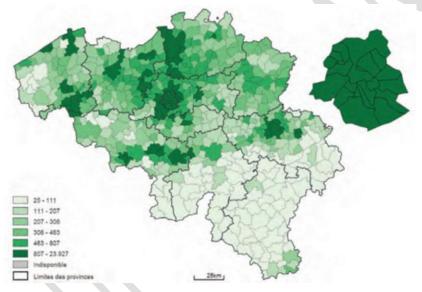


Figure 3 Population density by municipality as of 1 January 2015

Source: FPS Economy - FPS Economy - Directorate-General Statistics and Economic Information

| indisponible | Data unavailable |
|-----------------------|-----------------------|
| Limites des provinces | Provincial boundaries |

Belgium's GHG intensity in 2015, at 10.5 tonnes of CO_2 equivalent per capita, is significantly lower than in 1990 (when it was 14 tonnes). Due to the significant contribution of energy-intensive industry to Belgian GDP, this figure is above the average CO_2 intensity for the EU, which fell from 12 tonnes to less than 9 tonnes per capita between 1990 and 2015.

Statbel, the Belgian national statistics office, uses inability to pay energy bills as a measure of material

poverty (defined as an inability to maintain an average standard of living and to cover the costs of rent, water, electricity, etc.). The percentage of the population in poverty was 5.1 % in 2017.

Constituent parts of the National Energy and Climate Plan

In preparing this initial draft integrated NECP, cooperation and consultation with various other strategic areas was vital at both federal and regional level. As well as climate and energy, these areas also included mobility, science policy, finance, defence and agriculture. Given the integrated nature of the plan, contributions from the various entities and administrations involved in these strategic areas proved essential. This was because many of the strategic objectives and measures overlap and/or have a direct or indirect impact on one or more strategic areas other than climate and energy. This approach also sought to confer a certain degree of ownership on all the strategic areas involved. This ensured the necessary level of engagement when preparing entity-specific plans, ensuring that effort required to achieve or deliver the agreed objectives and measures could be made.

Entity-specific plans

The decision to start with entity-specific plans as the basis for the final integrated draft plan was part of the steering group's working methodology. Each entity adopted its own approach to developing its plan, both in terms of content and implementation through consultation, etc.

The NECP contains a summary of the plans of the various Belgian entities. For a full description of the strategic measures, please see the entity-specific plans which accompany this plan. The plans have been approved by the respective governments within Belgium. Therefore, these are the only plans that are officially valid for the purposes of the European Commission's assessment under the Regulation on the Governance of the Energy Union.

Federal

The NECP is largely based on the federal energy strategy approved by the Federal Government on 30 March 2018.

Flemish Region

On 20 July 2018, the Flemish Government approved the draft Flemish Energy Plan 2021-2030 and the draft Flemish Climate Policy Plan 2021-2030. Together the two coordinated plans represent the Flemish contribution to Belgium's draft NECP.

In adopting the Flemish energy plan 2021-2030, the Flemish government defined its contribution to the EU's energy efficiency and renewable energy targets by 2030. It also formulated proposals to make energy infrastructure smarter and more flexible. The Climate Policy Plan outlines climate policy for the period 2021-2030.

Walloon Region

The Walloon Region conducted a preliminary written stakeholder consultation based on the 2030 baseline scenario (the 'no additional measures' scenario) in March-April 2017. This consultation then served as an input for drafting the plan. A further stakeholder consultation was conducted in February and March 2018 (with a workshop held on 22 and 23 February and written responses received by 15 March) on fact sheets covering energy and climate issues.

On 19 July 2018, the Walloon Government finalised its contribution to the NECP in accordance with the Governance Regulation and the Clean Energy Package. The plan includes a package of measures in areas within the Region's remit, thus contributing to the achievement of the climate and energy targets that the EU has allocated to Belgium. These policies and measures will be incorporated into the 2030 Air, Climate and Energy Plan (PNEC) for the Walloon Region, which will include all policies and measures relating to air quality. The PNEC will be subject to a public inquiry in Wallonia.

Brussels-Capital Region

On 12 July 2018, the Government of the Brussels-Capital region finalised its contribution to the draft version of the NECP 2030. The Brussels plan contains 52 measures specific to the Region, including 20 measures relating to buildings, 17 measures relating to transport and 14 measures relating to renewable energy. State authorities are directly responsible for at least 9 of these measures.

Inter-Federal Energy Pact

In the Inter-Federal Energy Pact of December 2017, Belgium reaffirmed its commitment to the Paris Agreement by putting particular emphasis on the transition to a low-carbon society.

The Inter-Federal Energy Pact sets out a common ambition for the energy transition in Belgium. It is recognised by the three regional governments and the Federal Government as a significant statement of intent regarding their determination to complete the required energy transition. As such, it has informed the development of the various entity-specific plans that form the basis of the integrated NECP.

The Energy Pact outlines objectives for Belgium's energy system by 2050, setting various energy transition targets. It serves as the basis for a coherent medium- and long-term strategy for changing Belgium's energy system, setting out key measures to accelerate the energy transition. The Pact also gives an insight into the 2030 energy mix.

Lastly, it reaffirms energy's central role in government policy. Energy efficiency and the transition to sustainable energy consumption must be seen as horizontal measures. These should be integrated into the various relevant areas of public policy, including tax, health, mobility, employment, training, land use and the circular economy.

ii. Strategy for the five dimensions of the Energy Union

Belgium's energy and climate policy sets the following strategic objectives, in line with the overall philosophy and four pillars of the Inter-Federal Energy Pact:

- **Ensuring sustainable, secure and affordable energy**. The aim is to achieve an optimal balance between environmental efficiency, economic efficiency and social efficiency.
- Putting citizens at the heart of the energy system. Empowering and encouraging citizens and businesses to make the most effective and energy efficient decisions with a view to collective achievement of the overarching objectives through participation and information.

Maintaining an affordable system for both large and small consumers. The global energy transition comes at a price, but the cost of failing to act would be even higher. The transition will also yield economic opportunities for Belgium. The focus will be on affordability and the competitiveness of firms, as well as on vulnerable consumers.

- Ensuring participation and that initiatives at all levels of government are consistent. The focus will be on dialogue, inclusiveness, communication and consistency between the different levels of

government to achieve a positive outcome.

This is reflected in the draft NECP for each dimension of the Energy Union, as follows.

1. Dimension decarbonisation

Reduction in GHG emissions

As part of dimension decarbonisation, Belgium will reduce its GHG emissions by 35 % in 2030 compared with 2005 levels for non-ETS sectors. Energy-intensive industry and the electricity sector come under the EU ETS. With this in mind, the EU ETS is designed as a harmonised instrument that reduces GHG emissions while largely preserving the competitiveness of businesses. In the past, Belgium has taken considerable steps to reduce greenhouse gases in the economy, to the point where several sectors have already adopted the most cost-effective measures possible. However, non-ETS sectors will have to move up a gear before 2030 and their GHG emissions will have to decline at a faster rate than they have done so far. This will require a renewed effort from those sectors that contribute the most to GHG emissions, i.e. the buildings and transport sectors. In the buildings sector, emphasis is placed on significantly improving energy efficiency and on 'greening' energy sources. The transport sector is aiming for an ambitious modal revolution in passenger transport, at the same time as greening the vehicle fleet and other types of transport (freight, public, etc.). This NECP proposes a range of measures with a view to effecting this transition.

The Regions are concentrating on the large-scale renovation of their buildings. The transport sector is relying on legislation and behavioural change. All entities have pledged to introduce measures to support these initiatives and raise awareness.

Renewable energy

As part of dimension decarbonisation, Belgium has set a contribution in terms of the proportion of renewable energy it uses. The EU target is 32 % by 2030. Based on the measures outlined in the entity-specific plans, Belgium will generate 18.3 % of its gross final energy consumption from renewable energy sources (RES) by that date.

| By entity | RES production (Mtoe) | Final energy consumption | Proportion of RES in final |
|----------------------------|--------------------------|--------------------------|-------------------------------|
| | | (Mtoe) | consumption (%) |
| Belgium | 6.0 | 32.9 | 18.3 |
| Brussels-Capital Region | 0.1 | 1.6 | 4.8 |
| Wallonia (*) | 2.3 | 10.1 | 22.7 |
| Flanders | 2.4 | 21.2 | 11.2 |
| Federal | 1.3 | | |

Renewable energy production in 2030

(*) Based on a biofuel inclusion rate of 10 % (actual), rather than 14 %. These figures will be reviewed in early 2019.

2. Dimension energy efficiency

With regard to energy efficiency, Belgium has set its contribution to the EU target of 32.5 % by 2030. Its estimated contribution is 22 % in primary energy savings and 17 % in final energy savings compared with the PRIMES (Price-Induced Market Equilibrium System) 2007 baseline by 2030. Compared with 2005 actual consumption, its estimated contribution is 26 % in primary energy terms and 12 % in final energy terms. A significant contribution (estimated at 181 TWh) to Belgium's target should come from the implementation of Article 7. Since there was no data available to calculate the energy savings that might be achieved by implementing Article 7, assumptions were used to calculate the scale of the future commitment.

3. Dimension energy security

Energy security is one of the major challenges facing Belgium in the short and medium term. The strategic objectives or priorities associated with energy security can be summarised as follows:

- In view of the plans announced to phase-out low-calorific gas supplies from the Netherlands from 2022 onwards, Belgium plans to switch 1.2 million connections to high-calorific gas between 2017 and 2029.
- A major change in the energy mix following the phasing out of nuclear power by 2025, with 5 918 MW of decommissioned nuclear capacity having to be replaced. Belgium is opting for an energy mix based on flexible capacity, load shifting, storage and renewable energy. A monitoring and correction mechanism will therefore be developed to ensure security of supply, safety, sustainability and long-term affordability.
- As nuclear power is phased out, plans will be drawn up for the decommissioning of nuclear power plants and the management of radioactive waste. This will require various decisions to be made, particularly regarding technical specifications and the siting of waste storage facilities.
- A capacity compensation mechanism will be developed during the period 2022-2025. This will
 ensure security of electricity supply and attract investment to develop new capacity or maintain
 existing capacity. This mechanism will be implemented at structural level, taking the situation in
 neighbouring countries into account.
- Belgium will also perform the various risk assessments regarding the security of electricity, natural gas and oil supply enshrined in EU and international legislation. These assessments will mainly be carried out at regional level through, inter alia, the Pentalateral Energy Forum and the Gas Platform.
- Several longer-term forecasts are being prepared, including prospective studies for electricity and natural gas (SPF Économie – AD Energie) and the energy outlook (Federal Planning Bureau). Regulators and grid operators, individually or within their European coordinating bodies (e.g. ACER, CESR, ENTSO-E, ENTSO-G), are also conducting numerous studies in support of policymakers, with a view to ensuring security of supply.
- Lastly, Belgium is continuing to invest in improving and updating its crisis-management policy for all relevant energy carriers.

4. Dimension internal energy market

The strategic priorities for improving the internal energy market are focused on the following areas:

- With regard **to energy transportation infrastructure**, the next few years will see the reinforcement of existing interconnections with France and the Netherlands (Brabo). The existing 380 kV internal corridors will also be strengthened. In addition, projects of common interest (PCIs) currently in development include further investment in interconnections with Germany (ALEGrO HVDC link) and the UK (Nemo HVDC link).
- To encourage **market integration**, the results of the existing market coupling will be evaluated at regular intervals during the period 2020-2030 on the basis of clear key performance indicators (KPIs).
- Solutions will be found in response to the increasing need for **flexibility** using storage, the reciprocal adaptation of supply and demand, the extension of connections between countries, the improvement of energy networks, the establishment of energy communities and the creation of options for energy storage.
- With regard to **energy poverty**, all existing federal and regional measures in years to come will focus on tackling the issue at source in accordance with EU directives, with targeted measures to reduce energy consumption.
- Smart meter roll-out will be accelerated, allowing citizens to make their own contribution to flexibility and security of supply.
- Tariffs calculated on the basis of a both a capacity tariff and of consumption will be introduced in a bid to ensure network costs are shared fairly.

Market mechanisms will be adapted in order to create the conditions for ensuring security of supply while facilitating an energy transition at the lowest possible cost.

5. Dimension research, innovation and competitiveness

Belgium's research and innovation (R&I) policy in connection with the Energy Union is aimed at supporting the objectives of EU energy policy in terms of energy security, sustainability and competitiveness. In addition, the R&I policy stimulates innovation in and by Belgian companies in order to boost their competitiveness. Belgium is convinced that a common European approach is necessary to achieve the EU strategy for a resilient Energy Union and a forward-looking climate policy.

Belgium is committed to spending at least 3 % of GDP on research and development (R&D).

The different Belgian entities are developing various programmes to achieve these goals. For the federal authorities, the main emphasis is on the Belgian Federal Science Policy Office (BELSPO) programme and research in the nuclear sector. In the various Regions, the focus on climate and energy is reflected in research programmes and cooperation as part of the Strategic Energy Technology Plan (SET-Plan).

Maintaining and enhancing the competitiveness of its firms is a key issue for Belgium. To ensure that Belgian industry remains competitive and to protect jobs, an energy standard is being developed for energy-intensive companies in particular. Household energy bills will also be monitored and special consideration given to a proactive policy to address poverty.

iii. Table summarising the plan's key objectives, policies and measures

| Dimension | 2030 target | Comments |
|----------------------------|-------------|---|
| Decarbonisation | | |
| GHG-ESR | -35 % | Compared with 2005 levels |
| RES | 18.3 % | of gross final energy consumption |
| Energy efficiency | | |
| Primary energy consumption | 39.0 Mtoe | i.e22 % compared with the business-as-usual (BAU) scenario, with PRIMES 2007 as the reference in 2030, i.e26 % relative to actual consumption in 2005 (*) |
| Final energy consumption | 33.1 Mtoe | i.e17 % compared with the BAU scenario, with PRIMES 2007 as the reference in 2030, i.e12 % relative to actual consumption in 2005 (**) |

(*): according to Eurostat energy balances (updated for solid fuels); taking the sum of regional energy balances for 2005, the reduction is 29 %.

(**): according to Eurostat energy balances (updated for solid fuels); taking the sum of regional energy balances for 2005, the reduction is 16%.

1.20verview of current policy situation

- i. National and Union energy system and policy context of the national plan
- ii. Current energy and climate policies and measures relating to the five dimensions of the Energy Union

1. Dimension decarbonisation

Reduction in GHG emissions

Belgium succeeded in reducing its non-ETS and ETS GHG emissions (excluding LULUCF) by 19.7 % in 2016 compared with 1990 levels. The most significant contributions came from the transition from solid/liquid fuels to gaseous fuels, industry efforts to cut emissions ($CO_2/N_2O/Fluor$) and a widespread commitment to rational energy use.

Although the main focus is on the key non-ETS sectors, significant reductions appear to have been made in the housing sector, largely as a result of better insulation. Emissions from road transport have been rising steadily since 1990, owing to the increase in the number of cars and longer journeys.

In policy terms, Belgium has set itself a binding target of a 15 % reduction by 2020 (compared with 2005 levels) in non-ETS sectors. This target is spread among the different Regions, which have introduced their own measures to achieve the necessary reductions. The Federal Government is contributing to this effort through additional measures and a policy of enablement.

Renewable energy

In principle, primary responsibility for renewable energy in Belgium lies with the Regions. However, this principle is undermined by the fact that the Regions only exercise their substantive powers within the limits of their territorial jurisdictions, and not in maritime areas. Since the 1980 State Reform, the Federal Government has been responsible for renewable energy sources in maritime areas under Belgian jurisdiction according to international maritime law. Biofuels are also subject to federal jurisdiction. All other aspects relating to renewable energy are under regional jurisdiction.

Potential for renewable energy generation is comparatively low in Belgium. The country is very flat and densely populated, with a relatively low number of sunshine hours. The large-scale use of hydropower, onshore wind turbines and solar panels is difficult owing to the considerable challenges around land use and public support.

In 2016, the share of renewable energy in total final energy consumption was 8.65 %. Belgium is thus on track according to the National Renewable Energy Action Plan and Directive 2009/28/EC. However, growth in the share of renewables in final energy consumption has slowed in recent years and is being closely monitored to ensure that the targets will be met.

Total electricity production stood at 7 788.8 ktoe in 2016. The share of electricity generated from renewable sources was 15.75 %, a large part of which came from wind energy (40 %). Biomass and solar energy each accounted for about 20 %. In the transport sector, 5.89 % of fuel came from renewable sources, out of a total of 9 055 ktoe. 8.14 % of energy used in heating and cooling was renewable, out of a total of 18 840 ktoe.

2. Dimension energy efficiency

In order to transpose and implement Article 3 of Directive 2012/27/EU on energy efficiency, in June 2013 Belgium notified the European Commission of its indicative energy efficiency target for 2020,

specifically an 18% reduction in primary energy relative to projected gross domestic energy consumption (excluding non-energy uses), according to PRIMES 2007 baseline modelling.

Belgium's indicative energy efficiency target is the sum of individual estimates of primary energy savings based on existing and planned policy measures taken at federal and regional level. The energy reduction in 2020 relative to the PRIMES 2007 baseline (53.3 Mtoe) was calculated using the methodology developed for the 2011 and 2012 National Reform Programmes. This equates to an energy saving of 9.6 Mtoe and gross domestic energy consumption of 43.7 Mtoe in 2020. As required by the Energy Efficiency Directive (EED), this primary target is converted into a final consumption target of 32.5 Mtoe in 2020.

In 2016, primary energy consumption was 49 Mtoe, equating to 36.3 Mtoe of final energy consumption.

3. Dimension energy security

Like Europe as a whole, Belgium is largely dependent on imports of primary energy sources (oil, natural gas, coal, nuclear fuel) to meet domestic demand. Nuclear fuel is not naturally present below ground in Belgium. Since the markets for the various energy carriers are almost completely liberalised and are therefore subject to market movements at international, European, regional and national level, Belgium does not have a clear policy on the diversification of its energy supply when it comes to oil, natural gas or coal. However, the origin of these different primary energy sources is continually monitored and no potentially problematic supplier monopolies have been identified to date.

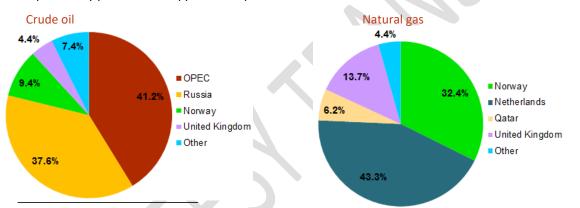


Figure 1.2: Origin of energy imports by carrier (crude oil on the left, natural gas on the right⁴ – both in %) (Source: 2016 key energy figures)

⁴ 40 % of the natural gas imported from the Netherlands comes from a third country and is merely transported by the Dutch natural gas network.

4. Dimension internal energy market

Belgium serves as a role model for the proposed EU interconnection target. According to the current timetable, Belgium will already have an electricity interconnection rate of approximately 21 % by 2020. The EU target for 2030 (i.e. 15 %) will thus be achieved by 2020. The interconnection rate will increase again in late 2020 or early 2021 due to the Aachen Liège Electricity Grid Overlay (ALEGrO) and investments in additional static voltage regulators. Aside from existing projects, further expansion could potentially be envisaged following the consultation currently under way on the Draft Federal Development Plan 2020-2030 submitted by Elia (Belgium's national transmission system operator), additional impact assessments and changes to the electricity system in the coming years. If all the projects described in the Development Plan are completed, the interconnection rate will be approximately 30 % by 2030. With regard to natural gas, Belgium already has an efficient and welldeveloped natural gas network, with well-established internal infrastructure complemented by interconnections with all its neighbouring countries, an LNG terminal at Zeebrugge and a storage facility at Loenhout. In addition, Belgium's gas transmission system operator, Fluxys, has a major stake in key projects in central and western Europe. This provides added flexibility and enhances both security of supply and the attractiveness of Belgium's natural gas market. The interconnection rate makes an enormous contribution to energy security, provided this security can be guaranteed for Belgian consumers. This aspect will need to be developed in future and will be included in measures relating to market function.

The roll-out of smart meters will ensure that citizens make their own contributions to flexibility and security of supply. Market function will be adapted in order to provide the framework for ensuring security of supply during the energy transition, and to ensure this is done at the lowest possible cost.

Fuel poverty is another major strand of Belgium's energy policy, including in the context of effort to secure accessible and affordable energy for all citizens. Various measures are already in place nationwide. For example, a federal policy is in place with a view to protecting low-income or vulnerable residential customers. The policy is designed to make energy bills more affordable through direct or indirect financial support, including:

- a Social Tariff for electricity and natural gas. This discounted tariff is calculated every 6 months on the basis of the lowest market price;
- a Gas and Electricity Fund, used to take preventive and remedial action;
- a Social Heating Fund (heating oil fund), used to subsidise heating oil bills;
- a deferred payment scheme allowing heating oil bills to be paid in instalments.

On 4 March 2016, an energy poverty programme was approved for the first time by the Flemish Government. The programme consists of 34 action points for tackling energy poverty at source and is part of the Flemish Poverty Reduction Action Plan 2015-2019.

A range of measures have also been adopted by the Regional Governments to protect low-income households and help them pay their energy bills, including:

- installation of power limiters/prepayment meters;
- public welfare services provided in the event of non-payment (minimum delivery in winter, preventing any attempt to have the locks changed);
- financial incentives for reasonable energy consumption (MEBAR/REG subsidies) or home improvements;
- support measures to reduce energy consumption or energy costs (awareness-raising, energy advisors, energy training for social workers, free energy audits).
- etc.

In the Brussels-Capital Region, gas and electricity regulations are geared towards consumer protection,

which is ensured by the following measures in particular:

- the supplier has an obligation to supply any customer upon request, provided the customer does not owe money to the company. The supplier must offer a minimum 3-year contract;
- provision for 'regional protected customer' status; customers may be granted this status depending on their circumstances;
- a ban on disconnecting the supply during the winter months (1 October to 31 March);
- the Brussels energy guidance fund, paid to public social welfare centres (CPAS) as part of their public service mandate;
- a regulated debt collection process designed to minimise the number of households that are disconnected by assisting customers in difficulty;
- as part of this package of regional measures, the energy supply cannot be disconnected without authorisation from a magistrate; this ensures that the decision on whether to disconnect the supply is impartial.

5. Dimension research, innovation and competitiveness

Belgium is committed to research and innovation as a means of supporting the EU's energy and climate policy objectives in terms of sustainability, energy security and competitiveness. In addition, research and innovation policy stimulates innovation in and by Belgian companies with a view to boosting their competitiveness. Given the need for a common European approach, Belgium's research and innovation policy is closely linked to priorities set out in the SET-Plan. At international level, Belgium is a member of the International Renewable Energy Agency (IRENA) and the International Energy Agency (IEA).

Overall, Belgium is committed to achieving the European R&D target of 3 % by 2020.

Belgium's objectives are translated into specific policies by the Federal Government and the different Regions, taking into account distribution of powers related to research and innovation between them.

Given the significant presence of energy-intensive industries in Belgium, maintaining competitiveness is crucial for a successful energy transition.

iii. Key cross-border issues

Within the framework of the Regional Energy and Climate Dialogue 2030 (see Section 1.4 below), the countries in the Pentalateral Energy Forum have identified a number of issues with a cross-border impact and on which cooperation would seem desirable in the preparation of their respective NECPs. A governance structure has also been established to ensure structural monitoring of this cooperation.

iv. Administrative structure for implementing national energy and climate policies

In September 2016, the CONCERE-CNC steering group for the NECP 2030 was given its mandate by the CNC and CONCERE. The Federal Government and each of the Regions are represented by two steering group members, responsible for the energy and climate sectors respectively. The steering group (see Section 1.1(i)) coordinates, plans and oversees the following:

- a) The development of Belgium's NECP in accordance with the European Commission's guidelines and timetable.
- b) National dialogue and consultations with other relevant official sectors (such as transport and agriculture) and stakeholders are launched by the steering group. In addition, dialogue

and consultation on topics that fall within the exclusive remit of each entity may be organised separately by each entity as it deems appropriate, with the aim of fostering synergies and preventing duplication of effort. The content of this dialogue and consultation is shared with the steering group.

- c) Dialogue with neighbouring countries and the European Commission on Belgium's NECP.
- d) Options for outsourcing and supervising joint missions with third parties as part of the NECP development process.

1.3Consultations and involvement of national and Union entities and their outcome

i. Involvement of parliament

Federal Government

The draft NECP will be submitted to Belgium's Chamber of Representatives in the first trimester of 2019.

Flemish Region

The Flemish Parliament and the Inter-Parliamentary Dialogue on Climate Change have not yet been consulted on the draft text. A parliamentary consultation will take place in the spring of 2019.

Walloon Region

On 20 February 2014, the Walloon Parliament adopted the Climate Decree. The decree is designed to set targets for reducing GHG emissions in the short, medium and long term and to provide the tools to ensure that these targets are met. Specifically, it requires 5-year emissions 'budgets' to be drawn up.

The targets set by the decree are as follows:

- a 30 % reduction in GHG emissions (compared with 1990 levels) by 2020;
- an 80-95 % reduction in GHG emissions (compared with 1990 levels) by 2050.

To achieve these targets, the decree requires the Government to publish an Air, Climate and Energy Plan every 5 years.

The aim of the plan is to provide a comprehensive description of the action taken and planned in order to reduce emissions of greenhouse gases and other atmospheric pollutants and thus to improve air quality. The draft plan must be accompanied by a cost-benefit analysis of the measures, a provisional timetable for their introduction, and an assessment of their impact.

The first plan following the adoption of this decree covers the period until 2022. This plan was adopted on 21 April 2016.

Given that, under the terms of the decree, the plan is part of a dynamic process closely monitored by the parliament and Government, the measures may be redirected, strengthened or scrapped as appropriate.

The plans must be clearly articulated, particularly as regards reporting to the European Commission.

Brussels-Capital Region

On 12 July 2018, the Government of the Brussels-Capital region adopted its regional section of the NECP

and took note of the Environmental Impact Reduction Strategy for Existing Buildings (commonly referred to as the 'renovation strategy'), which will be submitted as an annex. The plan itself was not subject to a parliamentary consultation.

ii. Involvement of local and regional authorities

Federal

Consultations took place during the development of the Energy Pact. Consultation were also held with representative bodies (CFDD, CEC, etc.). A national public consultation will take place in the first trimester of 2019.

Flemish Region

On 20 July 2018, the Flemish Government approved the draft Flemish Energy Plan 2021-2030 and the draft Flemish Climate Policy Plan 2021-2030. Taken together, the two coordinated plans represent the Flemish contribution to Belgium's draft NECP.

Local authorities were not consulted separately by the Flemish Region. However, their contributions were included over time as described in paragraph (iii), and they were asked for an opinion through their affiliation with the advisory councils of SERV (Social and Economic Council of Flanders) and MINA.

Walloon Region

Local authorities in Wallonia have not been specifically involved in drawing up the Walloon plan to date.

In early 2019, a public inquiry will be held on the Walloon Air, Energy and Climate Plan, which consists of the regional energy and climate plan and the plan relating to air quality. The public inquiry will assign a central role to local authorities. Initially they will be consulted upstream on the content of the Environmental Impact Assessment, which will take place during the first phase of the public inquiry. Subsequently, local councils will have an important role to play during the inquiry itself, by keeping citizens informed of its activities.

iii. Consultations of stakeholders, including the social partners, and engagement of civil society and the general public

The different elements of the NECP have been presented to the public and civil society in various ways.

First, a nationwide consultation took place on the Inter-Federal Energy Pact. Between early May and late June 2017, the 129 key stakeholders were canvassed in writing on their vision, expectations and requirements regarding the development of Belgium's energy market by 2050. Almost 50 written responses to this consultation were received.

In addition, an online citizens' consultation was held in the autumn of 2017 (17 October to 5 November). More than 45 000 people took part in the online survey.

The responses to the two public consultations were analysed by the energy administrations concerned (under the aegis of the CONCERE Energy Pact working group) and were given full consideration by policy makers as a contribution to the pact.

At federal level, the federal advisory bodies CFDD (Federal Council for Sustainable Development) and

CCE (Central Economic Council) submitted their contributions and proposals for specific measures (see annex), some of which were included in the federal contribution to the NECP.

An analysis of this survey can be found here: <u>https://www.energiepact2050.be/129-17-brochure-A4-N.pdf</u>

Flemish Region

The Flemish Energy Plan 2021-2030 relies on a fast-track approach. Five pillars (energy efficiency, renewable energy, flexibility, funding and governance) underpin the vision for the energy system. Specific proposals have also been set out for policy and action to be taken on the ground. The Flemish Climate Policy Plan 2021-2030 was unveiled at the Flemish Climate Summit in 2016. Both plans were submitted to strategic advisory councils in Flanders, which expressed their views on them.

Walloon Region

In the Walloon region, a preliminary written stakeholder consultation based on the 2030 baseline scenario (the 'no additional measures' scenario) was held in March and April 2017. The authorities then used this as an input when drafting statements on the areas covered by the plan. An additional stakeholder consultation was carried out in February and March 2018 (workshop held on 22 and 23 February and written responses received by 15 March).

A public inquiry will take place in the first half of 2019 on the Air, Climate and Energy Plan (PACE).

Brussels-Capital Region

No specific consultation is envisaged for the Brussels section of the plan. Nevertheless, the Brussels Economic and Social Council delivered an own-initiative opinion. With regard to the renovation strategy and Good Move Plan (Brussels Mobility Plan) annexed to the plan, stakeholder consultations were held in 2018 and 2019.

Joint consultations

As yet, no national consultation has taken place.

Following the presentation of the first draft plan, a national consultation initiative (public, stakeholders and parliament) will follow in the first quarter of 2019 (as agreed within the CNC-CONCERE steering group and mentioned in its working methodology).

iv. iv. Consultations of other Member States

At bilateral level, there is no specific initiative for the exchange of information on NECP-related projects. Belgium's dialogue with neighbouring countries and other Member States tends to take place in the context of regional cooperation (see Section 1.4 below).

v. v. Iterative process with the Commission

The Commission was invited to participate in the Regional Energy and Climate Dialogue 2030 (see Section 1.4), to which it responded enthusiastically. It will continue to participate in this process in future at the request or initiative of the Member States.

At national level, several informal consultations with the Commission have taken place with various representatives of all relevant entities within the Commission's Technical Working Group (Directorate-General for Energy and Directorate-General for Climate Action) on the NECPs.

1.4Regional cooperation in preparing the plan

i. Elements subject to joint or coordinated planning with other Member States

Given that new policies and measures were still being developed and discussed during the preliminary draft phase, no specific regional analysis of the NECP has yet been carried out in relation to energy. In addition, according to the latest governance requirements, there is no specific requirement to consult on draft content.

However, Belgium has well-established structures for regional cooperation and coordination on energy. The outcomes of these bilateral discussions and relations vary depending on the individual neighbouring countries involved.

At **bilateral level**, recent examples of cooperation include:

- A memorandum of understanding signed with the Netherlands. The agreement covers bilateral cooperation on energy, with particular emphasis on electricity, given that transmission system operators (TSOs) in Belgium and the Netherlands are closely linked within the electricity market.
- A memorandum of understanding was recently signed with Germany. It emphasises bilateral cooperation on electricity and natural gas, since the gas markets in both countries are closely linked.
- There is already cooperation with Luxembourg in the gas market, and there is long-term cooperation with France on electricity.

In addition, regular cooperation with these countries continues on specific projects, including network interconnection and market balancing projects, such as Nemo, ALEGrO and a modular offshore network in the Belgian North Sea that allows other countries to connect to wind farms. Effective balancing markets ensure security of supply at the lowest possible cost. They may also bring environmental benefits by reducing the need for back-up generation. The coupling of balancing markets in Belgium and the Netherlands provides mutual benefits for both countries.

ii. Explanation of how regional cooperation is considered in the plan

Belgium is an active member of the **Benelux** cooperation framework. It maintains close contact with the Benelux Secretariat, which plays a vital role as Secretariat of the Pentalateral Energy Forum (PEF) and the North Seas Cooperation. Cooperation and consultation initiatives on NECPs have been launched within these forums.

In concrete terms, within the framework of the **PEF** and the Benelux Presidency, on 27 June 2018 Belgium organised the first '**Regional Energy and Climate Dialogue 2030**' in conjunction with the Benelux Secretariat. The meeting at director-general level was a first step towards the practical implementation of the 'Benelux Declaration on Regional Cooperation in the Elaboration of Integrated National Energy and Climate Plans', which was signed on the margins of the Energy Council on 11 June 2018. This initiative also gives substance to the provisions on regional coordination concerning NECPs, as laid down in the Governance Regulation.

Once the initiative is implemented, the terms of reference of the Pentalateral Energy Forum will be amended to allow for structural monitoring. This will be set out in a policy statement (see annex) signed

by the energy ministers of the Pentalateral Energy Forum countries on the margins of the Energy Council on 19 December 2018. In addition to the terms of reference, the policy statement will also outline the governance structure and areas for further cooperation, with a focus on cross-border aspects.

Belgium is part of the enlarged North Sea region, which has significant renewable energy potential. The North Seas Energy Cooperation (NSEC) is a voluntary, bottom-up and market-oriented regional cooperation initiative. It was created in 2016 to create synergies, ensure that national policies remain harmonised and develop mutually beneficial strategies wherever possible. The initiative was launched by Denmark, the Netherlands and Belgium. Its aim is to coordinate and facilitate the cost-effective use of offshore renewable energy, particularly wind energy, to ensure a sustainable, secure and affordable energy supply for North Sea countries through increased and more coordinated deployment and through potential joint projects or project clusters. The NSEC targets a phased approach with a view to further integration and greater efficiency of wholesale electricity markets while helping to reduce GHG emissions, harmonise average wholesale prices and strengthen security of supply in the region. In addition, The Benelux Talanoa Dialogue event took place on 24 September 2018 under the Belgian Presidency. Following an international invitation and in the spirit of the Paris Agreement, the Benelux countries held a dialogue on the key questions of 'Where have we got to?'; 'Where do we want to go?' and 'How do we get there?' The main objective was to take stock of climate initiatives, especially concerning the pledge to keep global warming well below 2 °C and to attempt to limit it to 1.5 °C. Opportunities were explored for closer cooperation among Benelux countries in future in a number of specific policy areas (including transport, energy efficiency, feedstock, funding and fair transition).

2. National objectives and targets

2.1 Dimension decarbonisation

2.1.1 GHG emissions and removals

i. The elements set out in point (a)(1) of Article 4

Concerning the reduction of GHG emissions under the dimension of 'Decarbonisation', Belgium has a binding emission reduction target of 35 % by 2030 (compared with 2005 levels) for non-ETS sectors. This is 5 % higher than the European average under Regulation (EU) 2018/842 of 30 May 2018 on binding annual GHG emission reductions by Member States from 2021 to 2030, contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013.

To that end, the various entities will implement the following measures:

- According to projections, the 'with additional measures' (WAM) scenario for the Flemish Region will equate to a 35 % reduction in GHG emissions in non-ETS sectors by 2030 (compared with 2005 levels).
- Walloon Region: the combined projected impact of the new policies and measures will reduce emissions from non-ETS sectors by around 37 % (compared with 2005 levels).
- Brussels-Capital Region: the combined projected impact of the new policies and measures will reduce emissions from non-ETS sectors by around 32 % (compared with 2005 levels).
- In view of its federal powers and its policy of supporting the regions in achieving their joint climate targets, the Federal Government will pursue existing internal policies and measures and implement the measures recommended in the NECP, in addition to new measures contributing to the achievement of GHG reduction targets. The Federal Government is committed to reviewing and implementing regional demands under the NECP by the end of March 2019. Where appropriate, it will propose alternative internal federal policies and measures with a similar effect to compensate for any demands it cannot meet. The Federal Government is committed to quantifying its measures in terms of resources by the end of June 2019. For federal buildings, federal vehicles and Belgium's national rail operator (SNCB), the results will also be quantified. The federal measures will be updated as part of evaluations of the NECP.

Belgium is committed to applying Article 4 of Regulation (EU) 2018/841 as a minimum requirement, and therefore undertakes to comply with the 'no debit' rule.

To that end, the various entities will implement the following measures:

- The Flemish Region will set an objective to comply with the no debit rule during the period 2021-2030.
- The Walloon Region will set an objective to comply with the no debit rule during the period 2021-2030.
- ii. Where applicable, other national objectives and targets consistent with the Paris Agreement and the existing long-term strategies. Where applicable for the contribution to the overall Union commitment of reducing the GHG emissions, other objectives and targets, including sector targets and adaptation goals, if available
- In 2010, Belgium adopted the National Climate Change Adaptation Strategy⁵. This describes the main

⁵ National Climate Commission, 2010. National Climate Change Adaptation Strategy. <u>http://www.climat.be/index.php/download_file/view/286/1205/409/</u> based on Eurostat figures

consequences of climate change, the measures taken to adapt, the roadmap to a future national adaptation plan for 2020-2030 and the different strategic guidelines for the development of adaptation policy. The strategy has three objectives:

- improve consistency between adaptation activities in Belgium (assessment of the impact of climate change, vulnerability to climate change and the adaptation measures already implemented);
- improve communication at national, European and international level;
- start developing a national action plan.

2.1.2 Renewable energy

iii. The elements set out in point (a)(2) of Article 4

An agreement has been reached at EU level to set an overall EU target of at least 32 % renewable energy by 2030.

Belgium's contribution will consist of the bottom-up composition of the various entities and target a contribution of 18.4 % by 2030.

iv. Estimated trajectories for the sectoral share of renewable energy in final energy consumption from 2021 to 2030 in the electricity, heating and cooling, and transport sectors

Federal Government

The Federal Government is only responsible for offshore wind generation, biofuels in the transport sector and rail traffic.

As of 23 October 2018, installed offshore wind farm capacity stood at 1 186 GW. In 2030, the contribution of offshore wind to Belgium's renewable energy mix will be 4 GW. In the best-case scenario, this equates to energy generation of around 14 TWh in 2030. Note that the increase in energy generation and capacity is non-linear during the period 2021-2030.

| Z1+Z2 | 2021 | 2025 | 2030 |
|-------|-------|-------|--------|
| MW | | | 4 000 |
| GWh | 8 300 | 8 150 | 14 000 |
| Mtoe | 0.714 | 0.701 | 1.204 |

Suppliers of diesel and/or petrol are required to demonstrate on an annual basis that the volumes offered for use by consumers contain a nominal percentage of sustainable biofuels. Since 1 January 2017, the minimum content of sustainable biofuels has been 8.5 % by volume for petrol and 6 % by volume for diesel (5.5-5.6 % in energy terms, for both petrol and diesel). In 2020, the minimum content will increase to 8.5 % in energy terms for both petrol and diesel under the law of 13 July 2013. The royal decree increasing the minimum content of sustainable biofuels to 8.5 % in energy terms will enter into force on 1 January 2020.

During the period 2021-2030, the percentage for first-generation biofuels will remain at 7 %. The share of advanced biofuels will increase in line with the revised Renewable Energy Directive (RED II) based on the following scenario (in real terms): 2 % from 2021 to 2024; 5 % from 2025 to 2029; 7 % from 2030.

v. Estimated trajectories by renewable energy technology that the Member State projects to use to achieve the overall and sectoral trajectories for renewable energy from 2021 to 2030, including expected total gross final energy consumption per technology and sector in Mtoe and total planned installed capacity (divided by new capacity and repowering) per technology and sector in MW

Belgium has shared and reviewed the estimated trajectory of its offshore renewables, information on its offshore deployment plans and best practices in the design of offshore wind tenders within the framework of the North Seas Energy Cooperation (NSEC).

The aggregation of national offshore wind targets and the corresponding trajectories among all countries in the region results in an overall trajectory of approximately 49 GW in the Greater North Sea region by 2030.

- vi. Estimated trajectories on bioenergy demand, disaggregated between heat, electricity and transport, and on biomass supply by feedstocks and origin (distinguishing between domestic production and imports). For forest biomass, an assessment of its source and impact on the LULUCF sink
- vii. Where applicable, other national trajectories and objectives, including those that are long term or sectoral (e.g. share of renewable energy in district heating, renewable energy use in buildings, renewable energy produced by cities, renewable energy communities and renewables self-consumers, energy recovered from the sludge acquired through the treatment of wastewater)

During the period 2021-2030, the percentage for first-generation biofuels will remain at 7 %. The share of advanced biofuels will increase in line with the revised Renewable Energy Directive (RED II) based on the following scenario (in real terms): 2 % from 2021 to 2024; 5 % from 2025 to 2029; 7 % from 2030.

2.2 Dimension energy efficiency

The energy efficiency dimension follows the model proposed by the European Commission. It therefore focuses mainly on the implementation of the revised Energy Efficiency Directive (Directive 2012/27/EU). In this context, various possible scenarios have been developed. The potential savings by 2030 have also been estimated in order to set Belgium's target, which will contribute to the EU target of 32.5 % by 2030 (Article 3). A significant contribution to Belgium's target will have to come from the implementation of Article 7. Depending on the chosen scenario, Belgium's energy efficiency policy may be developed further. The necessary strategic choices and decisions will be made according to the target set by Belgium. Particular attention will be paid to the following strategic measures: energy policy agreements (EPAs); the development of modernisation strategies; the exemplary role of the state authorities; further policy development around energy service companies (ESCOs).

i. The elements set out in point (b) of Article 4

Article 4(b)(1): the indicative national energy efficiency contribution to achieving the Union's energy efficiency targets of at least 32.5 % in 2030, as referred to in Article 1(1) and Article 3(4) of Directive 2012/27/EU [version amended by proposal COM(2016)761], based on either primary or final energy consumption, primary or final energy savings, or energy intensity.

Belgium's overall contribution to achieving the European energy efficiency target of 32.5 % by 2030 is obtained by combining the contributions of the Regions and the Federal Government, on the basis of their respective 'with additional measures' (WAM) scenario, as presented in the annexes to this NECP.

The national WAM scenario, in which the contributions of the existing and additional measures to be implemented in the three Regions and at federal level have been taken into account, was used to calculate Belgium's contribution to the European energy efficiency target of 32.5 %. According to this WAM scenario, primary energy consumption will be around 39 Mtoe and final energy consumption around 33.1 Mtoe in 2030. Compared against the PRIMES 2007 baseline, which estimates primary energy consumption at 50.1 Mtoe and final energy consumption at 39.9 Mtoe in 2030, this implies an energy saving of 11.1 Mtoe, or 22 %, for primary energy consumption. Compared with 2005 consumption, this represents an energy saving of 26 %. Converted into final energy, this equates to a saving of 6.8 Mtoe or 17 % compared with PRIMES 2007 in 2030, or 12 % compared with 2005 consumption.

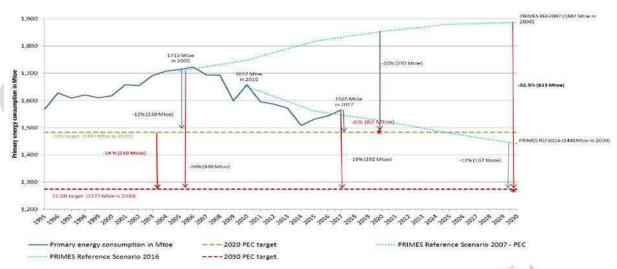
WAM modelling of the projections contained in this NECP produces the following result:

| Final energy consumption in 2030 |
|----------------------------------|
| 21.6 Mtoe |
| 9.9 Mtoe |
| 1.6 Mtoe |
| 33.1 Mtoe |
| |

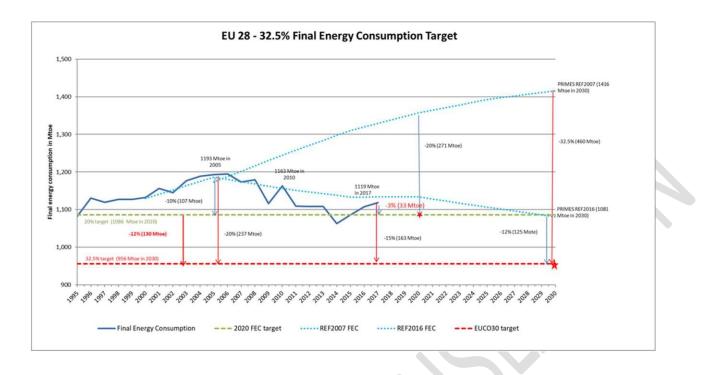
The choice of official indicator to express Belgium's contribution to the EU target will be determined at a later stage.

The overall EU target for 2030 of a 32.5 % reduction in primary energy consumption compared with the projections (PRIMES 2007) translates into a 26 % reduction in the EU's primary energy consumption compared with 2005, and a 20 % reduction in final energy consumption (see graphs below).

CLEAN ENERGY FOR ALL EUROPEANS



EU 32.5% Primary Energy Consumption Target



Flemish Region

The measures envisaged in the draft Flemish Energy Plan 2021-2030 would achieve final energy consumption of 21.6 Mtoe in 2030. This implies a final energy saving of 4.5 Mtoe in 2030 compared with PRIMES 2007.

Walloon Region

Based on the new policies and measures set out in the NECP, Wallonia is committed to reducing its final energy consumption by 22.7 % relative to 2005. This reduction is greater than the EU average.

Article 4(b)(1)(2): the cumulative amount of energy savings to be achieved over the period 2021-2030 under **point (b) of Article 7(1)** on the energy saving obligations pursuant to Directive 2012/27/EU [version amended by proposal COM(2016)761]

The precise calculation of the energy savings required by Article 7 of the Energy Efficiency Directive (Directive 2012/27/EU, as amended in June 2018) cannot be made without the figures for 2016, 2017 and 2018 consumption. These data will only be available in late 2019 or early 2020 and so cannot be included in this initial draft NECP or in the first final NECP.

However, the scale of this future obligation can be estimated on the basis of assumptions. This initial estimate will need to be refined once the 2017 and 2018 consumption data are available in order to calculate the official target for Belgium.

Based on final energy consumption over the last 3 years, as obtained from national and regional balance sheets, an average consumption range can be calculated.

Table 2.2b: reference data for final energy consumption (2014-2016) (TWh in PJ)

| Final energy consumption | 2014 | 2015 | 2016 | Average |
|---|--------------------|--------------------|-------------------|-------------------|
| | 266.74 TWh | 274.19 TWh | 279.43 TWh | 273.5 TWh |
| | 960,2254,52 GWh | 978,1261,46 GWh | 1006267,13 GWh | 984,4261,0 GWh |
| Energy balance for Flanders | 916 PJ | 941.3 PJ | 961.7 PJ | 939.7 PJ |
| | 124.5 TWh | 122.3 TWh | 120.8 TWh | 122.5 TWh |
| Energy balance for Wallonia | 448.3 PJ | 440.2 PJ | 435.0 PJ | 441.2 PJ |
| | 18.61 TWh | 19.65 TWh | 20.34 TWh | 19.53 TWh |
| Energy balance for Brussels | 66.99 PJ | 70.74 PJ | 73.22 PJ | 70.30 PJ |
| Sum of regional balances | 1 432 PJ | 1 452 PJ | 1 470 PJ | 1 451 PJ |
| EUROSTAT BE Final energy consumption (May 2018) in PJ | 1 432 PJ | 1 502 PJ | 1 521 PJ | 1 485 PJ |

The reduction scale applied on the basis of 1 485 PJ gives the final figures for the savings to be achieved as follows:⁶

Table 2.2c: Savings to be made under Article 4(b) (PJ in TWh/year)

| Year | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | Cumul ative target | |
|-------------------------------------|------|------|------|------|------|------|------|------|------|------|--------------------------|-------|
| Energy savings in PJ | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 119 | |
| | | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 107 | |
| | | | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 95 | |
| | | | | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 83 | |
| | | | | | 12 | 12 | 12 | 12 | 12 | 12 | 71 | |
| | | | | | | 12 | 12 | 12 | 12 | 12 | 59 | |
| | | | | | | | 12 | 12 | 12 | 12 | 48 | |
| | | | | | | | | 12 | 12 | 12 | 36 | |
| | | | | | | | | | 12 | 12 | 24 | |
| | | | | | | | | | | 12 | 12 | |
| active energy savings in PJ/year | 12 | 24 | 36 | 48 | 59 | 71 | 83 | 95 | 107 | 119 | 653 | PJ/m³ |

| TWh/year 3 7 10 13 16 20 23 26 30 33 | 1 TWh per m ³ 8 1 | 33 | 30 | 26 | 23 | 20 | 16 | 13 | 10 | 7 | 3 | Total active energy savings in TWh/year |
|--------------------------------------|------------------------------------|----|----|----|----|----|----|----|----|---|---|---|
|--------------------------------------|------------------------------------|----|----|----|----|----|----|----|----|---|---|---|

This gives an initial indication of the scale of the effort required in order for Belgium to meet its Article 7 obligation:

- an additional energy saving of 12 PJ (3 TWh) per year between 2021 and 2030;
- an estimated impact in 2030 amounting to a reduction of 119 PJ (33 TWh) compared with a scenario without this

⁶ This exercise is based on Eurostat figures.

obligation;

• a cumulative target for Belgium of 653 PJ (181 TWh) during the period 2021-2030.

The cumulative saving is Belgium's only official target. This means that if the savings recovered in the first few years are lower – due to the additionality rule, for example – these will have to be recovered at a later stage, which is difficult given the cumulative calculation method.

ii. The indicative milestones of the long-term renovation strategy for the national stock of residential and non-residential buildings, both public and private, the roadmap including domestically established measurable progress indicators, an evidence-based estimate of expected energy savings and wider benefits, and their contributions to the Union's energy efficiency targets under Directive 2012/27/EU [as amended by proposal COM(2016)761] under Article 2a of Directive 2010/31/EU on the energy performance of buildings, as amended by Directive 2018/844/EU

Estimated projection 2030:

| Reduced energy consumption of buildings in 2030 compared with 2005 levels | Residential | Tertiary | Total |
|---|---|---|-----------------------------|
| Flemish Region ⁷ | -31.3 % (compared with BAU in 2030, base year 2007) | -21.7% (compared with BAU in 2030, base year 2007) | |
| Walloon Region | -27.9 % (compared with 2005) | -32% (compared with 2005) | -29.1% (compared with 2005) |

Federal

Federal Government buildings achieve a minimum primary energy saving of 1 % and a CO₂ reduction of at least 40 % every year, relative to 2015.

Flemish Region

Residential buildings

The long-term objective for existing dwellings is based on two equally important aspects, specifically a package of measures on the one hand and an energy performance indicator on the other. By 2050 at the latest, existing dwellings must achieve an energy performance level equivalent or comparable to that of new buildings with planning applications dated 2015 or later.

The package of measures consists of:

1. the imposition of maximum U-values for the building envelope.

⁷ De cijfers in het ontwerp Vlaams Energieplan werden berekend op basis van de Vlaamse energiebalans en verschillen met de Eurostat-cijfers onder andere voor wat betreft elektriciteitsproductie door zelfproducenten.

2. a heating installation comprising:

- a condensing boiler, or
- a (micro-)cogeneration system, or
- a heating system based on a renewable energy source (heat pump, etc.), or
- decentralised heating appliances with a total maximum output of 15 W/m², or
- connection to efficient district heating, and
- operation in accordance with EU, Belgian and Flemish regulations.

Regarding the energy performance indicator, the target will be to achieve an energy level equivalent to an energy score (building energy performance index) of 100 kWh/m² or E60 (major energy-related renovation and new construction). The energy performance indicator, based on an energy score of 100 kWh/m², will differ according to the type of building (including whether it is an apartment or uses a closed, semi-open or open construction).

Action plan for replacement of fossil fuels

A Flemish strategy and action plan will be developed and implemented in order to phase out the use of fossil fuels in space heating. A coherent strategy for phasing out fossil fuels from space heating must take into account the type of heat demand and select the most suitable form of heating from the various technologies available.

Article 5

The Flemish Government has decided to lead by example on public buildings. The following reductions have therefore been set at Flemish central government level for the period up to 31 December 2030, compared with the 2015 baseline:

- a reduction in CO₂ emissions of at least 40 %;
- a reduction in primary energy consumption of at least 27 %.

In line with EU climate targets, a 100 % reduction in fossil fuel consumption by 2050 will be set as a long-term objective. Taking into account the nature of these buildings, their high turnover and their users, a policy scenario will be set up designed to phase out fossil fuels, with the aim of zero (net) direct GHG emissions from these buildings by 2050.

The cumulative annual energy saving expressed in MWh, which is equivalent to the savings that can be generated by renovating 3 % of the floor area of buildings owned and used by the Flemish authorities each year up to the cost-optimal level, is set out below:

| Year | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|--|------|------|------|------|-------|-------|-------|-------|-------|-------|
| Cumulative energy saving (in MWh) | 369 | 545 | 716 | 882 | 1 043 | 1 199 | 1 350 | 1 497 | 1 639 | 1 778 |

Flemish regional forecasts for the residential and tertiary sector in 2030:

| Reduction in GHG emissions in 2030 | | |
|---------------------------------------|-------------|----------|
| compared with 2005 | Residential | Tertiary |
| Flemish region | 50% | 43% |

Walloon Region

The renovation rate will have to increase significantly to achieve the 2050 target. A 5-year review clause has been introduced.

Not all buildings covered by the strategy will be able to meet the average target set for the entire building stock. Demolition and reconstruction must therefore be considered as an option.

In addition, the increase in the number of new energy-efficient buildings is one factor that will help to improve the building stock and achieve the overall target. New buildings with high performance requirements will also contribute to the overall targets. Around 15 000 new homes are expected to be built each year, on top of the current stock of 1.5 million dwellings.

The example set by the authorities in this area is a powerful tool with significant knock-on effects.

In view of this, **Article 5** of the Directive introduces a requirement to renovate 3 % of central government buildings each year. Article 5 also encourages local authorities to set the same example by proactively renovating their building stock.

Brussels-Capital Region

The renovation strategy is essentially a strategy for 2050 with several energy targets. These include a primary energy consumption target based on the terms of the energy pact, i.e. average energy consumption of 100 kWh/m²/year for the residential sector and energy-neutral buildings for the tertiary sector.

During the first decade of this strategy (2021-2030), regulatory measures will be introduced (energy performance certificate 3.0, building passport, renovation roadmap) and the existing incentives overhauled. The roadmap is a five-step renovation plan that will be drawn up when works are carried out and will be mandatory for all planning applications. It will consist of a package of works that, based on the building's initial performance, will enable the performance target set for the building to be achieved by 2050.

iii. Where applicable, other national objectives, including long-term targets or strategies and sectoral targets, and national objectives in areas such as energy efficiency in the transport sector and with regard to heating and cooling

1. Transport sector targets

Federal Government

The aim is for 20 % of commuting journeys to be made using 'soft' modes of transport (electric bikes, walking and

cycling, with other motor vehicles limited to 25 km/h) by 2030.

Flemish Region

Flanders is committed to reducing GHG emissions from road transport by at least 27 % by 2030 compared with 2005 levels. This translates into maximum emissions of 11.5 Mtoe in 2030. To achieve the climate goals, drastic action is needed on transport and mobility. First, the focus must be on managing demand for mobility. This can be achieved through spatial planning and societal measures, where every kilometre avoided contributes to the target. At the same time, the sustainability of mobility must be an overarching objective. The development of a robust, intelligent and integrated multimodal mobility system with sufficient capacity will improve traffic flows and allow more intensive use of alternatives. This forms the second strand of the emission reduction strategy. Lastly, an ambitious plan will be launched to 'green' the entire vehicle fleet. Only by tackling all three aspects simultaneously will the climate goals be achieved.

- From 2030, all new passenger cars sold will produce low levels of carbon emissions⁸, and at least half will be zero-emission vehicles.
- By 2030, 25 % of all new buses (including tour buses, school buses and coaches) will be low carbon.
- From 2025, only low-carbon buses will be permitted in urban areas, and only zero-emission vehicles will be allowed in urban centres.
- From 2019, the Belgian public transport operator De Lijn will only purchase low-emission buses (hybrid, electric, hydrogen, etc.).
- From 2025, all buses providing an urban transport service will have to be hybrid, electric or hydrogenpowered. Only zero-emission vehicles will be allowed in urban centres.
- At least 5 % of all new heavy goods vehicles purchased will be low-emission vehicles by 2030.
- 30 % of new light commercial vehicles and vans will be low-emission vehicles by 2030.

Walloon Region

To provide impetus for a fundamental shift, Wallonia has developed an ambitious mobility strategy called 'FAST 2030'. This strategy is described in more detail in the 'decarbonisation' section of this NECP. Its implementation will deliver a 25 % reduction in GHG emissions from the transport sector.

To help achieve the ambitious targets set out in the 'FAST 2030' vision, a significant part of the Walloon investment plan is devoted to improving mobility in Wallonia. A FAST 2030 action plan is also in development. Known as the 'Regional Mobility Strategy', it will provide a roadmap for achieving the targets.

As regards the greening of the fleet, the 2030 target seeks to combine alternative solutions and fuels by significantly reducing the share of traditional combustion engine vehicles and balancing the share of electric, compressed natural gas (CNG), hybrid and hydrogen vehicles.

This indicative target will remain flexible in order to accommodate unforeseen changes over the medium term, such as technological developments, rising costs of equipment or energy sources, or new products appearing on the market.

The TEC group has already begun the process of greening its fleet, which includes around 1 850 buses. By 2030,

⁸ Koolstofarme voertuigen zijn batterij-elektrische voertuigen, hybride voertuigen en voertuigen op waterstof, gerecycleerde koolstofbrandstoffen of biobrandstoffen.

most of the fleet should be replaced either by electric buses (powered by batteries or hydrogen), or by hybrid or CNG buses.

All new cars and buses purchased by local authorities and public transport (bus) operators from 2025 will be zeroemission vehicles.

Since lorries have to be capable of travelling long distances, the most suitable alternative technology is liquefied natural gas (LNG). Electrification (battery and hydrogen) is also under way, but the technology is not yet competitive. In the case of vans, faster and wider diversification is expected than for lorries.

In terms of infrastructure, the Walloon Region will seek to ensure that the required number of public electric charging points, charging points on business premises, hydrogen fuelling stations, LNG fuelling stations and CNG fuelling stations are in place by 2030. An increased proportion of these CNG fuelling stations will also run on renewable energy in the form of biogas.

Brussels-Capital Region

The upcoming regional mobility plan will be known as the Good Move Plan, and will have regulatory force. Developed as part of a dynamic and inclusive process, Good Move sets out the region's mobility targets and actions for 2018-2028. It is based on six priorities and requires some 50 measures to be implemented. According to initial estimates – which are still to be confirmed in its environmental impact report – the Good Move Plan could contribute to a 21 % reduction in vehicle kilometres in the Brussels region by 2030. The overarching climate and energy goals of the Good Move plan are to reduce vehicle use and ownership and to make the fleet more environmentally friendly.

1. Heating sector targets

Flemish Region

A decision has been taken to make maximum use of green heat capacity for the different heating technologies. It is nearly always more cost-effective from an economic point of view to obtain a given contribution to generation from green heat than from green electricity or green transport.

For heat pumps, the system cost (impact on network load, higher investment and support costs than other sources of green heat) is higher than for other options (renewables). However, not everyone will opt for a heat pump when investing in a replacement system or as part of a renovation. To encourage a wider uptake of heat pumps, their cost-effectiveness in dwellings must be improved by reducing heating demand and integrating heat pumps into the electricity market and power grid. One way of achieving this could be by adopting a more flexible approach to heat pumps as part of which operators could plan for lower energy tariffs during periods of peak production. Various thresholds would have to be scrapped to take account of more widespread use of heat pumps.

District heating contributes to more efficient heat production and provides the infrastructure required to facilitate conversion to renewable energy sources (e.g. geothermal energy).

The focus will continue to be on district heating that facilitates the use of renewable or residual heat. This concept has come under the spotlight in recent years through regular calls for green heat (including district heating), residual heat (networks), biomethane injection and geothermal energy.

Forecast

| Green heat (in GWh) | 2016 | 2020 | 2030 | |
|------------------------|-------|-------|-------|--|
| Solar | 167 | 246 | 442 | |
| Heat pumps | 308 | 610 | 1 300 | |
| Geothermal | 0 | 164 | 594 | |
| Household biomass | 3 949 | 3 850 | 1 950 | |
| Other biomass | 3 387 | 4 327 | 5 401 | |
| Total | 7 811 | 9 197 | 9 687 | |

To achieve climate neutrality by 2050, each local council should consider this objective within a non-ETS framework for the area under its control and decide on a suitable energy management strategy. Converting the existing energy supply to a more efficient one that includes a higher proportion of renewables and the use of (residual) heat is not something that can be done overnight. A targeted, tailor-made strategy will be required.

Walloon Region

Renewable electricity generation will cover around 37 % of final electricity consumption for all applications combined.

The technological objectives were set taking the following factors into account:

- available potential (space, resources, waterways, land, etc.);
- type of project, ideally integrated with industrial/economic activities;
- cost of production and expected future development;
- socioeconomic implications (jobs);
- environmental impact (recoverable by-products, waste management, etc.);
- whether it is variable or constant;
- the overall trend of current developments.

The majority of production will come from wind energy, followed by photovoltaics (PV). This will be followed by solid biomass cogeneration, biogas cogeneration and hydro power. Geothermal electricity will be used for demonstration purposes.

By 2030, renewable heat production will cover around 25 % of heat consumption for all applications combined. This target will be achieved using geothermal energy, solid biomass (wafer, pellets, boilers, stoves or cogeneration), biogas (all sources combined), tertiary and residential heat pumps and, to a lesser extent, solar thermal energy.

Natural gas is considered a transitional fuel and is therefore part of the 2030 mix. It will be gradually replaced by

biogas.

The technological objectives were set taking the following factors into account:

- available potential (resources, infrastructure, etc.);
- type of project, ideally integrated with industrial/economic activities;
- cost of production and expected future development (learning curve);
- socioeconomic implications (jobs);
- environmental impact (recoverable by-products, waste management, etc.);
- building performance;
- the overall trend of current developments.

| Renewable heat – WAM | 2030 | | | | |
|------------------------|--------|--|--|--|--|
| Biomass – heat only | 7 281 | | | | |
| Biomass – cogeneration | 4 645 | | | | |
| Solar thermal | 181 | | | | |
| Heat pump | 1875 | | | | |
| Geothermal | 251 | | | | |
| Total – WAM | 14 233 | | | | |

Brussels-Capital Region

The use of renewable energy in the region is expected to change between 2021 and 2030. Given the power-sharing arrangement, the Brussels efforts described here relate only to the production of heat and cooling from renewable sources (see table below). The renewables section of the Brussels NECP provides more details of this strategy and the corresponding policies and measures.

Table 2.2h: Heat sector forecasts in GWh

| Unit: GWh | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 203 |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| RES H&C | 136.11 | 138.00 | 139.92 | 144.19 | 148.56 | 153.00 | 152.19 | 157.03 | 162.08 | 167.4 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

2.3Dimension energy security

iv. The elements set out in point (c) of Article 4⁹

Belgium does not have indigenous energy resources and (still) depends to a large extent on imports (see Chapter 1).

The announced reduction in the supply of lean gas from the Netherlands from 2022 is worrying on account of the scale of the conversion that will need to be undertaken. Belgium plans to transfer 1.2 million connections from lean gas to rich gas between 2017 and 2029. Furthermore, market participants will have to make new arrangements over the next few years to meet their final-customer obligations. The government is acting as facilitator by liaising with all interested parties via the website <u>www.legazchange.be/fr</u>.

Belgium foresees a radical conversion of its electricity supply during the period 2020-2030. Nuclear power plants will be gradually decommissioned (see Figure 2.3a). The Federal Government confirmed this commitment – which was enshrined in legislation back in 2003 – on 30 March 2018 as part of the Inter-Federal Energy Pact. To compensate for the decommissioning of 5 918 MW of nuclear capacity, Belgium will opt for an energy mix based on flexible capacity and renewable energy. In the long term, the share of fossil fuels in the electricity supply will be systematically reduced, so that eventually the supply only includes sustainable or recycled fuels, gas and electricity.

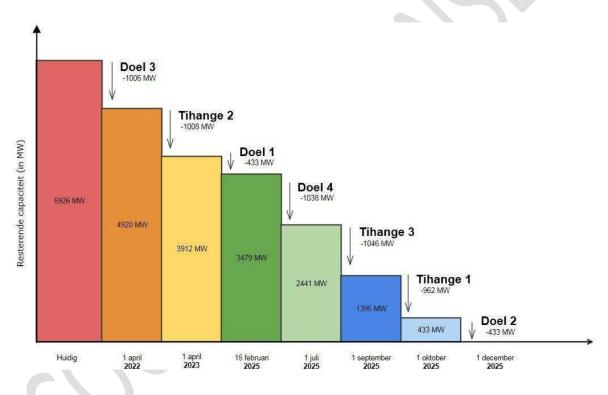


Figure 2.3a: Timetable for phasing out nuclear power

Belgium will make all necessary plans in relation to decommissioning of its nuclear power plants and to ensure that radioactive waste and depleted nuclear fuels are stored in the most suitable manner. It will take all necessary decisions, particularly regarding technical specifications and the location of waste storage facilities.

In addition to specific monitoring at federal level, Belgium will also conduct various risk assessments relating to the security of its electricity, natural gas and oil supplies in accordance with EU and international legislation. Several

⁹ (1) National objectives to: - increase diversification of energy sources and supply from third countries, which may seek to reduce dependency on energy imports; - increase the flexibility of the national energy system; - cope with limited or interrupted supply of an energy source and to improve the resilience of regional and national energy systems, with a timetable for achieving those objectives.

longer-term projections will also be prepared, such as the Federal Planning Bureau (FPB's) energy outlook for 2050. The design and methodology of these studies will be regularly evaluated to make them as useful as possible for policymakers, minimise any overlaps with other analyses and maintain consistency. In addition, regulators and grid operators, either individually or within their European coordinating bodies (e.g. ACER, CEER, ENTSO-E, ENTSO-G), are also conducting numerous studies in support of policy in order to ensure security of supply.

Lastly, Belgium is continuing its efforts to refine and update its crisis management policy for all significant energy carriers. It will also develop operational contingency plans for each energy carrier, taking into account national, regional, EU and international obligations, and will give due consideration to developments in cybersecurity. By finalising its various contingency plans, Belgium intends to produce an overarching contingency plan which maps the effects associated with the different energy carriers and sets out specific procedures to address these effects.

ii. National objectives with regard to increasing the diversification of energy sources and supply from third countries for the purpose of increasing the resilience of regional and national energy systems

Belgium will become increasingly dependent on gas for its electricity. Belgium – like the rest of Europe – currently depends to a large extent on crude oil imports to meet its energy needs. Although a commitment is needed to reduce imports and consumption of petroleum products for energy purposes (primarily transport and residential heating), substantial quantities will still be required over the coming years. As a result, oil will continue to play an important role in Belgium's economic and energy policy in 2020-2030. Belgium will look to diversify its petroleum products (especially in transport) by continuing to encourage the addition of different types of biofuels. This policy should reduce the country's dependency on a small number of commonly available and specific products.

Belgium is also actively committed to increasing energy efficiency with a view to reducing its dependency on foreign suppliers of primary energy resources. These measures are outlined in Chapter 3, Section 3.2.

Total electricity demand is now equivalent to one fifth of Belgium's total energy demand. However, in addition to other technologies such as hydrogen, biofuels and 'recycled carbon fuels', the partial electrification of transport, space heating and industry are all expected, which will increase the share of electricity in the energy mix. A support mechanism that fully complies with EU legislation and directives on State aid will be developed and introduced during the period 2022-2025. This will ensure security of electricity supply and attract investment to create new capacity or maintain existing capacity. The impact on the climate, energy prices, security of nuclear facilities and security of supply will be constantly monitored.

iii. Where applicable, national objectives with regard to reducing energy import dependency from third countries, for the purpose of increasing the resilience of regional and national energy systems

According to the European Commission's analysis (EU impact assessment of November 2016), under the 'clean energy' package, Belgium's renewable energy potential is limited by comparison with other European countries (16-19 % of energy consumption). Energy efficiency measures, the modal shift in transport and increasing energy generation from renewable sources will therefore have a positive impact on Belgium's fossil fuel consumption. However, phasing out nuclear power will increase the country's dependency on fossil fuels. Since Belgium will still depend to a large extent on foreign suppliers, good interconnectivity and open markets without trade barriers are essential. Several measures merit particular attention; these will be described in more detail in the chapter on energy efficiency and renewable energy. The Federal and Regional Governments are also fully committed to implementing a more sustainable mobility policy. In general, this will focus on limiting demand for transport and travel, improving the organisation and orientation of mobility services, and greening the fleet. This will be covered in more detail in Chapter 3.

iv. National objectives with regard to increasing the flexibility of the national energy system, in particular by means of deploying domestic energy sources, demand response and energy storage

The estimated energy mix in 2030 will be used to calculate flexible capacity requirements. The development of renewable energy must also have a social objective and benefit all consumers. The measures that Belgium will take to achieve these ambitions for the development of renewable energy sources are described in Chapter 3.

In addition to production, greater emphasis will also be placed on flexibility (including storage and demand management) and interconnections (see Sections 2.4 and 3.4.1) to ensure security of supply.

The different levels of government will ensure the continuous development of new centralised and decentralised storage systems, and that peak-load shifting is possible where the technical and economic potential exists. In view of its responsibility for security of supply, the Federal Government will consult with the Regions to identify the most flexible system available and ensure the stability of the system. The Regions are working on a clear regulatory framework with a view to placing storage behind the meter or at the neighbourhood level and to delivering demand management across the distribution network. In addition, the option of importing energy in the form of hydrogen or methane will also be examined.

2.4 Dimension internal energy market

2.4.1 Electricity interconnectivity

The level of electricity interconnectivity that the Member State aims for in 2030 in consideration of the electricity interconnection target for 2030 of at least 15 %, with a strategy with the level from 2021 onwards defined in close cooperation with affected Member States, taking into account the 2020 interconnection target of 10 % and the following indicators of the urgency of action: (1) price differential in the wholesale market exceeding an indicative threshold of EUR 2/MWh between Member States, regions or bidding zones; (2) nominal transmission capacity of interconnectors below 30 % of peak load; (3) nominal transmission capacity of interconnectors below 30 % of installed renewable generation. Each new interconnector shall be subject to a socioeconomic and environmental cost-benefit analysis and implemented only if the potential benefits outweigh the costs

According to the current timetable, Belgium already has an electricity interconnectivity level of approximately 21 %. The EU target for 2030 (i.e. 15 %) will thus be achieved by 2020. The interconnection rate will be even higher in late 2020 or early 2021 due to ALEGrO and investments in static voltage regulators.

Aside from the existing projects, further expansion could potentially be envisaged following the consultation currently under way on the Draft Federal Development Plan 2020-2030 submitted by Elia (Belgium's national transmission system operator), as well as additional impact assessments and changes to the electricity system in the coming years. If all the projects described in the development plan are completed, the interconnection rate will be approximately 30 % by 2030.

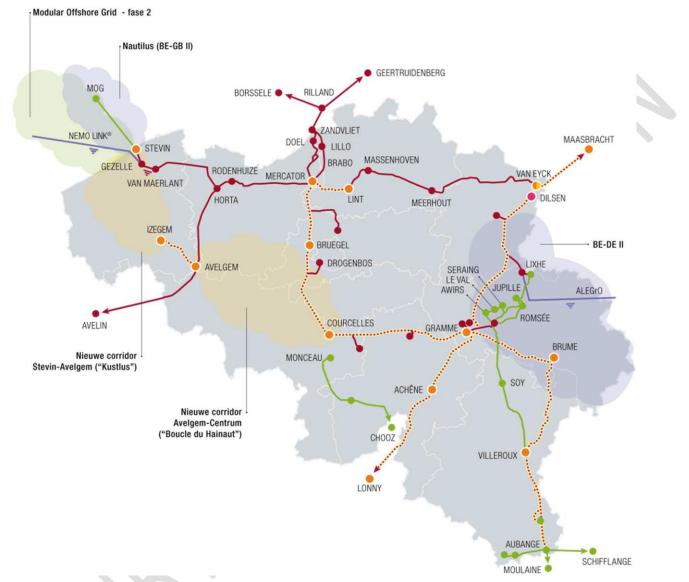


Figure 2.3b: Development of interconnections and the backbone of the 380 kV and 220 kV domestic network (Source: Elia, Draft Federal Development Plan)

Belgium is involved in the NSEC's work on specific plans for joint offshore or cluster projects. The NSEC has compiled a list of potential areas and projects in the region where joint projects could be very beneficial. These include: (1) IJmuiden Ver wind farm in the UK; (2) CGS IJmuiden Ver – Norfolk; (3) COBRAcable; (4) the offshore wind farm connected to NL; (5) the North Seas Wind Power Hub.

The NSEC is working on the development of specific plans to implement selected programmes from this list.

2.4.2 Energy transmission infrastructure

i. Key electricity and gas transmission infrastructure projects, and, where relevant, modernisation projects, that are necessary for the achievement of objectives and targets under the five dimensions of the Energy Union Strategy Figure 8 below provides an overview of the main investments in the 380 kV network for the period 2020-2030. These are grouped into five investment packages according to a modular approach. Package A includes both the strengthening of existing interconnections with France and the Netherlands and the reinforcement of existing 380 kV internal corridors.

The following projects are currently recognised as PCIs:

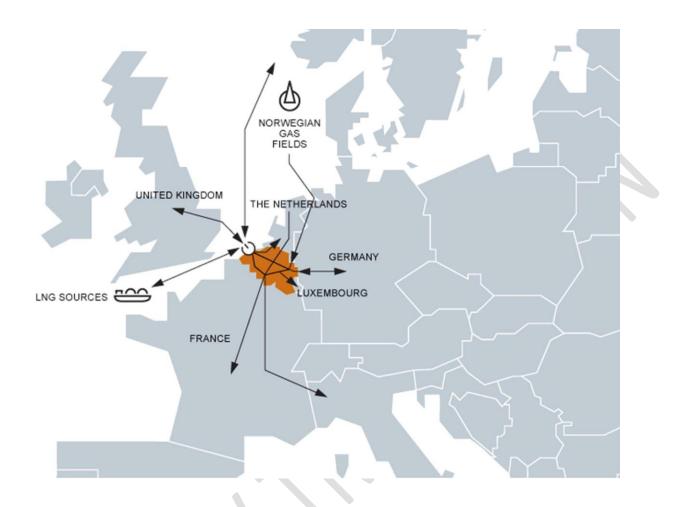
- Brabo project: strengthening the interconnection with the Netherlands;
- 2nd HVDC link with the UK;
- 2nd HVDC link with Germany.

Figure 2.3c: Overview of the modular development of the 380 kV network 2020-2030 (source: Elia, draft Federal Development Plan)



With regard to natural gas, Belgium already has an efficient and well-developed natural gas network, with a solid internal infrastructure that will be supplemented by interconnections with all neighbouring countries, an LNG terminal at Zeebrugge and a storage facility at Loenhout.

Figure 2.3d: The 18 interconnection points on the Belgian network allow natural gas from the United Kingdom, Norway, the Netherlands, Russia and all LNG-producing countries into the network. The Belgian network also serves as a hub for the transmission of natural gas to the Netherlands, Germany, Luxembourg, France, the United Kingdom and southern Europe (source: Elia, Draft Federal Development Plan)



ii. Where applicable, main infrastructure projects envisaged other than Projects of Common Interest (PCIs)

Not applicable

2.4.3 Market integration

i. National objectives related to other aspects of the internal energy market such as increasing system flexibility, in particular related to the promotion of competitively determined electricity prices in line with relevant sectoral law, market integration and coupling, aimed at increasing the tradeable capacity of existing interconnectors, smart grids, aggregation, demand response, storage, distributed generation, mechanisms for dispatching, re-dispatching and curtailment, and real-time price signals, including a timeframe for when the objectives shall be met

In accordance with the updated memorandum of understanding signed in December 2018 by the energy ministers concerned, the results of the coupling of existing markets will be evaluated at regular intervals during the period 2020-2030 on the basis of KPIs. If the results fall short of expectations, opportunities for improving existing mechanisms will be discussed in consultation with governments, regulators, TSOs and market operators in Pentalateral Energy Forum (PEF) countries.

- ii. Where applicable, national objectives related to the non-discriminatory participation of renewable energy, demand response and storage, including via aggregation, in all energy markets, including a timeframe for when the objectives are to be met
- iii. Where applicable, national objectives with regard to ensuring that consumers participate in the energy system and benefit from self-generation and new technologies, including smart meters

The various regional parliaments will vote shortly on the gradual roll-out of smart meters in homes across different parts of the country. The cost-benefit ratio of this technology was still negative until a few years ago. However, prices have since fallen and the technology is seen as a vital means of responding to future challenges.

In **Flanders**, smart meters for electricity and gas will be installed no later than 2035 on all low-voltage connections up to 56 kVA. This will primarily affect new builds or major renovations, or specific types of customer such as solar panel owners and customers with a prepayment meter.

In Wallonia, the development of smart networks can be centred on three specific objectives:

- a framework for the use of smart meters with phased roll-out;
- setting up a framework for the flexibility market in line with federal legislation;
- setting up a framework for alternative networks.

In the **Brussels-Capital Region**, smart meters are currently being installed in new builds, during major renovations and for prosumers. For all other segments the details of the smart meter roll-out are still under discussion.

iv. National objectives with regard to ensuring electricity system adequacy, as well as for the flexibility of the energy system with regard to renewable energy production, including a timeframe for when the objectives are to be met

The increasing integration of intermittent, decentralised renewable energy requires greater flexibility, to be achieved by balancing supply and demand. This will be done by:

- developing connections between countries and making energy networks smarter;
- creating energy storage potential.

The four entities will seek to ensure the ongoing development of new centralised and decentralised storage systems, as well as of peak-load-shifting capability both in industry and private households. Residential storage, SME storage, local storage potential, electric vehicles in storage mode and local tools will increase further by 2030, as will the volume of daily demand shifts. An increasing share of these different capabilities will contribute directly to security of supply, in that they will be readily available and can be activated via the market. Market operation will be adapted to develop the framework for ensuring security of supply during the energy transition at the lowest possible cost.

v. Where applicable, national objectives to protect energy consumers and improve the competitiveness of the retail energy sector

2.4.4 Energy poverty

Where applicable, national objectives with regard to energy poverty, including a timeframe for when the objectives are to be met

Through the action it proposes on energy poverty, the federal poverty reduction plan 2016-2019, has focused on evaluating and improving existing federal measures that directly or indirectly affect energy bills. As such, and with this in mind, it has followed the guidance set out in the Government Agreement. Due to Belgium's regionalised structure, existing energy efficiency measures – which fall within the remit of the different regions (Brussels, Flanders and Wallonia) – differ between the three Regions.

To meet the EU's targets, a study will be carried out as to how the current measures at each level of government can contribute to or be reformed in line with the overall approach to energy poverty, which seeks to minimise consumption. Energy is a basic need and must be available for all. It is therefore essential that it is affordable for low-income households.

Walloon Region

The objective in terms of consumer protection is to guarantee the current level of protection for low-income groups. A high level of protection exists at present, providing a satisfactory response to the problem of sustainable access to energy. The numerous mechanisms for supporting households in difficulty (such as subsidies for low-income households, winter fuel allowance, prepayment meters, social tariffs, etc.) will be maintained or improved.

2.5Dimension research, innovation and competitiveness

i. National objectives and funding targets for public and, where available, private research and innovation relating to the Energy Union, including, where appropriate, a timeframe for when the objectives are to be met

Belgium has committed to the objectives set out in Lisbon and the Europe 2020 strategy with a view to achieving the target of investing 3 % of GDP in R&D. The state accounts for 1 %, while the private sector will cover 2 % of R&D funding. Gross domestic expenditure will be expressed as gross expenditure on research and development (GERD). Belgium's R&D efforts will be recorded and reported to the Organisation for Economic Co-operation and Development (OECD). Belgium's figures aggregate data from the country's Regions and Communities. These data are available at http://www.innovationdata.be/i/KNO_RDGT_1/Total-RD-expenditure.

Responsibility for research and innovation policy in Belgium is shared between the Federal Government, the three Regions and the Communities (see Chapter 3. Policies and measures). More detailed information on the Federal Government and the Regions is given below.

Hydrogen is recognised as a key technology in the energy transition: it allows market segments for which few alternatives are available to decarbonise and provides the electricity system with a flexible solution that can accommodate the significant rise in the penetration rate of intermittent renewable energy. Although it is still too early to quantify the targets for 2030, it is essential that all four entities agree on a scalable roadmap for the roll-out of power-to-gas.

Federal Government

In addition to establishing a long-term inter-federal energy vision and an Energy Pact between the Federal Government and the Regions, the priorities set by the current Federal Government include creating a stable, favourable investment climate that fosters innovation and provides predictability through long-term guarantees.

One of Belgium's priorities is to maintain its nuclear expertise and know-how, particularly in relation to responsible management of radioactive waste and depleted nuclear fuel. This will ensure a high level of safety and avoid unnecessary burdens for future generations.

Belgium also wants to remain a world-class player in R&D and innovation in key areas such as nuclear medicine and the production of medical radioisotopes, research into new materials, particle accelerator technology and transmutation of radioactive waste. It has therefore decided to build a new large-scale research facility known as MYRRHA (Multi-purpose Hybrid Research Reactor for High-tech Applications). This is described in the Strategy Report on Research Infrastructures Roadmap drawn up by ESFRI (European Strategy Forum on Research Infrastructures).

The Federal Government has also introduced the concept of the 'energy standard' into its strategy. This standard, which is based on consumption profiles and energy intensity, should ensure that the various components that make up the overall cost of energy in Belgium are no higher than in neighbouring countries. This will enable Belgian companies to remain competitive and allow households' purchasing power to be assessed.

Flemish Region

The current research and innovation policy supports the Vision 2050 priorities in several ways. The vision statement of 2016 divides the Flemish Government's strategic vision into seven transitions, including the energy transition, which is inextricably linked with a forward-looking climate change policy. The other, closely related, transitions focus on the built environment ('Slim Wonen en Leven' transition), transport (mobility transition) and industry (transition to a circular economy and Industry 4.0). The Flemish Region analyses data relating to the 3 % R&D target on an annual basis. Further information can be found at <u>www.vlaamsindicatorenboek.be</u> and

http://www.innovationdata.be/i/KNO_RDGT_1/Total-RD- expenditure.

The Flemish Region welcomed the Inter-Federal Energy Pact as a significant statement of intent regarding the development of Flemish energy and climate plans for the period 2021-2030. These energy and climate plans were ratified by the Flemish Government on 20 July 2018. They recognise the importance of research and innovation in supporting the seven Vision 2050 transition priorities and the objectives of the European Energy Union. Careful consideration will be given to the preparation of an annual budget. The Flemish Government will continue to support research and innovation with a view to achieving the objectives of the European Energy Union (from basic research projects to R&D projects, including pilot projects and priority cluster projects – see Chapter 3).

Brussels-Capital Region

In July 2016, the Brussels Government adopted a Regional Innovation Plan (PRI) for the period 2016-2020. In this plan, the Region committed to increasing expenditure on research and innovation to 3 % of GDP by 2020. R&D spending has risen in recent years, from 1.52 % of GDP in 2013 to 1.79 % in 2015.

In December 2017, the Regional Government pledged to meet the objectives set out in the Inter-Federal Energy Pact, including, among others, fiscal support for the recruitment of researchers, support for pilot projects, support and promotion of innovative technologies, campaigns to support the circular economy and implementation of a plan to tackle energy insecurity.

Walloon Region

Part of the annual state R&D budget is allocated to:

- R&I projects directly relating to energy and climate (up to 4 %);
- R&I projects with a climate or energy dimension (up to 11 %).

The priority thematic areas are determined on the basis of the European roadmap (SET-Plan), with a specific focus on areas in which the Walloon Region has recognised expertise, either at universities and research facilities or within industry. This list of priority areas is intended to concentrate effort.

Additional resources may be allocated to energy and climate R&D where revenue permits (see contribution to funds and/or carbon pricing below).

ii. Where available, national 2050 objectives related to the promotion of clean energy technologies and, where appropriate, national objectives, including long-term targets (2050) for deployment of low-carbon technologies, including for decarbonising energy and carbon-intensive industrial sectors and, where applicable, for related carbon transport and storage infrastructure

For the objectives relating to 'the deployment of technologies in the market,' including those aimed at making carbon-intensive industrial sectors carbon-neutral and energy-neutral, please refer to the objectives of Dimension 1 of the NECP (Decarbonisation and Renewable Energy).

The fifth Dimension mainly deals with R&D objectives, extending to deployment on the market. In this context, Belgium fully supports the objectives of the European Strategic Energy Technology (SET) Plan, which seeks to accelerate the development and deployment of low-carbon technologies in Europe through better collaboration and alignment of national/regional and EU research and innovation programmes and activities (for more information about these measures, see Chapter 3 Policies and measures). Belgium supports the 10 key actions of the SET-Plan and their strategic R&I objectives, as jointly defined and approved by all countries covered by the SET-Plan, the European Energy Research Alliance (EERA), European Technology and Innovation Platforms (ETIP) and

other stakeholders and platforms (EMIRI, etc.). Belgium, the Federal Government and the Regions have committed to implementing the action plans (implementation plans linked to the strategic R&I objectives) and the 10 key actions of the SET-Plan.

iii. Where applicable, national objectives with regard to competitiveness

Competitiveness can be defined and/or interpreted in different ways.

The research and innovation policy seeks to encourage innovation in and by Belgian companies to boost their competitiveness. Belgium has not set any specific targets in this regard.

For details of the policies and measures, please refer to Chapter 3 – Policies and measures.

In addition, it is also worth highlighting the proposal by the Federal and Flemish Governments to introduce an 'energy standard' in Belgium. To protect the competitiveness of Belgian industry and maintain employment, an energy standard will be introduced for energy-intensive companies. The cost of household energy bills will also be monitored, and particular attention will be paid to an active poverty reduction policy. The Federal Government will introduce a draft law on the energy standard before parliament before the end of the legislative period.

3. Policies and measures

3.1 Dimension decarbonisation

Only the <u>main</u> policies and measures (PaMs) included in the 'with additional measures' (WAM) scenario are summarised in this chapter. Existing PaMs or those not directly relevant to the quantification presented in the WAM scenario are not described in this section. Therefore, this is not a comprehensive list of all PaMs. All PaMs adopted by the federal and regional authorities can be found in the annexes. The purpose of the NECP is not to list all of the entities' PaMs; these can be found in the annexes and represent the official list for each entity.

It should be noted that the PaMs applied in the 'residential' sector (buildings) are presented in the 'Energy efficiency' chapter.

3.1.1 GHG emissions and removals

- i. GHG emissions and removals
- A. Horizontal policies and measures

By definition, horizontal PaMs cover a wide range of sectors.

At national level, all Governments are committed to developing new PaMs on the principles set out below.

Environmentally friendly taxation

Environmentally friendly taxation consists of developing a new tax regime or new fiscal instruments to identify price signals that are not compatible with decarbonisation targets and the 'polluter pays' principle. A plan for environmentally friendly energy taxation will be developed jointly with the Federal and Regional Governments by 2021. This new system or these new instruments must be consistent with any other tax reforms in order to maintain the international competitiveness of companies and provide for a policy that supports citizens. Each Region will conduct a review of the future greening of (para)fiscal taxes and the elimination of subsidies that are harmful to the climate.

At federal level, the report resulting from the Belgian national debate on carbon pricing was published in late June 2018. It includes exploratory research on options for carbon pricing (such as a carbon tax). This fiscal instrument could have a potentially significant impact on the various non-ETS sectors (e.g. transport, buildings, industry and agriculture). However, further feasibility studies are still needed, taking into account the distribution of powers within Belgium. Regarding the allocation of revenue from any taxation, consideration should be given to maintaining the overall tax level and rewarding the relevant entities responsible for achieving the GHG emission reduction target.

As part of the proposed value-added tax (VAT) reform, Belgium will advocate a change in VAT on climate-friendly investments (cycle paths, heat pumps, insulation, complete renovations, product repairs, etc.) with the European Commission.

International shipping and aviation

International shipping and aviation are not covered by the Member States' non-ETS climate objective. Therefore, policy will be organised for the most part at international level. However, Belgium is keen to introduce strategic measures such as promoting energy efficient vessels and shore power.

In the maritime sector, and in consultation with other Member States, Belgium will explore the introduction of a mechanism to ensure a transition to carbon-free energy at international and national level and the introduction or strengthening of emission standards. To that end, a step-by-step plan is to be developed for shipping in Belgium. In parallel, active cooperation at international level should continue and proposals for measures should be submitted

to and supported by the International Maritime Organization (IMO).

Similarly, Belgium will urge the aviation industry to make concrete commitments and develop a roadmap to achieve a significant reduction in its GHG emissions.

The aim is to internalise the external environmental costs of aviation through fiscal measures. For example, Belgium could support Europe-wide initiatives to introduce a standard excise duty on kerosene and/or a tax on airline tickets. Pending an EU initiative for an airline ticket tax, Belgium will work with neighbouring countries to examine whether and how such a tax might be introduced by a group of countries, with the tax due being based on the distance travelled. Such measures would have two benefits, as they would both internalise the external costs of flights within Europe and allow a tax on flights outside the EU to be considered.

Inclusion of the 'climate change' dimension in financial, budgetary and investment decision-making

The necessary public measures will have to be co-financed by shifting priorities within existing budgets. For example, it is possible that stimulus funding could be used to finance the energy and climate transition. Belgium is looking at ways of greening the financial system to encourage private funding for the climate transition. It wants to focus more on attracting EU funding in all policy areas relevant to energy and climate policy.

Other federal instruments

The Federal Government issued its first green bonds (Green OLO) in February 2018. The proceeds from these will be ring-fenced to fund public spending on the transition to a sustainable economy. The new eligible expenditure for the period 2021-2030 will be identified in the transport, energy and buildings sectors, primarily on the basis of this plan, the Energy Pact and the national strategic investment pact.

Strengthening support for local climate policy

Belgium will also focus on practical support and guidance, smart cities, mobilising local energy investments (e.g. via ELENA in Flanders or the POLLEC programme in Wallonia) project co-financing and better communication, as well as on multi-level governance. This will also require the voluntary commitment of local councils to the Covenant of Mayors, a European initiative enabling local and regional authorities to pledge to reduce GHG emissions by more than 20 % by 2020 and more than 40 % by 2030.

Improving climate governance and optimising the National Climate Commission

The various governments will provide sufficient resources and guarantee them for all authorities involved in the introduction of the NECP.

Strengthening the exemplary role of government in the energy transition

By means of sustainable public procurement, the state will give the necessary impetus to the market to commit to a decarbonised transition of the economy (by greening their vehicle fleets, purchasing according to the principles of the circular economy, through their tender selection criteria, etc.).

Flemish region

A spatial planning policy that contributes to climate objectives

On 30 November 2016, the Flemish Government approved the White Paper on Strategic Land-Use Planning for Flanders. This sets out the following principles:

 More efficient land use to improve the current spatial footprint and systematically reduce any additional footprint, with a view to the decarbonisation of public space. This principle is important for carbon storage (see the chapter on LULUCF), for reducing energy demand in buildings (high-rise construction) and for curbing transport demand (fewer poorly sited developments). Other relevant aspects include focusing on renewables (wind energy) and protecting the landscape from the effects of climate change (designated blue and green corridors).

- Multifunctional planning and interconnectivity to create a solid, dynamic public space with functions and the connections between them clustered together within the spatial footprint. This is essential to guard against the effects of climate change (water management) and for carbon storage, as well as to reduce transport demand (interconnectivity).
- Joined-up development of public transport flows and cycling infrastructure at road transport hubs and future development based on existing facilities. This is crucial for the modal shift (to public transport and cycling/walking for movement of people and to inland waterways for freight transport) as well as for managing demand for mobility (proximity of infrastructure).
- A joined-up energy system through energy efficient organisation and use of space (building design and orientation, etc.), promoting energy exchange (e.g. residual value) at spatial level, prioritising renewable energy in close proximity to the final user and consolidating energy infrastructure.
- Coherent (public) energy space, with functional, coherent space for farming, forestry, natural habitats and water, a dense network of blue and green corridors, dynamic management of food production, biodiversity, soil infiltration and rainwater storage, and hydrogen and mineral extraction. This is particularly important for protecting against the effects of climate change and for carbon storage.
- Better quality of life through improved well-being, standards of living and health, adapting the housing stock to changing demographics, creating a healthy environment, public space and natural landscape. This is essential to avoid homes that are too large and thus reduce energy demand for domestic heating. A safe and accessible public space encourages the use of non-motorised transport.

In addition, the White Paper on Strategic Land-Use Planning for Flanders includes concrete objectives for achieving climate and energy targets. Several (aspects) of **these objectives are essential for achieving climate and energy targets**, such as:

- 1. Reducing the additional spatial footprint, with the average additional daily spatial footprint being reduced to 0 hectares by 2040.
- 2. European urban economic space and energy networks, with the spatial backbone preferably reinforced by developing additional housing and commercial areas around strategic (future) public transport hubs on the backbone. The residential density within walking distance from all strategic public transport hubs on the spatial backbone will increase significantly. At the same time, the usable space at these locations will grow each year as a result of a focus on mixed-use development. Sites with high-quality road links are ideal locations for developing other economic activities. With the introduction of destination neutrality, there will be sufficient space (and interconnectivity) to complete the transition to renewable energy by 2050 by boosting renewables generation and improving the cohesion of the European energy network.
- 3. Wide range of living environments:
 - Biodiversity, ecological coherence and soil quality. Spatial planning contributes to biodiversity and soil quality by applying spatial principles such as multifunctionality, load-bearing capacity and ecological function.
 - Protection against the effects of climate change, with planning designed to reduce vulnerabilities to climate change (thermal stress, flood risk, etc.) specific to each site (adaptation). Spatial planning enhances protection against the effects of climate change by applying spatial principles such as multifunctionality, restrictions on paving and dynamic planning.
 - In terms of energy, spatial planning is carried out depending on building design, the position of the sun during the day and the use of more energy efficient materials. Intelligent planning will save energy by applying spatial principles to aspects such as energy-neutral homes and lifestyles.
- 4. With more people living and working near existing and future public transport hubs and facilities, residential density and floor space will need to increase at locations with (very) good road transport links and/or (very) good facilities by 2050. Care will be taken to limit the number of additional housing units and workplaces built too far from a public transport hub or cluster of transport facilities by 2050, except where doing so is in the interests of making efficient use of space.
- 5. In terms of paving in public spaces, by 2050 this will have decreased by at least one fifth compared with 2015

in agricultural, woodland and other undeveloped areas.

6. The network of blue and green corridors will result in a substantial increase in the surface area of water and green spaces in public places and in towns and villages relative to 2015. The extent of paving in places dominated by the spatial footprint will stabilise by 2050 and preferably decrease compared with 2015 levels. There will be no further increase in paving after 2050.

These strategic objectives will be achieved by implementing the policy at all levels of government. The Flemish authorities have announced their plan to set up **a monitoring mechanism** for the strategic vision, operational policy and aims. Through this monitoring, it will be possible to assess whether the contribution of the space to climate change mitigation or adaptation is moving in the right direction and whether this is happening fast enough to make a sufficient contribution to climate and energy targets during the period 2021-2030. The operational objectives and implementation of the overall policy will be adjusted as required.

In addition, we want to reinforce the link between spatial planning, climate and energy. The White Paper on Strategic Land-Use Planning for Flanders focuses on **core development**, both in towns and villages. This provides a **stronger framework for rethinking energy supply** and phasing out fossil fuels. The **following specific targets**, which will require a cross-cutting approach, will be treated as particular priorities:

1. By 2030, all local councils will have an energy management strategy

To ensure climate neutrality by 2050, each local council should consider this target within a non-ETS framework for the area it covers and decide on an appropriate energy management strategy. Converting the existing energy supply to a more efficient one that includes a higher proportion of renewables and the use of (residual) heat is not something that can be done overnight. A targeted, tailor-made strategy will be required.

This energy management strategy must also be accompanied by a comprehensive management policy:

- Community schemes, such as district heating, require sufficient density. The map of probable returns indicates the sites with the highest probable returns. These sites are the best suited to community solutions.
- Investments in existing public utility infrastructure (e.g. replacement of gas pipelines) must be weighed up carefully. Indications should be given as to where future investments will be made, where dwellings will have to source their own energy supply, and where demolition and relocation to a better site are advisable.
- Older buildings may require more energy; this issue must be addressed.
- Procurement of new public utility equipment based on fossil fuels should be avoided wherever possible.
- In new (re)developments, any heat sources present in the local environment should be taken into account. This will ensure an optimal balance of heating supply and demand. Local authorities can play a vital role here in guiding new investment.

2. By 2025, new fossil fuel-based infrastructure will be avoided wherever possible in new workplace-home developments still to be connected to utilities.

Systems that, as part of the energy management strategy, can be converted in the near future in order to switch to renewable energy by 2050 (for example, a collective boiler room that will be connected to district heating powered by residual heat or green heat in the future), will be the exceptions to this general rule.

The **Flemish authorities will support local authorities in developing their energy management strategies** (see the 'Local authorities' chapter of this plan). We want to continue to promote the Environmental Impact Report as a way of achieving climate targets.

Promoting the green and circular economy to achieve climate targets

The aim is for a 30 % reduction in the footprint of materials consumption in Flanders by 2030. A circular economy roadmap outlining concrete measures will be developed and implemented. In addition, a strategy for a collaborative economy that supports the circular economy and leads to a decrease in the use of raw materials will

also be developed.

Environmentally responsible consumption

In addition to a more sustainable and circular production system, a more sustainable consumption system is also required. We are developing a coherent food policy that takes into account ecological, economic, social and health issues. We are also examining and developing the benefits of a Flemish protein transition, to be achieved by switching from animal-based to plant-based protein sources.

Strengthening support for local climate policy

We will use tools and data to support local authorities in their climate policy. To ensure climate neutrality by 2050, each local council should examine this target within a non-ETS framework for the area it covers and decide on an appropriate energy management strategy. The Flemish Government will support local authorities in this regard. In addition, more emphasis will be placed on practical support and guidance, smart cities, mobilising local energy investments (e.g. via ELENA), project co-financing and better communication and multi-level governance.

Climate-friendly government

The Flemish authorities are setting an example by implementing existing action plans for energy efficiency, mobility and behaviour and renovating buildings used by its Infrastructure Management Agency. It is preparing to embark on a new phase of implementation for the period 2021-2030.

The following overall targets have been set for the period up to 31 December 2030, taking 2015 levels as a baseline:

- a 40 % reduction in CO₂ emissions linked to buildings' energy consumption;
- a 40 % reduction in CO₂ emissions linked to the fuel consumption of service vehicles;
- a 40 % reduction in aggregated CO₂ emissions from energy and fuel consumption;
- a 27 % reduction in primary energy consumption linked to the energy consumption of buildings.

These overall objectives apply both to the plan's overall scope and to individual entities.

The scope includes the 'Article 4(1) Accounts Decree' and 'Improved administrative policy' subcategories, together with VRT (Flemish broadcaster) and VITO (Flemish Institute for Technological Research).

Education

Work will also be carried out on an ambitious integrated approach to education on the natural world, the environment and sustainability in schools, with particular emphasis being placed on the climate.

Walloon Region

Changes in individual behaviour are seen as a crucial lever for moderating energy consumption in housing, transport, recreation and other areas of consumption.

The potential for reducing GHG emissions associated with behavioural change is high; studies in other countries suggest it could amount to between 10 % and 27 %. However, the level of acceptance of behavioural change is currently low, estimated at only 5 %. Coherent long-term programmes are therefore needed in order to increase this acceptance rate and achieve the maximum potential reduction.

State authorities have a key role to play in these programmes by:

- ensuring coherent communication based on the objectives pursued;
- facilitating behavioural change by removing barriers;
- ensuring that action taken is relevant to the objective pursued and that the impact of any awareness campaigns is assessed regularly.

With regard to land management, Wallonia has finalised its Regional Development Plan (SDT). The plan includes a package of medium- and long-term measures to enable the region to forecast and meet the future needs of its population.¹⁰

Land management is a contextual policy area that clearly influences energy and environmental issues. The regional development plan will therefore focus on policies such as:

- linking urban areas and developing new ways of organising the economy, such as the local economy and circular economy, which will transform the planning approach and the relationship between functions, activities and resources;
- improving the Region's energy performance and gearing it towards reconnecting the different generations within communities;
- meeting current and future demand for accessible housing adapted to sociodemographic, energy and climate-related changes.

In practical terms, the plan will look to prevent urban sprawl, develop urban areas and wasteland, improve the mix of activities and functions in urban centres, support and encourage local councils in achieving self-sufficiency in energy (storage and production), increase housing and zoning density, and accentuate biodiversity in urban areas (less mineralisation, introduction of 'cold zones', etc.).

Brussels-Capital Region

Since 2017, the Region has organised an umbrella communication campaign each year linking the various measures and tools the Regional Government has put in place. The aim is to raise awareness of positive behaviour among the population and increase the acceptance of new measures.

B. <u>Transport and mobility</u>

Policies and measures to reduce GHG emissions from transport are organised according to the following three principles:

- reducing demand for mobility, mainly through regional planning (reducing distances between residential areas, amenities and recreational facilities) and a cultural shift in behaviour;
- driving the development of mobility through investment in multimodal mobility systems and promoting a modal shift by strengthening and improving public transport and encouraging the use of soft mobility (e.g. walking and cycling);
- aiming for the gradual decarbonisation of remaining road transport through the use of low- or zerocarbon technologies.

Each Government is responsible for specific issues. However, coordination and cooperation are needed on several of these issues. On the basis of a shared vision of mobility, the Federal Government and Regions will sign an interfederal cooperation agreement by 1 July 2020 covering areas requiring such agreement, with a view to implementing some of the measures set out in this plan.

A cooperation agreement may be signed with leasing companies for vehicle registration duty and/or the annual road tax in the form of a partnership, independent state-owned enterprise or non-profit organisation.

At the same time, provision may be made for a cooperation agreement between the Regions on vehicle taxation (vehicle registration duty and/or annual road tax).

¹⁰ These objectives should be seen as stepping stones towards a low-carbon society by 2050.

Federal Government

Promotion of biofuels: a decision has been taken to increase the share of second-generation biofuels according to the following scenario:

By 2030, the biofuel incorporation rate will be 14 % (in real terms). Every 2 years, a study will be carried out to assess the technical feasibility of the incorporation rate, the availability of the resource, environmental integrity and potential conflicts of use, the availability of advanced fuels on the European market and the cost to the consumer.

This inter-federal study will be carried out for the first time in the first half of 2020. If necessary, the incorporation rate will be reviewed on the basis of the study's findings. In such circumstances, alternative federal internal policies and measures will be introduced to ensure the same level of GHG emission reductions.

With this in mind, an inter-federal action plan may be an option, for example to involve public and private fleets in contributing to the achievement of these targets. The technical feasibility and availability of resources in view of the EU target will be raised in discussions with the European Commission.

In the case of **company cars**, the existing or future regulatory framework ('mobility budget' and 'cash for cars') will be examined. If necessary, this will be adjusted with a view to ongoing improvement of the company car scheme to meet energy and climate targets. Measures will also be taken to green company car fleets and the professional diesel scheme will also be evaluated.

Fiscal measures

- Assessment and adaptation, where appropriate, of the existing or future regulatory framework in order to offer an alternative to company cars (see mobility budget and cash for cars, for example), with a view to continuous improvement and achievement of the energy and climate targets.
- Efforts to tackle the external factors associated with company cars (air pollution, congestion and road safety, for example) by considering further reducing labour costs and endeavouring to make the system more straightforward.
- Greening the company car fleet.

Optimisation of rail transport (competitiveness, customer satisfaction). To encourage a modal shift to rail, significant investments will have to be made in the coming years to improve rail passenger transport.

Completion of the Regional Express Network (RER) by 2031 (primarily widening lines 161 and 124 to four tracks). By 2025, the RER network will be fully operational with a minimum of four S-trains per hour at peak times and two S-trains per hour at off-peak times and at weekends. New station infrastructure and integrated public transport fares will make this service more attractive for new and existing passengers. This is subject to the regions introducing a decree before their parliaments during the first half of 2019 ratifying the **cooperation agreement of 5 October 2018 between the Federal Government, Flemish Region, Walloon Region and Brussels-Capital Region on the financing of strategic rail infrastructure.** It is also subject to the Brussels-Capital Region signing the Cooperation Agreement for implementation of the RER project, which will allow work on the RER to be finalised. Other projects include equipping the rail network with the European Train Control System (ETCS) (permanent train speed control and automatic braking system); purchasing new rolling stock (M7 double-deck cars, etc.); modernising the Brussels to Luxembourg line; increasing capacity on the Ghent to Bruges route; providing a link to Gosselies airport; Fleurus station and electrifying line 19 between Mol and Hamont. Operational measures will also need to be implemented to improve the quality of the rail service, making it more reliable and attractive and enhancing the customer experience (operating model and timetables, products and services, fare policy and distribution).

Promotion of rail freight. To increase the modal share of rail freight transport, targeted investments must be made to improve its competitiveness, especially compared with other modes of transport. This will complement

measures already being taken including works to allow 740-metre-long trains to operate on the Belgian rail network and to accommodate these trains in stations, improving rail links at logistics platforms, constructing or reopening missing sections of the rail freight network, increasing the capacity of the Zeebrugge to Ghent line and improving the state of ancillary infrastructure. Other measures relating to the operation of the rail network or regulatory measures will also be implemented to make rail freight transport a more attractive option.

Updating the freight subsidy mechanism after 2020 to further encourage the modal shift towards rail freight. In consultation with the rail industry and taking into account the European regulatory framework, the Federal Government will seek to maintain the current support measures for rail freight after 2020.

Flemish Region

The basis for the Flemish WAM scenario, which includes an estimated GHG reduction of 27 % in 2030 compared with 2005, is as follows. First, the focus must be on managing demand for mobility. This can be achieved through spatial planning and social measures, where every kilometre avoided contributes to the target (see regional planning policy under horizontal measures).

At the same time, the sustainability of mobility must be an overarching objective. The development of a robust, intelligent and integrated multimodal mobility system with sufficient capacity will improve traffic flows and allow more intensive use of alternatives. This is the second strand of the emissions reduction strategy. A maximum reduction of 51.6 billion vehicle-kilometres will be achieved by 2030. This equates to a 15 % decrease from 2015 levels for passenger cars and vans, and a maximum increase of 14 % for lorries. The share of sustainable transport used for commuting will increase by at least 40 %; in the highly urbanised areas of Antwerp, Ghent and the Flemish periphery, it will rise to at least 50 %. Lastly, an ambitious plan will be launched for the greening of the entire Flemish vehicle fleet. By 2030, all new passenger cars sold will be low-emission vehicles, and at least half will be zero-emissions. From 2025, only low-carbon buses will be permitted in urban areas, and only zero-emission vehicles will be allowed in urban centres.

The ambitious strategic measures to be taken are:

• Investing in accessibility by focusing on demand

The starting point in this respect is the effective demand for transport, rather than the supply. A more efficient transport system will be achieved by utilising resources in an optimal and targeted manner, providing a system that improves accessibility in a better and more efficient way and persuades people to use more sustainable and cleaner forms of transport.

• Preparing transport networks for the future

To improve accessibility, investments will be made to futureproof networks. Stable investment in network maintenance and targeted investments in capacity and service development are also required. The aim is to ensure that these networks can respond to future challenges, such as the development of autonomous and connected modes of transport, conversion to clean vehicles and ships, etc. The investments will focus on achieving the highest possible economic and societal returns.

Developing an integrated multimodal and synchromodal mobility system.

Well-integrated model networks are required to ensure effective combined mobility and synchromodality¹¹ as well as efficient logistical organisation. This gives passengers and businesses/users more options for travel or transporting cargo sustainably and makes better use of available transport capacity.

To establish an integrated multimodal transport system, a tiered network of road transport hubs is being

¹¹ Synchromodality: mobility in which several modes of freight transport are combined and where it is possible to pass or transfer easily from one mode of transport to another.

developed to provide a multimodal service within which users can transfer between different modes.

• Encouraging behavioural change

To achieve behavioural change, a regional approach is needed that supports green mobility and logistics (see above), as well as offering attractive measures to incentivise changes in behaviour (such as a wide range of clean forms of transport). To that end, the focus is on user charges in line with the 'polluter and user pays' principle. Transport costs are converted into variable costs and external (environmental) costs are internalised.

A budget-neutral intelligent mileage-based tax is being introduced for all light vehicles. This will allow fixed taxes to be scrapped (vehicle registration duty and annual road tax) and reduce vehicle-kilometres and road congestion, as well as enforcing the 'user pays' principle and internalise external costs. When setting the level of charges, consideration will be given to vehicles' environmental performance. Solid (mobility) alternatives will be offered to enable citizens to adapt their behaviour.

At the same time, when the intelligent mileage tax for light vehicles is introduced, the existing mileage tax for lorries will also be assessed to examine how this can be differentiated according to departure time, starting location and destination.

- Making road transport in Flanders greener using low-emission and zero-emission vehicles, in accordance with the Flemish action plan.
- Examining how Flanders can contribute to the supply of clean fuels for shipping and aviation.
- Water-borne transport: freight transport accounts for 6.3 billion tonne-kilometres. This should be transferred from the road to alternative modes of transport (inland waterways or rail). The share of rail and inland navigation in modal distribution should increase to 30 %.

The various seaports make considerable use of sustainable modes of transport. The share of these modes of transport (rail, inland waterway and estuary) has increased by around 5-10 % (relative to 2013).

Walloon Region

The Walloon Government has set ambitious mobility targets. These are set out in the FAST vision, which expresses them in terms of passenger-kilometres for individuals and tonne-kilometres for freight and focuses on modal transfer. In addition, Wallonia's vehicle fleet is set to become greener, mainly as a result of electric, CNG and LNG vehicles. These ambitions and the measures to achieve them will ensure a minimum reduction of 24 % in GHG emissions from transport, compared with 2005 levels.

To give practical effect to this vision, the multimodality model will have to be developed. In the light of current issues and challenges, only a model that combines the various modes effectively will offer maximum accessibility by simultaneously addressing both direct symptoms (i.e. accidents and congestion) and indirect symptoms (i.e. pollution and paralysis of the economy).

This will entail the near-simultaneous implementation of eight inextricably linked projects. As outlined in the FAST vision, the priorities for these eight projects are threefold; namely mobility governance, mobility supply and mobility demand. None of these projects is superfluous; each one represents a prerequisite for overall success, which must be measured from an economic, social and environmental perspective in the short, medium and long term.

The eight projects are:

- 1. to establish a harmonious and coherent model for governance and management of mobility at regional level;
- 2. to predict and manage the social impact of disruptive technology and changes in the way it is used;
- 3. to increase options for ride-sharing and define the relevant catchment areas;

- 4. to make co-modality more attractive for people and goods;
- 5. to harness technological developments to improve the efficiency and safety of transport systems;
- 6. to make reducing the amount of travel a priority in regional planning;
- 7. to focus practical action on sustainable mobility using intelligent and targeted taxation;
- 8. to inform, train and educate the public and civil society on sustainable mobility.

With regard to a greener vehicle fleet, the key measures can be summarised as follows:

- Infrastructure deployment will be maintained for LNG/CNG and hydrogen.
- Sales of electric vehicles will be boosted by temporary incentives and a limited budget tied in with vehicle registration duty and road tax.
- To encourage the use of biogas in CNG and LNG production, this sector will need support. In practice, incentives will be introduced for installing infrastructure. Where CNG consumption reaches a sufficient level, the government will consider introducing a minimum biogas content.
- Charging points: to encourage public and private actors to install electric vehicle charging points throughout the region, the Walloon Government intends to continue issuing calls for projects based on the recoverable advance mechanism.
- Hydrogen: a support mechanism for infrastructure installation will be established.

Various regional tax measures will be taken, such as:

- vehicle registration duty and road tax will be modulated according to the vehicle's emissions, weight and environmental performance;
- in the medium term, stamp duty will become transferrable with the aim of reducing commuting distances.

Brussels-Capital Region

The main mobility and transport initiatives are outlined in a new regional mobility plan called 'Good Move'. This regulatory plan is structured around 6 'focuses' and involves the implementation of some 50 measures during the period 2018-2028. The overarching climate and energy goals of the Good Move plan are to reduce vehicle use and ownership and to green the fleet. Based on initial estimates, the plan could contribute to a 21 % reduction in vehicle-kilometres by 2030. Consultations are under way. The government has agreed to ban internal combustion vehicles, with a ban on diesel-powered light vehicles in the region to be introduced as early as 2030. Petrol engines are expected to be banned during the subsequent decade. Consultations are also under way on the implementation of these decisions. With regard to the exemplary role of public authorities, the Brussels-Capital Regional Government is aiming for 100 % of its new vehicles and public transport registered after 2025 to be zero-emission. The requirements for regional vehicle fleets or captive fleets (taxis, carsharing, etc.) will be revised upwards. The government is also keen to study the options available for specific vehicle types (waste collection vehicles, coaches, light commercial vehicles, breakdown trucks, etc.).

The Brussels-Capital Region is targeting a sharp reduction in the number of commuters driving to work. It is working with the Federal Government to examine ways of reducing the number of company cars and phasing out the company car scheme without affecting purchasing power.

C. Industry

This sector is extremely diverse, given the large number of different industries in terms of size and function. The

trend in GHG emissions and energy consumption in this sector is closely linked to the implementation of horizontal policies and measures relating to tax and investment. Most of the measures combine energy efficiency improvements with the introduction of specific, voluntary or binding regulatory measures.

Federal Government

Continuation and refinement of federal support for businesses to encourage industry to make the necessary additional effort by 2030. This assumes a level playing field within the EU in terms of ongoing improvement, with adequate reporting and the avoidance of any lock-in.

Flemish Region

The WAM scenario forecasts a reduction in final energy consumption of almost 21 % by 2030, compared with the estimated BAU scenario in industry. Combined with energy efficiency measures, it is estimated that that these measures will deliver a 21 % reduction in GHG emissions in non-ETS industry by 2030 (compared with 2005 levels). This estimate takes account of the introduction of the following additional strategic measures:

- Strengthening and optimising energy agreements for energy-intensive industry, with a view to ensuring
 the widest possible industrial transition in Flanders. For the new energy agreement due to take effect in
 2023, the current energy agreements will be examined, in close consultation with the target group, to see
 how energy agreements might be pursued under European regulations. During the assessment, it may
 prove sensible to work with industry and consider extending the scope of the energy agreement to
 include the use of materials, mobility, etc. This would give companies access to a wider range of
 measures, enabling them to increase their contributions to the industrial transition in Flanders.
- Companies with an energy consumption of less than 0.1 PJ are not included in the target group for the current energy agreement. To encourage these less energy-intensive companies to take steps to improve energy performance and reduce emissions, other instruments will also be examined and developed during the period 2021-2030. 'Mini energy agreements' represent the first of these instruments. Provided these are assessed as positive, such mini agreements can be combined with the continuation of the portfolio of small and medium-sized enterprises (SMEs) for subsidised energy consulting, with subsidies of 30 % to 40 % and the subsequent development of the ESCO market for SMEs.
- The development of the ESCO market for businesses, particularly SMEs.
- Continued support for industry by means of financial support mechanisms (environmental incentives, subsidies for strategic environmental improvements and the SME portfolio).
- The introduction of a public service (for education, awareness, information, advice and networking) by the Flemish Innovation and Entrepreneurship Agency (VLAIO) and its partners. The aim is to reach as many people as possible and actively engage with them in order to achieve the objectives of the energy and climate policy.
- Communication of consolidated and transparent information. Efforts will be made to distribute information locally via existing information channels.
- The following strategic measures will also be taken in non-ETS industry to cut CO₂ emissions:
- Continuation of the action plan to reduce emissions of F-gases.
- Reduction of N₂O emissions from caprolactam production. By 2020, N₂O emissions will fall to below 2005 levels. Even if the introduction of an additional (downstream) end-of-pipe measure should prove technically and economically unfeasible, it is estimated that emissions could be reduced by 55 % by 2030, relative to 2005 levels.
- Greening of energy carriers.

Walloon Region

In the non-ETS industry sector, the reduction in GHG emissions by 2030 will be achieved by a combination of two types of measures:

- The first type of conceivable measure is designed to further improve energy efficiency in this sector. An energy efficiency figure of 10 % has been set, to be achieved via a variety of technical measures.
- Above this figure, it appears that more radical decarbonisation measures for non-ETS industries need to be considered. Alongside 'conventional' energy efficiency measures, it has been decided to introduce 'fuel switching' for the energy supply in this sector. The options for facilitating the transition to other energy carriers include the use of renewable heat (solar thermal, heat and geothermal pumps or biomass combustion) and low-carbon electricity. Fuel switching will cover 8 % of the consumption and production of heat from renewable sources, or 314 GWh.

The various tools used to implement these measures are listed below:

- introduction of new voluntary sector agreements;
- continuation of the low-interest loan mechanism for businesses (Novallia);
- modification of the framework for ESCOs;
- adjustment of the conversion factor (carbon content of electricity) with a view to ensuring 'reasonable' electrification;
- investment subsidies.

For fluorinated industry, the main measure is to establish a voluntary agreement with the food distribution sector to reduce its GHG emissions. The use of fluorinated gases and energy consumption will both be targeted under the agreement. The measure comes at a time of increasing restrictions on the use of hydrofluorocarbon (HFC) gases under Regulation (EU) No 517/2014.

D. (Residential) buildings

Flemish Region

Green heat:

A decision has been taken to make maximum use of green heat capacity for the various different heating technologies available. It is nearly always more cost-effective from an economic point of view to obtain a given contribution from green heat than from green electricity or green transport.

The focus will continue to be on district heating that facilitates the use of renewable or residual heat. This concept has come under the spotlight in recent years through regular calls for green heat (including district heating), residual heat (networks), biomethane injection and geothermal energy.

In addition, houses on new plots will no longer be connected to mains gas from 2021. From that date, the E30 standard will apply to new builds. The limited residual energy demand will then be easily coverable by energy sources other than fossil fuels.

Walloon Region

The efforts envisaged for the residential sector in Wallonia are ambitious, with a GHG reduction of around 24 % compared with 2005 levels.

The most transformative measures are described in the Walloon renovation strategy, which is associated with

more stringent requirements for new builds (see energy efficiency chapter).

Brussels-Capital Region

The overall target for the residential sector is ambitious, realistic and sensible from the point of view of both cost and sustainability. The period 2021-2030 will see the introduction of new tools and measures – including the new energy performance certificate (EPC), building passport and building renovation roadmap – necessary to achieve the long-term objective, namely to reach 100 kWh per m² per year on average by 2050. This would seem a fair and realistic goal for the residential sector. Moreover, the suitability of this objective was confirmed by the 'costoptimum' study of residential buildings, which assesses the economic impact of different energy targets.

The residential sector will be guided towards the appropriate performance level through the regular imposition of requirements relating to energy saving improvements. This will help to ensure that the required threshold is reached. This type of system requires an EPC for all buildings, regardless of whether they are subject to any transaction. The system will be adapted during the period 2021-2030 to include all recommendations needed to exploit the full energy saving potential of the building.

During the period 2021-2030, the Brussels Government will examine the issue of mains gas. To that end, it has undertaken to:

- consider the possibility of a ban on the installation of cooking, heating and domestic hot water appliances that use natural gas or butane/propane from 2030 in consultation with the sector, paying particular attention to the problem of energy dependency and the economic and social impacts associated with this measure;
- work with industry, the Federal Government and neighbouring Regions to develop an action plan by 2030, with a view to phasing out the gas distribution network in the Brussels region by 2050.

E. Agriculture

Flemish Region

According to estimates, the WAM scenario forecasts a 26 % reduction in emissions relative to 2005 levels and a fall in final energy consumption of 2 233 GWh compared with the BAU scenario. The basis for achieving these targets is threefold. It includes, for example, direct technological intervention, with better management of the agri-food chain to reduce the environmental footprint of food production (e.g. limiting food losses from the producer to the consumer, greater consumption of plant-based and alternative protein sources, development of the associated flows, improving the sustainability of the fisheries sector).

The principle strategic measures planned for non-energy emissions are as follows:

- striking a 'green deal' with the agricultural sector, accompanied by a performance commitment to be assessed in 2025;
- optimising feed rations and/or feed efficiency;
- reduced emissions from manure storage and management;
- increased nitrogen efficiency in the food production chain;
- focus on 'smart farming';
- tackling food loss and food waste;
- sustainable fisheries.

To cut energy emissions and improve energy efficiency in the agricultural sector, it is intended to involve all enterprises using the existing strategic instruments and measures, which are (1) energy scan/audit and support; (2) universal education and awareness-raising; (3) simplifying and promoting the exchange of energy at local level; (4) continued assistance for sensible energy consumption for agricultural enterprises without tax accounting; (5) encouraging the installation of solar panels in agricultural enterprises.

Walloon Region

In the first instance, the actions envisaged in the agricultural and forestry sectors consist of maintaining and strengthening the policies and measures already in place.

It will then be necessary to consider:

- (i) introducing new initiatives under the revised common agricultural policy;
- (ii) the framework for developing energy crops;
- (iii) the development framework for biomethanisation in the agricultural sector (a number of biomethanisation units already exist in this sector).

Brussels-Capital Region

The Brussels farming strategy ('Good Food') mainly focuses on two types of action:

- developing sustainable professional agricultural production;
- promoting sustainable self-production.

F. LULUCF

This sector aims to avoid being a net source of emissions (thus complying with the 'no debit rule'). If the sum of these sectors leads to a net carbon sink, this may be used to offset emissions under the Effort Sharing Regulation (ESR), with a cap on use. Conversely, if the sum of these sectors leads to a net emission, this must be offset within the sector.

Flemish Region

Flanders has set itself the goal of satisfying the neutral or positive balance sheet rule (no debit rule) in 2021-2030. Therefore, neither the purchase of an additional LULUCF emissions allowance within Belgium or from other EU Member States, nor the use of its own modest emissions allowance under the European System of Accounts (ESA) will be necessary. To comply with the no debit rule, an LULUCF Action Plan will be drawn up before the start of the period covered by the plan. The main measures in this regard are the development of a soil carbon monitoring network, practical application of the measures needed to comply with the no debit rule, and the integration of LULUCF into any policy governing land and land use (in particular forestry and nature, agriculture, water and space), in addition to the development of short- and medium-term strategies in these policy areas.

Walloon Region

For forestry management, which is the largest carbon sink in the Walloon Region, accounting is based on the difference compared with a baseline representing a BAU-type projection by 2030.

This sector aims to avoid being a net source of emissions (thus complying with the 'no debit rule'). If the sum of these sectors leads to a net carbon sink, this may be used to offset emissions under the Effort Sharing Regulation (ESR), with a cap on use. Conversely, if the sum of these sectors leads to a net emission, this may be partially offset within the sector. Thereafter, annual emission allocations (AEAs) under the Effort Sharing Regulation (ESR) or external purchases will have to be used to offset emissions.

Several recent measures have encouraged the adaptation of forests to climate change with a view to maintaining or improving their carbon sequestration, including:

- the black spruce treatment standard;
- the Walloon Forest Health Observatory, active since 2011;
- the publication in 2017 of recommendations for forestry decision-makers, owners and managers, 'Le changement climatique et ses impacts sur les forêts wallonnes' ('Climate change and its impact on Wallonia's forests');
- the revision of the *Fichier écologique des essences [Economic Index of Fuels]* in 2017, a tool designed to support decision-making in determining the suitability of the species/stand area;
- reforestation measures (technical framework, provincial incentives).

However, depending on the baseline adopted for forestry management (final adoption in 2020 following a review) and future land-use changes, particularly the conversion of forests and grassland, it is possible that the sector may be categorised as a (relatively low) source of emissions, rather than a carbon sink.

G. Waste management

Federal Authorities

Updating and practical implementation of the federal roadmap for the circular economy¹².

Flemish Region

In order to achieve the target of a 51 % reduction in emissions (compared with 2005 levels) by 2030, the Flemish Region will:

- reduce the amount of waste incinerated by encouraging recycling and prevention.
- advocate a long-term vision for waste treatment facilities. A tool is being developed to stimulate the phasing out of waste treatment facilities.
- increase the selective collection of organic waste from households and businesses, and continue efforts to pre-ferment vegetables, fruit and garden waste for renewable energy production.

¹² https://www.health.belgium.be/sites/default/files/uploads/fields/fpshealth_theme_file/circ-econ-nl-light.pdf

Walloon Region

On 22 March 2018, the Walloon Government approved the Walloon Waste and Resources Plan (PWD-R). The PWD-R, which is intended to follow on from the Horizon 2010 Plan, will incorporate the new European obligations for the circular economy and increased recycling rates. While incineration and recycling have gradually replaced landfill in recent years, the Walloon Government's intention is to increase the proportion of recycling from now on as compared with the amount of waste that is incinerated. In real terms, more than 700 actions are proposed via 157 measures designed to reduce, reuse, sort, recycle and recover waste more effectively. The plan covers individuals, businesses, local councils, local authority associations, non-profit organisations and government bodies. It will reduce GHG emissions by 70 % by 2030.

ii. Where relevant, regional cooperation in this area

Belgium is working within the NSEC to coordinate the tender schedule, exchange best practice in the design of offshore wind systems and identify common principles and possible options for the alignment of subsidies where possible.

With regard to the tender schedule, Belgium regularly shares information on its national tender schedule with the other NSEC countries. The NSEC countries meet regularly and keep each other informed of their respective national tender schedules. The aim is to identify potential overlaps and streamline tendering procedures in the North Sea region. Wherever possible, Belgium is willing to take these tender schedules into account when planning future tenders, along with other criteria. This should avoid any unnecessary duplication and provide a stable capacity reserve for the stakeholders concerned without the need for downtime and recovery cycles.

iii. Without prejudice to the applicability of State aid rules, financing measures, including Union support and the use of Union funds, in this area at national level, where applicable

Within the NSEC, Belgium also contributes to the analysis and development of options to increase fundraising for joint projects, for example from the European Fund for Strategic Investments (EFSI) and the Connecting Europe Facility (CEF), as well as from institutional investors. These joint projects could be cross-border renewable energy projects in line with the CEF proposal.

3.1.2 Renewable energy

National level

The common thread running through Belgium's renewable energy policy is the search for **cost-effectiveness**, taking into account the diversity of the geographical, socioeconomic and technological potential available. Although powers **are shared** between federal and regional authorities, interaction between these authorities is maintained. Specific measures (policies) can be found in **entity-specific projects**. An overview of the key measures identified by each region can be found at the end of this section.

Federal Authorities

The planned increase in offshore **wind capacity to 4 GW** is based on an extension of offshore concession areas and a Maritime Space Management Plan. Onshore, efforts are being made to maximise the available and economically viable wind potential by commissioning suitable sites wherever possible, in cooperation with industry and the defence and aviation sectors. Administrative procedures for new and existing wind farms are shortened, simplified and streamlined wherever possible, since the time required to complete them has a tangible economic impact.

To achieve the target share of renewable energy in the **transport** sector, the focus is on a mandatory **biofuel** content of 14 % by 2030. Companies that supply diesel and/or petrol will have to demonstrate that the volumes released for use by consumers on an annual basis contain a nominal percentage of sustainable biofuels. This minimum content will be 7 % for first-generation biofuels and 7 % for advanced biofuels.

Flemish Region

Table 3.1.a Flemish forecasts for final green energy consumption between 2020 and 2030 (GWh):

| GWh | 2020 | 2030 |
|-----------------------|--------|--------|
| Green heat | 9 197 | 9 687 |
| Green electricity | 10 519 | 11 956 |
| Biofuels in transport | 5 046 | 6 270 |
| Total | 24 762 | 27 700 |

Green electricity

- Solar energy

A detailed calculation of potential has been made using the solar map. This map shows the roof surfaces available for solar power, identified on the basis of optimal orientation, surface area and shadow analysis.

According to the solar map, a potential 57 GWe has been calculated for the 'ideal' category, defined as sites with incident solar radiation of more than 1 000 kWh/m²/year. The potential of the 'usable' category, with incident solar radiation of between 800 and 1 000 kWh/m²/year, is 15 GWe. At the end of 2017, installed PV capacity was 2.5 GWe. The solar map shows that there is enough rooftop potential to deliver significant growth.

The forecasts take into account the Energy 2020 plan, which estimates an additional 6.4 million 230 Wp solar panels (6.4 million x 230 Wp = 1 472 MW) during the period 2016-2020. Additional annual growth of 300 MWe is forecast by 2030. Flanders will therefore have 6.7 GWe of solar PV capacity. This target is very much in line with the potential identified by the solar map and within the potential for integrating and balancing the grid.

Wind energy

For wind energy, the objectives of the 'Windkracht 2020' wind plan are taken into account, with the construction

of 280 additional wind turbines from 2016 to 2020. This corresponds to average annual growth of 50 to 60 wind turbines, or 150 MWe of additional wind power, mostly from projects that have already been approved. 'Windkracht 2020' thus equates to an installed capacity of 1.5 GWe by 2020. The average growth rate is projected to be about 51 MW per year lower for the period 2021-2030, due to the limiting factor of lack of available space. By the end of 2030, total installed capacity will rise to 2 GWe.

- Biomass and biogas

As mentioned earlier, the potential of biomass and biogas for green electricity was determined in the Vito study entitled 'Het potentieel van bio-energie in Vlaanderen in 2030, april 2017' ('Bioenergy potential in Flanders in 2030, April 2017').

For large waste-wood-fired biomass plants, it is assumed that the capacity forecast in the 2020 energy plan will be maintained until 2030. The Max Green wood pellet power plant will be decommissioned between 2020 and 2030. Biomass waste recovery facilities are expected to switch to green heat in the form of district heating. This explains the fall in green electricity produced from biomass.

For biogas, a slight increase in production has been factored in, since it is assumed that 10 additional facilities for the fermentation of vegetable, fruit and garden waste and extra 'pocket' digesters will be set up in the agricultural sector.

- Biofuels and environmentally friendly vehicles

Federal policy will provide most of the reference framework for the use of biofuels in transport. The Federal Government is primarily responsible for this policy area. In addition, the relatively limited use of renewable energy sources (compared with green heat and electricity generation) is expected to stabilise, with a shift from first-generation biofuels to advanced biofuels. Under RED II, the share of biofuels will gradually increase to 14 % by 2030.

Green heat

Maximum use of green heat potential has been assumed for the various thermal technologies. It is nearly always more cost-effective to obtain a given contribution from green heat than from green electricity or transport.

For heat pumps, the system cost is higher than for other options (renewables), due to impact on network load and higher investment and support costs than for other sources of green heat. Not everyone will opt for a heat pump when investing in a renovation or replacement. To encourage more use of heat pumps, the cost-effectiveness of heat pumps in homes with lower heat demand and the integration of heat pumps into the market and electricity grid should be improved. This could be done, for example, by taking a more flexible approach to heat pumps, which would allow operators to plan for lower energy tariffs during periods of very high production or at times of low network load. Some thresholds will have to be raised to increase the uptake of heat pumps.

District heating contributes to more efficient heat production and provides the necessary infrastructure to facilitate the transition to renewable energy sources (e.g. geothermal energy). The focus will continue to be on district heating that facilitates the use of renewable or residual heat. This concept has come under the spotlight in recent years through regular calls for green heat (including district heating), residual heat (networks), biomethane injection and geothermal energy.

Walloon Region

Support for renewable electricity

The Green Certificates mechanism has been improved by:

- tapering of support (reduction in production cost and lifetime support);
- simplified operation:
- transfer of support for heat generation to another mechanism in the context of high-quality cogeneration.

This type of mechanism is still necessary to offset the higher cost of production compared with other sources for which not all external factors are priced in.

The trend for electricity prices in Europe will be decisive and should eventually lead to a reduction in support (the phasing out of nuclear in central Europe will push up electricity prices on the ENDEX market).

The aim is to limit and avoid extra charges on electricity bills relating to energy generation.

Other measures are needed to provide the best framework for the development of renewable generation, including:

- improving and securing the overall framework and reducing costs (permits, guarantees, administrative procedures, etc.);
- implementing and strengthening wind energy policy;
- introducing a policy for large-scale deployment of photovoltaic power.

The use of wind and photovoltaic energy is expected to grow more substantially (by 58 % and 195 % respectively) than in the baseline scenario.

Based on these estimates, renewable electricity generation will make up around 37 % of final electricity consumption by 2030.

Tabel 3.1.b Waalse prognose finale consumptie van groene energie per fillière 2015-2016 en 2030 met bestaande en bijkomende maatregelen (WEM/WAM) (GWh):

| In GWh | 2015 | 2016 | 2030 WEM | 2030 WAM |
|----------------------------|-------|-------|----------|----------|
| Onshore wind | 1 437 | 1 518 | 2 907 | 4 600 |
| Photovoltaic | 792 | 798 | 1 120 | 3 300 |
| Hydro | 314 | 318 | 342 | 440 |
| Geothermal | 0 | 0 | 11 | 40 |
| Biomass – electricity only | 543 | 778 | 208 | 90 |
| Biomass – cogeneration | 975 | 1 051 | 1 104 | 1 611 |
| TOTAL | 4 060 | 4 463 | 5 691 | 10 081 |

Support for renewable heat

The share of renewable energy in heat consumption has risen only gradually since 2005. No structural measures have been implemented. To achieve the objectives in terms of phasing out fossil fuels (particularly heating oil), five types of measures need to be introduced:

- Identifying alternatives and making them available (by informing the relevant audience) together with a usage transition plan (the right technology or solution for a given situation).
- Putting in place a mechanism to support renewable heat, waste heat and decentralised heating and gas

networks for industry, the tertiary sector, multiple-occupancy buildings and SMEs. This mechanism will seek to offset the additional cost of certain technologies.

- Offering a government guarantee for mature high-risk technologies (e.g. geothermal energy), with a costsharing mechanism if deposits are higher than expected.
- Establishing a framework for decentralised heating and gas networks (where they meet the optimum cost).
- Setting up a scheme to replace existing fireplaces and stoves.

A support mechanism is currently needed to allow investment in technologies that are not competitive compared with conventional energy sources that do not consider the 'polluter pays' principle. Such mechanisms are intended to mitigate market distortion.

The mechanism will adapt to fluctuations in energy prices, so that support is limited to the additional cost only (e.g. an increase in the reference energy price will trigger an automatic reduction in support). In addition, competition between projects should help to achieve the best possible economic performance (via calls for tenders for large-scale facilities).

A shift to low-carbon energy will make energy bills more affordable for consumers (fewer, lower increases with less volatility).

Bioenergy

The use of biomass in energy generation will be consistent with the work carried out by the Government, taking into account the key aspects of sustainability, conflicts of use, inclusion in the bioeconomy roadmap and consistency between energy carriers.

With this in mind, the Walloon Government is keen to establish a framework governing the use of biomass (from all sources) for energy purposes.

Brussels-Capital Region

The Brussels Region has already taken steps to increase the use of renewable energy, with both individuals and businesses investing in this area. The Region will continue to set an example in its public buildings (including social housing) and will require the same commitment from other authorities as it looks to develop the most appropriate solutions for its urban environment. In this context, **solar energy** (solar thermal and photovoltaic) and **heat pumps** provide some interesting options for decarbonising the regional energy system. The Brussels-Capital Region also plans to develop an **investment strategy for renewable electricity outside the region**.

- Setting an example in public authorities (extending the SolarClick programme for the installation of photovoltaic panels on public buildings in the region; strengthening cooperating with social housing bodies with the aim of allowing investment in renewable energy by reviewing the management agreement; considering methods of recovering all or part of the biowaste and green waste collected).
- **Regulatory measures** (directly imposing a requirement for all new buildings to generate renewable energy; considering a requirement to install photovoltaics in indoor or outdoor car parks run by private operators).
- Economic stimuli (encouraging collective projects and better use of local renewable electricity generation; extending support mechanisms (air-to-air heat pumps and installations in public outdoor spaces)).
- **Supporting measures** (enlisting more support from professionals and individuals on issues surrounding heat pumps).
- Cooperation measures (encouraging managers of public buildings at non-Brussels authorities with

premises in the region to invest in renewable energy generation at their Brussels sites; signing cooperation agreements – starting with neighbouring regions – with a view to investing directly in renewable electricity generation outside the region).

3.1.3 Other elements of the dimension

- i. Where applicable, national policies and measures affecting the EU ETS sector and assessment of the complementarity and impacts on the EU ETS
- ii. Policies and measures to achieve other national targets, where applicable

Introduction of adaptation plans (national, federal and regional) and their updates

iii. Policies and measures to achieve low-emission mobility (including electrification of transport)

Flemish Region

A key element of greener mobility is the large-scale introduction of vehicles that run on clean fuels. The most significant growth will be achieved during the period 2020-2030. By 2030, half of all new passenger cars will be zero-emission cars. This is the only way to achieve a zero-emission fleet by 2050. With this in mind, the following targets have been set:

- from 2030, all new passenger cars sold will be low-emission vehicles, and at least half will be zeroemission vehicles;
- by 2030, 25 % of all buses purchased (coaches, school buses, buses) will have a low carbon footprint;
- from 2025, only low-emission buses will be permitted in urban areas, while only zero-emission vehicles will be allowed in city centres;
- from 2019, the public transport operator De Lijn will only purchase low-emission buses (hybrid, electric, hydrogen-powered, etc.);
- from 2025, only hybrid, electric and hydrogen buses will be used in urban areas, while only zero-emission vehicles will be allowed in city centres;
- at least 5 % of new heavy goods vehicles will be low-emission vehicles by 2030;
- by 2030, at least 30 % of new light commercial vehicles and vans will be low-emission vehicles.
- iv. Where applicable, national policies, timelines and measures planned to phase out energy subsidies, in particular for fossil fuels

3.2 Dimension energy efficiency

 Energy efficiency obligation schemes and alternative policy measures under Articles 7a and 7b of Directive 2012/27/EU, to be prepared in accordance with Annex III to this Regulation

Each region is implementing its own policies in order to achieve the Article 7 objective. The Federal Government is

also pursuing policies that support or further the achievement of this objective.

Overall, the policies and measures described in this integrated NECP, as well as in its regional annexes, are likely to contribute to the alternative mechanism under Article 7, provided that the implementation of those measures is consistent with the strict methodological criteria laid down in Annex V (eligibility and additionality). The Energy Efficiency Directive was only recently revised, and Belgium is awaiting guidance from the Commission on its interpretation and application before deciding its position on eligibility.

If necessary, energy efficiency measures will be adapted or replaced within the framework of the agreed goals to ensure that the plan meets this requirement.

Flemish Region

According to an initial indicative calculation, the Article 7 target represents a cumulative end-use energy savings target of 114 TWh for the Flemish Region during the period 2021-2030.

Regarding the implementation of the Article 7 target for 2021-2030, for the time being the Flemish Region has chosen not to introduce a system of energy saving requirements for suppliers or distribution system operators, but to continue down the route of alternative measures. Accordingly, the measures previously notified to the European Commission for the period 2014-2020 will be renewed under the 'with existing measures' (WEM) scenario with all existing and new measures taken into account. To that end, a new monitoring tool is being developed to monitor all savings resulting in particular from:

- building renovation;
- continued energy policy agreements with companies;
- the obligations of electricity distribution system operators under the emission reduction unit (ERU) with regard to existing buildings (both residential and non-residential) and mileage tax for heavy goods vehicles;
- other mileage tax.

During the development of all new policy measures set out in the Flemish Energy Plan (such as incentives for water heaters with heat pumps, the requirement for at least three types of energy improvements to be carried out when a house is sold, introduction of mobility measures, etc.), a scheme will be put in place to determine what percentage of the proposed measures are eligible under Article 7. Some measures will be replaced if necessary.

Walloon Region

According to an initial assessment (to be confirmed at a later date), Article 7 requires a new end-use energy saving of 980 GWh per year (i.e. a cumulative total of around 53 920 GWh) during the period 2021-2030. These figures will have to be confirmed once the 2016, 2017 and 2018 consumption data are available.

Although the introduction of a requirement – albeit only a financial one – has been mooted, the Walloon Government has decided for now to continue using the same alternative measures as in the previous period (2014-2020). These include, inter alia:

- measures for the building sector derived from the renovation strategy described below, including the development of energy services and energy performance contracts, mainly in the public tertiary sector;
- industry measures, including pursuing efforts possibly in another form under industry agreements to continue improving final energy consumption;
- measures to promote the use of renewable heat;
- transport-related measures, as described in Section 3.1 above.

Brussels-Capital Region

Article 7 as defined in the Energy Efficiency Directive (2012/27/EU, revised in June 2018) would, according to initial estimates, impose a cumulative energy savings target of 8 438 GWh on the Brussels region for the period 2021-2030. This corresponds to an annual saving of around 153 GWh.

The main additional measures in the Brussels-Capital Region affect buildings and transport.

- Building measures targeted via the Brussels building renovation strategy described below, including restrictions and financial subsidies (i.e. incentives), to be accompanied by a major public and industry awareness campaign. The existing tools will also be strengthened.
- In transport, the measures are designed to:
 - reduce (individual) mobility needs in order to lower energy consumption. This objective is based primarily on the adoption and implementation of the 'Good Move' regional mobility plan, as detailed in part 2 ('Towards an energy-efficient city').
 - Improving the performance of remaining vehicles and migrating the Brussels fleet towards a zero-emissions fleet.
- ii. Long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private (88), including policies, measures and actions to stimulate cost-effective deep renovation and policies and actions to target the worst performing segments of the national building stock, in accordance with Article 2a of Directive 2010/31/EU on the energy performance of buildings, as amended by Directive 2018/844

The energy performance and energy efficiency of buildings are the responsibility of the federal entities. Consequently, each entity has developed its own long-term renovation strategy for buildings in its region: 'Renovatiepact', 'Actieplan voor tertiaire gebouwen' and 'Strategie en Actieplan voor defossilisering van de verwarming in gebouwen' in Flanders; 'Long-term renovation strategy for Wallonia's buildings' in Wallonia; 'Strategy for reducing the environmental impact of existing buildings' in the Brussels-Capital Region. Details of these strategies can be found in the regional annexes to this integrated NECP.

While these strategies inevitably differ on some points, they present a common vision and share numerous measures.

All of the strategies have the following objectives in common:

- to involve civil society and stakeholders closely in taking action;
- to see a dramatic rise in the rate at which buildings are renovated;
- to achieve an average output of 100 kWh per m² or less¹³ for the entire residential housing stock by 2050 (equivalent to an A rating in the EPC);
- to aim for the energy neutrality or decarbonisation (heating, domestic hot water, cooling and lighting) of buildings in the tertiary sector by 2050.

The policies and measures implemented or envisaged are broadly very similar.

Legislative measures

• Introduce a buildings passport and reinforce the role of the EPC or energy audit, which identifies the

¹³ This figure varies from region to region. Voor het Vlaams Gewest wordt deze gedifferentieerd per gebouwtype.

priority work to be carried out within a specified timeframe.

- Develop a strategy to phase out fossil fuel heating for new builds or deep renovations, starting with heating oil.
- Expand and/or strengthen the market access policy for products and equipment that consume energy (stricter emission standards, ban on the use of certain types of heating, fuel standards, etc.).

Fiscal measures

- Determine whether the scope of the reduced VAT rate of 6 % on the renovation and demolition of private dwellings, currently in force in 32 towns, could be extended to all towns and villages. Examine the impact of the measure and the feasibility of its introduction within the existing framework or within a modified future EU framework. Whatever the decision, implementation will be in accordance with EU legislation on VAT.
- Entry into force on 1 January 2019 of the optional scheme for charging VAT on new buildings leased for commercial purposes where the lessee is a Belgian taxpayer. This measure will spur on the renovation of Belgium's commercial building stock by allowing the deduction of the VAT payable on the costs associated with these new buildings.

Financial incentives

- Align subsidies for investments in energy efficiency (building envelope and systems) with the objectives of long-term deep renovation, based on the recommendations and priorities of the energy audit or energy performance certificate.
- Facilitate access to low-interest loans for renovation works.
- Promote third-party investor models (public-private partnerships or similar) and set out a legal framework allowing third-party investment firms to lend to individuals and businesses and provide them with the necessary financial guarantees in relation to energy efficiency improvements.
- Provide support to disadvantaged groups for renovation projects to improve their homes.
- Regulate landlords and encourage the renovation of grouped housing.
- Encourage system maintenance to ensure long-term performance.
- Facilitate access to EU funding.
- Encourage the use of crowdfunding.
- Set out a framework for energy performance contracts.

Exemplary role of public bodies

- Public buildings to play an exemplary role.
- Renovation of existing federal and regional public housing stock to achieve the energy neutrality standard.
- Inclusion of environmental clauses in public procurement contracts.
- Rationalisation of the public estate by reducing the portfolio (vacating premises) and relocating to buildings with high levels of energy performance with no need for renovation. Deep renovation of social housing stock.

Development of information/awareness-raising tools and measures

- Reinforce the role of the energy audit and energy performance certificate in providing information on the building's performance and energy saving potential, identifying works to be carried out as a priority within a specified timeframe. Include a roadmap in the audit outlining the renovation pathway to be followed in order to achieve an A-rating.
- Introduce building passports containing the building's energy, architectural and land registry data.
- Develop exemplary projects showcasing deep renovations as part of the EU-funded LIFE BE REEL project.
- Compile statistics to improve knowledge of the building stock.

- Gather consumption data to gain more information about the energy consumption and specifications (energy rating) of household appliances and to assess their energy saving potential.
- Introduce a monitoring system for reporting under Article 7 of the Energy Efficiency Directive, impact assessments and regular strategy updates.
- Develop an effective system for communications.

Training measures

• Provide effective training for professionals with an enhanced role.

Each entity will translate these general points into specific measures, the most emblematic of which are summarised below.

Federal

Align the energy performance of federal public buildings with the objective of achieving neutrality by 2040:

- In view of the wide variety of buildings affected, action plans will need to be drawn up for each building type (different standards could be envisaged for protected or listed buildings). In addition, current obstacles (market supply, existing standards, rental or partnership constraints, budget, continuity of service, etc.) that might prevent the project from being completed on time will have to be analysed. The concepts of energy and climate neutrality must also be clearly defined.
- Budget commitments will have to be guaranteed via multiannual plans with separate appropriations (over 5, 6 or 7 years) and 20-year budgets, depending on how ambitious the government wants to be.
- Other improvements could come from further rationalisation of the public estate by reducing the portfolio (vacating premises) and relocating to buildings with high levels of energy performance and no need for renovation (such as new prisons).

Flemish Region

To accelerate and improve energy-related renovations in Flanders' buildings, several new instruments are already in the pipeline:

- The EPC will be reworked in 2019 to replace the standard recommendations with a package of measures (energy savings and cost estimates, for example) consistent with the long-term objective for 2050.
- A housing map is being developed in partnership with the public sector in order to monitor developments in the housing sector. The first digital version will be unveiled in late 2018.

In addition, the WAM scenario includes the following energy saving measures:

- introducing an incentive in 2019 for water heaters fitted with a heat pump;
- developing a strategy for accelerating the rate of replacement of heating installations and optimising the settings of existing natural gas and oil-fired boilers;
- phasing out oil-fired boilers in new buildings and major energy renovations;
- building new homes without a mains gas connection;
- encouraging renovation after demolition, launching a revolving fund for retrofitting energy-related upgrades in sheltered housing;
- Making band E standards for major energy renovations progressively tougher they will move from E90 to E60 by 2025;

• imposing a requirement to carry out at least three energy saving improvements within 5 years of completion of any sale involving existing dwellings and offices.

Similar measures to those for housing are planned for commercial property, notably an increase in federal tax relief on investments, environmental subsidies, the Terra information platform and the Flemish Government's energy efficiency action plan.

A Flemish strategy and action plan for phasing out fossil fuel heating will be developed and implemented. A coherent strategy for phasing out fossil fuel heating should take into account the type of heat demand and choose the most appropriate heating method from the different technologies available.

Walloon Region

The key renovation measures for the residential and tertiary sectors are:

- The introduction of tools for the renovation roadmap (energy audit and energy performance certificates including details of costs), the building passport and the one-stop shop.
- Maintenance and improvement of the incentive scheme, with eligibility being subject to an energy audit. Changes could include:
- Strengthening the incentive scheme for the roofs of F-rated or G-rated dwellings up to 2025;
- An additional incentive for low-income households.
- From 2025, all rental accommodation with an energy performance level of F or G will be renovated (according to the roadmap) within a specific timeframe, with details to be confirmed at a later date.
- From 2025, incentives will be available for renovating homes being sold, in accordance with the roadmap (return within 10 years).
- The option of imposing different rates of stamp duty and inheritance and gift tax according to the environmental performance of the property will be examined and implemented by the Region once it assumes powers in this area. The aim will be to achieve budget neutrality (upward adjustments will be offset by downward adjustments).
- A study will consider changes to the basis for property tax according to the building's environmental performance. The changes will be based on the findings of the study and will be subject to the Region assuming the relevant powers. Any change would be phased in with the aim of achieving budget neutrality (upward adjustments would offset downward adjustments). The development of a common framework and ongoing dialogue with the Federal Government are both likely.

As far as the different stages of renovation are concerned, several influential factors must be taken into account:

- the intention that energy retrofitting should go hand in hand with a significant reduction in energy insecurity and an improvement in the quality of Wallonia's housing;
- the need to spread the public spending needed to stimulate investment in renovation projects;
- the region's determination to position its renovation strategy as a driver for achieving EU targets for reducing energy consumption.

Brussels-Capital Region

The success of the measures implemented as part of the Brussels renovation strategy requires targeted and specific communications and a suitable timeframe.

• Alongside these specific actions, the region is keen to emphasise the fundamental importance of the strategy by developing a common thread linking all actions and ramping up awareness campaigns.

- The 'common thread' campaign will take place over a 4-year period, enabling it to have a real impact on the various target audiences. During the campaign there will be periodic emphases on specific actions, depending on the requirements identified. The campaign will also be subject to regular review.
- As a follow-up to this campaign, the website of the regional environment agency (Bruxelles Environnement) will be redesigned to include a 'sustainable renovation toolkit' (for example, a beginner's guide to procedures in the Walloon Region). This will provide information for the various target audiences (consumers, homeowners' associations, etc.) on the necessary technical, financial and administrative procedures. The sustainable renovation toolkit will provide the necessary links to existing tools (sustainable building guide, tool to optimise the total environmental impact of materials (TOTEM)), etc.).

iii. Description of policy and measures to promote energy services in the public sector and measures to remove regulatory and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models

The market for energy service companies (ESCOs) and energy performance contracting is still relatively undeveloped in Belgium, despite a few positive individual experiences. Nevertheless, this energy efficiency financing model offers some potential for development. The Belgian authorities are mindful of this and are in the process of establishing the structure needed to support this development in consultation with stakeholders (both suppliers and potential customers). This process will include:

- analysing barriers to the development of the concept and searching for solutions;
- communication campaigns to promote ESCOs and the benefits of energy performance contracting;
- renewed contact with financial institutions to de-risk the financing of the sector;
- preparing specifications and model agreements, measurement and monitoring tools, and training/qualifications to ensure quality of service.

Federal

The federal authorities are launching a review together with the regions under the aegis of the special advisory committee on energy consumption. The aim is to define a legal framework enabling third-party investment firms to lend to individuals and businesses and provide them with the financial guarantees necessary for carrying out energy efficiency-related works.

Flemish Region

Energy services for local authorities

As many local authorities are looking for support to implement energy saving or energy generation measures across their estates, Eandis and Infrax (the Flemish umbrella organisations for electricity distribution system operators) have been providing a service to facilitate this process since 2010. The service is an extension of the mandatory support required under Article 6.4.1.1/7 of the Energy Decree of 19 November 2010, which states that distribution system operators must assist a local authority with the planning and implementation of its energy policy if the authority requests them to do so. This supplementary service is not a regulated activity and thus has no impact on distribution network tariffs. Energy services for buildings may include, but are not limited to, the building envelope, heating, ventilation and air conditioning, lighting, heating and lighting maintenance, renewable energy and works associated with such works (such as demolition and maintenance). Similar services are also available for public lighting and the application of the sustainable fleet principle.

Energy services for public buildings

On 7 July 2006, the decree on the retrofitting of school infrastructure was enacted. The decree defines the key elements of the investment programme for (new) school infrastructure through alternative sources of funding. In 2009, the private investment company Scholen van Morgen nv, which specialises in DBFM (Design, Build, Finance and Maintain), was chosen to accelerate the investment of funds totalling around EUR 1 billion. The programme consists of the design, construction, funding and maintenance (over a period of 30 years) of 182 school construction projects (new builds and renovations).

In February 2012, the Flemish government set up the independent private agency Vlaams Energiebedrijf (VEB). The agency's mandate is to manage energy on behalf of the public sector, making it more sustainable and efficient. It does this by purchasing energy centrally and more cost-effectively, and by pooling and utilising energy data. Lastly, it also advises public services on how to use energy more efficiently.

With regard to this final aspect of its activities, VEB has developed a comprehensive service that encourages public bodies to introduce energy-related measures in a structured and accessible way. Ideally, the approach should be based on an in-depth analysis of the portfolio. Data analysis and on-site surveys are used to identify which buildings consume the most energy and which can potentially be renovated. This is then followed by a comparative analysis. A dynamic energy investment plan is drawn up on the basis of energy audits of the selected buildings. To ensure that the plan's measures are implemented effectively, VEB works with stakeholders via a two-pronged approach by (i) guiding them through the process of energy performance contracting, where a third party commits to a guaranteed energy saving for the public entity on the basis of energy measurements, and (ii) providing a 'library' of quality framework agreements that public entities can refer to quickly and confidently when performing energy measurements.

Energy services for businesses

In 2017, Participatiemaatschappij Vlaanderen (PMV) set up a EUR 20 million fund. Known as the 'Energy Efficiency Fund', the fund invests in improving the energy efficiency of SMEs through public-private partnerships ('ESCO' model). The overarching aim is energy efficiency, although broad-based projects combining energy efficiency with local renewable energy generation (wind, solar, green heat) and energy management (flexibility, demand response) are also considered under the scheme. In practical terms, the Energy Efficiency Fund invests in projects, ESCOs or ESCO funds where, for every euro that the energy efficiency fund invests in a project, private funds invest at least one euro in the same category or in a lower category. The projects, ESCOs or ESCO funds are managed by private managers. PMV thus unlocks the venture capital available for this type of investment.

If the energy efficiency fund discovers that some markets or niches are not being targeted, it has the option of setting up a new project company (ESCO or ESCO fund) to cover this target group. In the end, the ultimate goal is to make maximum use of energy efficiency opportunities in order to achieve the climate targets for Flanders.

Walloon Region

The Walloon Government also took a decision to develop the legal and regulatory framework for ESCOs and energy performance contracting in the region, particularly for buildings in the tertiary sector, and starting with public buildings.

The analysis carried out identified more than 30 actions, grouped into 8 key tasks, for developing ESCOs in the Walloon region. It also highlighted a priority shared with the renovation strategy – namely the development of the legal and regulatory framework for ESCOs and energy performance contracting.

Of the 8 tasks described below, the first (establishing a regional agency) has already been completed, with specialist firm BEFIN (a subsidiary of the Société régionale d'Investissement de Wallonie) appointed to provide local councils across the region with the benefit of its experience of energy performance contracting during the RENOWATT pilot project.

| ID | Description |
|----------------------------|---|
| 1. Regional agency | - To establish a regional facilitation agency as the single point of contact for all |
| | actors. Mission, To need expertise and information and to support stakeholders so |
| | Mission: To pool expertise and information and to support stakeholders so that the private and non-profit sectors can adopt professional processes and |
| | implement them effectively. |
| | In line with the renovation strategy, digitalisation and performance monitoring |
| | of organisations benefiting from energy services must be stepped up. |
| 2. Technical toolkit | Develop simplified forms and frameworks for energy performance contracting |
| | designed for SMEs. |
| | - Establish a technical framework and performance measurement and verification |
| | standard that is both simple and fit for purpose (e.g. based on the International |
| | Performance Measurement and Verification Protocol (IPMVP)). |
| | - Establish a technical certification centre providing access to specialists (qualified personnel) and standard 'test beds' for key processes to be improved in the tertiary |
| | sector, in schools and in hospitals. The techniques covered can be added gradually to |
| | the database, thus providing a record of gains made. |
| | - After 2020, develop an ESCO accreditation framework (once the market is |
| | established). |
| | - Set up a technical certification centre (potentially with extremely simplified monitoring, reporting and verification (MRV)), for example based on records of |
| | techniques with proven performance and results validated by the technical centre (see |
| | above). Catalogues of Standard Qualifying Actions could serve as a basis. |
| 3. Dissemination | - Launch an information campaign for energy services and the regional energy |
| | strategy. Promote and disseminate incentives for energy efficiency investments |
| | tailored to the tertiary sector and the available ESCO solutions. Publication of |
| | model energy performance contracts and a list of ESCOs that are recognised |
| | (or accredited in the medium term) via facilitating agencies. |
| | - Publicise 'success stories'/Develop an educational portal on energy |
| | performance contracting for energy managers and legal professionals. |
| | - Introduce energy efficiency funding and ESCO models into energy audit |
| | findings and renovation roadmaps . |
| | - Promote facilitation agencies among equipment suppliers, energy service |
| | providers and energy/building managers. |
| 4. Training | - Establish a training programme for the banking sector , including the promotion of the European Commission's De-Risking Energy Efficiency Platform (DEEP). |
| | - Set up a training course on performance monitoring and verification |
| | techniques/Develop interdisciplinary higher education training focused on ESCOs and |
| | energy performance contracting. |
| 5. Reduce the risks | Gradually introduce a flexible fund and various mechanisms that promote access to |
| associated with funding | finance and de-risk financing for banks: |
| mechanisms | - For the tertiary sector, use the energy transition fund for revolving-type financing |
| meenamorio | to allow access to capital for small ESCOs (or final beneficiaries in the bank |
| | guarantee model). Funds must come from various sources (public, municipal, consumers, green bonds, revenue from CO ₂ allowances, supplier's obligations |
| | under Article 7, etc.) and will be topped up using energy savings or loan interest |
| | rates. The fund will offer subordinated debt at attractive rates. The total fund will |
| | amount to between EUR 250 million and EUR 300 million. |
| | 70 |

| | Establish other mechanisms to reduce financial risk (and interest rate risk) for SMEs, e.g. additional public guarantee, subsidised interest rates (or tax relief), co-investment by sources other than the fund, etc. Secure energy efficiency revenue streams. If the price of energy for the tertiary sector or public buildings is not increased through fiscal measures, financial support may be needed to supplement energy savings and guarantee a return for ESCOs, as well as to make the scheme sufficiently attractive for final beneficiaries. This should be consistent with measures taken under Article 7. At regulatory level, develop green bonds at regional or municipal level, in line with the European framework, to raise new dedicated sources of funding. |
|--------------------------------|---|
| 6. Pilot projects | Support energy performance contracting pilot projects for (1) selected tertiary- sector firms; (2) a panel of five or six local councils and (3) a pool of Wallonia public service buildings |
| | Monitor and publicise the results. |
| 7. Public energy governance | Review management procedures and regulations restricting energy performance contracting by public bodies (especially hospitals and schools), including the adaptation of management agreements and the inclusion of energy performance concepts (energy performance contracting, MRV, future energy savings, etc.) in multi-annual investment plans. Review existing maintenance agreements to allow the future adaptation or integration of energy performance contracting (or energy efficiency improvements in general). |
| 8. Monitoring | Monitor the effects of the action taken Reassess their relevance each year and make any necessary modifications Conduct the necessary studies to refine them (for financial de-risking measures and legal support actions, development of MRV standards, etc.). |

In Brussels

In its renovation strategy, the Brussels Region suggests encouraging the development of energy service companies (ESCOs), coupled with public funding if necessary.

As previously announced in the Air, Climate and Energy Plan, the Region intends to put in place a strategy for the development of ESCOs. The regional environment agency plans to carry out a study to investigate the deployment potential of ESCOs and energy performance contracting in the Brussels-Capital Region. Investors naturally gravitate towards the most profitable investments, such as the replacement and regulation of heating, ventilation and air conditioning (HVAC) appliances. Given the significant reductions in consumption linked to these investments, measures with a longer return period will be harder to introduce later on. In this context, the role of the authorities is to steer the energy performance contracting market towards more ambitious programmes and a comprehensive approach towards energy saving-related investments, while maintaining an overall return acceptable to investors. The following actions will be examined with a view to implementation:

Promoting the concept of ESCOs and energy performance contracting

- Establishing a *market facilitator* to support the implementation of ESCOs and energy performance contracting, with a view to creating favourable conditions for the development of ESCOs.
- Setting up a *project facilitator* to assist entities in developing energy performance contracting and choosing the right ESCOs. The facilitation body will also act as an aggregator of requests, thus limiting ESCO spending on research and project promotion.

Removing administrative and legal hurdles

• Providing model specifications and model energy performance contracts.

Setting up a special public legal vehicle able to help public building managers applying for energy
performance contracting put together a financing solution, and offering tax and accounting advice for the
renovation programme.

Removing economic hurdles

- Conducting a feasibility study on the introduction of forms of internal contracting (intracting) for public buildings to capture financial savings made on energy bills and re-inject them into new energy saving-related works.
- De-risking financing to encourage ESCOs to adopt a more comprehensive approach to energy renovation by:
 - setting up a revolving regional fund for ESCOs to facilitate access to capital, provided that the project takes a comprehensive approach;
 - supplementary funding mechanisms to include investments in the programme that have environmental benefits but long-term returns.

Removing technical hurdles

- Training actors at all levels and in all types of skills (technical training, contracting, performance measurement).
- Establishing a cluster of Brussels-based companies to help them win large-scale public tenders for energy performance contracting.
- Other planned policies, measures and programmes to achieve the indicative national energy efficiency contributions for 2030 as well as other objectives referred to in point 2.2 (for example measures to promote the exemplary role of public buildings and energy efficient public procurement, measures to promote energy audits and energy management systems¹⁴, consumer information and training measures¹⁵, and other measures to promote energy efficiency¹⁶)

1. Measures in the industrial, transport and agriculture sectors

The policies and measures developed in Belgium in the industrial, transport and agriculture sectors are detailed in the 'decarbonisation' section of this NECP and will not be repeated here.

2. Regulating new buildings

Responsibility for the energy performance of buildings is devolved to Belgium's regional governments.

Alongside the implementation of their long-term renovation strategy for the existing building stock described earlier, the Regions will implement the various requirements of the new Energy Performance of Buildings Directive (EPBD). The requirements introduced in recent years will also continue to be progressively strengthened.

Flemish Region

¹⁴ In accordance with Articles 12 and 17 of Directive 2012/27/EU.

¹⁵ In accordance with Articles 12 and 17 of Directive 2012/27/EU.

¹⁶ In accordance with Article 19 of Directive 2012/27/EU.

The mandatory E rating for new homes will become gradually stricter between now and 2021, moving from E40 in 2018 to E35 in 2020. From 2021, all new housing will have to meet NZEB (nearly zero-energy building) requirements as a minimum. Planning applications or notices will have to demonstrate a maximum E rating of E30.

In 2017, the EPC requirements were introduced for all non-residential buildings, including the E rating and the minimum percentage of renewable energy. A trajectory has been set for stricter requirements to be introduced between now and 2021. To ensure that the requirements remain achievable and affordable, a new study of optimal E ratings dependant on cost is carried out every 2 years. The trajectory set may be altered as necessary.

Walloon Region

An estimated 15 000 new homes are expected to be built in Wallonia each year (in addition to the existing stock of around 1.5 million homes). Wallonia plans to phase in stricter requirements for new buildings, from NZEBs in 2021 to zero-energy buildings (ZEBs) in 2050. The updated 'cost optimum' study in 2023 will determine whether zero-energy buildings can become the new standard from 2025.

Brussels-Capital Region

For new buildings in the tertiary sector (excluding buildings used for administrative and teaching purposes), the EPC requirements will be further tightened. In this respect, the Government is committed to evaluating and strengthening EPC requirements for new non-residential buildings (sports centres, cultural centres, hospitals, nursing homes, nursery schools, etc., excluding buildings used for administrative and teaching purposes) from 2021.

3. <u>Regulating products and systems</u>

The Federal Government is responsible for setting product standards. It plans to introduce a broader, tougher policy on products and market access for products and equipment that consume energy (stricter emission standards, ban on the use of certain types of heating and fuel standards, etc.), ensuring that sufficient attention is paid to harmonisation between the Regions. Products will be required to achieve a minimum energy efficiency rating by a certain date. An impact assessment using a model based on stock statistics is needed to estimate the precise impact of these measures.

In this context, a study is currently under way to determine the structure of energy consumption in Belgian households. It is focusing in particular on household appliances and their specifications, such as the energy rating defined by the European energy label.

The regions have an obligation to maintain heating systems properly.

4. Promoting energy-efficient procurement

The authorities take their exemplary role very seriously. As well as implementing energy efficiency measures in their buildings, they must also set a good example in their procurement procedures (for equipment, for example).

The Federal Institute for Sustainable Development (FIDO) is the driving force behind federal sustainable development policy in Belgium. It is responsible for promoting and integrating sustainable development into federal government services. By publishing a 'sustainable procurement guide', it provides federal government departments with the necessary guidance for (sustainable) procurement. FIDO is also responsible for implementing the Federal Sustainable Development Plan, which will include sustainable measures implemented within Federal Government departments. This plan is currently in development.

5. <u>Reducing consumption and emissions through behavioural change</u>

Wallonia is keen to tap the energy saving potential associated with behavioural change. It will therefore step up its communications around the objectives pursued, organising targeted thematic campaigns depending on its annual priorities, taking measures to remove barriers to behavioural change and cultivating 'standards of behaviour', while ensuring the relevance and impact of the actions undertaken to that effect. An expert group will be established for this purpose.

v. Where applicable, a description of policies and measures to promote the role of local renewable energy communities in contributing to the implementation of policies and measures in points i, ii, iii and iv

Not applicable

vi. Description of measures to develop measures to utilise energy efficiency potentials of gas and electricity infrastructure

The objective is to see a significant improvement in the energy efficiency of gas and electricity infrastructure used by transmission and distribution system operators.

The transmission system operator (TSO) Elia applies the following principles to make its infrastructure more energy-efficient:

- introducing technological innovations to make more efficient use of existing infrastructure;
- rationalising 36 kV and 70 kV transmission systems at a higher voltage level;
- offsetting network losses by choosing technology to meet network infrastructure requirements;
- calculating Elia's annual carbon footprint (direct and indirect emissions). This includes energy consumption on site and at substations, as well as the energy consumption of IT equipment.

Flemish Region

Article 3.1.4/1(4) of the Flemish Energy Decree states that energy efficiency is one of the objectives that the energy market regulator (VREG) must pursue in developing networks. In practice, this is done by examining and approving grid operators' investment plans.

Under Article 4.1.19 of the Energy Decree, distribution system operators (DSOs) must submit an annual investment plan to VREG for their systems, highlighting key investments and the timescales associated with them.

On 26 February 2014, the Flemish Parliament approved a decree that provides a formal basis for including a requirement for the system operator to send VREG its assessment of the energy efficiency potential of its gas and electricity infrastructure under technical rules.

The study carried out by Synergrid under Article 15(2) of Directive 2012/27/EU on energy efficiency did not lead to additional projects and/or ideas for proactively limiting the energy losses of distribution systems or adjusting investments in existing infrastructure. The current investment policy already takes optimal account of energy losses in power grids and the cost-effectiveness of investments, given the failure rate of existing assets and the expected safety and reliability performance of those grids. However, some improvements could be made to grid operation.

Article II.1.1.1(3) of the technical Regulation for the operation of electricity distribution systems requires grid operators to send VREG their assessment of the energy efficiency potential of their electricity infrastructure each

year, in particular regarding transmission, distribution, load management and interoperability, and connection to energy generating installations, including access possibilities for micro energy generators.

Flemish DSOs have therefore looked at various measures to improve energy efficiency in the operation of distribution systems. They report to VREG on the implementation of those measures.

In terms of low-voltage investment measures, three-conductor networks (3X230V) are converted into four-conductor networks (3X230/400V) whenever they are replaced.

For medium voltage, the optimal cable section is used. The choice is determined:

- 40 % by load (low load);
- 30 % by voltage drop (10 and 11 kV);
- 30 % through cables for losses (150 mm²).

To optimise the use of the distribution network, grid operators install switch-disconnectors and remotecontrolled circuit breakers in their medium-voltage cabinets.

Operational measures:

- adjust the automatic transformer setting;
- dynamic line rating;
- reducing consumption at substations and cabinets, with power for own use generated on site;
- reducing travel using remote control/remote readings.

vii. Regional cooperation in this area, where applicable

Not applicable

viii. Financing measures, including Union support and the use of Union funds at national level

Not applicable

3.3 Dimension energy security

i. Policies and measures related to the elements set out in point 2.3

In November 2017, the Belgian transmission system operator Elia published a study entitled 'Electricity Scenarios for Belgium towards 2050'¹⁷. The study, based on the evaluation of the European Network of Transmission System Operators (ENTSO-E), identified several problems relating to the security of electricity supply in the country in the medium and long term. Various studies and bodies (universities, consultancies, etc.) have confirmed that Belgium faces major problems, despite its ambitious plans for regional and federal renewable energy development, demand management, storage and interconnections. These problems stem from an unprecedented supply shock linked to the country's decision to phase out nuclear power, since nuclear energy currently accounts for more than half of generation capacity.

Market operations will be adjusted initially to provide a framework for ensuring security of supply during the energy transition, at the lowest possible cost.

The results show that Belgium will need at least 5.7 GW of thermal capacity in 2025. The country depends on large quantities of imports to meet its needs; if there were no surplus energy abroad, this requirement could increase to 8 GW. The model also shows that revenue streams from the energy market cannot guarantee that new generation capacity will fill the capacity gap. Additional flexibility and renewables generation could help to build a system that is fit for purpose. However, the contribution provided through such flexibility would be limited, since the most critical situations occur during cold spells that coincide with cloudy, windless conditions.

A capacity compensation mechanism will be developed during the period 2022-2025. This will ensure security of electricity supply and attract investment to develop new capacity or maintain existing capacity. The mechanism will be subject to structural monitoring, taking into account the situation in neighbouring countries.

In view of these findings, and in parallel with the ongoing commitment to improve the operation of its electricity market, Belgium – like other EU Member States – urgently needs to set up a capacity compensation mechanism to match electricity generation capacity to demand.

This approach is in line with the European Commission Staff Working Document accompanying the 'Report from the Commission – Final Report of the Sector Inquiry on Capacity Mechanisms', which stresses the importance of ensuring that the introduction of a capacity mechanism does not serve as a substitute for adopting reforms aimed at improving market operation. In this particular case, the support mechanism does not seek to replace these reforms, but rather to supplement them; the reforms cannot solve the problem of insufficient capacity given the absence of incentives for investing in generation capacity and demand management.

ii. Regional cooperation in this area

In January 2018, the Pentalateral Energy Forum published its second 'Generation Adequacy Assessment' including an original scenario (for the seven countries concerned) for the periods 2018-2019 and 2023-2024. The third assessment will be launched in 2019 for the years 2020-2021 and 2029-2030. This study will accompany ENTSO-E's Mid-term Adequacy Forecast (MAF) in the form of a regional annex.

On 26 June 2017, Belgium signed a memorandum of understanding (MoU) on contingency planning and crisis management with its Pentalateral Energy Forum partners. The following was agreed:

- countries would be transparent regarding the way in which tasks and responsibilities are allocated;
- they would agree on an 'early warning' system;

¹⁷ http://www.elia.be/fr/a-propos-elia/newsroom/news/2016/20-04-2016-etude-adequation-flexibilite-systeme-electrique-belge

- they would agree on the type of instruments to be used to respond to the crisis, giving priority to marketbased measures; and
- they would identify possible common risks for the region.

As part of the implementation of this MoU, a crisis exercise took place on 19 and 20 June 2018. Regional cooperation will be further extended and reinforced on the basis of the outcome.

iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

In view of the points set out above, and to guarantee Belgium's security of supply, the Belgian Government plans to introduce a capacity support mechanism. This mechanism will be based on the findings of the final report of the sector inquiry carried out by the European Commission and the various decisions approving the mechanisms set up by other Member States. However, it will need to take into account the specific features of Belgium's electricity system. Unlike the compensation mechanisms of its European neighbours, which are characterised by a limited need for new capacity, the Belgian mechanism must be able to attract or maintain sufficient capacity within a short period of time. At the same time, it must also take into account the country's high level of interconnectivity and the capacity available elsewhere in Europe.

3.4 Dimension internal energy market

3.4.1 Electricity and gas infrastructures

vi. Policies and measures to achieve the targeted level of interconnectivity as set out in point (d) of Article 4

Despite the high interconnection rate of approximately 21 % in 2020, Belgium will still consider cases in which the construction of additional network infrastructure or the modernisation of existing networks is desirable in order to support the core energy objectives. This analysis will specifically take into account the recommendations of the Commission Expert Group on 2030 electricity interconnection targets, namely:

- to assess whether the existing infrastructure is being used optimally, whether there are any barriers, and to remove them as necessary;
- to assess whether the threshold levels of price divergence, nominal transport capacity relative to peak consumption and reception capacity for renewable energy are adequate or have been reached;
- to perform an in-depth analysis of social profitability, in which the two general socioeconomic aspects will be specifically examined.

For the period 2020-2030, the need for additional investment in the natural gas network will also be analysed. In 2018-2027, for example, the TSO Fluxys is planning investment projects totalling EUR 549 million.

The programme is based on three key pillars:

- 1. investments to maintain the integrity of the natural gas transmission infrastructure and to adapt and upgrade that infrastructure (67 %);
- 2. investments in LNG initiatives and cross-border projects (26 %);
- 3. investments intended to cover the growth in capacity made available to final users (7 %).

This will enable Belgium to consolidate its position as a natural gas hub in central and western Europe, satisfy additional demand and/or the relocation of demand, and anticipate market developments (e.g. alternative fuels for transport, gas-fired electricity generation). In this context, Belgium will also examine how, in structural terms, the existing gas network can be put to use in the wider context of the energy transition, for example by adding green gas, synthetic gas or hydrogen.

Fluxys will work closely with distribution system operators on the needs assessment.

In Belgium, the energy pact stipulates that from 2035 at the latest, new housing developments will no longer be connected to mains gas unless the local network is supplied by renewable gas.

vii. Regional cooperation in this area

The Pentalateral Energy Forum was established in 2005 by the energy ministers of the Benelux countries, Germany and France to foster cooperation in the area of cross-border electricity exchange. This is a temporary intergovernmental initiative assisted by an independent secretariat which, through information exchange among regulators and grid operators in the participating countries, seeks to improve management of the cross-border high-voltage network and coordinate distribution methods. Any legal obstacles are removed wherever possible. Its main objectives are market integration and security of supply. A new action plan was agreed through the signature of the Second Political Declaration of the Pentalateral Forum. One of the key aims of this package of actions is to deepen the internal market by strengthening regional cooperation and combining a flexible market with a high level of security of supply. To achieve this goal, the Pentalateral Energy Forum will continue to play a pioneering role in the interconnection of electricity markets and to improve the quality of its joint assessment of the adequacy of regional production. Another primary objective is to make electricity markets more flexible. Exploring different approaches to cross-border participation in capacity remuneration mechanisms (CRM) will also be on the agenda. Lastly, the integration of the renewable energy market will feature high on the Forum's agenda. The Pentalateral Energy Forum will thus continue to support EU energy policy and proactively share its findings with other countries and the European Commission.

Belgium is also a member of the North Seas Energy Cooperation, originally established as the North Seas' Countries Offshore Grid Initiative (NSCOGI) in 2010. On 6 June 2016, 10 countries (Belgium, Denmark, Germany, France, Ireland, Luxembourg, Norway, the Netherlands, Sweden and the United Kingdom) and the European Commission signed a political declaration in favour of increased cooperation and renewed commitment.

Four areas of work were identified:

- 1. maritime spatial planning;
- 2. development and regulation of offshore networks and other offshore infrastructure;
- 3. mechanisms to support and finance offshore wind projects;
- 4. technical standards and rules in the offshore wind sector.

It was decided that an in-depth feasibility study should be carried out and several 'clusters' set up. In parallel with long-term projects such as Dogger Bank, the Bay of Helgoland and developments in the Irish Sea, the Belgium-Netherlands-United Kingdom cluster is particularly important, since much existing offshore wind generation already takes place in this area, meaning that cooperation is possible in the short term.

The Federal Government is playing a very active role in developing cooperation around this cluster, in conjunction with Elia and the Belgian Federal Commission for Electricity and Gas Regulation (CREG). Together with the other countries involved, it is exploring opportunities for connection, cooperation and further development of this cluster.

Energy cooperation in the North Sea is intended to facilitate the cost-effective deployment of offshore renewable energy so as to ensure a sustainable, secure and affordable energy supply in the North Sea countries. This will also facilitate future interconnections, integration and greater long-term efficiency of the wholesale electricity market. Belgium is working with other North Seas Energy Cooperation countries to examine opportunities for specific cooperation projects. In addition to joint offshore wind projects, which would be connected to and backed by several Member States (see Section 3.1.2), this includes work on possible 'hybrid' solutions that would use a network connection cable to transport offshore wind energy from the point of generation, as well as the interconnection capacity between countries. It also involves work on the corresponding market adjustments.

Belgium is thus contributing to the development of a regional study on the opportunities for cooperation in hybrid projects and on the identification and resolution of possible legal, regulatory and trade barriers. Further work is planned on synergies between offshore wind and offshore oil and gas installations.

viii.

Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

Not applicable

3.4.2 Energy transmission infrastructure

i. Policies and measures related to the elements set out in point 2.4.2, including, where applicable, specific measures to enable the delivery of Projects of Common Interest (PCIs) and other key infrastructure projects

Belgium encourages the companies concerned to submit plans for cross-border projects. These projects are actively supported and overseen by Belgium's federal and regional governments since they contribute to the development of Belgian infrastructure and increase interconnections with neighbouring countries.

Coordination between the relevant authorities will be scaled up with a view making the authorisations required to develop new generating capability easier to obtain and adapting the networks required for renewables development. In this context, the 'one-stop shop' approach will be routinely applied to energy infrastructure projects of national interest. Particular attention will be paid to maintaining the lowest possible administrative burden for the projects' developers.

ii. Regional cooperation in this area

All projects are reviewed by the TEN-E regional committees and, where possible, are submitted jointly (e.g. the FR/B project for the conversion of B gas to H gas).

In addition, the regional partnerships mentioned in connection with electricity infrastructure also address issues surrounding energy transmission infrastructure.

iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

If necessary, PCIs can apply for EU funding – for example from the CEF – at the same time as being supported and overseen by the federal authorities.

3.4.3 Market integration

i.,

Policies and measures related to the elements set out in point 2.4.3

Belgium will closely monitor the commercial capacity available from interconnections with neighbouring countries and will take steps to ensure that investments in interconnectivity also improve the country's security of supply. Where appropriate, the correct and timely implementation of the action plans drawn up in accordance with the Regulation on the internal electricity market will also be closely monitored to ensure that policy on security of supply is not compromised.

> ii. Measures to increase the flexibility of the energy system with regard to renewable energy production such as smart grids, aggregation, demand response, storage, distributed generation, mechanisms for dispatching, re-dispatching and curtailment, real-time price signals, including the roll-out of intraday market coupling and cross-border balancing markets

At both federal and regional level, efforts are being made to balance demand and consumption. For example,

measures are being taken to attract the right investments in order to obtain a complementary energy mix. In parallel, technical regulations and regulatory regimes are regularly reviewed to make producers more accountable and remove barriers to active demand response.

In the light of this situation, legal frameworks have been revised according to the different regional contexts to provide for the gradual and targeted roll-out of smart meters. This should give network users more insight into their energy consumption so that they can identify ways of using less energy. Smart meters will also help households and businesses shift their energy consumption from times of peak demand to periods of surplus production without inconvenience or loss of productivity.

Prosumers can choose whether to be aggregated and whether to feed the electricity they generate into the grid at peak times, using a (domestic) battery storage system to contribute to network stability.

Lastly, the gradual integration of the intraday and balancing markets will be pursued at regional and European level so as to increase the liquidity, security of supply and flexibility of the system.

As mentioned in Chapter 1, Belgium already has extensive interconnections. Further consideration will be given in the future to whether additional investments represent added value from a social point of view and whether Belgian consumers can be sure of benefiting from them. In addition, transmission and distribution system operators will endeavour to make efficient use of the existing grid by introducing intelligent network features and solutions (e.g. dynamic line rating, high-performance conductors). In addition to the meters supplied to final users, which are designed to allow the grid to be used and managed as efficiently as possible, the energy infrastructure will also evolve to facilitate the energy transition. Within this framework, the existing discrete energy networks will interact and become increasingly interdependent. District heating or a gas network (hydrogen/biogas) could thus serve as a back-up for the electricity grid, for example. Due to the increasing interaction and dependencies between existing discrete energy networks, operational cooperation will also be enhanced, both between transmission and distribution system operators and among distribution system operators.

Distribution-level storage could be used to support the distribution network as an alternative to traditional network dimensioning based on peak power. In order to install individual home or neighbourhood batteries and to achieve demand management across a distribution network, a clear regulatory framework is needed. In addition, the focus is on large-scale, long-term storage to bridge seasonal differences and provide a solution for long periods during which the supply of solar and wind energy is not sufficient. Particular attention will also be paid to the potential of hydrogen technologies to convert surplus renewable energy into energy and economic processes (e.g. electricity-gas, electricity-industry, electricity-mobility), with an emphasis on developing a roadmap and launching pilot schemes.

To bolster (energy) infrastructure, the legal certainty and investment security of projects must be supported by a simplified permit application procedure and by optimising existing legislation on urban planning and the environment.

Where applicable, measures to ensure the non-discriminatory participation of renewable energy, demand response and storage, including via aggregation, in all energy markets

Not applicable.

iv. Policies and measures to protect consumers, especially vulnerable and, where applicable, energy poor consumers, and to improve the competitiveness and contestability of the retail energy market

Households that are unable to pay their energy bills are not cut off immediately. In the absence of a direct response to the supplier's reminders and final demand, the supplier may terminate the contract. The maximum social price (or social tariff) is an electricity or gas price which is lower than the standard tariff. At federal level, the Belgian Commission for Electricity and Gas Regulation (CREG) is responsible for setting the maximum social price. All suppliers must automatically charge this price if network users are eligible for it. If network users are entitled to maximum social tariffs, they are also granted such tariffs by the system operator, irrespective of whether they have a prepayment meter. The maximum social price is derived from a survey, carried out every 6 months, to find the cheapest supplier in Belgium.

Flemish Region

If the network user does not find a new supplier in time following the termination of the contract, the system operator takes over the supply. If the network user similarly fails to pay the system operator, the system operator will install a prepayment meter.

Only customers entitled to the maximum social price for electricity and natural gas qualify as 'protected customers'. A network user can be a protected customer regardless of whether they have an ordinary meter or prepayment meter. The Flemish Government offers protected customers the following additional benefits in terms of electricity and gas supply:

- suppliers cannot charge fees for sending reminders and final notices if bills are not paid on time;
- the state offers additional or increased allowances for energy-saving investments.

Walloon Region

The Walloon Region has extended the concept of protected customers as defined by the Federal Government to include additional low-income households in difficulty.

Regional protected customers include individuals (either the person whose name is on the supply agreement, or a person living at the same address) who have:

- been invited to attend a financial literacy course at a public social welfare centre (CPAS);
- been involved in debt mediation with a CPAS or accredited debt mediation centre;
- applied for a collective debt settlement.

To move on to the social tariff regional protected customers must contact their supplier, who is responsible for transferring them to the relevant distribution system operator. The system operator then acts as the social supplier for the protected customer.

Brussels-Capital Region

- Termination of a contract on the grounds of non-payment and the resulting disconnection may only be authorised by a magistrate. In the event of non-payment, a power limiter is placed on the electricity supply (except for protected customers), although the power remains switched on until a magistrate has authorised the termination of the contract.
- The power supply cannot be cut off during the winter months.
- A consumer that owes money to a supplier can apply for Brussels 'protected customer' status. This can be
 granted by the system operator, CPAS or BRUGEL, on the basis of various criteria. If protected status is
 granted, the commercial supply contract is suspended. The customer then switches to the social tariff and
 is supplied by the system operator. The commercial supplier and the customer can take advantage of the
 suspension of the contract to negotiate a repayment plan.

Similarly, various energy subsidies are available to improve the energy performance of homes and domestic installations. These subsidies are higher for low-income households.

v. Description of measures to enable and develop demand response, including those addressing tariffs to support dynamic pricing¹⁸

At distribution level, the energy market in Belgium is about to change with the advent of Atrias, a national clearing house, and the introduction of a new market communications standard, known as MIG6. The new clearing house will facilitate data exchange between energy market participants, while the new market model will include the latest technologies, such as the availability of smart meters and distributed production. Atrias and the new MIG6 should be operational by April 2020; the demand management opportunities afforded by digital/smart meters will be fully available from this point.

3.4.4 Energy poverty

i. Where applicable, policies and measures to achieve the objectives set out in point 2.4.4

Energy poverty is not an isolated phenomenon; it is an integral part of overall poverty. Energy poverty must be tackled at source. Developing tools to make homes more energy efficient will ease pressure on energy bills, while an action plan to tackle energy poverty will be drawn up by each entity. This plan will outline measures to reduce consumption, as the size of energy bills is directly linked to consumption. The main priority for the energy poverty action plan should be to reduce consumption and promote energy efficiency.

At **federal** level, existing aspects of social energy policy will be assessed. Under the Winter Energy Package, social tariffs can only remain in force temporarily, as the European Commission intends to phase out regulated prices to improve market operation. In Belgium, the social tariff is not seen as price regulation, since it is calculated every 6 months on the basis of the lowest market rates and thus tracks the market. It is now time to consider how this policy should be implemented in practice, how it affects other social energy measures in place at federal level, and whether these measures could be subsumed by other measures or through cooperation at regional or departmental level.

Support measures will be introduced for disadvantaged and vulnerable groups when appliances or fuels are withdrawn from the market, allowing these groups to participate fully in the energy transition.

In the **Flemish Region**, the energy poverty programme approved by the Flemish Government in March 2016 includes measures to prevent exclusion from the energy supply and measures to support and subsidise vulnerable households so that they can make their homes more energy efficient. In 2018, a comprehensive review was carried out which led to recommendations for additional measures in the autumn. These measures are also included in the Flemish poverty action plan. Lastly, the Programme to Combat Energy Poverty is part of the Flemish long-term strategy for 2050 for the deep renovation of all housing in the region. Other measures are in the pipeline. Of these, the creation of a revolving fund to finance energy-related renovations for low-income households has considerable potential.

In **Wallonia**, several measures are in place to tackle energy poverty. These measures will be maintained or extended.

Measures relating to meters and monitoring consumption

The prepayment feature, currently offered in the form of prepayment meters, will be replaced by smart meters during their phased roll-out. The concept of protected customers could be extended, depending on economic circumstances.

¹⁸ In accordance with Article 15(8) of Directive 2012/27/EU.

- Support measures to reduce consumption or bills

Various mechanisms are in place to improve access to energy and help households at risk of fuel poverty. These include raising awareness through preventive action plans for energy, energy guardians and 'Mebar' subsidies, which consist of a subsidy paid to low-income households for work carried out in their homes designed to reduce energy use.

In the **Brussels Region**, measures to address energy poverty are largely focused on reducing the energy consumption of buildings and promoting sensible energy use, at the same time as protecting vulnerable consumers.

The Brussels-Capital Region recently updated its proactive energy access policy. Specifically, the conditions for 'protected customer' status have been relaxed to protect energy access for the most vulnerable. The new conditions will be reviewed in 2020 and at 4-year intervals thereafter to ensure that they continue to represent the best response to energy poverty.

3.5 Dimension research, innovation and competitiveness

- i. Policies and measures related to the elements set out in point 2.5 ('all instruments contributing to the achievement of the objectives of the integrated NECPs')
- ii. Where applicable, cooperation with other Member States in this area, including, where appropriate, information on how the SET-Plan objectives and policies are being translated to a national context
- iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

In the interests of coherence, points 3.5(i), (ii) and (iii) are dealt with together in the section below.

General

Belgium's research and innovation (R&I) policy for the Energy Union is aimed at supporting the objectives of EU energy policy in terms of energy security, sustainability and competitiveness. In addition, the R&I policy stimulates innovation in and by Belgian companies to boost their competitiveness. Belgium is convinced that a common European approach is necessary to achieve the EU strategy for a resilient Energy Union with a forward-looking climate policy.

Belgium's R&I policy is thus closely linked to the priorities of the European Strategic Energy Technology Plan (SET-Plan). Within the framework of the SET-Plan, Belgium (both the federal authorities and the regions) is working with other SET-Plan countries to define the strategic objectives of the plan's 10 key actions. This definition will be followed by R&I activities (as defined in the implementation plans) to achieve those strategic objectives. This will involve national and regional R&I programmes and/or co-financing of EU programmes, such as participation in ERA-NET co-financing activities.

At international level, Belgium is a member of the International Renewable Energy Agency (IRENA) and the International Energy Agency (IEA). Belgium participates in various IEA programmes for technological collaboration both through federal authorities and the regions.

Responsibility for R&I policy relating to the Energy Union in Belgium is shared between the Federal Government, the three Regions and the Communities. The federal authorities hold powers for R&I in the field of nuclear energy (nuclear fission and fusion), R&I in other areas under federal jurisdiction – such as renewable energy in the Belgian exclusive economic zone of the North Sea, biofuels, security of supply and network balancing – and for funding research at federal scientific institutes in support of climate policy. The Regions are primarily responsible for R&I relating to non-nuclear energy. The Communities are responsible for research policy at universities.

On 11 December 2017, the Federal Minister for Energy and the energy ministers of the three Regions reached an agreement on a Belgian Inter-Federal Energy Pact, a common vision for the energy transition by 2030 and 2050. To ensure that Belgian industry remains competitive and to protect jobs, an energy standard will be introduced for energy-intensive companies.

At administrative level, the BELSET platform has been set up between the federal and regional authorities. This is an informal consultation platform for all issues relating to the European Strategic Energy Technology Plan (SET-Plan), the overarching European strategy for R&I in energy technologies. BELSET was set up to organise productive consultations between policy advisers for energy technology R&I (CIS-Energy) and energy policy advisers (CONCERE/ENOVER) involved in the follow-up to the European SET-Plan.

Specific information for the federal government and regions

Federal Government

At federal level, the Belgian Minister for Energy is responsible for nuclear research and, together with the Secretary of State for the North Sea, renewable energy research in the North Sea. In addition, the Secretary of State for Science Policy decides on the priorities for science and technology policy linked to research at federal scientific establishments.

The Federal Public Service for the Economy, SMEs, Self-employed and Energy (FPS Economy) is the main public authority responsible for the management and funding of nuclear energy research programmes and renewable energy research programmes in the North Sea.

The Federal Government funds research in support of policy, including research linked to climate policy and carbon capture and storage (CCS), through research programmes such as Science for Sustainable Development and via the BRAIN-2 (2018-2022) and FED-tWIN (2015-2022) programmes.

These programmes are generally directed by the Federal Public Service for Science Policy, also known as the Belgian Federal Science Policy Office (BELSPO), which coordinates research between all Belgian authorities. BELSPO accounts for almost 30 % of Belgium's total public research budget. It is responsible for funding the 10 federal research establishments and introducing researchers to international research networks.

BRAIN-2, 'Belgian Research Action through Interdisciplinary Networks', is the second phase of a recurring research framework programme that meets the scientific knowledge needs of Belgium's federal departments and supports the scientific potential of federal scientific establishments by funding research projects based on scientific excellence and EU and international support.

FED-tWIN is a new federal research programme that facilitates cooperation between federal scientific establishments and Belgian universities by funding joint research posts, to be filled by PhD researchers working part-time at each of the two institutions.

Internationally, BELSPO has the tools for multilateral and bilateral cooperation. Climate-related research is a typical area for international cooperation. Belgian climate research dovetails with EU and international strategies, as noted in Belgium's Seventh National Communication on Climate Change under the United Nations Framework Convention on Climate Change. BELSPO and the federal research institutions are also involved in Copernicus. Moreover, Belgian science policy institutes and funding bodies take part in EU Joint Programming Initiatives (JPIs).

In addition, the Federal Government manages the Energy Transition Fund, issuing a call for R&I projects linked to areas under the federal government's responsibility (nuclear energy, transport networks, energy storage, offshore energy, etc.) every year. The scope of projects eligible for the fund will be extended to include regional competences. The fund is supported by an annual fee of EUR 20 million paid by the owner of the Doel nuclear power plant to the Federal Government in return for the extension of its operating licences, until 15 February 2025 for Doel 1 and 1 December 2025 for Doel 2.

Belgium participates in 12 IEA Technology Collaboration Programmes, or TCPs (formerly known as Implementing Agreements), which focus on the efficient end use of energy, renewables and models. These are financed by FPS Economy. Belgium also participates indirectly in TCPs that study fusion through the European Atomic Energy Community (Euratom).

As a Member State of the European Joint Undertaking for ITER and the Development of Fusion Energy, and as a voluntary contributor to the 'Broader Approach' between the EU and Japan, as well as through research by the Belgian Fusion Association, Belgium also contributes to the development of fusion energy with a view to introducing carbon-free electricity generation in 2050.

Supporting nuclear research and the development of nuclear fusion

Belgium will have to continue prioritising its R&D and innovation to maintain or develop a high level of nuclear competence, expertise and know-how over the coming decades. In an international context, Belgium will continue the necessary research into innovative solutions for high-level radioactive waste and the qualification of materials from nuclear fusion reactors; maintaining this expertise should also enable radioisotope production to continue in Belgium.

Belgium has therefore decided to build a new large-scale research facility known as MYRRHA (Multi-purpose Hybrid Research Reactor for High-tech Applications). This is described in the Strategy Report on Research Infrastructures Roadmap drawn up by ESFRI (European Strategy Forum on Research Infrastructures).

Belgium will continue working on the development of nuclear fusion energy in collaboration with Euratom and the other Member States as part of the implementation of the European Roadmap 'Fusion Electricity – A roadmap to the realisation of fusion energy' (ITER).

The Federal Government is responsible for much of Belgium's taxation policy. Tax incentives to promote R&D generate revenue indirectly for the Federal Government via two types of tax exemptions. First, researchers in both the public and private sectors may, under certain conditions, be eligible for an 80 % exemption from income tax (amounting to EUR 696 million in 2013 and EUR 761 million in 2014). Second, taxes on patent income are also eligible for 80 % tax relief (amounting to EUR 193 million in 2012, the last year for which data are available).

As previously mentioned, the Energy Transition Fund will receive EUR 200 million in return for the 10-year extension of the operating licences for Doel 1 and 2. On average, EUR 20 million will be made available each year for R&D projects linked to the energy transition. The 17 projects that have already been selected will receive EUR 28 million (EUR 8 million for R&D in renewable energy, EUR 9 million for nuclear energy (waste treatment)) and EUR 11 million for security of supply).

To conclude, in September 2016, Belgian Prime Minister Charles Michel launched a proposal for a National Investment Pact with the private sector to create a sound investment climate and sustainable and inclusive growth between now and 2030 through public-private partnerships. A strategic committee was set up in order to consult a variety of economic, institutional and academic stakeholders and to distil the findings of these consultations into a limited number of practical recommendations. The report was published on 11 September 2018. Six 'strategic' sectors were identified, energy being one of them. The investment pact provides an overview of the investments required to enable the energy transition (i.e. phasing out nuclear power): (a) renovating buildings to make them smarter and more energy efficient, with a focus on public buildings; (b) a change in the energy mix; (c) the adjustment and expansion of networks; (d) the development of storage facilities for heat and electricity; (e) the development of alternative fuels; (f) the decommissioning of Belgium's nuclear power plants and nuclear waste management. These energy-related projects represent a total investment of EUR 60 billion between now and 2030 (versus EUR 150 billion for the six strategic sectors). In general, the private sector will provide around 55 % of the capital funding. Some of this funding will be spent on innovation, research and development.

Flemish Region

On 25 March 2016, the Flemish Government approved the long-term vision for Flanders entitled 'Visie2050'. This endorses the United Nations Sustainable Development Goals (SDGs) set out in the United Nations resolution entitled 'Transforming our World: the 2030 Agenda for Sustainable Development', ratified by the General Assembly on 25 September 2015. Visie2050 identifies seven transitions, including the energy transition, which is coupled with the future climate change policy. The other transitions relate to smart living, mobility, the circular economy and Industry 4.0. R&I is seen as a cornerstone of these seven transitions. Both Visie2050 and the United Nations 2030 Agenda for Sustainable Development are driven by sustainability. The two strategic documents served as the basis for Vizier2030, a framework of objectives set for the Flanders region in the first half of 2018. In the short term, one of the objectives is to reach the target of 3 % R&D spending in Flanders. This will lead to a significant rise in the number of R&D staff and will improve Belgium's ranking compared with leading European countries (see Section 2. National objectives and targets).

Since the climate and energy challenge is global, Flanders is convinced that the solution is a strong European and international approach to R&I in order to accelerate the clean energy innovation needed to achieve the energy transition and create a climate-friendly society. Flanders therefore fully embraces the objectives of the European SET-Plan and its 10 key actions, and is actively engaged in collaborative projects to implement them.

The region's R&I policy has a wealth of tools at its disposal to help realise this vision.

Two funding agencies are responsible for implementing R&I policy, including R&I in support of Energy Union priorities. Both agencies have a bottom-up approach and finance projects across all scientific fields. The Scientific Research Fund (FWO) finances basic and strategic scientific research in all scientific fields at universities and research facilities in the Flemish Community. It also fosters cooperation between Flemish universities and other research institutes. The FWO funds both world-class research projects and up-and-coming researchers; funding is awarded following an inter-university competition and an assessment by national and international experts. The Flemish Agency for Innovation and Entrepreneurship (VLAIO), the main point of contact for businesses in Flanders, stimulates and supports innovation and entrepreneurial spirit and helps to establish a favourable economic climate.

VLAIO's arsenal includes both instruments for providing economic support to companies and mechanisms for financing innovation within the business community. The instruments for economic support, which further the objectives of the Energy Union, include an environmental incentive (for environmental investments in businesses) and strategic environmental support (for environmental investments that cannot be standardised because they are specific to the company concerned). In the area of R&I, VLAIO offers grants for R&D projects, including support for development projects at an advanced stage of the innovation process (pilot phase). In addition, VLAIO also provides support through advice and training and by stimulating coordination and networking. VLAIO's grants cover the entire spectrum of R&I projects, including energy and climate (energy efficiency, renewable energy technologies, energy systems, energy storage, carbon capture, use and storage (CCUS), etc.), and are awarded following an evaluation based on the precise innovation involved and the economic added value created for Flanders. VLAIO also supports Flemish clusters (both innovative business networks and high-tech clusters – see below).

94

The two funding agencies FWO and VLAIO encourage European R&I cooperation under the Horizon 2020 programme, notably through participation in ERA-NET Cofund instruments, Joint Programming Initiatives (JPIs) and EUREKA. With regard to Energy Union initiatives and, in particular, initiatives aimed at achieving the strategic objectives of the SET-Plan, Flanders is involved in the Cofunds for SOLAR-ERA.NET and the ERA-NET SES RegSys (Smart Energy Systems Focus Initiative on Integrated Regional Energy Systems). Flanders also participates in the JPI Urban Europe through the ERA-NET 'Sustainable Urbanisation Global Initiative' Cofund.

The Flemish Government funds R&I through an annual grant to the four Strategic Research Centres (SOCs). The SOCs involved in R&I within the Energy Union are VITO (Flemish technological research institute), IMEC (research institute for microelectronics and nanoelectronics, including research in digital technologies for healthcare, smart electronics, sustainable energy and transport) and Flanders Make (smart manufacturing with a focus on product and production technology in the automotive, smart machine and manufacturing sectors).

Created in 2011, Energyville is a unique research collaboration on sustainable energy and smart energy systems between VITO and IMEC and the universities of Leuven and Hasselt.

In 2015, the Flemish Government approved the introduction of a cluster policy in Flanders through a Cluster Policy Concept note. The aim was to tap into latent economic potential and boost the competitiveness of Flemish companies through active and sustainable cooperation between all actors, particularly in areas linked to the region's main social challenges, with direct economic value added for the Flemish business community.

Two types of clusters have been established and have benefited from organisational support, namely high-tech clusters and innovative business networks (IBN). High-tech clusters also receive a dedicated project budget. International cooperation is essential for these clusters to function.

Officially launched in May 2017, the Flux50 high-tech cluster facilitates cross-sectoral cooperation between the energy, ICT and buildings sectors to develop innovative and multidisciplinary energy products and services in five areas of innovation (energy ports, micro-networks, multi-energy neighbourhood solutions, energy cloud computing platforms and smart renovation). The Power to Gas IBN (set up on 15 September 2016) focuses on capacity-building, knowledge transfer, business model development and demonstration projects in the field of gas-fired electricity generation. The 'Groen Licht' IBN (1 April 2017) seeks to build knowledge with a view to developing innovative products and services in the lighting sector.

Since the summer of 2017, a tendering process for cluster projects has also been open online. Its objectives are in line with Visie2050's priorities for the energy transition, circular economy and Industry 4.0.

Flanders also supports R&I linked to the priorities of the Energy Union through the European Regional Development Fund (ERDF) and Interreg (2014-2020), particularly priority axis 1 (stimulating research, technological development and innovation), priority axis 3 (promoting the transition to a low-carbon economy) and priority axis 4 (promoting sustainable urban development). Energyville initiatives and the Interreg Hydrogen Region 2.0 project were supported in this context. More information is available on <u>https://www.vlaio.be/nl/andere-doelgroepen/europees-fonds-voor-regionale-ontwikkeling-efro/efro-vlaanderen/overzicht-van</u>

For the next programming period of the European structural and investment funds, we will look at how we can provide further support to energy and climate R&I.

As well as technological innovation, Flanders also encourages social innovation. This includes knowledge transfer to companies (through universities, for example) and providing business advice and guidance through various channels (including civil society organisations).

To facilitate innovation and pilot/demonstration projects, Flanders will identify any obstacles in legislation and consider introducing areas that are less tightly regulated.

Walloon Region

How we develop and the type of society we want to build for future generations will inevitably shape the strategic

choices we make today. Therefore, five EU-level priority themes have been identified to guide investment in research, specifically sustainable development, renewable energy, technology research, ageing and quality of life, and health.

These strategic themes address clearly identified social issues and match up to emerging economic sectors with significant potential for innovation. The clusters that have existed in Wallonia since 2005 – BIOWIN (life sciences), SKYWIN (aerospace), WAGRALIM (agro-industries), LOGISTICS EN WALLONIE (logistics), MECATECH (mechanical engineering) and GREENWIN (environmental technology) – mobilise the region's workforce around these themes. They draw on technological and R&I expertise and know-how to revitalise the region's economy by creating new businesses in response to societal challenges. The clusters are founded upon a partnership between universities, research facilities and companies of various sizes. By channelling research efforts, local stakeholders can extend their international reach by participating in joint research programmes (Horizon 2020, ERA-NET, EUREKA, etc.) and making use of shared research infrastructure (ESFRI). Thematic clusters have also been established for the renewables and energy efficiency sector. These provide a platform for the research community to showcase energy research projects. They include the 'TWEED' cluster for renewable energy and the 'CAP Construction' cluster for environmentally friendly building construction. In addition, the GreenWin cluster focuses on innovation in green chemistry and sustainable materials (including their applications in near-zero-energy or zero-energy buildings).

Energy research is a core part of Wallonia's energy commitments and regional expertise. The main fields of research are renewable energy; smart grid technologies and business models; building components; energy storage technologies; low-emission vehicles; electric vehicles; the circular economy; advanced biofuels; hydrogen and fuel cells and energy efficiency.

Energy research is based on calls for proposals on themes consistent with the priorities of the SET-Plan and the potential of Wallonia's scientific and business community.

Research draws on the SET-Plan in defining its key actions, implementation plans and R&I roadmaps and is used to inform Wallonia's R&I priorities, taking into account the technological capabilities of the Region's industries and the scientific expertise of its research community.

The Walloon Region participates in the relevant ERA-NET Cofund, SOLAR 2 and RegSys initiatives (on integrated regional smart energy systems).

The main research areas in which Wallonia has developed expertise, both at research facilities and universities and within industry, are:

- renewable energies such as concentrated solar power (largely for export), residential microcogeneration, predictive wind turbine maintenance, assembly and integration of photovoltaic sensors, manufacture and operation of heat pumps and manufacture of components for hydroelectric power plants;
- technologies and business models for 'smart' power grid solutions (and other energy sources involving data management), including optimisation simulators and algorithms, production forecasting (PV and wind), active load management, autonomous sensors, logistics, and network and neighbourhood management;
- components for construction, including the environmental properties of construction materials and recycling; insulating, anti-condensation and low-emissivity glass; load-bearing and insulating geopolymer screeds; insulating blocks for panel joints; low-emissivity roofs made from bio-sourced materials; building-integrated photovoltaics and timber-frame construction;
- storage (daily and inter-seasonal), including batteries (and their recycling) and emergency power supplies; phase-change materials; compressed air storage; accumulators; hybrid batteries (lithium, redox-flow, etc.) and storage management tools;
- low-emissions vehicles (as opposed to electric vehicles), including gas-powered engines, airship

transport, light vehicles and rail upgrades;

- electric vehicles, including network integration and charging points;
- the circular economy, including reverse metallurgy, and recycling of materials (e.g. rare earths, energy, waste water, rare metals), plaster and laminated glass;
- advanced biofuels, such as enzyme and algal hydrogen production, molecule recovery in bio-digesters, hydrogen and fuel cell production, bio-coal, synthetic fuels from solid waste and sludge recovery from wastewater treatment plants.

Brussels-Capital Region

In the Brussels Regional Innovation Plan, the strategy provides for regular analysis of the return on investment in R&I. From this perspective, three strategic areas of activity have been identified as having significant innovation potential, specifically the environment and the green economy, health. and information technology (IT) and the digital economy.

With regard to the environment (the environment, energy and the green economy form a single strategic research area), the regional innovation plan focuses on strategies for the circular economy and smart cities. In the light of this focus, energy efficiency, sustainable chemistry, the circular economy and mobility have been identified as the key factors for innovation.

The approach outlined in the regional innovation plan is to maximise the impact of R&I in Brussels by enhancing cooperation in this area among regional public bodies and fostering a collaborative approach with the Federal Government, the regional authorities and the European Union. A major consultation took place prior to the preparation of the Regional Innovation Plan, involving various R&I actors in Brussels (universities, public institutions, non-governmental organisations, professional bodies, etc.). The compatibility and complementarity of the actions proposed with the projects selected under the ERDF Operational Programme 2014-2020 should further improve the expected outcomes of the structural fund's investments, since the full amount allocated to Thematic Objective 1 of the ERDF Operational Programme (Strengthening research, technological development & innovation) will be used to finance initiatives in these three strategic areas of activity.

New instruments are proposed in the Regional Innovation Plan to boost support for companies and research organisations, including measures to raise awareness of innovation support schemes, renewed cluster development, capitalising on new forms of innovation (such as social innovation) and showcasing the region's expertise.

Within the Brussels-Capital Region, three key actors are responsible for deciding and implementing innovation policy:

- Innoviris is the institute that supports scientific R&I. It supports and finances collaborative and multidisciplinary research projects in the Region's key policy areas (environment, healthcare and IT) with potential for short- and medium-term development in the region. The thematic call for 2018 concerns green chemistry.
- The non-profit organisation Research in Brussels encourages and promotes scientific research and technical innovation. Its work helps to boost the reputation of Brussels' research on the international scene.
- Impulse.brussels helps entrepreneurs implement their development plans. It can provide information on all aspects of setting up and running a business in the Brussels-Capital Region.

When it prepares the next Regional Innovation Plan, the Government will ensure that public R&D investments make a significant contribution to the emission reduction targets it has set itself.

In terms of tools, the update of the Regional Innovation Plan would seem to represent an ideal opportunity to make the energy and climate transition one of the Region's core priorities.

This transition will inevitably involve testing and experimentation, not just in terms of technology, but also as far various configurations, combinations and practices are concerned. However, some legal and administrative provisions may pose an obstacle such experimentation. It would therefore seem sensible for the Region to establish a special framework for testing. Clearly, there would be no question of watering down standards. Rather, the aim would be to build a special framework for testing in the context of a specific project and over a limited timeframe, concluding with an evaluation and presentation of the results and lessons learned from the test.

In the light of this situation, the Government of the Brussels-Capital Region pledges to:

- Continue and strengthen the Regional Innovation Plan while making it an integral part of the energy and climate transition in urban areas. The plan will be designed such that strategic research areas are identified and, where appropriate, supplemented, and social and behavioural innovation is included alongside technological innovation.
- Develop a regulatory framework for testing. This would be a well-defined, controlled framework that temporarily removes certain barriers (tariffs, taxes, obligations, etc.) in order to test and document the relevance and performance of decarbonisation and energy efficiency pilot projects, while ensuring that the regulatory framework complies with State aid rules.

In view of the power-sharing arrangements, the Brussels-Capital region is keen to supplement its own efforts through greater cooperation with the Federal Government within the framework of the energy pact. The Regional Government is therefore committed to working with the Federal Government on tax incentives for the energy and climate transition – including pilot projects and measures to bring about a change in public behaviour and business practices – and on a regulatory framework to enable testing in compliance with federal regulations.

SECTION B: ANALYTICAL BASIS

4. Description of the current situation and projections with existing policies for each of the five dimensions

In the rest of this document, projections with existing measures are referred to as the 'WEM scenario'.

4.1 General parameters and variables

The projections are specifically based on changes in the population and number of households and on the number of heating degree days. They are not based on changes to prices or costs (fuels, CO₂, technology, etc.), or on projections for macroeconomic variables (GDP, value added and disposable income).

Table 1 Parameters and variables specifically used in projections with existing measures

| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|----------------------|-------|-------|-------|-------|-------|-------|
| Population | 10.4 | 10.8 | 11.2 | 11.5 | 11.8 | 12.0 |
| Number of households | 4.4 | 4.6 | 4.8 | 5.0 | 5.1 | 5.2 |
| Household size | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 |
| Heating degree days | 1 828 | 2 309 | 1 688 | 1 870 | 1 870 | 1 870 |

Source: hypothetical assumptions, compilation of regional projections for 2020-2030.

Note: population and number of households in millions; household size = average number of persons per household.

4.2Dimension decarbonisation

4.2.1 GHG emissions and removals

Table 2 Change in greenhouse gas emissions (WEM scenario)

Mt CO2-ea

| Wit CO2 CQ | | | | | | |
|--|-------|-------|-------|-------|-------|-------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| Total excluding LULUCF | 145.4 | 132.7 | 117.6 | 114.7 | 118.2 | 124.2 |
| Total including LULUCF | 142.4 | 131.2 | 116.4 | 114.0 | 117.3 | 122.9 |
| EU ETS (according to ETS 2013-2020 scope) | 66.5 | 54.8 | 44.7 | 42.7 | 47.7 | 54.3 |
| ESD ¹⁹ (according to ETS 2013-2020 scope) | 78.9 | 77.9 | 72.8 | 72.0 | 70.5 | 69.9 |
| LULUCF | -3.0 | -1.5 | -1.2 | -0.7 | -0.9 | -1.2 |

Source: Belgian CRF report (15 March 2018) for 2005-2015; compilation of regional and federal projections for 2020-2030.

Between 2005 and 2015, total GHG emissions (excluding LULUCF) fell from 145 Mt CO₂-eq to 118 Mt CO₂-eq, a reduction of 19 % (Table 2). This decrease is mainly due to a 33 % fall in EU ETS emissions in 2015 compared with 2005. During the same period, emissions under the Effort Sharing Decision (ESD) fell by 8 %. Between 2005 and 2015, Belgium's total LULUCF emissions balance contracted by 60 %, although it remained a significant carbon sink in 2015.

In the WEM scenario, total GHG emissions (excluding LULUCF) are expected to rise between 2015 and 2030, reaching 124 Mt CO₂-eq (-15 % on 2005). This increase is due to a rise in EU ETS emissions of up to 54 Mt CO₂-eq (-18 % in 2030, relative to 2005), chiefly as a result of higher emissions from electricity generation. In the WEM scenario, on account of the phasing out of nuclear by 2025, nuclear energy generation is partly offset after 2025 by increased production at gas-fired power stations. In the WEM scenario, the change in ESD emissions is moderate, ranging from a fall of 8 % (in 2015) to 11 % (in 2030), as compared with 2005. Belgium's LULUCF emissions balance still represents a carbon sink after 2015. After a slight decrease between 2015 and 2020, the carbon sink grows by 3 % between 2015 and 2030 in the WEM scenario.

Table 3 Change in total GHG emissions by IPCC sector (WEM scenario) Mt CO₂-eq

| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|-------|------|------|------|------|------|
| 1 Energy | 105.6 | 98.5 | 86.2 | 83.4 | 88.3 | 95.0 |
| 1A Fossil fuel combustion | 104.9 | 97.8 | 85.5 | 82.8 | 87.7 | 94.4 |
| 1A1 Energy generation | 29.4 | 26.5 | 21.3 | 16.9 | 22.0 | 28.3 |
| 1A2 Manufacturing and construction industry | 18.7 | 15.7 | 13.6 | 14.0 | 14.0 | 14.2 |
| 1A3 Transport | 26.6 | 26.4 | 26.7 | 27.5 | 28.0 | 28.7 |
| 1A4 Other sectors | 30.0 | 28.9 | 23.9 | 24.2 | 23.6 | 23.1 |
| 1A5 Others | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 1B Fugitive emissions from fuels | 0.7 | 0.8 | 0.7 | 0.6 | 0.6 | 0.6 |
| 2 Industrial processes and product use | 26.4 | 21.5 | 19.7 | 20.2 | 19.5 | 19.1 |
| 3 Agriculture | 10.3 | 10.2 | 10.1 | 9.8 | 9.4 | 9.2 |
| 4 LULUCF | -3.0 | -1.5 | -1.2 | -0.7 | -0.9 | -1.2 |
| 5 Waste | 3.1 | 2.5 | 1.6 | 1.3 | 1.0 | 0.8 |
| | | | | | | |

Source: Belgian CRF report (15 March 2018) for 2005-2015; compilation of regional and federal projections for 2020-2030.

At sectoral level, an 18 % reduction in energy-related emissions (IPCC sector 1) can be seen between 2005 and 2015. This decline is spread between the subcategories of energy generation (mainly power stations, refineries and coking plants), industry and space heating (i.e. 'other sectors'). In the transport sector, emissions stabilised during this period. Emissions from industrial processes were down by 25 % in 2015 compared with 2005 levels, largely due to the decline in iron and steel production. During the period 2005-2015, (non-energy) emissions from agriculture showed a modest decrease of 2 %. The 48 % drop in emissions from the waste sector in 2015 (relative to 2005) is mainly because of the decrease in methane emissions from landfill.

By 2030, the WEM scenario shows an increase in energy-related emissions that can be attributed primarily to the energy generation subcategory. This is explained by the increased use of gas-fired power plants (see above). To a lesser extent, the WEM scenario forecasts higher emissions in the transport sector and industry, while emissions from buildings continue to fall steadily. Emissions from industrial processes and agricultural emissions record relatively modest falls between 2015 and 2030, down by -28 % and -10 % respectively in 2030 from 2005 levels. Waste-related emissions continue to decline by 2030.

| Mt CO2-eq | | | | | | |
|------------------|-------|-------|-------|------|-------|-------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| CO ₂ | 125.6 | 113.6 | 100.2 | 98.6 | 103.6 | 110.4 |
| CH₄ | 9.3 | 8.8 | 8.1 | 7.5 | 6.9 | 6.7 |
| N ₂ O | 8.5 | 7.6 | 6.0 | 5.6 | 5.6 | 5.6 |
| F-gases | 2.0 | 2.8 | 3.2 | 2.9 | 2.0 | 1.5 |
| | | | | | | |

Table 4 Change in GHG emissions by type of GHG, excluding LULUCF (WEM scenario) Mt CO_p ag

Source: Belgian CRF report (15 March 2018) for 2005-2015; compilation of regional and federal projections for 2020-2030.

In terms of specific types of GHGs, falls of 20 %,12 % and 29 % were recorded for CO₂, CH₄ and N₂O respectively in 2015, relative to 2005 levels. During the same period, the only increase observed is in F-gases, which are up by 58 %. This is largely due to the increased use of F-gases, resulting in higher emissions. The main reason for this is that ozone-depleting substances are no longer used in refrigeration plants, and F-gases have long been the most obvious alternative.

CO₂ emissions are forecast to rise from 100 Mt CO₂-eq to 110 Mt CO₂-eq between 2015 and 2030, owing to the increase in energy-related emissions (see also Table 4). The continued decline in methane emissions is largely explained by changes in emissions from landfill (see Table 3). Nitrous oxide emissions also decline during the period 2015-2030. The same applies to F-gas emissions. In view of the stricter EU regulations and the policy adopted in Belgium, F-gases with a very high global warming potential (GWP) are expected to be phased out and replaced by greener alternatives, or by F-gases with a less negative impact on the climate.

Table 5 Change in ESD GHG emissions by IPCC sector (WEM scenario)

| Mt CO₂-eq | |
|-----------|--|
|-----------|--|

| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|------|------|------|------|------|------|
| 1 Energy | 63.2 | 62.1 | 57.3 | 57.6 | 57.6 | 57.8 |
| 1A Fossil fuel combustion | 62.6 | 61.4 | 56.8 | 57.1 | 57.0 | 57.2 |
| 1A1 Energy generation | 1.9 | 2.0 | 2.4 | 2.1 | 2.0 | 1.9 |
| 1A2 Manufacturing and construction industry | 4.2 | 4.2 | 3.9 | 3.3 | 3.5 | 3.5 |
| 1A3 Transport | 26.5 | 26.3 | 26.6 | 27.5 | 28.0 | 28.7 |
| 1A4 Other sectors | 29.9 | 28.8 | 23.8 | 24.1 | 23.5 | 23.0 |
| 1A5 Others | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 1B Fugitive emissions from fuels | 0.6 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 |
| 2 Industrial processes and product use | 2.7 | 3.7 | 4.1 | 3.6 | 2.8 | 2.3 |
| 3 Agriculture | 10.3 | 10.2 | 10.1 | 9.8 | 9.4 | 9.2 |
| 4 LULUCF | - | - | | - | - | - |
| 5 Waste | 2.6 | 1.9 | 1.3 | 1.0 | 0.7 | 0.6 |

Source: Belgian CRF report (15 March 2018) for 2005-2015; compilation of regional and federal projections for 2020-2030.

The 8 % reduction in ESD emissions between 2005 and 2015 comes primarily from reductions in emissions from buildings (i.e. 'other sectors') and waste-related emissions (in particular methane emissions from landfill sites – see above). Between 2015 and 2030, ESD energy emissions stabilise in the WEM scenario. This stabilisation can be explained by an increase in transport-related emissions, offset by a decrease in other subcategories. Emissions from industrial processes decrease in the WEM scenario from 4.1 Mt CO₂-eq in 2015 to 2.3 Mt CO₂-eq. This decrease is primarily attributable to the reduction in F-gas emissions (see Table 3). As explained above, waste-related emissions also continue to decline by 2030.

4.2.2 Renewable energy sources

| % | | | | | | |
|---------|------|------|------|------|------|------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| RES | 2.3 | 5.7 | 7.9 | 11.0 | 10.9 | 10.7 |
| RES-E | 2.4 | 7.1 | 15.5 | 26.4 | 25.9 | 25.2 |
| RES-T | 0.6 | 4.7 | 3.8 | 6.7 | 6.4 | 6.5 |
| RES-H&C | 3.4 | 6.1 | 7.8 | 8.1 | 8.0 | 7.9 |

Table 6 Share of renewable energy sources in gross final energy consumption, total and by sector (WEM scenario)

Source: Eurostat and SHARES 2016 results (<u>http://ec.europa.eu/eurostat/web/energy/data/shares</u>) for 2005-2015; compilation of regional and federal projections for 2020-2030.

The share of renewable energy sources (RES) increases during the period 2005-2015, from 2.3 % in 2005 to 7.9 % in 2015. The share of RES is higher than the indicative trajectory for 2010-2020 towards the target of 13 % in 2020.

The pace of change varies depending on the sector. The increase is particularly pronounced in the electricity sector, where RES (RES-E) rose from 2.4 % in 2005 to 15.5 % in 2015. The RES share for heating and cooling (RES H&C) and transport (RES-T) increases more slowly: from 3.4 % in 2005 to 7.8 % in 2015 for heating and cooling, and from 0.6 % in 2005 to 3.8 % in 2015 for transport. The RES share in transport is lower in 2015 than in 2010 due to

the fall in biodiesel supplies. This follows the repeal of legislation laying down rules for blending biodiesel with diesel in June 2015.

The increase in RES-E is mainly due to the growth in wind energy and solar PV (see the energy mix in electricity generation). A small proportion of the increase is also due to a slight fall in gross final electricity demand (-2 % between 2005 and 2015).

The trend in RES-T primarily stems primarily from biofuels. The contribution of renewable electricity to rail and road transport remains marginal.

Lastly, despite the sharp growth in heat pumps between 2005 and 2015, their contribution to RES-H&C remains low in 2015. The increase in RES-H&C results mainly from biomass, which accounts for more than 94 % of RES consumption for heating and, to a lesser extent, from the fall in heating energy consumption (-8 % between 2005 and 2015).

Projections²⁰ with existing measures show an increase in the share of renewable energy (total share and by sector) in 2020 compared with 2015. Despite the total share reaching 11 % in 2020, compared with 7.9 % in 2015, the existing measures are expected to fall short of the 13 % target for 2020. After 2020, the total share of RES stabilises at around 11 %. The same trend applies to the share of RES by sector. Stabilisation over the period 2020-2030 reflects the increase in gross final energy consumption (denominator) and the decrease in the use of biomass for electricity generation and heating (numerator), which offset the growth in renewables for other uses (e.g. wind, solar PV, biofuels, heat pumps).

Growth in RES-E is particularly pronounced in 2020. This reflects the significant increase in electricity generation from wind turbines (offshore wind turbines in particular). It is assumed that there will be no new investment in offshore wind after 2020.

For RES-T, the projection is close to 6.5 % for the period 2020-2030. The jump between 2015 and 2020 is essentially due to the introduction of E10 petrol in January 2017. However, the trend for RES-T shows that existing policies for the development of biofuels and the use of electricity for transport (numerator) are insufficient to meet the 10 % target for 2020 and to stimulate the development of renewable energy sources beyond 2020.

Among RES sectors, the RES-H&C sector records the lowest growth between 2015 and 2020.

²⁰ Projections of RES indicators are only available until 2030 due to missing data from the Flemish region (absence of political agreement for the period 2030-2040).

4.3 Dimension energy efficiency

| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|-----------------------------|--------|--------|--------|--------|--------|--------|
| Primary energy | | | | | | |
| consumption | 52 544 | 53 937 | 45 741 | 48 683 | 45 521 | 43 855 |
| Final energy consumption | 37 803 | 38 036 | 35 880 | 37 039 | 37 255 | 37 548 |
| Industry | 12 935 | 12 468 | 11 918 | 13 074 | 13 048 | 13 166 |
| Residential | 9 925 | 9 411 | 8 163 | 8 253 | 8 095 | 7 954 |
| Tertiary | 4 995 | 5 812 | 5 358 | 5 375 | 5 445 | 5 468 |
| Transport | 9 948 | 10 345 | 10 440 | 10 337 | 10 667 | 10 959 |

Table 7 Primary and final energy consumption in the economy and by sector (WEM scenario) ktoe

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels)²¹; compilation of regional projections for 2020-2030.

Note: For the period 2020-2030, final energy demand in the transport sector corresponds to fuel sales in Flanders and in the Brussels-Capital Region, but to fuel consumption in Wallonia.

Belgium's primary energy consumption fell by 13 % between 2005 and 2015. The weak primary energy consumption for 2015 compared with 2005 and 2010 is partly due to the sharp decrease in nuclear energy production.

Moreover, final energy consumption drops by 5 % during the period 2005-2015. Industry and the residential sector are responsible for this downward trend; their energy consumption falls by 8 % and 18 % respectively. On the other hand, energy consumption rises in the transport sector (+5 %) and tertiary sector (+7 %).

Projections with existing measures show a general downward trend for primary energy consumption until 2030 (-17 % in 2030 compared with 2005 levels). The downward trend is mainly due to the implementation of the legislation to phase out nuclear power for the period 2022-2025; the higher level in 2020 than in 2015 is due to the availability of nuclear generation capacity. The projection for primary energy consumption in 2020 (48 683 ktoe) is higher than Belgium's indicative energy efficiency target (47 300 ktoe).

The projection for final energy demand with existing measures, on the other hand, shows an upward trend until 2030. In 2020, final energy demand (37 039 ktoe) exceeds Belgium's indicative energy efficiency target (32 500 ktoe). In 2030, final energy demand is 1 % lower than in 2005. The increase in the period 2020-2040 is mainly due to transport.

²¹ Historical data are taken from Eurostat energy balances for Belgium (European Commission recommendations/requests), while projections are based on regional energy balances. The gap between the two sources is small and decreases over time, both for total primary and final energy consumption. For 2005, it is 4 % for both primary and final energy consumption; for 2015, it is zero for primary energy consumption and 1 % for final energy consumption. However, the differences at energy and sector level may be much greater. It is worth noting that the consumption of solid fuels is currently under review and will be updated; the update will be sent to Eurostat as soon as possible.

4.4 Dimension energy security

| % | | | | | | | |
|------------------|------|------|------|------|------|------|--|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | |
| Solid fuels | 10.6 | 6.8 | 5.9 | 5.2 | 5.4 | 5.6 | |
| Oil | 40.9 | 39.8 | 44.6 | 41.5 | 44.4 | 46.3 | |
| Natural gas | 24.5 | 27.3 | 25.7 | 23.5 | 29.1 | 35.3 | |
| Nuclear heat | 20.4 | 20.2 | 12.4 | 18.6 | 8.7 | 0.0 | |
| Electricity | 0.9 | 0.1 | 3.3 | 0.9 | 2.8 | 3.0 | |
| Renewable energy | 1.9 | 4.6 | 6.8 | 8.9 | 8.3 | 8.4 | |
| Waste | 0.8 | 1.2 | 1.3 | 1.4 | 1.3 | 1.4 | |

Table 8 Energy mix of gross domestic consumption (WEM scenario)

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels)²²; compilation of regional projections for 2020-2030.

About three quarters of Belgium's gross domestic consumption comes from fossil fuels (solid fuels, oil and natural gas) in 2005, 2010 and 2015. In 2005 and 2010, 20 % comes from nuclear power. However, this share falls to 12 % in 2015 following the shutdown of several nuclear reactors. Part of the decrease in nuclear energy generation in 2015 was offset by electricity imports, which increased to 3.3 % (compared with less than 1 % in 2005 and 2010). The share of renewable energy sources rises steadily, from 2 % in 2005 to almost 7 % in 2015.

Projections with existing measures indicate an increasing share of fossil fuels (almost 90 % in 2030). The increase is particularly pronounced for natural gas owing to its more intensive use for electricity generation. In addition, the share of renewable energy sources stabilises at around 8.4 %. An increasing (or decreasing) share is not necessarily synonymous with increasing (or decreasing) consumption; for example, domestic oil consumption was lower in 2020-2030 than in 2005. Gross domestic consumption of natural gas and renewable energy rises steadily over the period covered by the projection.

Table 9 Import dependency (WEM scenario)

| 70 | | | | | | |
|-------------------|------|------|------|------|------|------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| Import dependency | 77.2 | 73.8 | 78.9 | 71.1 | 81.7 | 90.2 |
| | | | | | | |

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels)²³; compilation of regional projections for 2020-2030.

Note: For the period 2020-2030, the breakdown according to domestic renewable energy generation and net imports is not available.

For the purposes of calculating import dependency it is assumed that the renewable energy is generated entirely in Belgium.

Belgium relies on imports for almost all of its energy needs, since the country has very limited domestic energy sources. These include renewable energy sources (wind, solar and biomass), as well as nuclear heat, although the uranium required to produce it is imported. Domestic production of renewable energy increased by a factor of 3.4 between 2005 and 2015. All fossil fuels are imported. However, fossil fuel imports fell by 8 % between 2005 and 2015. Belgium's import dependency varies from 74 % to 79 %.

Projections with existing measures result in increasing import dependency (90 % in 2020-2040). The main reasons for this development are the phasing out of nuclear power (nuclear heat is considered domestic production according to Eurostat's statistical convention) and the growth in natural gas imports. By contrast, renewable energy sources record only moderate growth.

²² Ibid. ²³ Ibid.

4.5 Dimension Internal energy market

Electricity and natural gas prices for 2005, 2010 and 2015 are reported in Annex I, Part 2. No projections are available because they are not used in modelling WEM (or WAM) scenarios.

4.6 Dimension research, innovation and competitiveness

5. Assessment of the impact of planned policies and measures

This chapter illustrates the impact of the policies and measures described in Chapter 3 on the energy system and GHG emissions and removals. The projections taking into account the planned policies and measures are referred to below as the 'WAM scenario' ('with additional measures').

This section also includes a comparison with projections based on existing policies and measures (described in Chapter 4).

5.1. Dimension decarbonisation

5.1.1. GHG emissions and removals

Table 10 Trends in GHG emissions (WAM scenario) Mt CO₂-ea

| Wit CO2-Eg | | | | | | |
|---|-------|-------|-------|-------|-------|-------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| Total excluding LULUCF | 145.4 | 132.7 | 117.6 | 109.7 | 107.9 | 103.4 |
| Total including LULUCF | 142.4 | 131.2 | 116.4 | 109.0 | 106.9 | 102.2 |
| EU ETS (according to ETS 2013-2020 scope) | 66.5 | 54.8 | 44.7 | 41.9 | 47.8 | 52.2 |
| ESD (according to ETS 2013-2020 scope) | 78.9 | 77.9 | 72.8 | 67.8 | 60.0 | 51.2 |
| LULUCF | -3.0 | -1.5 | -1.2 | -0.7 | -0.9 | -1.2 |

Source: Belgian CRF report (15 March 2018) for 2005-2015; compilation of regional projections for 2020-2030.

In the WAM scenario, total GHG emissions (excluding LULUCF) are expected to decrease between 2015 and 2030 to 103 Mt CO₂-eq (-29 % from 2005). A reduction in ESD emissions is observed between 2015 and 2030, from 73 Mt CO₂-eq to 51 Mt CO₂-eq. In 2030, the WAM scenario leads to a 35 % reduction in ESD emissions compared with 2005 (as opposed to 11 % in the WEM scenario). By contrast, EU ETS emissions rise to 52 Mt CO₂-eq (compared with 54 Mt CO₂-eq in the WEM scenario), mainly as a result of an increase in emissions from electricity generation. In the WAM scenario, the emissions balance for LULUCF does not differ from the WEM scenario.

Table 11 below shows the distribution of ESD emissions among regions in the WAM scenario. In 2030, the WAM scenario sees a reduction in ESD emissions of 35 % in Flanders, 36 % in Wallonia and 32 % in the Brussels-Capital Region, relative to 2005.

Table 11 Distribution of ESD GHG emissions by region (WAM scenario)

| Emissions in Mt CO ₂ -eq | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | |
|-------------------------------------|------|------|-------|-------|-------|-------|--|
| Belgium | 78.9 | 77.9 | 72.8 | 67.8 | 60.0 | 51.2 | |
| Flemish Region | 46.3 | 47.0 | 44.7 | 41.8 | 36.5 | 30.1 | |
| Wallonia | 28.1 | 26.5 | 24.4 | 22.4 | 20.2 | 18.0 | |
| Brussels-Capital Region | 4.4 | 4.5 | 3.7 | 3.6 | 3.3 | 3.0 | |
| Change since 2005 (%) | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | |
| Belgium | 0 % | -1 % | -8 % | -14 % | -24 % | -35 % | |
| Flemish Region | 0 % | 1% | -3 % | -10 % | -21 % | -35 % | |
| Wallonia | 0 % | -6 % | -13 % | -20 % | -28 % | -36 % | |
| Brussels-Capital Region | 0 % | 1 % | -16 % | -19 % | -26 % | -32 % | |
| | | | | | | | |

Table 12 Table 3 Change in total GHG emissions by IPCC sector (WAM scenario) Mt CO2-ea Mt CO2-ea

| 1AFossil fuel combustion104.997.885.578.478.375.51A1 Energy generation29.426.521.316.722.526.71A2 Manufacturing and construction industry18.715.713.613.613.312.91A3 Transport26.626.426.725.122.619.51A4 Other sectors30.028.923.922.919.816.31A5 Others0.20.10.10.10.11B Fugitive emissions from fuels0.70.80.70.60.6Industrial processes and product use26.421.519.719.919.118.2Agriculture10.310.210.19.58.98.310.110.110.1ULUCF-3.0-1.5-1.2-0.7-0.9-1.210.110.110.1 | Mit CO2-EQ | | | | | | | |
|--|---|-------|------|------|------|------|------|--|
| 1AFossil fuel combustion104.997.885.578.478.375.51A1 Energy generation29.426.521.316.722.526.71A2 Manufacturing and construction industry18.715.713.613.613.312.91A3 Transport26.626.426.725.122.619.51A4 Other sectors30.028.923.922.919.816.31A5 Others0.20.10.10.10.11B Fugitive emissions from fuels0.70.80.70.60.6Industrial processes and product use26.421.519.719.919.1Agriculture10.310.210.19.58.98.3LULUCF-3.0-1.5-1.2-0.7-0.9-1.2 | | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | |
| 1A1 Energy generation29.426.521.316.722.526.71A2 Manufacturing and construction industry18.715.713.613.613.312.91A3 Transport26.626.426.725.122.619.51A4 Other sectors30.028.923.922.919.816.31A5 Others0.20.10.10.10.10.11B Fugitive emissions from fuels0.70.80.70.60.60.6Industrial processes and product use26.421.519.719.919.118.2Agriculture10.310.210.19.58.98.3LULUCF-3.0-1.5-1.2-0.7-0.9-1.2 | 1 Energy | 105.6 | 98.5 | 86.2 | 79.1 | 78.9 | 76.1 | |
| 1A2 Manufacturing and construction industry 18.7 15.7 13.6 13.6 13.3 12.9 1A3 Transport 26.6 26.4 26.7 25.1 22.6 19.5 1A4 Other sectors 30.0 28.9 23.9 22.9 19.8 16.3 1A5 Others 0.2 0.1 0.1 0.1 0.1 0.1 1B Fugitive emissions from fuels 0.7 0.8 0.7 0.6 0.6 0.6 Industrial processes and product use 26.4 21.5 19.7 19.9 19.1 18.2 Agriculture 10.3 10.2 10.1 9.5 8.9 8.3 LULUCF -3.0 -1.5 -1.2 -0.7 -0.9 -1.2 | 1A Fossil fuel combustion | 104.9 | 97.8 | 85.5 | 78.4 | 78.3 | 75.5 | |
| 1A3 Transport26.626.426.725.122.619.51A4 Other sectors30.028.923.922.919.816.31A5 Others0.20.10.10.10.10.11B Fugitive emissions from fuels0.70.80.70.60.60.6Industrial processes and product use26.421.519.719.919.118.2Agriculture10.310.210.19.58.98.3LULUCF-3.0-1.5-1.2-0.7-0.9-1.2 | 1A1 Energy generation | 29.4 | 26.5 | 21.3 | 16.7 | 22.5 | 26.7 | |
| 1A4 Other sectors30.028.923.922.919.816.31A5 Others0.20.10.10.10.10.11B Fugitive emissions from fuels0.70.80.70.60.60.6Industrial processes and product use26.421.519.719.919.118.2Agriculture10.310.210.19.58.98.3LULUCF-3.0-1.5-1.2-0.7-0.9-1.2 | 1A2 Manufacturing and construction industry | 18.7 | 15.7 | 13.6 | 13.6 | 13.3 | 12.9 | |
| 1A5 Others 0.2 0.1 0.1 0.1 0.1 0.1 1B Fugitive emissions from fuels 0.7 0.8 0.7 0.6 0.6 0.6 Industrial processes and product use 26.4 21.5 19.7 19.9 19.1 18.2 Agriculture 10.3 10.2 10.1 9.5 8.9 8.3 LULUCF -3.0 -1.5 -1.2 -0.7 -0.9 -1.2 | 1A3 Transport | 26.6 | 26.4 | 26.7 | 25.1 | 22.6 | 19.5 | |
| 1B Fugitive emissions from fuels 0.7 0.8 0.7 0.6 0.6 0.6 Industrial processes and product use 26.4 21.5 19.7 19.9 19.1 18.2 Agriculture 10.3 10.2 10.1 9.5 8.9 8.3 LULUCF -3.0 -1.5 -1.2 -0.7 -0.9 -1.2 | 1A4 Other sectors | 30.0 | 28.9 | 23.9 | 22.9 | 19.8 | 16.3 | |
| Industrial processes and product use 26.4 21.5 19.7 19.9 19.1 18.2 Agriculture 10.3 10.2 10.1 9.5 8.9 8.3 LULUCF -3.0 -1.5 -1.2 -0.7 -0.9 -1.2 | 1A5 Others | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | |
| Agriculture 10.3 10.2 10.1 9.5 8.9 8.3 LULUCF -3.0 -1.5 -1.2 -0.7 -0.9 -1.2 | 1B Fugitive emissions from fuels | 0.7 | 0.8 | 0.7 | 0.6 | 0.6 | 0.6 | |
| LULUCF -3.0 -1.5 -1.2 -0.7 -0.9 -1.2 | 2 Industrial processes and product use | 26.4 | 21.5 | 19.7 | 19.9 | 19.1 | 18.2 | |
| | 3 Agriculture | 10.3 | 10.2 | 10.1 | 9.5 | 8.9 | 8.3 | |
| Waste 3.1 2.5 1.6 1.3 1.0 0.8 | 4 LULUCF | -3.0 | -1.5 | -1.2 | -0.7 | -0.9 | -1.2 | |
| | 5 Waste | 3.1 | 2.5 | 1.6 | 1.3 | 1.0 | 0.8 | |

Source: Belgian CRF report (15 March 2018) for 2005-2015; compilation of regional projections for 2020-2030.

In the WAM scenario, sectoral level energy-related emissions are set to decrease by 2030. Only emissions from the energy generation subcategory continue to rise between 2015 and 2030, from 21 to 27 Mt CO₂-eq. This is due to greater use of gas-fired power stations (see above). However, by comparison with the WEM scenario, emissions from energy generation are lower in the WAM scenario due to greater use of renewable energy sources. Conversely, in the WAM scenario all other subcategories show a reduction in emissions between 2015 and 2030. The most significant reductions are in the transport and buildings sectors, with a decrease of 27 % and 46 % respectively in 2030, relative to 2005 levels. The reduction in emissions from industrial processes is fairly modest between 2015 and 2030. In the agricultural sector, the proposed additional measures lead to a 20 % reduction in

2030 compared with 2005 (as opposed to 10 % in the WEM scenario). Waste-related emissions continue their downward trend until 2030, as in the WEM scenario.

| Mt CO2-eq | | - | - | | | | _ |
|------------------|-------|-------|-------|------|------|------|---|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | |
| CO ₂ | 125.6 | 113.6 | 100.2 | 94.3 | 94.3 | 91.6 | |
| CH ₄ | 9.3 | 8.8 | 8.1 | 7.3 | 6.6 | 5.9 | |
| N ₂ O | 8.5 | 7.6 | 6.0 | 5.4 | 5.1 | 4.9 | |
| F-gases | 2.0 | 2.8 | 3.2 | 2.6 | 1.8 | 1.0 | |

Table 13 Change in GHG emissions by type of GHG, excluding LULUCF (WAM scenario)

Source: Belgian CRF report (15 March 2018) for 2005-2015; compilation of regional projections for 2020-2030.

Between 2015 and 2030, the WAM scenario suggests a reduction in CO₂ emissions from 100 Mt CO₂-eq to 92 Mt CO₂-eq (as against 110 Mt CO₂-eq in 2030 in the WEM scenario). The continued decline in methane emissions is largely explained by changes in landfill emissions (see Table 12), though additional reductions in the agricultural sector also play a part. Nitrous oxide emissions fall more sharply during the period 2015-2030 compared with the WEM scenario. This is due in large part to additional reductions in the agricultural sector and emissions from industrial processes. Likewise, further reductions in F-gases are forecast during the period 2015-2030 compared with the WEM scenario.

| Mt CO2-eq | | | | | | |
|--|------|------|------|------|------|------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| 1 Energy | 63.2 | 62.1 | 57.3 | 54.0 | 48.0 | 41.0 |
| 1A Fossil fuel combustion | 62.6 | 61.4 | 56.8 | 53.5 | 47.5 | 40.5 |
| 1A1 Energy generation | 1.9 | 2.0 | 2.4 | 2.1 | 1.8 | 1.6 |
| 1A2 Manufacturing and construction | 4.2 | 4.2 | 3.9 | 3.5 | 3.3 | 3.1 |
| 1A3 Transport | 26.5 | 26.3 | 26.6 | 25.1 | 22.6 | 19.5 |
| 1A4 Other sectors | 29.9 | 28.8 | 23.8 | 22.8 | 19.7 | 16.2 |
| 1A5 Others | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 1B Fugitive emissions from fuels | 0.6 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 |
| 2 Industrial processes and product use | 2.7 | 3.7 | 4.1 | 3.3 | 2.4 | 1.4 |
| 3 Agriculture | 10.3 | 10.2 | 10.1 | 9.5 | 8.9 | 8.3 |
| 4 LULUCF | - | - | - | - | - | - |
| 5 Waste | 2.6 | 1.9 | 1.3 | 1.0 | 0.7 | 0.6 |
| | | | | | | |

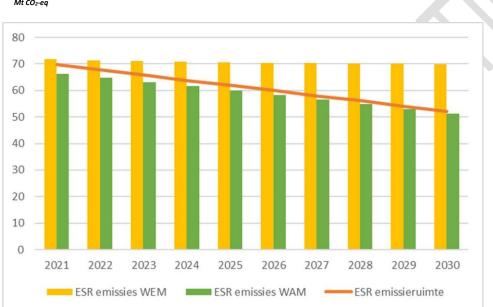
 Table 14
 Trend in ESD GHG emissions by IPCC sector (WAM scenario)

Source: Belgian CRF report (15 March 2018) for 2005-2015; compilation of regional projections for 2020-2030.

The 35 % reduction in ESD emissions in 2030 relative to 2005 (as opposed to 11 % in the WEM scenario) is largely attributable to the decline in energy-related emissions, which decrease from 57 Mt CO₂-eq to 41 Mt CO₂-eq between 2015 and 2030 (as opposed to 58 Mt CO₂-eq in 2030 in the WEM scenario). In absolute terms, the principal reductions during the period 2015-2030 are in the buildings and transport subsectors. Emissions from

industrial processes decrease in the WAM scenario from 4.1 Mt CO₂-eq in 2015 to 1.4 Mt CO₂-eq in 2030 (as opposed to 2.3 Mt CO₂-eq in 2030, in the WEM scenario). This is chiefly due to the fall in F-gas emissions (see Table 13) and additional policy efforts in the WAM scenario targeting nitrous oxide emissions from caprolactam production. As explained above, waste-related emissions also continue to decline by 2030, as in the WEM scenario.

In Graph 1, ESR emissions in the WEM and WAM scenarios are compared for reference with the ESR emission allocation, as (provisionally) set by the European Environment Agency (EEA). Interpolation was used to calculate emissions during the periods 2021-2024 and 2026-2029. In the WEM scenario, the emission allocation is exceeded in each year of the ESR period (2021-2030). Conversely, under the WAM scenario, the ESR targets are met every year.





n 1 ESR projections 2021-2030, WEM and WAM scenarios Mt CO2-eq

Source: Compilation of regional projections for 2020-2030 (ESR emissions, WEM and WAM scenarios);24 EEA Report No 16/2018 (ESR emission allocations).

5.1.2. Renewable energy sources

Table 15 Share of renewable energy sources in gross final energy consumption, total and by sector (WAM scenario)

| 70 | | | | | | |
|---------|------|------|------|------|------|------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| RES | 2.3 | 5.7 | 7.9 | 12.0 | 14.0 | 18.3 |
| RES-E | 2.4 | 7.1 | 15.5 | 26.9 | 30.3 | 40.4 |
| RES-T | 0.6 | 4.7 | 3.8 | 10.7 | 14.8 | 20.6 |
| RES-H&C | 3.4 | 6.1 | 7.8 | 8.6 | 10.3 | 12.7 |

Source: Eurostat and SHARES 2016 results (<u>http://ec.europa.eu/eurostat/web/energy/data/shares</u>) for 2005-2015; compilation of regional and federal projections for 2020-2030.

The planned policies and measures deliver a total share of renewable energy sources of 18.3 % in 2030, or 7.6 percentage points higher than in the WEM scenario (10.7 %).

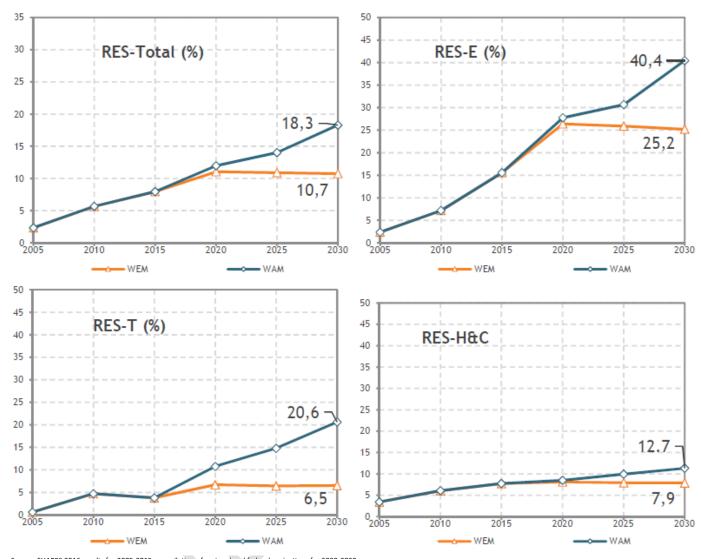
By comparison with the WEM scenario, the increase during the period is particularly striking in the electricity generation and transport sectors.

²⁴ <u>https://www.eea.europa.eu/publications/trends-and-projections-in-europe-2018</u>

The share of renewable energy sources in electricity consumption (RES-E) climbs to 40.4 % in 2030 in the WAM scenario, compared with 25.2 % in the WEM scenario and 15.5 % in 2015. The higher percentage in the WAM scenario than in the WEM scenario is due to growth in electricity generation from RES (+56 % compared with the WEM scenario in 2030)²⁵ and the decline in final electricity consumption (-3 % compared with the WEM scenario in 2030).

The share of renewable energy sources for transport (RES-T) rises to 20.6 % in 2030 in the WAM scenario, compared with 6.5 % in the WEM scenario and 3.8 % in 2015. The higher percentage in the WAM scenario compared with the WEM scenario stems from an increase in the use of biofuels (+46 % compared with the WEM scenario in 2030) and RES-E (4 times the WEM level in 2030). This is caused by the growth in electric vehicle use, as well as the fall in final energy consumption for transport (-19 % compared with the WEM scenario in 2030)

²⁵ The increase applies to all RES technologies, but is particularly pronounced for wind energy (both onshore and offshore): +67 % for wind, +49 % for solar PV and +20 % for biomass.



Graph 2 Share of renewable energy sources, WEM-WAM comparison

Source: SHARES 2016 results for 2005-2015; compilation of regional and federal projections for 2020-2030.

Lastly, the share of renewable energy sources for heating and cooling (RES-H&C) shows a moderate increase in the WAM scenario, to 12.7 % in 2030, in contrast to 7.9 % in the WEM scenario and 7.8 % in 2015. Given that total energy consumption for heating and cooling is comparable in the WAM and WEM scenarios, the sole reason for this increase is higher consumption of RES for heating and cooling (e.g. biomass, electric heat pumps).

5.2. Dimension energy efficiency

Projections with additional policies and measures show a steady decline in both primary and final energy consumption during the period 2020-2030. In 2030, primary energy consumption is 39 Mtoe, or 26 % below the

2005 level²⁶. Final energy consumption is 33.1 Mtoe, or 12 % below the 2005 level²⁷.

| KLOP | | | | | | |
|-------------------------------|--------|--------|--------|--------|--------|--------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| Primary energy consumption | | | | | | |
| consumption | 52 544 | 53 937 | 45 741 | 48 075 | 43 653 | 39 020 |
| Final energy | | | | | | |
| consumption | 37 803 | 38 036 | 35 880 | 36 514 | 35 303 | 33 117 |
| Industry | 12 935 | 12 468 | 11 918 | 12 955 | 12 776 | 12 656 |
| Residential | 9 925 | 9 411 | 8 163 | 8 131 | 7 548 | 6 563 |
| Tertiary | 4 995 | 5 812 | 5 358 | 5 243 | 5 085 | 4 665 |
| Transport | 9 948 | 10 345 | 10 440 | 10 185 | 9 894 | 9 233 |
| | | | | | | |

| Table 16 Primary and final energ | consumption in the economy and by sector (WAM scenario) |
|----------------------------------|---|
| ktop | |

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels)²⁸; compilation of regional projections for 2020-2030.

Note: For the period 2020-2030, final energy demand in the transport sector corresponds to fuel sales in Flanders and in the Brussels-Capital Region, but to fuel consumption in Wallonia.

The additional policies and measures deliver primary and final energy savings of 4.8 Mtoe and 4.4 Mtoe respectively in comparison with the WEM scenario in 2030. In percentage terms, the savings are -11 % and -12 % respectively.

The sectors that contribute the most to the downward trend (both in absolute and relative terms) are the residential, tertiary and transport sectors. In 2030, the final energy consumption of each sector decreases by 15 % to 17 % compared with the WEM scenario. On the other hand, the additional policies and measures for industry only reduce the sector's final energy consumption by 4 %.

²⁶ According to Eurostat energy balances. Considering the total regional primary energy consumption for 2005, the percentage reduction in 2030 is -29 %.

²⁷ According to Eurostat energy balances. Considering the total of regional final energy consumption for 2005, the percentage reduction in 2030 is -16 %.

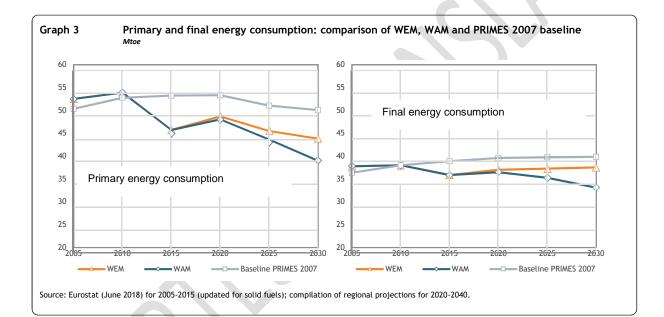
²⁸ Historical data are taken from Eurostat energy balances for Belgium (European Commission recommendations/requests), while projections are based on regional energy balances. The gap between the two sources is small and decreases over time, both for total primary and final energy consumption. For 2005, it is 4 % for both primary and final energy consumption; for 2015, it is zero for primary energy consumption and 1 % for final energy consumption. However, the differences at fuel and sector level may be much greater. It is worth noting that the consumption of solid fuels is currently under review and will be updated; the update will be sent to Eurostat as soon as possible.

Table 17 illustrates the change in primary and final energy consumption by 2030 according to the PRIMES 2007 baseline. Compared to the levels projected in 2030 in this scenario, primary and final energy consumption in the WAM scenario are reduced by 22 % and 17% respectively.

Table 17 Primary and final energy consumption according to the PRIMES 2007 baseline

| ktoe | | | | | | |
|----------------------------|--------|--------|--------|--------|--------|--------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| Primary energy consumption | | | | | | |
| | 50 369 | 52 803 | 53 289 | 53 353 | 51 078 | 50 094 |
| Final energy consumption | 36 403 | 38 013 | 38 938 | 39 613 | 39 803 | 39 870 |

Source: European Energy and Transport – Trends to 2030 – Update 2007 (EC, 2008).



5.3 Dimension energy security

| 70 | | | | | | |
|------------------|------|------|------|------|------|------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| Solid fuels | 10.6 | 6.8 | 5.9 | 5.2 | 5.5 | 5.9 |
| Oil | 40.9 | 39.8 | 44.6 | 40.8 | 41.8 | 41.9 |
| Natural gas | 24.5 | 27.3 | 25.7 | 23.5 | 30.2 | 35.9 |
| Nuclear heat | 20.4 | 20.2 | 12.4 | 18.6 | 9.0 | 0.0 |
| Electricity | 0.9 | 0.1 | 3.3 | 1.0 | 1.7 | 1.1 |
| Renewable energy | 1.9 | 4.6 | 6.8 | 9.5 | 10.5 | 13.8 |
| Waste | 0.8 | 1.2 | 1.3 | 1.3 | 1.3 | 1.3 |

Table 18 Energy mix for gross domestic consumption (WAM scenario) $\frac{\omega}{\omega}$

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels)²⁹; compilation of regional projections for 2020-2030.

The additional policies and measures reduce the share of fossil fuels in 2030, particularly oil (41.9 % in the WAM scenario, compared with 46.3 % in the WEM scenario), while the share of RES increases by 5.4 percentage points.

Table 19 Import dependency (WAM scenario) $\frac{9}{6}$

| 70 | | | | | | |
|-------------------|------|------|------|------|------|------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| Import dependency | 77.2 | 73.8 | 78.9 | 70.5 | 79.2 | 84.9 |
| | | | | | | |

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels)³⁰; compilation of regional projections for 2020-2030.

Note: For the period 2020-2030, the breakdown between domestic renewable energy generation and net imports is not available.

To calculate import dependency, it is assumed that the renewable energy is entirely generated in Belgium.

Despite additional policies and measures to stimulate the development of renewable energy sources, fossil fuels continue to account for more than 80 % of the primary energy mix in 2030. However, Belgium's import dependency decreases by 5 percentage points in comparison with the WEM scenario.

²⁹ Ibid. ³⁰ Ibid.