LONG-TERM STRATEGY FOR THE RENOVATION OF FLEMISH BUILDINGS

Further to Article 2a concerning long-term renovation strategies under the Energy Performance of Buildings Directive (EPBD) (2010/31/EU)

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SUMMARY

GENERAL

Flemish buildings, with a 28% share, make the second largest contribution to total non-ETS greenhouse gas emissions in Flanders. Moving towards a low-carbon society by 2050 therefore requires even greater efforts to make the building sector more sustainable through deep renovation and a shift towards sustainable heating.

The Flemish Climate Strategy 2050, which was adopted by the Flemish Government on 20 December 2019, includes the goal of achieving a reduction of 85% in the greenhouse gas emissions of the non-ETS sectors by 2050 (compared to 2005), with the ambition of proceeding to full climate neutrality. For the building sector, our aim is to reduce the emissions of the Flemish building stock to 2.3 Mt CO_2 equivalent by 2050. This is subdivided into the following indicative targets for 2050:

- Carbon neutrality for the non-residential building stock for heating, domestic hot water, cooling and lighting;
- Greenhouse gas reduction to 2.3 Mt CO_2 equivalent for residential buildings.

This is no easy task. The Flemish housing stock is characterised by a large proportion of old buildings, which has a significant impact on the energy performance of the Flemish housing stock. Flanders has a relatively large number of detached buildings (30%, comparable to the EU average). The proportion of residents in apartments, at 28%, is far below the European average of 40%. 72% of households are owner-occupied.

At the end of 2014, the Flemish Government launched the Renovation Pact. The objective of this programme is, together with a wide group of stakeholders, to develop and implement a coherent action plan that leads to a strong increase in the renovation rate and energy performance in line with the European energy and climate targets. Under the Renovation Pact, a long-term energy objective for 2050 was also set for the first time.

A Flemish long-term renovation strategy for 2050 has been drawn up on the basis of the activities in the Renovation Pact, among others, and stakeholder consultation in the context of Rapid Acceleration Working Groups and the Energy Poverty Programme. This strategy implements Article 2a of the EPBD (Directive 2010/31/EU) concerning long-term renovation strategies for buildings.

This strategy explains how private and public buildings can be renovated cost-effectively to achieve the long-term objective. The Flemish long-term renovation strategy for buildings forms part of a number of broader strategies of the Flemish Region. In terms of content, the renovation strategy is also geared to central policy objectives under housing policy and environmental policy. The strategy therefore also takes account of democratic trends, the endeavour for high-quality, energy-efficient and affordable housing for everyone, a relatively tight private and social rental market and an increase in spatial efficiency. The Flemish authorities are playing a major exemplary role in this respect by further raising and accelerating the existing renovation ambitions for their own building stock. In addition, additional initiatives are also being taken in cooperation with the social housing companies to make social housing climate-neutral. Other levels of government are also striving to set an example in the various actions to be carried out.

The long-term renovation strategy 2017 was enriched by a scenario analysis, which results in a roadmap for the renovation process up to 2050 for the Flemish Region. The methodology used to arrive at the roadmap consists of:

- Determining the baseline (2017);
- Establishing the long-term objective for 2050;
- Defining milestones and the accompanying timeline.

This roadmap was devised for both residential buildings and non-residential buildings.

Various scenarios were examined, each with a typical possible pathway to achieve the long-term objectives. These scenarios were based on the following underlying findings and assumptions:

- Nearly all buildings (96.5%) need to be renovated (or, where more appropriate, demolished and replaced by high-performance new buildings) to increase their energy efficiency and to meet the residual energy needs in a sustainable, low-carbon way.
- A substantial increase in both the rate and depth of renovation activity is required.
- The elimination of obstacles (e.g. regulatory barriers) must be expedited to enable the achievement of the long-term renovation objective for 2050.

Analysis of these scenarios led to the following general conclusions:

- Certain trigger points in the lifecycle of a building are ideal to exploit the potential for deep renovation at the most appropriate time and with the greatest cost-effectiveness. Encouraging deep renovation at these trigger points helps to spread out the efforts more evenly over the period up to 2050. At the same time, the necessary incentives should also be sought to prompt deep renovation outside the trigger points too.
- Large-scale use of renewable energy for the heating of buildings is conditional upon a prior extensive reduction in the energy demand of buildings through far-reaching energy efficiency and control of energy consumption via digitisation. A rapid improvement in energy performance is crucially important to achieve the 2030 greenhouse gas reduction target.

The updated strategy constitutes a supplement to the Flemish and National Energy and Climate Plan and is notified to the European Commission.

AMBITION AND KEY POINTS OF THE RENOVATION STRATEGY

The general ambition of the long-term renovation strategy: we aim to reduce the emissions of the Flemish building stock to 2.3 Mt CO_2 equivalent by 2050, subdivided into the following targets:

- Residential buildings:
    - By 2050 at the latest, existing residential buildings must achieve a comparable energy performance level to newly constructed dwellings for which permit applications were submitted in 2015. This long-term objective means that by 2050 the average EPC figure for the entire housing stock will be reduced by 75%. On the EPC scales used with energy labels (A to F), this corresponds to label A (EPC figure 100). This objective is further differentiated according to housing typology.
    - An indicative greenhouse gas reduction to 2.3 Mt CO_2 equivalent for residential buildings. There will therefore be a shift towards increasing the sustainability of the residual demand for electricity and heating, combined with the control of energy consumption through digitisation.
- Non-residential buildings: aim for a carbon-neutral building stock for heating, domestic hot water, cooling and lighting by 2050, with an exemplary role for the public authorities.

These efforts will also be continued after 2050 to make our building stock completely carbon-neutral as soon as possible after 2050.

Because it is established on the basis of data from the EPC database that at the moment at most 3.5%[1] of the existing housing stock meets the target, the annual renovation rate will have to increase to the equivalent of more than 3% deep renovations. Each year, between 2020 and 2050, over 95 000 dwellings will have to undergo deep renovation to reach the long-term objective of label A. If the renovation is carried out in phases, a multiplicity of dwellings are involved in which one or more energy-saving measures are carried out each year. With on average over 17 000 environmental permits for renovation each year, the renovation rate where a permit is required amounts to 0.6% of the housing stock. No environmental permit is required for a large proportion of energy renovation works. In recent years, between 90 000 and 100 000 energy premiums have been paid out per year. The proportion of unique addresses amounts to 65% or approximately 60 000 per year. On the basis of the housing policy, approximately 16 000 renovation premiums were paid out in 2019.

Based on VAT returns, it is estimated for Flanders that in 2018 just over EUR 6 billion was spent on renovation and maintenance (in private dwellings and social housing).[2] The number of loans granted by private banks for renovation amounts to over 60 000 per year.

Taking into account an overlap between these figures and assuming that an application is made for a premium for far from all renovations, it is estimated on the basis of these figures that renovation work is carried out in at least 80 000 dwellings per year, accounting for an annual renovation rate of 2.5% of the Flemish housing market. It should be noted that only a limited proportion of these renovations are one-off deep renovations towards the long-term objective for 2050.

Investments in renovation of the existing buildings up to the 2050 objective are estimated, on the basis of an average investment cost of EUR 55 000 per dwelling, at over EUR 200 billion (EUR 150 billion for residential buildings and EUR 57 billion for non-residential buildings).[3]

The challenge is to boost the existing propensity to invest still further and to focus still more on the energy-saving works aspect. To achieve this, the strategy places strong emphasis on encouraging deep renovations at trigger points, such as for example at transaction times (sale, inheritance) or at the start of a new lease. Exploiting the potential of these trigger points makes a significant contribution to the overall strategic objective to achieve the intended renovation rate between now and 2050.

The key points of the long-term renovation strategy for **residential buildings** are:
- Further elaboration of the long-term objective for 2050 according to housing typology;
- Initiatives to relieve the burden;
- Implementation of incentives for deep renovations in the context of transaction times (purchase, inheritance, renting out);
- Further development of the Housing ID that supports, informs and guides homeowners in deep renovation and healthy, comfortable and safe housing;
- Further development of the EPC+ as an advisory tool for housing renovation in line with the long-term objective for 2050;
- Integrated win-win approach with the asbestos-safe target for 2040 (asbestos certificate, incentives);

[1] Estimate based on 1.5 million EPCs in the database, compulsorily drawn up on sale and rental and valid for 10 years. Since there is no EPC obligation for renovated dwellings which are not sold/rented out, for the housing stock as a whole possibly more than 3.5% will meet the long-term objective for 2050. Moreover, often no new EPC is drawn up after renovation.
[2] Study '*Drempels aan de aanbodzijde*' [Supply-side barriers], Steunpunt Wonen, 2019
[3] More information on renovation costs is provided in Chapter 6 'Estimate of the investments, energy-saving and wider benefits'.

- Sufficient attention to other effects of renovation (increased comfort, added value of dwelling, etc.) to encourage renovation outside the trigger points as well.

The key points of the renovation strategy for **non-residential buildings** are:
- Further elaboration of the long-term objective, i.e. carbon-neutrality for heating, domestic hot water, cooling and lighting;
- Implementation of a renovation obligation within 5 years of purchase for tertiary buildings;
- Development of a Building ID on the same lines as the Housing ID;
- Mandatory EPC for all large non-residential buildings. The 2019-2024 Coalition Agreement provides that, from 2025, all large non-residential buildings with the possibility of heating or cooling must have an energy performance label. From 2030, these buildings must achieve a minimum energy performance label.
- In addition to the above: exemplary function of government buildings. Government buildings within Flemish territory must comply with the minimum energy performance label from 2028. Government buildings of the Flemish public authorities must achieve an annual savings target of 2.5% on primary energy consumption from 2021 onwards.
- Integrated win-win approach with the asbestos-safe target and the asbestos-safe obligations for public buildings in 2034 and 2040 respectively (exemplary function).

For both segments, the need to relieve the burden is a common thread in the strategic approach. In addition to financing solutions, building owners need awareness-raising, easily accessible guidance and, if they so wish, an overall approach from plan to implementation. A large number of initiatives, existing and announced, which contribute to this, are mentioned throughout the text.

1 INTRODUCTION

1.1. EUROPEAN POLICY CONTEXT

In order to meet the international climate objectives, a profound energy transition is necessary in the coming years and decades in Flanders. The Paris Agreement on Climate Change commits the participating countries to limiting global warning to a maximum of 2 degrees Celsius above the pre-industrial level and subsequently to continue the endeavours to limit the rise to 1.5°C. The EU established the climate and energy framework for 2030, which included the following objectives: reduction of greenhouse gas emissions by at least 40% compared to 1990, a binding EU target of at least 32% renewable energy in final energy consumption in 2030 (in accordance with the new Renewable Energy Directive [4]), an indicative EU reduction target of at least 32.5% for energy consumption in 2030 compared to the 2007 reference scenario (in accordance with the new Energy Efficiency Directive[5]).

In the light of the most recent scientific data and the need to step up climate action worldwide, on 12 December 2019, the European Council confirmed the target of a climate-neutral EU in 2050, in accordance with the objectives of the Paris Agreement. Poland was not yet able to commit to the implementation of this objective at that time, and the European Council will return to this issue in June 2020. Flanders explained its projected contribution to European climate neutrality in 2050 in the

[4] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources.
[5] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources.

Flemish Climate Strategy 2050, which was approved at the end of 2019 and was incorporated in the Belgian long-term strategy for the reduction of Belgium's greenhouse gas emissions. We are striving for an 85% cut in greenhouse gas emissions in Flanders in the non-ETS sectors by 2050 compared to 2005, with the ambition of moving towards full climate neutrality. For the ETS sectors, we are signing up within the context defined by Europe for these sectors with a declining scope for emissions under the EU ETS.

At present, at the request of the European Council, the European Commission is conducting an analysis of an update of the aforementioned projected framework. In its Communication 'The European Green Deal' of December 2019, the European Commission already proposed a reduction in the European greenhouse gas emissions of 50% to 55% by 2030 compared to 2005. On the basis of an evaluation of the additional climate efforts of other major trading blocs, Flanders can support a feasible, affordable, bottom-up increase in the European greenhouse gas reduction target for 2030, provided that it is distributed cost-effectively among the Member States, allows international flexibility and in so far as this does not increase the energy bill for citizens and businesses.

Buildings account for 36% of the total CO_2 emissions in the EU. Half the final energy consumption in the Union is attributable to heating and cooling, of which 80% in buildings. In other words, there is a lot to be gained in the building sector. In the revised Energy Performance of Buildings Directive,[6] the emphasis is therefore placed more on renovation of the existing building stock. Article 2a of the Directive requires Member States to establish a long-term renovation strategy. A similar, but far less extensive obligation already arose from Article 4 of the Energy Efficiency Directive (2012/27/EU), and has now been transferred to the Buildings Directive.

The Regulation on the Governance of the Energy Union[7] requires each Member State to notify a final integrated national energy and climate plan 2021-2030 (NECP) to the European Commission by the end of 2019. The long-term renovation strategy for buildings constitutes a supplement to the NECP and must be submitted by 10 March 2020.

1.2. FLEMISH POLICY CONTEXT

The Flemish long-term renovation strategy for buildings is part of a number of broader strategies of the Flemish Region.

On 9 December 2019, the Flemish Government finally approved the Flemish Energy and Climate Plan 2021-2030. Flanders aims to reduce its greenhouse gas emissions in the non-ETS sectors by 35% by 2030, compared to 2005. The Flemish Climate Strategy 2050, which was approved by the Flemish Government on 20 December 2019, includes the aim to reduce greenhouse gas emissions of the non-ETS sectors by 85% by 2050 (compared to 2005), with the ambition to move towards full climate neutrality.

We aim to reduce the emissions from the Flemish building stock to 2.3 Mt CO_2 equivalent by 2050, subdivided into the following targets:

[6] Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency.
[7] Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, Official Journal of the EU of 21 December 2018.

- For non-residential buildings, we are aiming for carbon neutrality for heating, domestic hot water, cooling and lighting;
- An indicative greenhouse gas reduction to 2.3 Mt CO_2 equivalent for residential buildings. The efforts will also be continued after 2050 to make the residential building stock fully climate neutral.

We achieve this by combining far-reaching energy efficiency and control of energy consumption through digitisation with a further increase in the sustainability of the residual demand for electricity and heating. These efforts will be continued in order to make our building stock fully climate neutral as quickly as possible after 2050. In addition to cutting the direct emissions, efforts are also being made to reducing the indirect carbon and materials footprint of our building stock.

The stated objectives build on earlier decisions by the Flemish Government. The Flemish Government policy paper '*Visie 2050: een langetermijnstrategie voor Vlaanderen*' (Vision 2050: a long-term strategy for Flanders) of 25 March 2016 makes the energy transition one of the seven priority transitions. More than 40 organisations (industry, academic world, social partners, various sector federations and citizens) cooperated in 5 'Rapid Acceleration Groups (*Stroomgroepen*) (Energy Efficiency, Renewable Energy, Financing, Flexibility and Governance) towards the Flemish Energy Vision 2030, which the Flemish Government approved on 19 May 2017. In this Vision, the Flemish Government undertook to work towards the transition towards a feasible, affordable, acceptable, safe and low-carbon energy supply which guarantees security of supply and helps to achieve the climate objectives. In terms of employment, this large-scale transition provides an important opportunity for significant, structural growth which at the same time poses a challenge to the labour market in terms of matching supply and demand.

The Interfederal Energy Pact of 2017, which was welcomed by the Flemish Government in 2018, also served as a basis.

With the approval of the Flemish Action Plan on the removal of asbestos (20 July 2018), the Flemish Government decided to make Flemish buildings and infrastructure asbestos-safe in phases by 2034 and ultimately by 2040. Prior to this, the long-term objective for 2040 was already included in the draft policy paper on the Renovation Pact of 17 July 2015 for an integrated building renovation policy on asbestos removal and energy performance towards the respective long-term objectives of 2040 and 2050. The public authorities themselves have a clear exemplary role in this plan.

Long-term strategy for energy-efficient buildings

The Flemish Region is aiming to reduce the emissions from the Flemish building stock to 2.3 Mt CO_2 equivalent by 2050. This is achieved by means of combining far-reaching energy efficiency and control of energy consumption through digitisation with increasing sustainability of the residual demand for electricity and heating. These efforts will also be continued after 2050 to make our building stock fully climate neutral as quickly as possible. In addition to reducing the direct emissions, efforts are also being made to reduce the indirect carbon and materials footprint of our building stock. In order to limit the greenhouse gas emissions, each of the following building characteristics will be addressed:

- Energy performance of the building envelope (roof, facade, woodwork and glazing, floors);
- Compactness (volume and building's surface area of heat loss) and orientation, especially in the case of reconstruction or new construction;
- Energy carriers (natural gas, fuel oil, electricity, etc.) and heating techniques.

The shift towards sustainable heating in our buildings by 2050 is an integral part of the long-term renovation strategy. The lion's share of energy consumption and CO_2 emissions in the building sector is attributable to heating. Consequently, it is crucial to focus on reducing the – currently largely fossil fuel-based – demand for heating and on increasing its sustainability. To achieve the 2050 target aimed for, the use of energy in general and of fossil fuels in particular for heating must decrease very substantially in the next 30 years.

For existing housing, renovation of the building envelope is the top priority so that the total demand for heating is first reduced and the dimensions of the new heating system can be adapted to the residual demand for heating. Where possible, Flanders focuses on heating networks supplied by residual heat or green heat produced centrally. For more dispersed buildings, heating networks are a less efficient solution. There the emphasis is placed on solar thermal energy and electrification (mainly using heat pumps) to achieve our ambitions. In addition to heating networks and electrification, low-carbon and preferably climate-neutral fuels must meet the residual heating demand in the building sector (including hydrogen, biomethane, biomass or synthetic fuels). In an intermediate phase, hybrid installations (such as the combination of a heat pump and a condensing boiler) may provide a technically and economically interesting solution.

In terms of content, the renovation strategy is also geared to central policy objectives under the housing policy and the environmental policy. The strategy therefore also takes account of demographic trends, the aim for high-quality, energy-efficient and affordable housing for everyone, a relatively tight private and social rental market and an increase in spatial efficiency.

NEW CONSTRUCTION

The greatest gain in the building sector is achieved by making our buildings more energy efficient. For new buildings, this will be achieved by tightening up the standards. For instance, from 2021, every new building must meet the nearly zero-energy requirements.

For residential buildings, there is a further evolution by 2021 to energy performance E30 (currently still E35), and a minimum proportion of renewable energy (15 kWh/m²/year). Stricter nearly zero-energy requirements will also apply for new non-residential buildings from 2021: tightening-up of the E-level by 2021 depending on the function of the building (e.g. office E50, school E55, commercial E60) and minimum proportion of renewable energy (20 kWh/m²/year). For both types of buildings, the low energy requirement ensures the feasibility of the move towards carbon-neutral implementation.

Monitoring shows that the energy performance requirements have easily been met for years in the case of new construction. However, the greatest challenge lies in increasing the efficiency of the existing building stock.

EXISTING RESIDENTIAL BUILDINGS

At the end of 2014, the Flemish Government launched the Renovation Pact, with the objective, together with a wide group of stakeholders, to develop and implement a coherent action plan that leads to a strong increase in the renovation rate and energy performance in line with the European energy and climate targets. Forty-three organisations (building sector, civil society, real estate, public authorities, combating poverty) committed to active cooperation in drawing up the Renovation Pact. The Ministers for Energy, Housing and Environment were jointly assigned the task by the Flemish Government in July 2015 to continue the process and to report periodically to the Government. In a

co-creation process with the stakeholders, the following sub-themes were given concrete substance: long-term objective, Housing ID, renovation advice, good practices and business models, obligations, financing, energy poverty programme, policy integration and communication.

As part of the concrete definition of the objectives of the Renovation Pact, a long-term objective was devised on the basis of consultation and studies (see section 2.4 'Cost-effective approaches to energy renovation'), which was endorsed by the Flemish Government.

By 2050 at the latest, existing residential buildings must achieve a comparable energy performance level to newly constructed dwellings for which permit applications were submitted in 2015.
This long-term objective means that by 2050 the average EPC figure for the entire housing stock will be reduced by 75%. On the EPC scales used with energy labels (A to F), this corresponds to label A. This objective is differentiated further according to housing typology. A shift will be made at the same time towards sustainable heating.

To achieve this long-term objective by 2050, two equivalent tracks were defined under the Renovation Pact: the implementation of a package of measures and the achievement of an energy performance indicator. The package of measures is composed as follows:

1° maximum U-values for the envelope:
- roofs and ceilings, walls and floors: Umax= 0.24 W/m^2.K;
- windows (profiles and glazing): Umax= 1.5 W/m^2.K and Uglass = 1.0W/m^2.K;
- doors and gates (including frame): Umax= 2.0 W/m^2.K;

2° a heating system comprised of:
- condensing boiler or;
- (micro) CHP or;
- heating system based on a renewable energy source (heat pump, etc.) or;
- decentralised heating appliances with a total maximum capacity of 15 W/m^2 or;
- connected to an efficient heating network.

For the alternative energy performance indicator track, the aim is an energy level equivalent to an energy rating (EPC figure) of 100 kWh/m^2 (label A), differentiated according to housing typology or an E-level of 60.

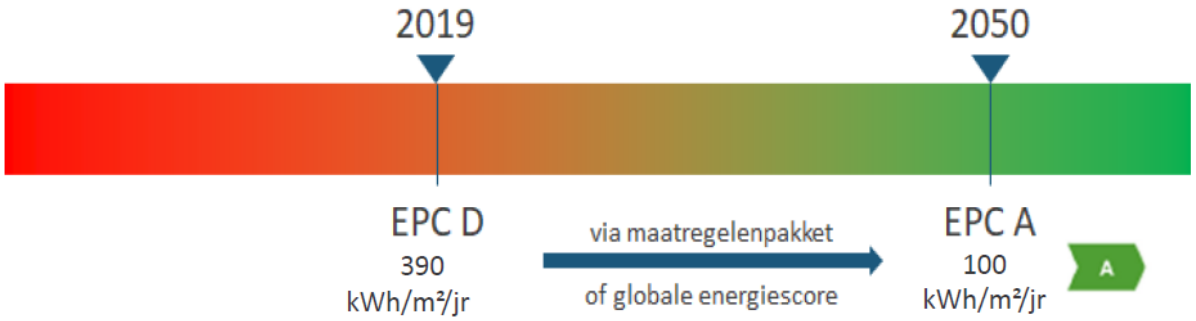


Figure 1: Current energy performance and long-term objective for residential buildings

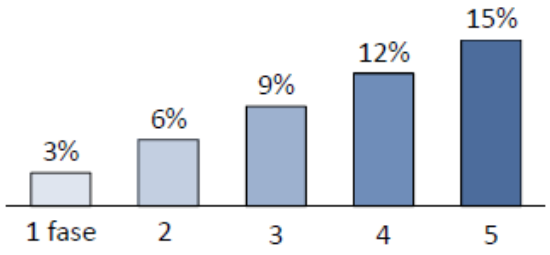
Key
via maatregelenpakket = via package of measures
of globale energiescore = or overall energy rating

jr = year

The 2019-2024 Coalition Agreement (October 2019) provides that the Flemish Government will refine the long-term target for 2050 for housing renovation of on average 100 kWh/m² according to the building typology (apartment, terraced, semi-detached or detached structure), will evaluate it on a regular basis and will ensure certainty by introducing intermediate benchmarks in line with the Flemish Energy and Climate Plan for 2030.

Because at the moment, according to the data from the EPC database, about 3.5% of the existing housing stock of nearly 3 million dwellings (houses and apartments) meet the target, a further 2.9 million dwellings must progress towards the 2050 objective (rounded to 96.5% of the housing stock).[8] This means that, if the efforts are spread uniformly, in the next thirty years an average of over 3% of the housing stock or over 95 000 housing units per year must move towards the 2050 objective.

In practice, most owners carry out renovations in phases, which means that on an annual basis, one or more energy-saving measures will have to be carried out in a multiplicity of dwellings in order to achieve the 2050 objective at the level of the housing stock. If, for example, renovation is carried out in three phases to label A, these are equivalent to a single renovation to label A in one step.



Impact of depth of renovation on number of renovations/year needed:

- In 1 step to label A: > 3% or 95 000 housing units/year
- In 2 steps to label A: > 6% or 190 000 housing units per year
- …..
- In 5 steps to label A: >15% or 475 000 housing units per year

Figure 2: Relationship between the number of renovation phases towards the long-term objective and annual proportion of dwellings to be renovated

Key
fase = phase

Given the impact of renovation on the daily life of households and on the necessary capacity in the construction sector, owners usually opt to renovate in as few steps as possible. For this reason, it is proposed in this strategy to encourage renovation firstly at naturally opportune times, such as for example at transaction times (sale, inheritance) or the start of a new lease (see below). At the same time, sufficient attention to renovation is also prompted by an increase in the value of the dwelling or building or by the need or desire for greater comfort.

In the remainder of this document, the following terms are used when referring to the 'renovation rate':

- Renovation rate label A equivalent: the annual renovation rate necessary between 2020 and 2050 to enable all Flemish dwellings to meet the long-term objective for 2050 (on average over 3%);

[8] Estimate based on 1.5 million EPCs in the database, compulsorily drawn up on sale and rental and valid for 10 years. Since there is no EPC obligation for renovated dwellings which are not sold/rented out, for the housing stock as a whole possibly more than 3.5% will meet the long-term objective for 2050. Moreover, often no new EPC is drawn up after renovation.

- Renovation rate: the number of dwellings in which renovation works are carried out on an annual basis (expressed as a % of the housing stock).

EXISTING NON-RESIDENTIAL BUILDINGS

The Flemish Climate Strategy for 2050 defined the following long-term target/level of ambition for existing non-residential buildings:

For the existing non-residential buildings, we are aiming for a carbon-neutral building stock for heating, domestic hot water, cooling and lighting by 2050.

The Flemish Energy Vision 2030 stated that, for non-residential buildings, a perspective must be given on a long-term objective with regard to energy performance. In this respect, efforts must be made to carry out deep energy renovation at times of transactions, such as sale, rental and change of function. To boost the demand for energy services by private actors, it must be possible to compare actual energy consumption of tertiary buildings within each sector or subsector.

The 2019-2024 Coalition Agreement provides that from 2025 all large non-residential buildings with the possibility of heating or cooling must have an energy performance label. From 2030, these buildings must achieve a minimum energy performance label. The government buildings within Flemish territory are setting a good example by complying with the minimum energy performance label at least two years earlier.

In order to achieve the long-term objective for non-residential buildings, i.e. carbon neutrality in 2050, it is important that a similar pathway is embarked upon for non-residential buildings as the Renovation Pact. The various stakeholders are also involved in this co-creation pathway. In this way, the public authorities obtain (even) more insight into the barriers to be removed for each subsector and the building managers can be closely involved in the concrete elaboration of the policy toolbox to enable the achievement of the long-term objective for the various subsectors.

INCREASING THE SUSTAINABILITY OF THE RESIDUAL DEMAND FOR HEATING

There will always be a residual demand for energy in both types of buildings. The Flemish Region is aiming to make heating more sustainable. Where possible, our buildings are heated with residual heat or green heat via heating networks. The maximum industrial residual heat will be recovered by 2050. Heat that can no longer be used in industry here is used as far as possible via heating networks for the heating of buildings or other sectors such as agriculture. The potential for such collective heating systems is increased by intelligent spatial planning which encourages reinforcement of centres and grouped housing. The legislative framework, the energy performance regulations (EPB regulations) and the support framework will be reviewed to give greater impetus to the development of heating networks fuelled by green and residual heat. For more remote or dispersed buildings, heating networks are less efficient and solar thermal energy and electrification (mainly via heat pumps) are opted for.

REDUCING THE ENVIRONMENTAL IMPACT OF BUILDINGS

In addition to direct emissions, our building stock also has a significant indirect carbon and materials footprint. For instance, materials today are responsible for 15% to 18% of a building's total environmental impact. This share will increase further as the building stock becomes more energy-efficient. On design, renovation and demolition, care can be taken and efforts must be made for materials to be reused or recycled in a high-quality and environmentally sustainable manner.

Compactness and more efficient use of the building stock (for example where spaces are shared) can already make a significant contribution to reducing the environmental impact of our buildings. For this reason, efforts focus on forms of housing that limit the building volume per user but at the same time maintain and even increase the housing quality and quality of life, such as co-housing, 'intergenerational homes', and buildings that are designed for change and multifunctional use so that spaces can be easily adapted to the needs of the user.

In time, designs will also allow for easy dismantling of buildings and spaces so that materials can be reused or recycled in a high-quality and environmentally sustainable manner. Material IDs associated with the building will retain information on the building materials used, their composition and location so that they can be recovered for reuse or recycling during the demolition phase. For existing buildings that are coming to the end of their life, selective demolition is considered to allow better recovery and recycling of the material flows. Toxic substances (such as asbestos and tar) need to be removed from the cycle, but all other, non-toxic waste materials are recycled with the highest possible quality and applied in a new life.

1.3. CURRENT SITUATION CONCERNING THE LONG-TERM RENOVATION STRATEGY 2017

The Fourth Flemish Energy Efficiency Action Plan, which was notified to the European Commission in April 2017 in implementation of the European Energy Efficiency Directive, contained as an annex the roadmap for the renovation of the Flemish building stock. The key points from the residential long-term renovation strategy 2017 were the fixing of the long-term objective for 2050 (see above), the development of a Housing ID, an update of the energy performance certificate and the rollout of the Energy Poverty Programme of 2016.

In December 2018, the Flemish Energy Agency (*Vlaams Energieagentschap*, VEA), in cooperation with the Environment Department, the Flemish housing agency Wonen-Vlaanderen and the Public Waste Agency of Flanders (OVAM), launched a first version of the **Housing ID** (see Annex). In the near future, the Housing ID will develop further into a digital safe and an active tool that supports, informs and guides homeowners in deep renovation and healthy, comfortable and safe housing. In 2018, the Flemish Parliament also adopted a legal basis to develop a digital Building ID for non-residential buildings, following the example of the Housing ID.

The energy performance certificate (EPC) for residential buildings has been mandatory since 1 November 2008 on the sale of housing units and since 1 January 2009 for rental. In addition to a calculation of the theoretical energy consumption for heating and hot water, the original version contained a summary and general basic advice for the building parts to be renovated.

In order to be able to raise awareness in a more targeted manner concerning the long-term objective for 2050 and the concrete steps still needed to get there, **an updated EPC has entered into force since January 2019**. The standard recommendations have been replaced by a package of measures tailored to the dwelling, including a cost estimate for single-family dwellings in line with the long-term objective for 2050. A label has been added to the updated EPC, ranging from F to A+. Label A corresponds to the energy performance objective for 2050. This objective will be broken down further according to the housing typology.

In March 2016, the Flemish Government approved an **Energy Poverty Programme** with 34 actions to protect energy users against disconnection and to make energy savings in the dwellings of vulnerable families. More information is included in the chapter on the Energy Poverty Action Plan.

The LIFE Integrated Project for Climate BE-REEL! ('BElgium Renovates for Energy-Efficient Living') started at the beginning of 2018 under the coordination of the VEA, with the aim of accelerating the implementation of the long-term strategy of the Walloon and the Flemish Regions. A partnership consisting, *inter alia*, of the Walloon and Flemish Regions, various towns and the Belgian Building Research Institute (*Wetenschappelijk en Technisch Centrum voor het Bouwbedrijf*, WTCB) aims through this project, for which the EU has awarded a LIFE subsidy of over EUR 8 million, to accelerate the implementation of the approved regional renovation strategies from 2018 to 2024 by setting up ambitious demonstration projects (renovation of over 8 500 dwellings), developing and disseminating innovative business models, setting up learning networks and expanding a knowledge platform.

2. KEY FIGURES CONCERNING THE FLEMISH BUILDING STOCK

2.1. GENERAL OVERVIEW

In the Flemish Region (13 522 km²), which is located entirely in the same temperate maritime climate zone, there are, according to the land registry data at 1 January 2019, nearly 2.7 million buildings (about 2.3 million residential buildings and 0.4 million non-residential buildings).

Terraced houses	Semi-detached houses	Detached houses	Apartment buildings	Commercial buildings	Other buildings	Total
652 055	587 359	898 501	131 693	77 524	339 050	**2 686 182**

Table 1: Land registry building stock statistics 2019

2.1.1. Energy consumption of existing buildings

The total final energy consumption in the Flemish Region fell in in 2018 (267.5 TWh) by 3.5% compared to 2005 (276.8 TWh). Compared to 2017, there was an increase of 0.6%.

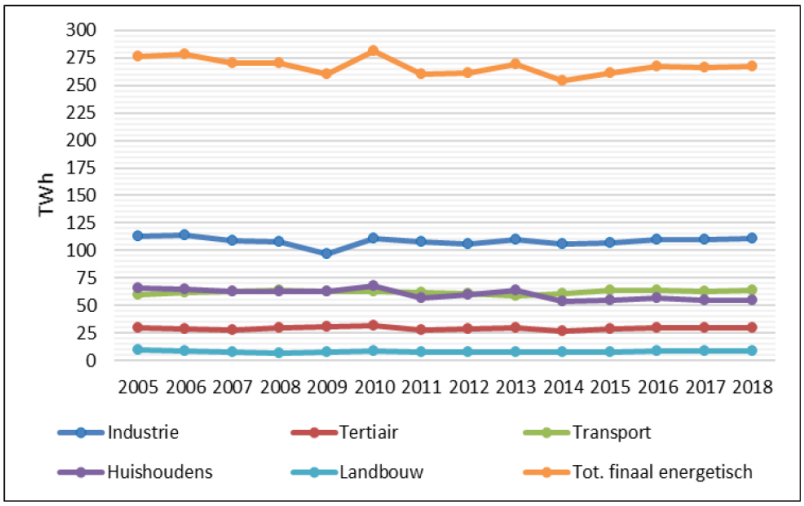


Figure 3: Trend in final energy consumption

Key
Industrie = Industry
Tertiar = Tertiary
Transport
Huishoudens = Households
Landbouw = Agriculture
Tot. finaal energetisch = Total final energy consumption

The share of households in final energy consumption amounted to 20% (54.7 TWh) in 2018. The tertiary sector, with energy consumption of 29.9 TWh in 2018, had a share of 11% in final energy consumption. Household energy consumption in 2018 (54.7 TWh) was considerably lower (-16%) than in 2005 (65.3 TWh), with 2018 being slightly warmer than 2005.

2.1.2. Greenhouse gas emissions of existing buildings

Total greenhouse gas emissions in Flanders fell by 12% from 86.3 megaton (Mt) CO_2 equivalent in 1990 to 75.6 Mt CO_2 equivalent in 2018. In the same period 1990-2018, the number of Flanders inhabitants rose by more than 14%, while GDP even increased by more than 72%.

Non-ETS greenhouse gas emissions in Flanders fell by 5% from 46.1 Mt CO_2 equivalent in 2005 to 43.8 Mt CO_2 equivalent in 2018. Only a provisional estimate is currently available for 2018. In the period 2005-2018, reductions are observed only in the buildings (-22%) and the waste sectors (-21%).

Sector	2005	2013	2014	2015	2016	2017	2018
Waste	2.8	2.4	2.3	2.3	2.2	2.3	2.2
Non-ETS Industry	4.4	6.5	6.3	6.0	6.2	5.7	5.9
Buildings	15.7	14.4	12.0	12.2	12.5	12.2	12.2
Agriculture	7.4	7.2	7.0	7.3	7.4	7.5	7.5
Transport	15.8	15.0	15.3	16.4	16.3	15.9	16.0
Total	**46.1**	**45.5**	**43.0**	**44.3**	**44.6**	**43.5**	**43.8**

Table 2: Non-ETS greenhouse gas emissions in Flanders 2005-2018 Mt CO_2 equivalent

In 2018, the transport (36%) and buildings (28%) sectors made the largest contribution to total non-ETS greenhouse gas emissions in Flanders.

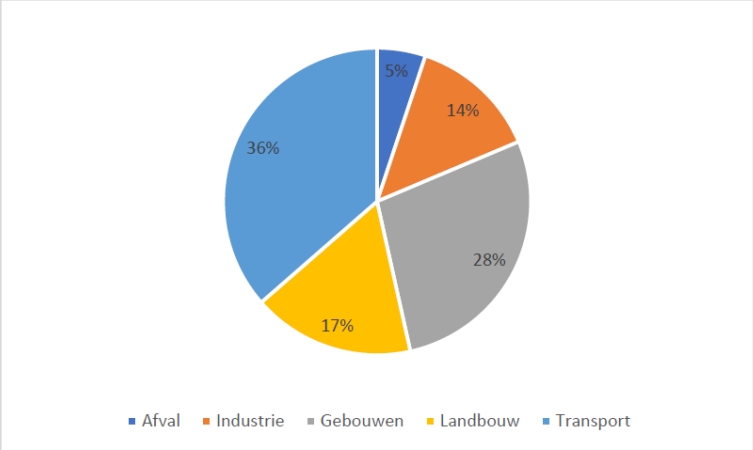


Figure 2 Sectoral shares in Flemish non-ETS greenhouse gases in 2018

Key
Afval = Waste
Industrie = Industry
Gebouwen = Buildings
Landbouw = Agriculture
Transport

2.2. KEY FIGURES CONCERNING RESIDENTIAL BUILDINGS

This section explains the main characteristics of the Flemish housing stock and the energy performance.

COMPOSITION OF THE FLEMISH HOUSING STOCK

The Flemish housing stock is characterised by a high proportion of old buildings. Approximately 55% of the single-family houses and just over 40% of the apartment buildings in Flanders are pre-1970s. The year of construction of a considerable proportion of single-family houses (28.5%) is before World War II. The year of construction is established on the basis of the land registry data. It must be borne in mind that in some cases there have already been major renovations, while the original date of construction was still maintained.

	Single-family houses		**Apartment buildings**	
Year of construction	**Number**	**%**	**Number**	**%**
< 1945	608 229	28.5%	20 322	15.43%
1946-1970	563 861	26.4%	34 486	26.19%
1971-1991	516 045	24.1%	26 959	20.47%
1992-2011	357 476	16.7%	35 083	26.64%
>2011	91 988	4.3%	12 338	9.37%
Unknown	229	0.0%	2 505	1.90%
Total	**2 137 828**		**131 693**	

Table 3: Land registry data 2019

According to typology, the distribution of the Flemish housing stock is as follows:

Terraced	Semi-detached	Detached	Apartments	Total
652 055	587 359	898 501	848 992	2 986 907
22%	20%	30%	28%	100%

Table 4: Land Registry housing stock statistics 2019

With an average of 6.5 housing units per apartment building, Flanders has nearly 850 000 apartments. In 1995, 17% of the total number of dwellings were located in an apartment building. In 2019, this number had risen to 28%. The proportion of people living in apartments is far below the European average of 40%. Belgian dwellings, with an average floor area of 125 m², are relatively large compared to the European average of 95 m² (source: Eurostat, EU-SILC). Approximately 40% of households live in urban areas and the same number in rural areas. The other 20% live in suburban areas.

With a population density of 487 inhabitants/km², Flanders is one of the most densely populated regions in Europe. At the beginning of 2019, the Flemish Region had 6 589 069 inhabitants. Between 2007 and 2019, the number of private households in the Flemish Region rose from 2.55 million to 2.8 million, an increase of over 10%. By 2030, Statistics Flanders (*Statistiek Vlaanderen*) forecasts an increase compared to 2017 of over 211 000 households to 2.98 million (+5%). In particular one-person and two-person households will grow by 10%, while the number of larger households will decline. In association with this demographic trend, there will be a growing need for adapted, small, affordable, good quality and easily accessible dwellings.

Households in Flanders	2017	2030	Increase
1 person	869 448	963 273	93 825
2 persons	948 641	1 049 728	101 087
3 persons	401 010	399 853	- 1 157
4 persons	369 414	377 985	8 571
5 persons or more	180 746	189 655	8 909
Total	2 769 259	2 980 494	211 235

Table 5: Trend in number of households by size and forecasted growth to 2030 (Statistics Flanders)

The new construction market in Flanders is reorienting. Since 2002, more building permits have been issued for new apartments than for houses. In 2019, 63% of the newly constructed dwellings for which permits were issued were apartments. Two thirds of the new dwellings are built by professional property developers.

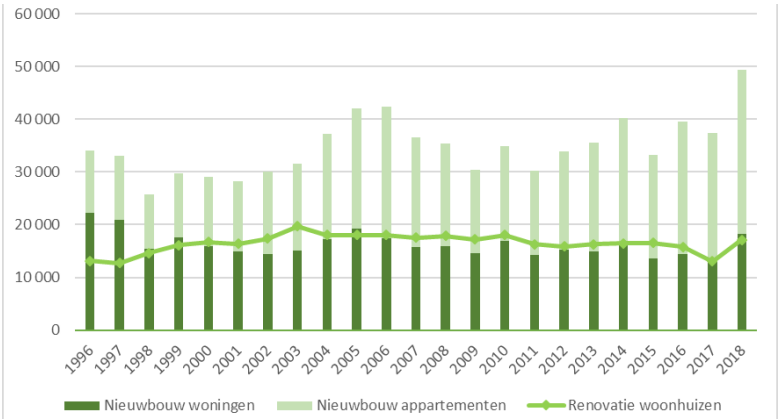


Figure 3: Trend in building permits for newly constructed dwellings and for renovation of dwellings from 1996 to 2018 (Source: Land Registry building stock statistics, ADS)

Key
Nieuwbouw woningen = newly constructed houses
Nieuwbouw appartementen = newly constructed apartments
Renovatie woonhuizen = renovation of residential buildings

Between 2013 and 2018, there was a clear increase in reconstruction after demolition (+85%) to over 4 000 in 2018. Based on data for the number of demolition applications and permit applications for new construction, it appears that for each housing unit demolished, on average 2.2 energy-efficient housing units are added (Spatial planning report, 2018).

OWNERS VERSUS TENANTS

72% of households are owner-occupiers (Housing survey (*Woonsurvey*) 2018). This is slightly above the EU average of 69% owners (Eurostat, EU-SILC 2018). 50% of Flemish owners are not paying off a housing loan. Within the 20% highest incomes, the proportion of owners is 90%, while in the lowest income quintile, it is only 50% (in 2005 still 63%). The proportion of private tenants amounts to 19% (550 000 dwellings) and the proportion of social tenants is 7% (approximately 165 000 dwellings). More young people (28%) and single persons (45%) rent, but also more low-skilled people, more unemployed people, more disadvantaged households and more sick and disabled persons. Large-scale research into the general housing quality of the Flemish housing stock shows that these rented dwellings are in general in a poorer condition in terms of quality and energy than owner-occupied dwellings.

COST OF HOUSING

In 2018, 1 in 5 Flemish households spent more than 30% of their disposable income on bare housing costs ('high housing expense ratio'). This refers to expenditure on rent or repayment of a housing loan, without additional housing expenses for insurance, taxes, maintenance and utilities. For the lowest income group, just over than 3 in 10 households have a high housing expense ratio, compared to 1 in 10 of the highest income group. In 2018, 52% of private tenants and 23% of social tenants had a housing expense ratio exceeding 30%.

HOUSING QUALITY

According to the results of the 2013 National Housing Survey (*Grote Woononderzoek*), based on specific housing inspections, just under one million Flemish dwellings, or 37% of the total inhabited housing stock, did not meet the minimum standards (quality, safety, health, energy) of the Flemish Housing Code (*Vlaamse Wooncode*). Approximately 650 000 of these dwellings can attain sufficient quality through one or more limited interventions that do not require major renovation works. That means that approximately 350 000 dwellings (13%) still remain where not all defects can be easily remedied and where the insufficient quality is of a more structural nature.

In the course of 2018, a new housing survey (*Woonsurvey 2018*) was carried out, which was published in April 2019. The physical condition of the Flemish dwellings improved between 2013 and 2018. In 2018, 77% of the Flemish housing stock was in good condition, 12% in moderate condition and 11% or approximately 310 000 dwellings in poor or very poor condition. As previous studies have already shown, the quality on the owner-occupied market remained better than on the rental market. Of the

± 310 000 dwellings (11%) with structural problems in Flanders, 115 000 are rented. All these private rented dwellings need deep renovation or are eligible for demolition and replacement new construction.

ENERGY PERFORMANCE OF HOUSING

In February 2020, approximately 1.5 million valid energy performance certificates had been issued. Of all dwellings, approximately 50% therefore had a calculated EPC figure. The average figure for an apartment is 248 kWh/m² per year and for a single-family house 418 kWh/m² per year. There is a strong correlation between the energy performance of buildings and the year of construction. Legislation on insulation came into force in Flanders only from 1993 with the introduction of the K-level for new dwellings. In 2006, the energy performance regulations (EPB) entered into force. On the basis of this, an 'EPC new construction' was issued for newly constructed dwellings which also contains a number.

The following table gives an overview of the numbers according to year of construction and type for both existing dwellings for which a mandatory EPC was drawn up in the context of a sale or rental, and newly constructed dwellings from 2006.

	Apartment		**Collective residential building**		**Single-family house**	
	Number	**Figure**	**Number**	**Figure**	**Number**	**Figure**
<=1920	***17 425***	***369***	***888***	***395***	***46 868***	***545***
1921-1945	***18 905***	***378***	***652***	***413***	***70 027***	***533***
1946-1970	***110 039***	***338***	***1 032***	***389***	***190 028***	***539***
1971-1985	***80 143***	***268***	***249***	***323***	***93 726***	***406***
1986-1995	***56 628***	***244***	***202***	***255***	***47 186***	***322***
1996-2005	***69 596***	***195***	***155***	***237***	***41 367***	***233***
>2005	***31 857***	***153***	***130***	***177***	***11 108***	***182***
EPB from 2006	***149 319***	***112***	***1 539***	***121***	***142 574***	***110***
unknown	***110 496***	***351***	***2 222***	***390***	***205 089***	***529***
Total (Years)	**644 498**	**248**	**7 069**	**320**	**847 973**	**418**
Total apartment, collective residential building and single-family house					**1 499 450**	

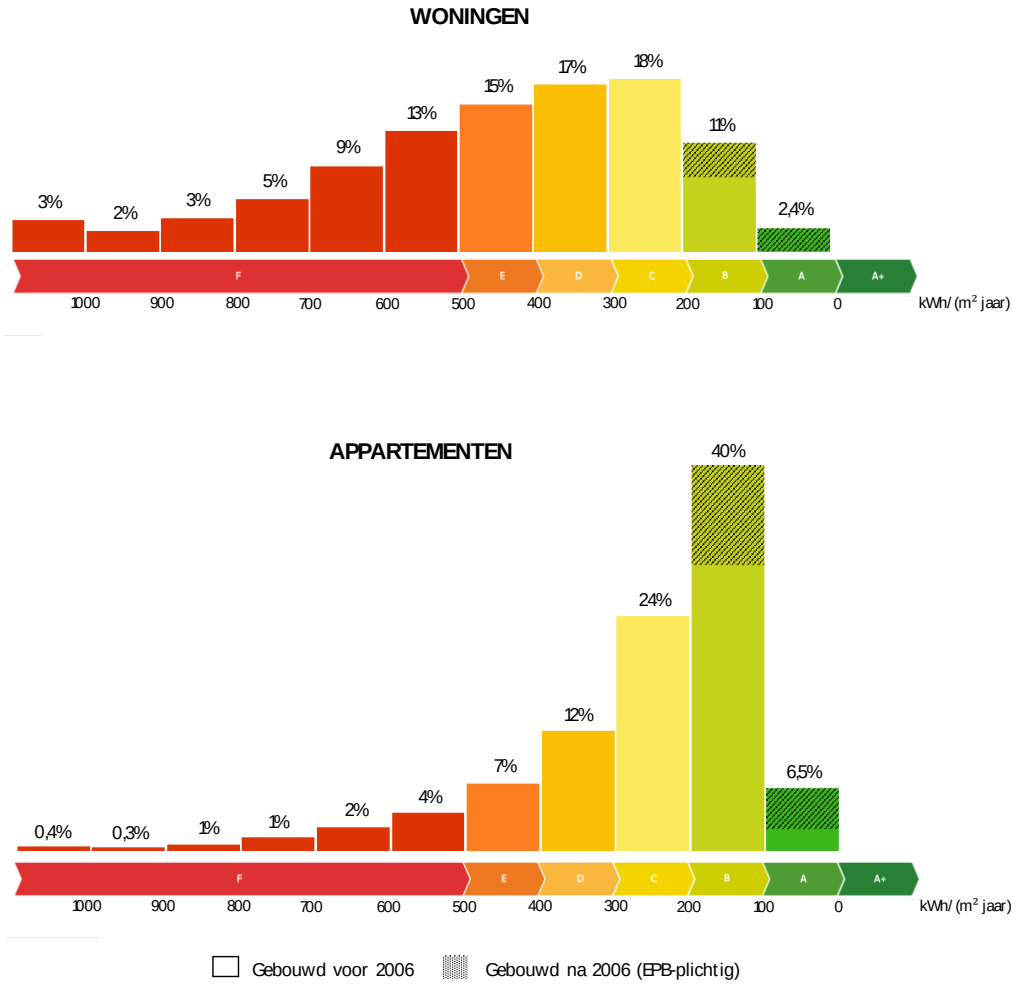
Table 6: Average figures for residential buildings according to year of construction and type of residential building. Source: EPC database and EPB database, VEA, February 2020

The EPC and the EPB databases contain files for only about half of the housing stock, drawn up in accordance with the current requirement on sale/rental (EPC) and building permit (EPB). Renovations carried out in dwellings which are not sold/rented or not subject to a permit requirement are not

reflected in the average energy performance figures stated in table. There is therefore a high probability that the average energy performance for the housing stock as a whole is better.

If the energy performance by year of construction segment is combined with the proportions of dwellings in the same segments, it is found that the main hotspots in terms of energy consumption are the houses built between 1945 and 1981 with the emphasis on the detached four-façade house.

As already indicated above, in the context of its long-term housing renovation strategy, the Flemish Government has set itself the target that all existing dwellings will achieve an equivalent or comparable energy performance level by 2050 at the latest as newly constructed dwellings with a permit application submitted in 2015. Expressed in the updated EPC, that is a figure of maximum 100 kWh/m² per year or label A. At present, 2.4% of houses and 6.5% of apartments comply with this. Of the single-family houses, 35% have the least efficient label F. In the case of apartments, this figure is below 9%.



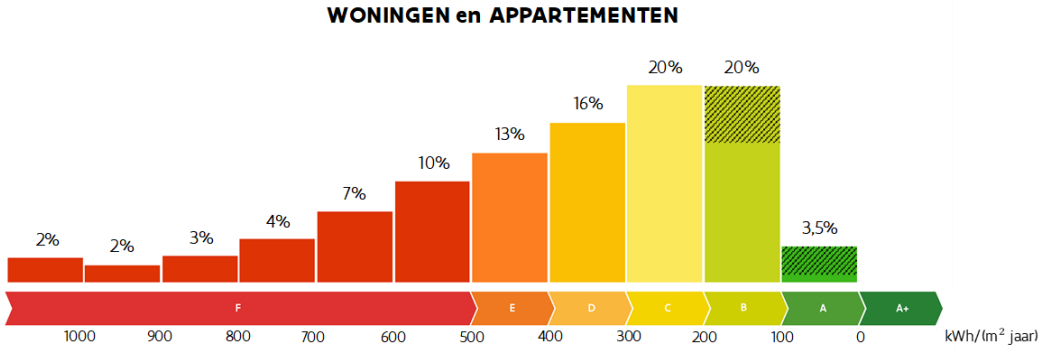


Figure 4: Distribution of dwellings over labels (EPB and EPC databases, weighted by Land Registry data (February 2019)

Key
WONINGEN = HOUSES
kWh/m2 jaar = kWh/m2 per year
APPARTEMENTEN = APARTMENTS
Gebouwd voor 2006 = Constructed before 2006
Gebouwd na 2006 (EPB-plichtig) = Constructed after 2006 (subject to EPB requirements)
WONINGEN EN APPARTEMENTEN = HOUSES AND APARTMENTS

TREND IN ENERGY PERFORMANCE OF THE HOUSING STOCK

The statistics on the total insulation percentage and the presence of different types of heating systems provide insight into the degree of renovation of the existing building stock. In the 2018 Housing Survey, progress was recorded for all forms of insulation in the period between 2005 and 2018. Owner-occupied dwellings perform better than rental dwellings, just as single-family dwellings score better than multi-family dwellings.

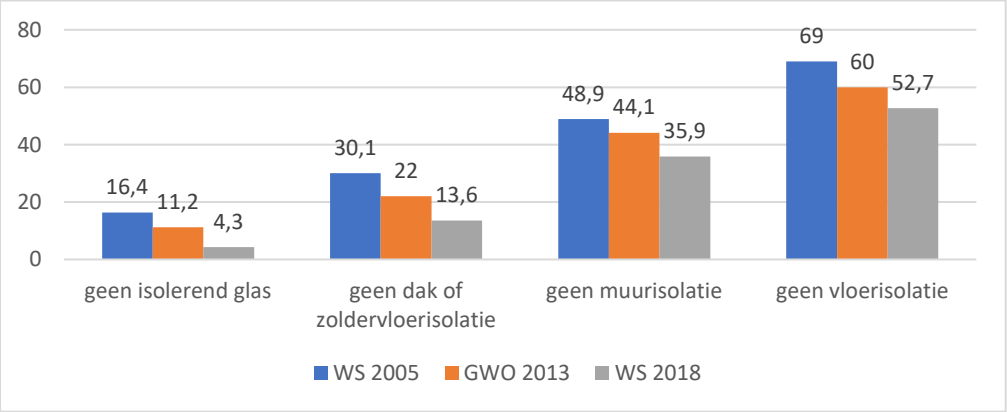


Figure 5: Absence of insulation (Housing Survey 2005, 2013 and 2018)

Key
geen isolerend glas = no insulating glass
geen dak of zoldervloerisolatie = no roof or loft floor insulation
geen muurisolatie = no wall insulation
geen vloerisolatie = no floor insulation

WS = Woonsurvey = Housing Survey
GWO = Grote Woononderzoek = National Housing Survey

HEATING AND DOMESTIC HOT WATER

84% of the heating demand is generated from fossil fuels. Heat is currently produced in Flemish homes mainly by means of individual heating systems. According to the recent REG (Rational Use of Energy) survey (2019), which was conducted among 1 001 families, 68% of the families heat their home with natural gas (main heating) and 16% with fuel oil. In addition, 9% of the surveyed families heat their home with electricity and 4% with wood. Wood, in addition to main heating, is mainly used for supplementary heating (this is not included in this figure). The heat pump and heating network categories currently together account for the heating of approximately 1% of the families. The results show that since 2015 there has been no perceptible change in the principal source of energy for main heating.

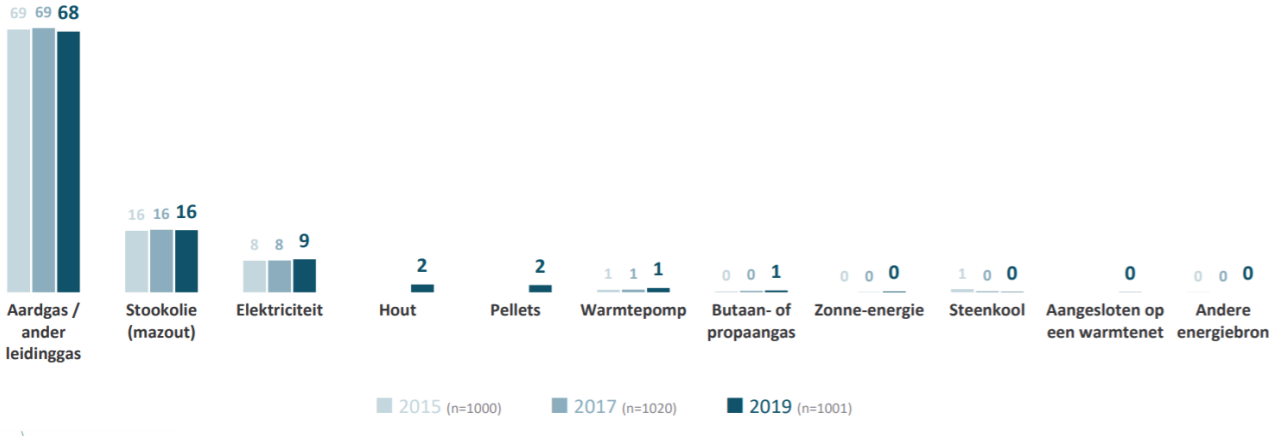


Figure 6: Change in the proportion of households (%) per main fuel or source of energy for heating of housing according to the results of the REG survey

Key
Aardgas/ander leidinggas = Natural gas/other pipeline gas
Stockolie (mazout) = Fuel oil
Elektriciteit = Electricity
Hout = Wood
Pellets
Warmtepomp = Heat pump
Butaan- of propaangas = Butane or propane gas
Zonne-energie = Solar energy
Steenkool = Coal
Aangesloten op een warmtenet = Connected to a heating network
Andere energiebron = Other energy source

For domestic hot water, 1% of the families have a heat pump boiler and 3% a solar boiler.

EXPLOITING THE POTENTIAL OF TRIGGER POINTS

There are a number of natural moments in the lifecycle of a residential building when owners are more likely to undertake a deep renovation, such as the purchase of a new dwelling. The identification of these trigger points offers the possibility to assess the associated renovation potential and to link

support and/or regulatory measures to them which take account of the specific characteristics of these moments.

An inventory was drawn up of the following typical moments: the change of owner or tenant, situations of vacancy, planned renovations, dwellings of structurally insufficient quality [9] and demolition followed by new construction. In particular, the change of owner or tenant and demolition of a poor quality dwelling followed by reconstruction offer great potential for deep renovation to label A. In addition, other moments can be seized upon, such as a planned renovation or vacancy, to maximise the improvement of the energy performance, whether or not in phases.

Utilising the potential of these trigger points makes a significant contribution to the overall strategic objective of achieving a label A equivalent renovation rate between now and 2050, which on average allows 3% of dwellings per year to move towards label A.

The following table provides an overview of the trigger points with their share in the total housing stock on an annual basis (details follow below):

Trigger point (source)	**% of dwellings**	**number/year**
Sale (1 x per 30 years) (land registry)	2.5%	75 000
Other transfers (inheritance, gift) (Federation of notaries)	1.0%	30 000
Change of tenant (every five years) (Estimate)	3.6%	110 000
Renovation with permit (Environmental permits)	0.6%	18 000
Major energy renovation (Environmental permits and VEA)	0.1%[10]	3 000
Demolition and reconstruction (Environmental permits)	0.14%[11]	4 000

Table 7: Trigger points: % of housing stock and number per year

In addition to these trigger points, vacancy can also be considered as a potential trigger point. The number of vacant dwellings in Flanders is estimated at 50 000 (1.7% of the housing stock). Since vacancy sometimes lasts for years, it is not possible to establish the proportion on an annual basis.

In order to exploit the potential of these trigger points on an annual basis, a range of appropriate activating policy measures are necessary. At present, only a limited number of renovations lead to label A in one go. Since in most situations, the renovation will be carried out in phases, the concept of 'label A equivalent' is used, which allows the energy saving achieved from phased renovations to be

[9] As defined in the National Housing Survey (*Grote Woononderzoek*) 2013.

[10] The number of major energy renovations is following a rising trend. In 2018, a permit was issued in the Flemish Region for about 1 000 major energy renovations (0.04%). It is expected that the growth will continue to 0.1% in 2025 (3 000/year), each time achieving the final target of a label A.

[11] The strong growth is expected to continue exponentially here. In 2030, we expect 20 000 cases per year (0.66%) rising to 40 000 by 2040 (1.33%). On average, we assume 24 000 (= 0.8%). In this respect, it is pointed out that the new dwelling constructed is subject to the strict EPB requirements for new construction, as a result of which the new housing units will by definition have label A.

taken into consideration uniformly in the renovation rate indicator (3% per year to label A). A few calculation examples for possible policy measures and their calculated contribution to achieving a 3% label A equivalent renovation rate:

- Demolition and reconstruction ((evolution towards) 0.8% of the housing stock per year):
  - The existing EPB requirements will lead to label A in 100% of cases, as a result of which from 0.14% to 0.8% of the housing stock per year will in time in fact progress to label A.
- Change of owner (sale) (2.5% of the housing stock per year (75 000):
  - Approximately 80% of dwellings (60 000 or 2% of the housing stock) has label C or worse. Labels E and F are considered as a priority for renovation.
  - It is assumed that energy renovation is achieved through a package of measures to be defined for 80% of these dwellings (i.e. 2% of the housing stock) which on average corresponds to 50% of the distance to the target label A. This is consequently considered as the equivalent of 1% of the housing stock progressing to label A.
- Change of owner (inheritance, gift) (1% of the housing stock per year):
  - Via a package of measures to be defined, 80% of these dwellings (0.8% of the housing stock) undergo an energy renovation which on average corresponds to 50% of the distance to the target label A, as a result of which an equivalent of 0.4% of the housing stock progresses to label A.
- Change of tenant (3.9% of the housing stock per year):
  - Via a package of measures to be defined, one or more energy-saving works can be carried out, which account for an average 15% energy saving or jump by 1 label, as a result of which an equivalent of 0.6% of the housing stock progresses to label A.

The effective realisation of the potential will be a dynamic process which, due to the low predictability, will be monitored continuously and adjusted regularly.

Depending on the extent to which the packages of measures geared to the trigger points succeed in exploiting the potential, additional renovations of inhabited dwellings will also be necessary apart from this in order to make up for any shortfall in achieving the goal of on average 3% renovation to label A.

The figure below illustrates the (theoretical) potential of existing policy measures and those to be defined for the main trigger points:

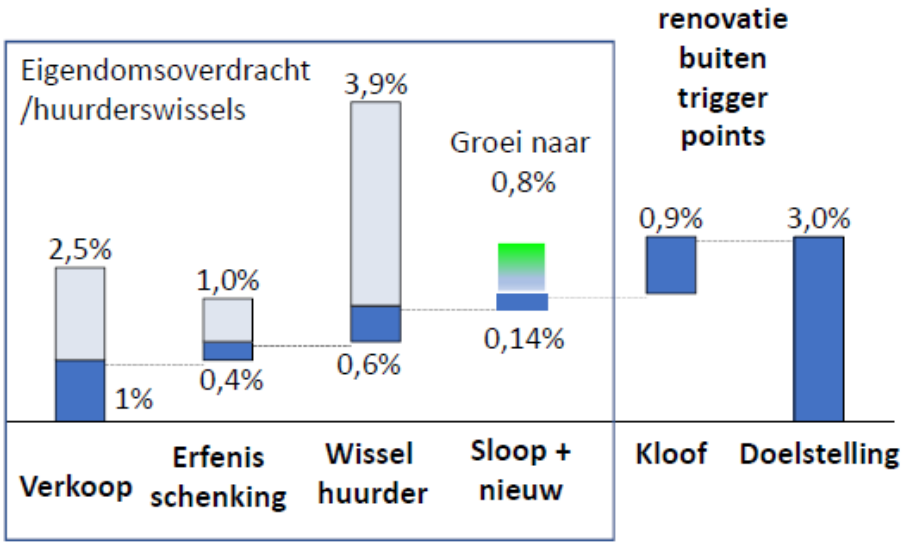


Figure 7: Potential for the utilisation of trigger points to renovate to the long-term objective for 2050

Key
Eigendomsoverdracht/huurwissels = Transfer of ownership/change of tenant
Groei naar = Growth to
Verkoop = Sale
Erfenis/schenking = Inheritance/gift
Wissel huurder = Change of tenant
Sloop + nieuw = Demolition + new
Renovatie buiten trigger points = Renovation outside trigger points
Kloof = Shortfall
Doelstelling = Objective

More details on the trigger points mentioned:

SALE

On an annual basis, on average 75 000 dwellings were sold between 2012 and 2018. In 2018 and especially 2019, there was strong growth in the number of sales.

Number sold per year	Total	Apartments	Detached	2-3 façades
2019	99 281	27 226	23 117	48 938
2018	81 116	22 555	18 969	39 637
2017	77 603	21 152	17 824	38 627
2016	74 725	20 401	17 203	37 121
2012	64 799	17 459	14 171	33 169

Table 8: Sales of dwellings per year (Source: Land Registry)

This number corresponds on an annual basis to 2.5% of the housing stock. **On average, this opportunity will arise only once for each dwelling in the period 2019 to 2050.** The construction sector estimates that 50% of the new owners carry out renovation works in the first year after purchase and 75% within three years. Prospective buyers with renovation ambitions can take account from the start in their financial planning of a possible major improvement in the energy performance of their dwelling. In addition, the temporary vacancy following purchase is ideal for a major renovation towards the 2050 goal. Fundamentally, the deeper the better, since the remaining energy-saving measures subsequently are often carried out in less favourable circumstances (with barriers such as disruption, technical lock-in, budgetary constraints).

In addition to works aimed at comfort and expansion, a number of families carry out energy-saving works at the same time. The strategy aims to maximise the potential from this so that owners integrate energy-saving works as far as possible in a targeted manner in their renovation, in accordance with the 2050 objective.

INHERITANCES/GIFTS

Dwellings also change owner as a result of inheritances and gifts. According to figures of the Federation of Notaries, over 14 500 gifts of real estate were made in 2018. For 45% of the gifts from a total of 81 017, information on the cadastral type is lacking, as a result of which the actual number may well be considerably higher. Together with inheritances of residential buildings, we conservatively estimate the number of these types of transactions at 30 000 or approximately 1% of the housing stock. In the case of inheritance, it must be borne in mind that this sometimes leads to shared ownership or to usufruct by one person involved, which has an effect on the potential impact of the inheritance as a trigger point.

CHANGE OF TENANT

On the basis of an estimated average rental period of five years, a rental rotation of 20% per year is established. In other words: 6 times between now and 2050. Each period between two tenants offers the opportunity to carry out one or more energy-saving works, whether compulsory or not, with on average progress of 1 EPC label towards the 2050 goal. For the proportion of private rental homes, this amounts to 110 000 dwellings per year or 3.6% of the housing stock.

DEMOLITION AND RECONSTRUCTION

According to the results of the 2018 National Housing Survey, approximately 350 000 dwellings are of structurally inadequate quality, the defects of which cannot all be easily remedied. In this category, consisting of 13% of Flemish dwellings, the dwellings from the oldest construction periods (mainly pre-1960) and rental dwellings are proportionally more represented.

In the strategic vision of the Spatial Policy Plan for Flanders, the Flemish Government set out the key aspects for a long-term vision of the spatial development of Flanders. Doing more with the same or less space, no net additional use of space, climate-resistant construction and ensuring multifunctional, adaptable and flexible forms of housing, including accessibility, are some of the core qualities it strives for.

Demolition and reconstruction in well situated locations, where, after reconstruction, the aim is for intensification, increasing the spatial efficiency and interlinking functions which can contribute to achieving the objectives that are further elaborated via the policy frameworks. Sufficient attention must be paid here to the elimination of barriers in order for this intensification after demolition at well situated locations to be possible.

At present, approximately 16% of new homes are built following demolition (in absolute figures: 4 000 dwellings out of a total of approximately 25 000 per year).[12] Taking the demographic growth into account, the total number of newly constructed housing units must increase to 40 000 per year by 2040.

[12] Figures as recorded in the EPB database.

VACANCY

The central vacancy register, in which municipalities are free, but not obliged, to record vacant buildings, lists 23 133 vacant dwellings. A dwelling is considered to be vacant if it has not been used in accordance with its residential function for a period of at least twelve consecutive months.

Since only 112 of the 308 municipalities made use of this register in 2018, the number of vacant dwellings in Flanders can be conservatively estimated at 50 000 or approximately 1.7%. A large proportion of these buildings have been empty for some time. Making these dwellings available again after deep renovation and/or demolition and reconstruction is a good opportunity.

The Flemish authorities wish to counter vacancy and dilapidation of dwellings and other buildings. For each existing building in a well-situated location which is brought back into use, no undeveloped space must be broached or other space already occupied used and there are opportunities to increase the spatial efficiency. The Flemish authorities are countering vacancies and dilapidation on the one hand with taxes and on the other hand with premiums.

Some dwellings are so poor that demolition and replacement by new construction is a better option than renovation. A roadmap is available on the website www.energiesparen.be, which can assist in weighing up correctly between renovation and demolition and reconstruction.

RENOVATION WITH BUILDING PERMIT

In 2018, 17 130 renovation permits for residential buildings were granted in the Flemish Region, accounting for over 0.6% of the housing stock:[13]

- 11 440 renovations without EPB requirements, for which it is assumed that they improve by one EPC label (0.4%);
- 5 600 with EPB requirements, of which:
    - 4 600 with energy-saving achieved comparable to 2 labels improvement on the EPC scale from F to A (0.2%),
    - 1 000 major energy renovations (0.04%) with the ambition to increase to 0.1% in 2025 (3 000 per year), whereby in each case the final target of a label A is achieved.

The differences between the requirements applying for renovation subject to permit and the more far-reaching major energy renovation (in which at least 75% of the envelope is retrofitted with insulation and the technical installation for the indoor climate is replaced) are shown in the following figure:

EPB requirements (requirements in the field of ENERGY PERFORMANCE and INDOOR CLIMATE)		DESIGNATED PURPOSE		
TYPE OF WORK		Residential	Non-residential	Industry
New construction (or equivalent)	thermal insulation	maximum S 31 (housing unit) and maximum U-values	maximum U-values	maximum K 40 (building) and maximum U-values
	energy performance	maximum E 35 (housing unit)	maximum E-level* (depending on the functional parts)	-
** for office buildings of public organisations, more stringent E-levels apply*				

[13] Since not all renovation works are subject to a permit, the number of renovation permits provides a limited picture of the number of renovations carried out.

	indoor climate	minimum ventilation systems and limitation of risk of overheating (housing unit)	minimum ventilation systems	minimum ventilation systems
	renewable energy	≥ 15 kWh/m² per year	≥ 20 kWh/m² per year	
	installations	-	-	minimum installation requirements
Major energy renovation	thermal insulation	maximum U-values (for new parts and parts with retrofitted insulation)		-
	energy performance	maximum E 70 (housing unit)	maximum E-level (depending on the functional parts)	follows the requirements for renovation
	installations	-	-	
	indoor climate	minimum ventilation requirements		
	renewable energy	≥ 15 kWh/m² per year	≥ 15 kWh/m² per year	-
Renovation	thermal insulation	maximum U-values (for new parts and parts with retrofitted insulation)		
	energy performance	-		
	installations	minimum requirements (for new, renewed or replaced installations)		
	indoor climate	minimum ventilation systems (for existing spaces, on replacement of windows and for new spaces)		ventilation requirements (for the newly constructed added part)

Table 9: EPB requirements for building projects with planning permit from 1 January 2020 to 31 December 2020 (VEA)

2.3. KEY FIGURES CONCERNING NON-RESIDENTIAL BUILDINGS

2.3.1. Private non-residential buildings

Commissioned by the VEA, the study 'Strategy paper on the renovation of non-residential buildings (*Strategienota renovatie niet-woongebouwen*) was delivered in 2016. The study, carried out by the consultancy Efika, analysed the energy performance of the non-residential building stock and provided an initial impetus for an action plan. This study was published on the VEA website and used as a basis for the further shaping of the long-term strategy.

COMPOSITION OF THE NON-RESIDENTIAL BUILDING STOCK

Six main categories can be distinguished in the non-residential building stock: offices, commerce, hospitality business, healthcare, education and other community and social services (water and waste sectors, cargo handling, laundries, sports and culture, etc.). The offices sector (excluding public authorities), commerce, the hospitality business and part of the other common and social services can be grouped under the economic sectors. Healthcare and education are social sectors. The majority of buildings are pre-1975 (Figure 10).

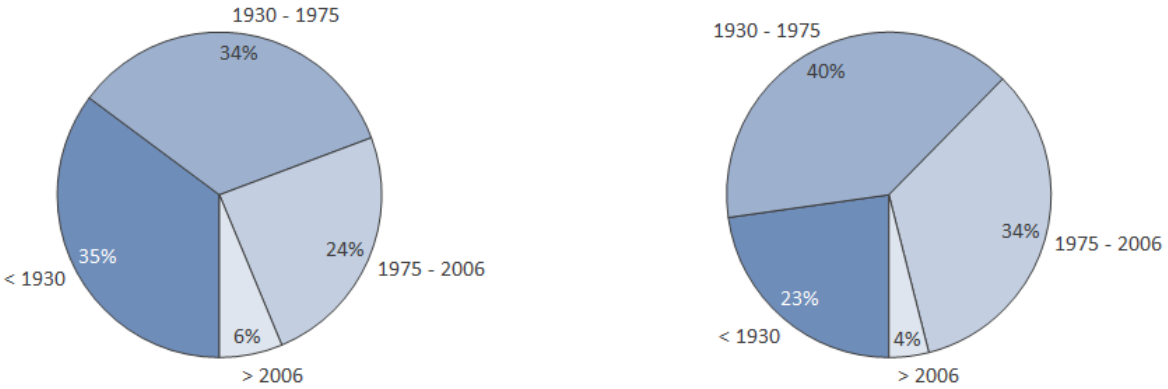


Figure 8: Estimate of the construction period of non-residential buildings (left: all buildings; right: public buildings)

Given the large number of subsectors, there is also considerable variation within the non-residential building stock with regard to energy consumption and market characteristics. In addition, there is a more complex ownership structure than for residential buildings. Non-residential buildings are more frequently rented or are managed by an external party.

ENERGY PERFORMANCE

Based on the combination of the actual electricity and natural gas purchase data of 76 560 non-residential buildings from Fluvius with surface area data from the land registry, Efika was able to estimate an average figure for the various subsectors.

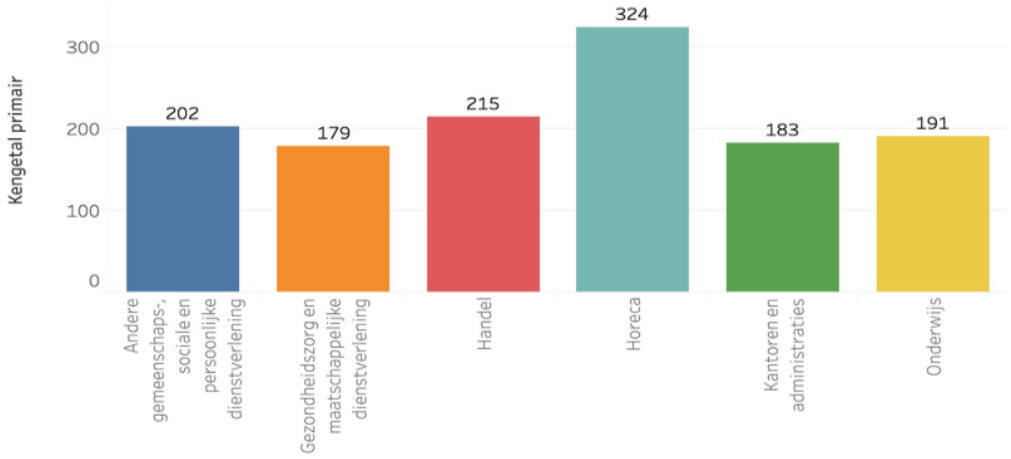
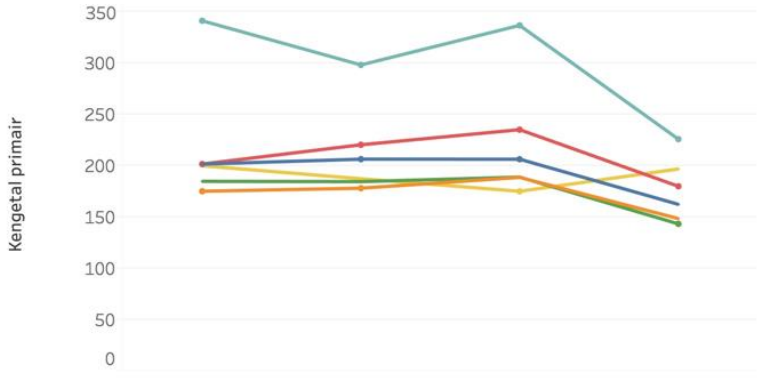


Figure 9: Average primary indicator per sector (kWh/m²) (Strategy paper on renovation of non-residential buildings, Efika)

Key
Kengetal primair = primary indicator
Andere gemeenschaps-, sociale en persoonlijke dienstverlening = Other community, social and personal services
Gezondheidszorg en maatschappelijke dienstverlening = Healthcare and social services
Handel = Commerce
Horeka = Hospitality business
Kantoren en administraties = Offices and administrations
Onderwijs = Education

After 2006, the energy performance improved in all sectors apart from education. The average energy performance improved by 25% after 2006. The introduction of the insulation requirements in 2006 had a favourable impact.



		Vòòr 1930	Tussen 1930 en 1975	Tussen 1975 en 2006	Na 2006
Andere gemeenschaps-, ..	Kengetal	202	207	207	163
	# gebouwen	3.406	3.432	2.399	597
Gezondheidszorg en maatschappe..	Kengetal	175	178	189	149
	# gebouwen	1.607	2.058	1.817	454
Handel	Kengetal	202	221	235	180
	# gebouwen	6.743	6.816	4.562	1.103
Horeca	Kengetal	342	299	337	226
	# gebouwen	6.586	4.115	1.488	297
Kantoren en administraties	Kengetal	185	185	189	144
	# gebouwen	7.860	8.946	8.133	2.289
Onderwijs	Kengetal	200	188	175	197
	# gebouwen	714	762	308	68
Totaal	Kengetal	**230**	**215**	**214**	**161**
	# gebouwen	**26.916**	**26.129**	**18.707**	**4.808**

Figure 10: Evolution in indicators per sector and construction period (Strategy paper on Renovation of non-residential buildings, Efika)

Key
Kengetal primair = Primary indicator
Vòòr 1930 = Before 1930
Tussen 1930 en 1975 = Between 1930 and 1975
Tussen 1975 en 2006 = Between 1975 and 2006
Na 2006 = After 2006
Andere gemeenschaps-, sociale en persoonlijke dienstverlening = Other community, social and personal services
Gezondheidszorg en maatschappelijke dienstverlening = Healthcare and social services
Handel = Commerce
Horeka = Hospitality business
Kantoren en administraties = Offices and administrations
Onderwijs = Education
Totaal = total
Kengetal = indicator
gebouwen = buildings

ENERGY CONSUMPTION

The pie chart below portrays the current energy performance of the non-residential building stock, based on the figures of the most recent Energy Balance Sheet (2018). These basic data allow an estimate to be made of the energy-saving potential and the energy consumption ratios between the various sectors. On examining the largest consumers, it can be seen that an estimated 9% of the non-

residential buildings are responsible for 67% of the energy consumption. **Offices (28% of the final energy consumption) and commerce (21% of the final energy consumption) are together responsible for about half the final energy consumption within the tertiary sector**. Furthermore, hospitality business, healthcare and education are responsible for 12%, 10% and 4% respectively of the final energy consumption. The residual category accounts for a quarter of total consumption.

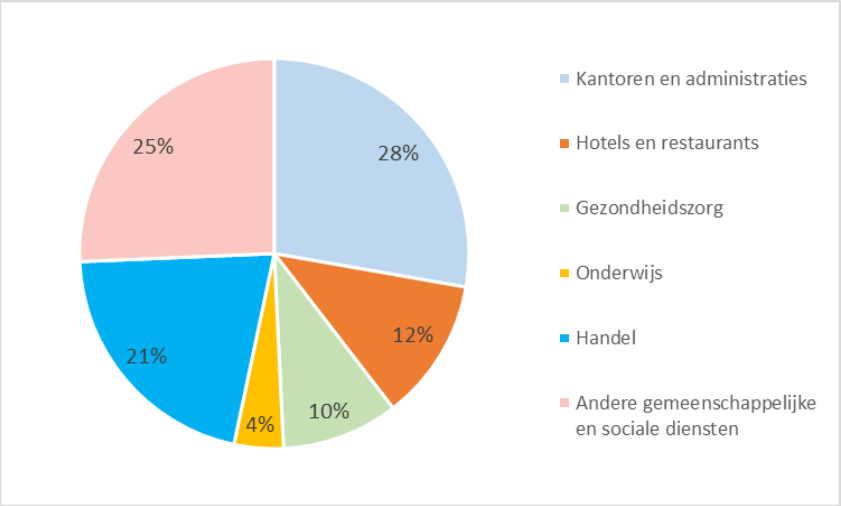


Table 10: Total final consumption per sector (Energy Balance Sheet 2018)

Key
Kantoren en administraties = Offices and administrations
Hotels en restaurants = Hotels and restaurants
Gezondheidszorg = Healthcare
Onderwijs = Education
Handel = Commerce
Andere gemeenschappelijke en sociale diensten = Other community and social services

Ventilation and cooling influence the energy consumption of non-residential buildings. Data exist only for public buildings, but these give an indication of the general trend which is to be expected in all non-residential buildings. The proportion of public buildings with ventilation increased from 29% for buildings constructed before 1930 to 81% for buildings constructed after 2006 (Strategic Paper on renovation of non-residential buildings, Efika). A comparable trend can be seen for cooling: there is an increase from 10% to 25% in public buildings. Higher comfort requirements (including ventilation and active cooling) cancel out part of the energy-saving. More efforts must therefore be made for innovation concerning passive and natural techniques for cooling and ventilation.

ENERGY VECTORS

Natural gas and electricity account for the lion's share of the energy carriers used within the non-residential sectors. Natural gas is responsible for 46% and electricity for approximately 40% of the final energy consumption. Heating oil and related have a share of only 8%, biomass and the residual category 'heating and other' together account for just over 5% of the total energy consumption.

In TWh	Natural gas	Electricity	Heating oil	Biomass	Heating and other	TOTAL
Offices and administrations	4.35	3.55	0.34	0.00	0.00	8.24

Hotels and restaurants	2.04	1.35	0.11	0.00	0.00	3.50
Healthcare	1.73	1.01	0.12	0.01	0.00	2.88
Education	0.81	0.36	0.04	0.00	0.00	1.21
Commerce	2.58	3.34	0.32	0.00	0.00	6.24
Other community and social services	2.22	2.47	1.51	0.88	0.53	7.62
TOTAL	**13.74**	**12.08**	**2.44**	**0.89**	**0.73**	**29.88**

Table 11: Trend in energy consumption per sector and per energy vector (Energy Balance Sheet 2018)

2.3.2. Public buildings

Public buildings are defined as: buildings located in the Flemish Region in which public organisations are located that provide public services to a large number of people and which are frequently visited by the public. This refers to buildings of:

- the federal authorities, including parastatal agencies;
- the Flemish authorities, including internal and external autonomous agencies;
- the provincial authorities;
- the municipal authorities, including public centres for social welfare;
- public undertakings;
- all educational institutions;
- welfare services;
- healthcare services.

It is compulsory to draw up an EPC public buildings for these buildings, from a floor area of 250 m². The EPC public database therefore provides a fairly accurate picture of the number of public buildings. The following table, based on the EPCs public buildings drawn up (February 2020), gives an idea of which types of buildings according to use come under public buildings and the interrelationships between these figures:

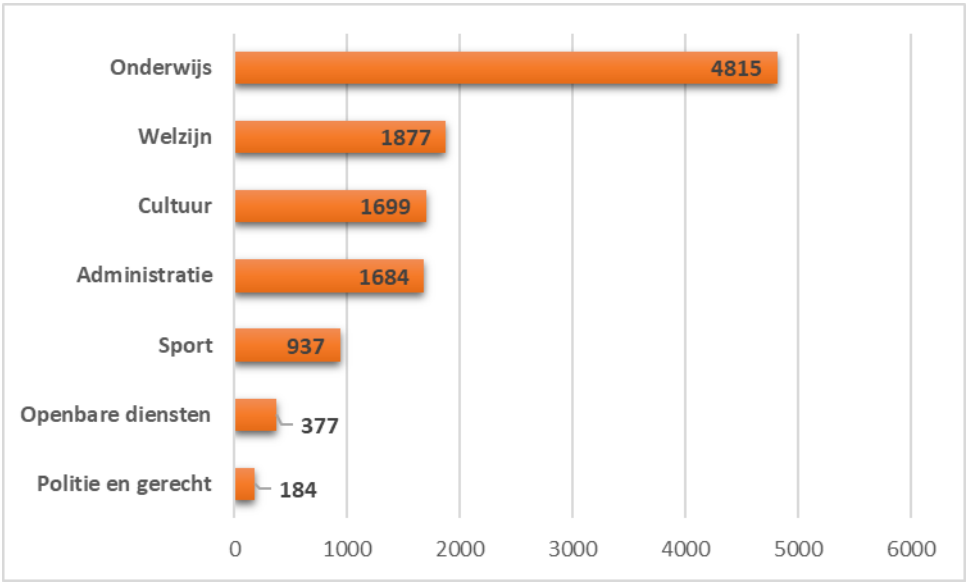


Table 12: Number of public buildings by sector based on the EPCs drawn up (VEA, February 2020)

Key
Onderwijs = Education
Welzijn = Welfare
Cultuur = Culture
Administratie = Administration
Sport = Sports
Openbare diensten = Public services
Polite en gerecht = Police and justice

Public buildings occupy a special place within the non-residential sectors. The situation of these buildings is special because the activities carried out in these buildings come within the context of social services. This means that a different approach is desirable for these buildings.

There is little information available specifically for public buildings. There is only information concerning the energy vectors, which comes from the EPC database for public buildings.

3. COST-EFFECTIVE IMPLEMENTATION OF ENERGY RENOVATION WORKS

3.1. COST-EFFECTIVE RENOVATION OF RESIDENTIAL BUILDINGS IN FLANDERS

3.1.1. Study of cost-optimal energy performance levels

In implementation of Articles 4 and 5 of the EPRD, the VEA had studies of cost-optimal energy performance levels carried out in 2012 and 2015 to review the existing requirement levels.[14] Because the requirements in Flanders are included in the EPB regulations, the EPB method was used for this purpose and not the EPC method for existing buildings.

Based on the 2012 study, it was decided to impose an overall energy performance requirement for a specific group of major energy renovations.[15] This took the form of an E-level, as also applies for new construction, and very extensive renovations (equated with new construction). Ordinary renovations have only separate requirements for the various measures, such as maximum U-values, installation requirements and ventilation requirements in certain rooms.

To assess the cost-effectiveness of renovations in general, the results of the 2012 study are taken as a basis. In that case, the baseline condition of the building is the condition it is in, without renovation. The following table shows the following indicators for the various typologies studied:

- The calculated E-level: The E-level is a measurement for the overall energy performance of a building, which is applied to new construction and major energy renovations. It is the result of a calculation of the annual primary energy consumption as an absolute value (in the numerator) and the comparison with a reference value (in the denominator). The denominator is determined in such a way that a similar package of measures leads to an equivalent E-level.
- The primary energy consumption in kWh/m²: The comparison of the calculated annual primary energy consumption as an absolute value (in kWh, in the numerator) compared to the gross floor

[14] Reports available at https://www.energiesparen.be/bouwen-en-verbouwen/epb-pedia/epb-beleid/studies
[15] The major energy renovation is a renovation with building permit application and the assistance of an architect, whereby
- condition 1: at least 75% of the existing and new partition structures which enclose the protected volume and that are adjacent to the outside environment are insulated and
- condition 2: at least the generators of a specific indoor climate are completely replaced.

area (in m², in the denominator). Although the calculation method according to the new construction method differs in content from the method for existing buildings, this is the indicator which best reflects the EPC number.

The indicators above are shown in the table at three levels:

- The baseline condition: the starting point of the calculations, with properties based on the year of construction of the dwelling, without additional measures.
- The cost optimum: the package of measures for which the lowest total current costs are calculated for the dwelling. This means that the investment costs for this package of measures are the most compensated for by the energy cost saving during a 30-year period of use of the dwelling. At cost optimum, financially the most favourable combination is found between investment costs and utilisation costs.
- The theoretical cost-neutral point:[16] the package of measures where the lowest (= best) energy performance is calculated, which results in the same total costs (both investment costs and utilisation costs and replacement costs) as the baseline condition. If the dwelling were not to be renovated, the same costs would be incurred as if renovation were carried out up to this point. It is the end point of the financially 'worthwhile' or cost-effective zone. On the illustration below, this is the boundary point of the light blue zone at the intersection between the net costs (blue line) and the zero line on the right. The point is theoretical because it is the calculated energy performance and does not take account of the actual consumption (see below).

Type of dwelling and year of construction	**Reference E-level Primary energy (PE)**	**Optimum**	**Theoretical cost-neutral point[17]**
Terraced house 1: Worker's house (1970)	E190 PE 325 kWh/m²	E110 PE 189 kWh/m²	E15 PE 37 kWh/m²
Terraced house 2: Town house (1920)	E207 PE 294 kWh/m²	E63 PE 89 kWh/m²	E-12 PE -16 kWh/m²
Semi-detached (1950)	E230 PE 371 kWh/m²	E76 PE 122 kWh/m²	E-8 PE -12 kWh/m²
Detached house 1: Bungalow (1970)	E251 PE 534 kWh/m²	E65 PE 139 kWh/m²	E-5 PE -10 kWh/m²
Detached house 2: Farmhouse (1980)	E144 PE 235 kWh/m²	E119 PE 194 kWh/m²	E3 PE 3 kWh/m²
Apartment 1 middle-bottom (1970)	E193 PE 343 kWh/m²	E78 PE 139 kWh/m²	E-3 PE -4 kWh/m²
Apartment 3 middle-middle (1970)	E154 PE 211 kWh/m²	E75 PE 103 kWh/m²	E-8 PE -10 kWh/m²
Apartment 6 side-top (1970)	E224 PE 404 kWh/m²	E88 PE 157 kWh/m²	E-2 PE -3 kWh/m²
Collective apartment (1970)	E202 PE 331 kWh/m²	E64 PE 105 kWh/m²	E-1 PE -1 kWh/m²

Table 13: Summary of macroeconomic optimum study 2012 (discount rate 3%, average energy scenario)

[16] In the study, this point is referred to as the 'cost-effective point'.

[17] All points with a lower total current cost (TCC) and a better energy performance than the baseline are 'cost-effective'. The value in the table corresponds to the point with the best energy performance for which the TCC is even lower than the baseline. The point is 'theoretical' because it is the calculated energy performance and does not take account of the actual consumption. This makes for an overestimate of the potential.

The following figure presents the principles of ‘cost optimality’ and ‘cost neutrality’ in the form of a graph:

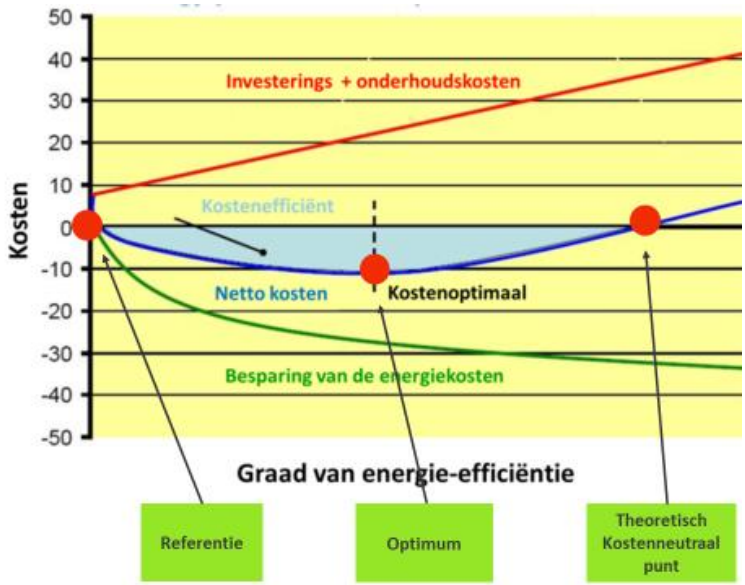


Figure 11: Principle of cost optimality/cost neutrality

Key
Kosten = Costs
Investerings + onderhoudskosten = Investment + maintenance costs
Netto kosten = Net costs
Kostenoptimaal = Cost optimal
Besparing van de energiekosten = Energy cost saving
Graad van enegie-efficiëntie = Energy efficiency level
Referentie = Baseline
Optimum
Theoretisch Kostenneutraal punt = Theoretical cost neutral point

By way of illustration, the three different levels are shown below in the overview table with packages of measures for the 'townhouse' housing type (year of construction 1920).

TAK (€)	Totale Investering (€)	TT (jaar)	K-peil (-)	E-peil (-)	NEBv (kWh/ m²jaar)	PEV (kWh/m². jaar)	Opmerkingen
102993	0	0	139	207	177	294	referentie
101653	2821	6	133	199	170	283	(1) isoleren kelderplafond (R=3.06)
95719	7410	8	116	179	152	254	(2) = (1) + nieuwe ramen op N (Uf=1.40 / Ug=1.1 / g= 0.6)
88535	12308	9	94	152	126	215	(3) = (2) + binnenisolatie van achtergevel (Z, R=3.25)
75240	19716	9	58	109	87	155	(4) = (1) + binnenisolatie en nieuwe ramen N en Z
72306	24294	10	58	89	66	126	(5) = (4) + ventilatie C++
73272	30074	11	38	85	63	120	(6) = (4) + dakisolatie (R=4.41)
72360	32445	11	43	71	49	100	(7) = (6) + ventilatie C++
71435	35502	12	36	63	42	89	(8) = (7) + glas (Ug=1.0 / g=0.5)
74702	44902	14	33	45	39	64	(9) = (8) + 2.5kWp PV en driedubbel glas (Ug=0.70, g=0.55)
76578	47692	14	33	37	38	52	(10) = (9) met 3.75kWp PV en dakisolatie (R=5.88)
78150	50217	13	33	29	38	41	(11) = (10) met 5kWp PV
80121	56787	15	28	25	33	34	(12) = (11) + vloerisolatie op volle grond (R=3.82)
81259	65166	18	33	20	39	28	(13) = (11) + LL WP SPF2.5 + warmtepompboiler
82417	73158	19	33	14	59	19	(14) = (11) + BW WP SPF5 aangesloten op oude radiatoren en SWW-boiler, maar geen ventilatiesysteem
84227	78240	20	28	11	52	14	(15) = (11) met vloerisolatie op volle grond (R=2.82) + BW WP SPF5 op vloerverwarming en dakisolatie R=5.88
90912	85932	20	28	1	52	0	(16) = (15) + 7.5kWp PV
94964	92379	21	28	-5	52	-7	(17) = (16) + zonneboiler-WP
99357	97441	22	27	-10	31	-13	(18) = (17) met binnenisolatie (R=3.71) en ventilatie C++
102286	101766	23	25	-12	29	-16	(19) = (17) met binnenisolatie (R=5.80) en grote zonneboiler, zonwerend glas (Ug=0.7, g= 0.40)
110867	106881	24	20	-15	18	-20	(20) = (19) met binnenisolatie (R=7.52), vloerisolatie volle grond (R=5.49), kelderplafondisolatie (R=4.39) en dakisolatie (R=7.12), deurprofiel (U=1.5) en ventilatie Dwtw2
121706	120319	27	20	-17	18	-24	(21) = (20) + extra grote zonneboiler op CV
138933	141729	31	18	-19	15	-27	(22) = (21) + WW WP SPF5.5 op vloerverwarming met maximale binnengevel-, dak- en vloerisolatie, beste deur- en raamprofielen en beste glas

Figure 14: Indication of the three levels on the overview table of the townhouse (1920): Baseline condition (red), cost optimum (blue) and theoretical cost neutral point (green)

Key

TAK	TCC
Totale Investering	Total investment
TT (jaar)	TT (year)
K-peil	K-level
E-peil	E-level
NEBv	Net energy need for heating
PEV (kWh/m2 jaar)	Primary energy heating (kWh/m2 per year)
Opmerkingen	Comments
(1) isoleren kelderplafond (R = 3.06)	(1) insulation cellar ceiling (R = 3.06)
(2) = (1) + nieuwe ramen op N (Uf = 1.40 / Ug = 1.1 / g = 0.6)	(2) = (1) + new windows on N (Uf = 1.40 / Ug = 1.1 / g = 0.6
(3) = (2) + binnenisolatie van actergevel (Z, R = 3.25)	(3) = (2) + interior insulation of rear facade (Z, R = 3.25)
(4) = (1) + binnenisolatie en nieuwe ramen N en Z	(4) = (1) + interior insulation and new windows N and Z
(5) = (4) + ventilatie C++	(5) = (4) + ventilation C++
(6) = (4) + dakisolatie (R = 4.41)	(6) = (4) + roof insulation (R = 4.41)
(7) = (6) + ventilatie C++	(7) = (6) + ventilation C++
(8) = (7) + glas (Ug = 1.0 / g = 0.5)	(8) = (7) + glass (Ug = 1.0 / g = 0.5)
(9) = (8) + 2.5k Wp PV en driedubbel glas (Ug = 0.70, g = 0.55)	(9) = (8) + 2.5k heat pump PV and triple glazing (Ug = 0.70, g = 0.55)
(10) = (9) met 3.75k Wp PV en dakisolatie (R = 5.88)	(10) = (9) with 3.75k heat pump PV and roof insulation (R = 5.88)
(11) = (10) met 5kWp PV	(11) = (10) with 5k heat pump PV
(12) = (11) + vloerisolatie op volle grond (R = 3.82)	(12) = (11) + floor insulation (R = 3.82) on the ground

(13) = (11) + LL WP SPF2.5 + warmtepompboiler	(13) = (11) + air-to-air heat pump seasonal performance factor 2.5 + heat pump boiler
(14) = (11) + BW WP SPF5 aangesloten op oude radiatoren en SWW-boiler, maar geen ventilatiesysteem	(14) = (11) + geothermal heat pump seasonal performance factor 5 connected to old radiators and hot water boiler, but no ventilation system
(15) = (11) met vloerisolatie op volle grond (R = 2.82) + BW WP SPF5 op vloerverwarming en dakisolatie R = 5.88	(15) = (11) with floor insulation on the ground (R = 2.82) + geothermal heat pump seasonal performance factor 5 on floor heating and roof insulation R = 5.88
(16) = (15) + 7.5kWp PV	(16) = (15) + 7.5k heat pump PV
(17) = (16) + zonneboiler-WP	(17) = (16) + solar boiler-heat pump
(18) = (17) met binnenisolatie (R = 3.71) en ventilatie C++	(18) = (17) with interior insulation (R = 3.71) and ventilation C++
(19) = (17) met binnenisolatie (R = 5.80) en grote zonneboiler, zonwerwend glas (Ug = 0.7, g = 0.40)	(19) = (17) with interior insulation (R = 5.80) and large solar boiler, sunlight-reflective glass (Ug = 0.7, g = 0.40)
(20) = (19) met binnenisolatie (R = 7.52), vloerisolatie volle grond (R = 5.49), kelderplafondisolatie (R=4.39) en dakisolatie (R = 7.12), deurprofiel (U = 1.5) en ventilatie Dwtw2	(20) = (19) with interior insulation (R = 7.52), floor insulation on the ground (R = 5.49), cellar ceiling insulation (R = 4.39) and roof insulation (R = 7.12), door profile (U = 1.5) and ventilation Dwtw2
(21) = (20) + extra grote zonneboiler op CV	(21) = (20) + extra large solar boiler on central heating
(22) = (21) + WW WP SPF5.5 op vloerverwarming met maximale binnengevel-, dak- en vloerinsolatie, beste deur- en raamprofielen en beste glas	(22) = (21) + water-water heat pump seasonal performance factor 5.5 on floor heating with maximum internal wall, roof and floor insulation, best door and window profiles and best glass

The calculations above were carried out on the basis of the assumptions imposed by the European Commission on the Member States for conducting the study of cost-optimal energy performance levels:

- The calculation period was set at 30 years;
- The primary energy factors used were: 2.5 for electricity from the grid and 1 for all other energy sources;
- The discount rate, with which future income and expenditure is calculated at the prices of the starting year, is 3%. This interest rate is expressed in real terms and therefore on top of inflation, the increase in the general price level;
- Taking account of the 'average' energy scenario.

Regarding this last point, the estimated price trends as determined by the European Commission[18] were the compulsory option. A 'low' scenario was based on a constant energy price (apart from a rise equal to inflation), and the high scenario took account of an annual increase of 3.5% (on top of inflation).

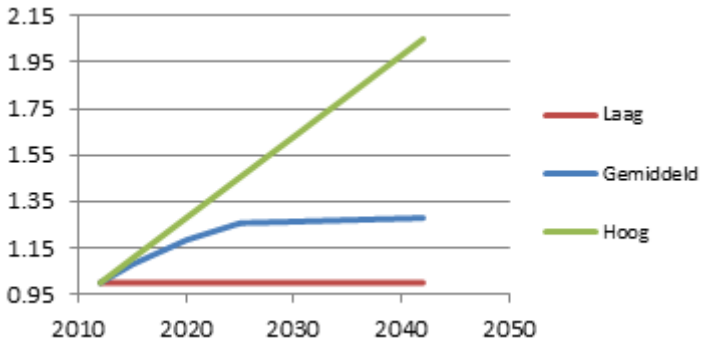


Figure 15: Energy scenarios (real price rise on top of inflation)

Key

[18] European Commission - Directorate-General for Energy in collaboration with Climate Action DG and Mobility and Transport DG, EU Energy Trends to 2030 - Update 2009, 2010.

Laag = low
Gemiddeld = average
Hoog = high

The results of this study on the cost-optimal energy performance levels are largely determined by the general financial parameter values and the energy scenarios considered for these parameters. Sensitivity analyses were therefore carried out. For the energy scenarios, the impact on the results was fairly limited. The calculated optimums hardly change, since the use in the vicinity of the optimums is very low, as a result of which they are less sensitive to changing energy prices. The impact is greater for the discount rate. 1% and 5% discount rates were also examined. 1% leads to more profitable investments and therefore lower E-levels (and the converse in the case of 5%). The situation in recent years is more in line with the 1% scenario.

The results for the various dwellings show that it is difficult to speak of one optimum for all renovations. The optimum depends very much on the starting situation and the renovation possibilities of the building. For instance, it is striking that the dwellings with the highest primary consumption in the baseline situation (bungalow and semi-detached house) will be among the lowest consumers after the renovation. The high initial consumption costs consequently provide a major incentive for energy-saving measures. As a result, for both types of dwellings, all renovation packages, including the net zero energy dwellings, are cost-neutral.

It is important to note here that the energy consumption is calculated on the basis of the calculated energy performance. Although savings are made on applying energy-saving measures, they depend not only on the energy performance itself, but also on the quality of execution, maintenance and certainly user behaviour. In the case of renovation of existing buildings, the rebound effect often plays a role, which means that part of the possible energy saving is used to increase comfort in the dwelling. As a result, the calculated energy saving is not entirely achieved. Moreover, the energy costs for the baseline situation may be heavily overestimated. The theoretical calculation assumes a certain degree of comfort, whereas occupants of a dwelling with low energy efficiency will tend to save on comfort to avoid paying too high a bill. The actual consumption may well be 50% less than the calculated consumption. The most cost-efficient level shown compared to the baseline situation, will consequently be an overestimation of the potential.

The long-term objective of label A, with an E-level below E60 or a primary energy consumption of less than 100 kWh/m², is cost-optimal only for the terraced townhouse. For all dwellings, the objective is in the cost-effective zone and for most dwellings even relatively close to the cost optimum with a limited total current additional cost of 1% to 6% above the cost-optimal point. Only in the case of the detached farmhouse, which as the most recent dwelling starts out from a reasonably insulated baseline, is the total current cost to achieve E57 or 92kWh/m² 20% higher than the cost optimum. This dwelling is consequently an example of the lock-in effect, whereby insulating it to a sub-optimal level in the past leads to a limited rate of return for additional measures in the present.

3.1.2. Cost-effective measures

On the whole, the packages of measures examined follow a logical sequence. Installing insulation and low-emission glass usually occurs before the replacement of installations. In this respect, renovation to the cost-optimal level does not constitute a technical barrier (lock-in) for the additional steps

needed for the cost-effective renovation to the long-term objective. The most important conclusions are set out below.

INSULATION MEASURES

Insulation measures for walls and roofs

For the dwellings that are already (moderately) insulated, such as the worker's house and the farmhouse, it is often impossible to apply cheap insulation techniques, such as cavity wall insulation. Consequently the graphs and tables in the results chapter in the report show that no additional facade insulation is installed for their economic optimum. The better the baseline is insulated, the more robust this conclusion will be. However, if cavity wall insulation is nevertheless possible, this energy-saving measure will be opted for almost immediately and extra insulation will come into consideration only at a very late stage.

When insulation is nevertheless undertaken, it proves that the cost-optimal maximum U-value for envelope measures is 0.24 W/m²K, for both new construction and renovation. This level was consequently laid down in the long-term objective and in the requirements for retrofitting existing parts of the envelope in contact with the outside with insulation. However, this does not mean that it is cost-optimal to bring all parts of the envelope to this level.

Windows

In the case of windows too, the worse their existing condition, the more quickly they will proceed to be replaced. To reduce the investment, it may also be opted to do this only for some orientations, preferably the north and east. Here too, the same U-values emerge for newly installed windows as for new construction.

Floor insulation and floor heating

Insulating cellars is one of the 'simplest measures' and is therefore quickly addressed. Floors on the ground come only right at the end of the measures examined (therefore also after the replacement of the technical installations) due to the high costs involved. Insulation of the floor on the ground is not part of the cost-effective pathway to label A for a single one of the dwellings.

Summary of cost-effective measures relating to the building envelope

For the building envelope, the baseline situation is decisive for the cost-effectiveness of the measures.

- If the dwelling was already insulated to a very limited extent in the baseline situation (U=0.85W/m²K and double glazing) or in the case of the floors on the ground, it is difficult for the energy saving from the (more expensive) insulation measures to compensate for the investment cost. Doing nothing to the envelope and focusing on other measures is then a legitimate option from the cost-effective point of view.
- If cheaper insulation installation methods are possible, it is advisable to implement them at an early stage: e.g. cavity wall insulation, cellar ceiling insulation and limited roof insulation for the existing flat roof with free height.
- None of the situations above: it is then advisable to apply an efficient layer of insulation directly (~new construction) if additional insulation measures are to be taken.

- The airtightness was not examined as a separate measure. It was assumed that for each envelope measure, due attention was paid to airtightness, as a result of which the airtightness of the dwelling as a whole improves as the envelope is tackled.

INSTALLATIONS

Heat generation
In most cases the central heating is addressed after the envelope measures, usually by installing a condensing boiler. On this point, the least old dwellings are adapted almost immediately. The possibility to recover the existing heat output elements is certainly a factor, but even without this assumption, an adaptation of the heating system would yield more than additional insulation.

The (almost) uninsulated dwellings for which cheaper insulation measures are possible first carry these out, as described above, and then switch to installation. The architectural dwelling which, with these insulation measures and a condensing gas boiler still have a substantial residual demand for heat, will even switch to the most efficient heating system, the water-to-water heat pump, before it reaches the optimum.

Ventilation system
Installing a ventilation system is one of the cost-optimal packages of measures for some housing types, such as the townhouse, but usually it is not at all. The package of measures to attain label A usually does include a ventilation system. It should be noted that a cost-optimal calculation cannot exploit any improvements to the basic ventilation. A ventilation system should not be lacking in a deep renovation in order to be able to control the indoor climate. Such renovation will of course also lead to increased airtightness and a healthy indoor climate may not be compromised as a result.

3.2. COST-EFFECTIVE RENOVATION OF NON-RESIDENTIAL BUILDINGS IN FLANDERS

Cost-optimal studies were also carried out for non-residential buildings in 2012, 2015 and 2017. The 2012 study was confined to offices and schools and a different calculation method was used, so in the meantime it has become less relevant. The 2015 and 2017 studies deal with different types of non-residential buildings. Whereas the VEA has an extensive database for residential buildings, including geometric data from 2006 onwards, this is not (yet) the case for non-residential buildings and especially the buildings which are not offices and schools. In other databases too, there is only limited relevant information available. It is consequently impossible to determine the extent to which the buildings examined are in fact a reference for the entire non-residential building stock. For this reason, the results of the study cannot be generalised without further ado for the entire building stock.

In addition, the calculation method for non-residential buildings is also more extensive than that for residential buildings. In order to be able to calculate all types of non-residential buildings, a subdivision is made into functional parts so that specific utilisation characteristics (e.g. temperatures, occupation times, hot water requirements, etc.) can be determined for each function. For instance, a higher temperature is calculated for a swimming pool than for an ordinary sports hall. For an office, use during working hours is taken into account, while for a hospital continuous use is factored in. As a result of these individual characteristics, the various cost-optimal and cost-effective solutions vary considerably between the different buildings and functions examined. A tailor-made approach is consequently more appropriate here.

Nevertheless, it emerges from the studies carried out that a number of general findings can be made regarding the composition of cost-optimal and cost-effective packages of measures:

- In the case of cavity walls, retrofitting with insulation is always appropriate from the point of view of achieving the cost-optimal package of measures.
- In most cases it is appropriate to replace the glass by low-emission glass, preferably retaining the profiles.
- For other envelope-related measures (roofs, floors), no clear-cut conclusions could be drawn.
- For ventilation, an economical system is usually installed with a heat exchanger.
- For the production of heating and cooling, CHP with back-up gas heating and a compression-type cooling device respectively emerge as a cost-optional measure.
- In addition, the application of free ground cooling, if applicable, is always cost-optimal.

3.3. FURTHER APPROACH

In 2022, new studies are planned into the cost optimality of the energy performance requirements. The intention here is to substantiate the current findings even more effectively and where necessary to adapt them, for both residential buildings and non-residential buildings.

Preferably, the study for housing renovations will consequently focus on the long-term objective (A label), differentiated by housing typology using the EPC method, and cover a larger number of dwellings so that the results can be extrapolated unequivocally for the entire housing stock. Further development of the assumptions concerning the relationship between calculated and measured energy consumption will be integrated as far as possible.

Naturally, the existing sensitivity analyses required in the European Commission methodology and updated parameters for the energy scenarios and the interest rates remain important to assess the impact of the assumptions made.

4. CURRENT POLICY AND PLANNED ACTIONS

The following sections provide an overview of the main current and planned measures and proposals for actions to encourage deep renovations of residential buildings (4.1), non-residential buildings (4.2) and public buildings (4.7) in accordance with the intended long-term objective, with specific attention to measures focusing on the worst performing buildings (4.3).

In addition, (planned) policy measures are also included to address the tenant-landlord split incentive (4.4) and to eliminate market deficiencies (4.5) and energy poverty (4.6).

4.1. MEASURES CONCERNING SUPPORT OF DEEP RENOVATIONS FOR RESIDENTIAL BUILDINGS

In view of the finding that the **renovation target for 2050** set by the policy appears to be **cost-effective for the majority of housing typologies** (and not far from the cost optimum), it is worthwhile to encourage owners to act.

At present, it is found that only a limited number of owners can or wish to achieve this ambition in the form of a one-off renovation. Usually owners will spread the efforts and costs in phased renovation. However, this entails the risk of technical lock-in. In addition, there is the risk that owners will confine themselves to the first steps towards label A and prefer to avoid the nuisance (and costs) associated with additional renovation works. As a result, the potential reduction in energy costs will be achieved only to a limited extent, leading to opportunities for possible additional borrowing capacity not being used.

In an ideal business case, the costs of deep renovation are reduced considerably especially by a collective and/or industrial standardised approach, a structurally high demand for renovation and above all a large supply of labour. A deep renovation then becomes an attractive and feasible option for more owners, with an overall cost-benefit balance which, due to the saved energy costs over the lifecycle of the building, is more positive than in the case of a less far-reaching renovation.

In order to increase the number of one-off renovations to label A, we shall encourage owners to take action as far as possible at trigger points, look for ways to reduce the costs, offer effective financial and/or tax support, indicate the advantages in terms of value and comfort of the dwelling and introduce achievable standards. In addition, we must guarantee that all renovations, both deep and phased, are achieved in accordance with the 2050 objective.

Present and planned measures

FACILITATE ACCESS TO HIGH-QUALITY INFORMATION AND ADVICE

The Housing ID: a free digital passport with all available information concerning the building. Through the Housing ID, the Flemish authorities are developing a centrally managed tool which helps owners via insight and targeted advice in the planning of renovation works in the pathway towards the 2050 objective and the relations with the authorities in this respect (including to obtain premiums and certificates). By removing barriers and offering streamlined, customised communication, the Housing ID will encourage high-quality renovations and contribute towards dynamics in the renovation market. The Housing ID is a free digital passport for the dwelling that was launched at the end of 2018. Each owner will in time receive access to and insight into all relevant information concerning the building, land and environment, certificates and premiums at the disposal of the authorities (more information can be found in Annex 2).

The Housing ID increases the owner's involvement in the general condition of the home in terms of comfort, energy performance, compliance with the regulations, etc. This greater involvement can contribute to increased readiness to invest in better energy peformance and quality of the home.

This is an innovative new policy instrument that is part of the core of the implementation process in Flanders for the long-term renovation strategy for buildings.

The Housing ID will be systematically provided with new functionalities and themes to meet the aforementioned objectives. In addition to general information about the building (location, layout, etc.), the Housing ID contains information on the energy performance (based on the EPC certificate or EPB declaration), insulation present, the potential for PV panels and solar boiler and environmental information (susceptibility to flooding, heritage. soil pollution, etc.) and an overview of planning permits. At the beginning of 2020, an overview of the available housing and energy premiums and tax benefits was added. Later in 2020, a housing quality monitoring instrument will be added. In addition,

owners in future will be able to share their Housing ID with third parties (building professional, architect, banks, energy houses, etc.). A digital safe is also being developed, where the owner can add relevant documents in the Housing ID, such as non-digital certificates (such as heating system cleaning and maintenance certificate), building plans, offers, invoices, photos, etc. In the course of 2022, the entry into force is planned of the asbestos certificate requirement (which provides information on the (potential) presence of asbestos and on the accessibility of asbestos applications) on sale and the asbestos certificate of a dwelling will also be accessible via the Housing ID. The 2019-2024 Coalition Agreement and the Flemish Energy and Climate Plan indicate the direction in which the Housing ID can develop as an awareness-raising tool.

The updated EPC[19] provides specific advice with a roadmap including cost price indication

Since the beginning of 2019, the updated EPC, which has also been integrated in the Housing ID, offers **specific advice with a roadmap including indication of the cost price for single-family dwellings to enable the dwelling to progress towards the 2050 objective**. A label has been added to the new EPC, ranging from F to A+. Label A corresponds to the 2050 objective. The indication of the renovation cost offers neutral arguments to potential buyers to negotiate the sale price. The new EPC offers opportunities, including outside the context of sale or rental, for citizens who do not wish to sell or rent out *per se* but who wish to know their label and wish to know which energy renovation works are needed to obtain a label A. Also for persons who have already completed a renovation, it may be of interest to know afterwards which label the renovated dwelling has obtained.

In order to increase awareness concerning the label and knowledge about the energy performance of the housing stock, a web application will be launched in 2020, which will enable citizens to generate free of charge an indicative determination of the EPC label, on the basis of an old EPC or on the basis of limited descriptive data about the dwelling. This app will also make it possible to benchmark the energy performance of the dwelling with comparable dwellings form their own municipality, the province and the Flemish Region.

In order to make the relatively hard to access group of apartment buildings more aware of energy renovations, the EPC for common parts of an apartment building was launched in January 2020.[20] This overarching EPC includes data on collective installations, the building envelope and the partitioning interior floors and interior walls. This EPC provides insight into the renovation pathway of the common parts and provides clearer incentives to the co-owners of the building to undertake renovation actions. In addition, this EPC serves as basic input for drawing up an EPC for the individual apartment, resulting in efficiency gains. From 2022, every apartment building, i.e. separately from sale and rental, must possess an EPC for the common parts. By 2025, it is planned that each apartment building must also have an asbestos certificate for the common parts.

For residential buildings which are protected due to their heritage value, obtaining label A is not always easy to achieve. Sometimes interventions depending on the energy-saving renovation measures are difficult to apply within the imposed or intended easements of the protection because they impair the heritage value. In the case of energy-saving renovation measures, the heritage value always takes precedence for listed buildings, which will also be central in the practical implementation of all the various instruments. However, it has been observed that in recent years within the restoration sector, increasing attention is paid to the introduction of new technology which combines

[19] An example of the updated EPC with renovation advice 2050 can be consulted at https://www.energiesparen.be/sites/default/files/atoms/files/VoorbeeldEPCvanafjanuari2019_nieuw.pdf.
[20] Comprehensive information at https://www.energiesparen.be/epc-van-de-gemeenschappelijke-delen.

maintaining the heritage values with energy saving (e.g. single superinsulated glass with an old appearance, special insulating coatings comparable to thin plaster layers, etc.). At present, the new technology is still relatively expensive. In addition, the efficiency of some measures is suboptimal, so it is necessary to think about their cost-effectiveness.

An EPC Heritage is currently being developed specifically for listed buildings, with the aim of determining for each listed building which long-term objective is feasible and desirable by carrying out energy-saving measures which do not impair the heritage value. The launch of the EPC Heritage is expected by 30 June 2022.

TECHNICAL ADVICE AND FINANCING

Energy houses provide advice and guidance for energy-saving works

In nineteen energy houses financed under the energy policy and operating across the entire Flemish territory, all citizens have been able since 2019 to obtain a uniform package of advice and guidance for energy-saving works. Under certain conditions, citizens can in addition receive an interest-free energy loan of up to EUR 15 000 for energy-saving works. In addition to persons from vulnerable target groups, certain non-commercial legal persons and cooperatives (schools, hospitals, non-profit organisations, etc.) can borrow up to EUR 15 000 at 1% (for ten years).

An energy house is a municipal institution or a cooperation between various municipalities.[21] These energy houses are developing further towards a coordinating role for partnerships with all local independent actors (e.g. architects) active in the field of housing and renovation. The energy house shows citizens the way with clear information on services and measures, such as energy premiums, energy loans, the Housing ID, the new energy performance certificate (EPC), digital meters, etc. Citizens can rely on guidance and support concerning renovation advice towards the 2050 objective, request and compare offers, obtain help in applying for premiums and interpreting the data (sunshine map, EPC, results from the free household energy scan, etc.).

In a large number of energy houses, the new services from 2019 are building on a long tradition. A number of energy houses are therefore forerunners in the field of guidance for deep renovation. The central coordination of the energy houses offers a platform for exchange so that all energy houses and regions can acquire the experience of the forerunners. In order to improve the guidance and financing offered to citizens, in the coming years the operation of the energy houses and the existing housing service points are being integrated into a unified energy and housing service point at local level, which forms the first contact (‘one-stop-shop’) for local target groups (citizens, businesses, associations, etc.).

The regional renovation strategy will be translated into action plans at local level. The rollout of a large-scale learning network will take place for this purpose under the BE REEL! project in the period 2018-2024.

Interest-free loans

The energy houses can offer an interest-free loan of up to EUR 15 000 for a term of 10 years to well-defined vulnerable target groups. Since 2010, 21 000 energy loans have been granted for a total of EUR 175 million.

[21] A list of energy houses can be found at https://www.mijnenergiehuis.be/

New owners who within 5 years renovate a dwelling with a bad label to label C or better may apply for an interest-free loan from 2021. The arrangements for this are being worked out.

DEMOLITION AND RECONSTRUCTION

Dwellings that cannot be brought to a high-performance level of energy or housing quality for a reasonable investment cost may be better demolished and reconstructed at the same location or elsewhere. Demolition and reconstruction may be an important instrument from the social perspective for firstly improvement of the quality of the Flemish housing stock and secondly the compaction of village and town centres which is pursued from different policy areas.

- Premium of **EUR 7 500 for demolition and reconstruction.** Since 2019, there has been a premium of EUR 7 500 for private individuals for the demolition of one or more buildings located in the Flemish Region and the associated reconstruction of one or more houses or an apartment building. The premium runs as a temporary measure for applications for an environmental permit up to the end of 2020, pending a general reduction in VAT.
- **Extension of the reduction in VAT (6% instead of 21%) for demolition and reconstruction** in central cities to the whole territory. Under the National Energy and Climate Plan (NECP), the Federal authorities committed to this measure, subject to the European Commission's authorisation. This measure is crucial to be able to achieve the long-term renovation strategy in the Flemish Region. A general reduction will convince many more owners to undertake demolition and reconstruction (also see trigger points). The measures mentioned to promote demolition and reconstruction also contribute to objectives under the environmental policy (compacting the housing function) and the housing policy (growing need for high-quality, affordable and easily accessible housing).
- **Extension of reduced registration tax ('sales tax') to the demolition-reconstruction category.** Under the Flemish Energy and Climate Plan (FECP), demolition-reconstruction is added to the categories for which a reduced rate of 5% applies.
- **Exemption for the building tax for renovation of uninhabitable properties**. An exemption from the building tax has applied from the tax year 2019 for the renovation of uninhabitable properties. Owners of properties listed in the regional inventory as uninhabitable or unsuitable can obtain an exemption from property tax for a period of 5 years if they demolish the building or dwelling concerned and replace it by one or more new or replacement buildings. For dwellings, the tax benefit is limited to a maximum of EUR 1 000 per year. The benefit can be cumulated with the reduction in property tax for a very energy-efficient new construction.
- **Elimination of regulatory obstacles that complicate or obstruct demolition and reconstruction**. For example, provisions that dwellings may be half the size and less high after reconstruction do not encourage demolition and reconstruction, counter increasing the spatial efficiency at well-situated locations and tend to have a deterrent rather than an encouraging effect.

ENERGY PREMIUMS

- **Minimum energy efficiency requirements.** With the premium reform approved by the Flemish Government on 15 June 2016, the content requirements of the individual premiums for residential and non-residential buildings (insulation, low-emission glass, heat pump, solar boiler) were

tightened up towards the long-term objective for 2050. A new premium was introduced for a heat pump boiler from 2019.

- **Total renovation bonus**. This premium is central to the approach to prompt owners to carry out deep renovation. Anyone who invests in 3 or more energy-saving measures within a period of 5 years, can be eligible form 2017 for the total renovation bonus on top of the basic premiums, the amount of which increases as more works are carried out (EUR 1 250 after three works, rising to a total maximum of EUR 4 750 (limited to half these amounts for apartments)). In the meantime, more than 3 000 bonuses have been paid out.
- In implementation of the 2019-2024 Coalition Agreement, provision will be made for lenders to be able to consult the EPC certificate within the context of a loan application so that they can better assess on this basis whether customers can obtain more favourable loan terms.
- The Coalition Agreement and the FECP also provide that all premiums for energy-saving under the energy policy and those for quality improvement and adaptation of housing under the housing policy will be dealt with together in one service point with a view to an **overarching housing renovation premium**. In this respect, cooperation between the VEA, the Flemish Housing Agency (*Agentschap Wonen-Vlaanderen*) and the distribution network managers will lead to more efficient data flows between front office and back offices. The subsidised works will be clearly defined to avoid overlapping or inconsistencies. Renovators will have to submit their application in only one place. The premium amount will be made more income-dependent than is currently the case. This will not only ensure greater transparency and greater customer-friendliness, but will also ensure that the various target groups are reached more effectively and in certain cases a more substantial premium can be granted. It is expected that by combining the strengths of both schemes in an integrated system with reinforced front office, more households will be encouraged to renovate.
- Through an energy performance certificate with energy renovation recommendations (updated EPC), we help owners in the sustainable, high-quality renovation of their dwelling. In the future, it is necessary to have an EPC to obtain a substantial renovation premium (minimum EUR 5 000) or energy loan (minimum EUR 7 500).
- From 2021, the Flemish authorities will no longer award a premium for the replacement of a fuel oil boiler for protected purchasers if natural gas is present in the street. In order to encourage more sustainable heating, we only still grant increased premiums for condensing gas boilers and heat pumps for protected purchasers.
- Encouraging replacement of electric boiler by **heat pump boiler**: as (temporary) support for market introduction, a heat pump boiler premium was introduced at the beginning of 2019. We are evaluating the premium scheme in 2020, with a view to adding a condition concerning active control.
- **Accelerated asbestos-safe roofs**: In support of the accelerated performance of renovations of roofs containing asbestos of dwellings (and of other applications), provision is made for various new measures in the asbestos plan (relieving the burden, premiums, etc.). Among other things, a premium will be granted from 2021 for renovation of an asbestos-containing roof of a dwelling.

TAX MEASURES TO BOOST INVESTMENTS IN RENOVATION

- **6% VAT rate.** The 6% VAT rate for the renovation of housing over 10 years old has already been an important tax incentive for many years.

- **Reduced gift tax for renovation.** With the reform of the gift tax from 1 July 2015, a first initiative was taken for the use of tax instruments to support investments in improving the energy performance of our building stock in a targeted manner. At the time of making the gift, the ordinary gift tax rate must be paid. As soon as the beneficiary of the gift can demonstrate compliance with the extra conditions, the difference between the ordinary rate and the reduced rate is refunded. The beneficiary of the gift must have the renovation works carried out within five years of the date of the deed of gift for a total amount of at least EUR 10 000 (excluding VAT) and according to the conditions applicable for energy premiums, i.e. in accordance with the 2050 objective.
- **Reduced registration tax for a major energy renovation.** On 9 May 2018, the Flemish Parliament approved the adjustment of the registration tax on the purchase of an immovable property for sales agreements from 1 June 2018. For the purchase of a single-family dwelling, the rate has since then amounted to 7% of the purchase price, with an extra reduction for major energy renovations. Under the FECP, the rate for major energy renovations will be further reduced to 5%, which will provide the purchaser with an extra budget for renovation.
- **Reduction of the annual building tax for major energy renovation.** For major energy renovation of residential buildings[22] with a building application as from 1 October 2016, the annual building tax is reduced for 5 years:
    - if the E-level is no higher than E90, the reduction amounts to 50%;
    - if the E-level is no higher than E60, the reduction amounts to 100%.

  In order to encourage deep renovation to label A in particular, the 50% exemption for E90 was abolished in 2020 and only the 100% exemption for E60 remains.

REQUIREMENTS AND STANDARDS FOR RESIDENTIAL BUILDINGS

There are already several requirements:

- **Compulsory EPC.** It is compulsory to draw up the EPC on sale or rental.
- **Minimum energy performance requirements in the Flemish Housing Code:**
    - the roof insulation standard and the glazing standard from the Flemish Housing Code:[23]
        - Compulsory roof insulation: by 2020, all roofs of independent dwellings (single-family dwellings, one-room flats and apartments, i.e. not rooms) must be insulated with an R-value of at least 0.75.
        - Compulsory double glazing: by 2023, all dwellings must be provided with double glazing.
    - From 1 January 2020, the roof insulation standard can also be met if the energy rating of the dwelling, established in an EPC, is lower than the limit value established by the Flemish Government. These limit values are:
        - 600 kWh/m² for a detached building;
        - 550 kWh/m² for a semi-detached building;
        - 500 kWh/m² for a terraced building;

[22] Major energy renovations: renovation (with building permit) in which at least the generator for heating and/or cooling is fully replaced and at least 75% of the building envelope is insulated (or retrofitted with insulation).

[23] The Flemish Housing Code contains minimum standards for residential buildings concerning safety, health, quality and energy performance. In this respect, it is pointed out that the standard for roof insulation (R value of 0.75) is far from the 2050 objective (R value 4.5). However, the conditions for the current energy premiums are already in line with 2050, as a result of which it can be expected that owners who install roof insulation will always do so in accordance with this long-term goal. The same reasoning applies for the double glazing standard.

    - 400 kWh/m² for an apartment.

  The 2019-2024 Coalition Agreement provides that rented housing must meet a continuously improving maximum EPC figure which is geared to the benchmarks and long-term objective for 2050. The Flemish Housing Agency (housing policy) is preparing a policy recommendation for this purpose.
- EPB requirements are in force for renovation works subject to a permit requirement.
- To achieve and accelerate additional savings by means of a major energy renovation, the E-level requirement was reduced in 2020 from E90 to E70 and will be further reduced from 2022 to E60 (= 2050 objective).
- **Inspection requirement for heating system.** The inspection and maintenance requirement for central heating (annual for fuel oil, every two years for natural gas, more extensive periodic audit every five years for appliances from 5 years old) was introduced under the Heating Appliances Decree (*Stooktoestellenbesluit*).
- **Ban on fuel oil boilers.** From 2021, there will be a ban on the installation of fuel oil boilers in new constructions and in the case of major energy renovation. If there is a natural gas grid in the street, an existing fuel oil boiler may no longer be replaced unless it is demonstrated that the fuel oil boilers are as efficient as the latest natural gas condensing boilers.
- **Ban on natural gas connection.** Natural gas connections are prohibited in the case of new large parcels and large apartment buildings, apart from for collective heating via combined heat and power or in combination with a renewable energy system as main source of heating.

The 2019-2024 Coalition Agreement provides that the standards of the Flemish Housing Code with regard to the maximum EPC figure will gradually be tightened up, taking into account the benchmarks of the long-term objective. This provides considerable support for the phasing out of the poorest EPC labels. The Coalition Agreement also provides that rented housing must also comply with this requirement.

RELIEVING THE BURDEN AND AWARENESS-RAISING

- We are creating a **pool of trained renovation coaches** with the following possible range of tasks:
    - Provision of primary renovation advice from the unified housing and energy service point. For customised advice, it is best to call on a pool of architects with experience in *BENOvatie* (better renovation).
    - Relieving the burden of specific target groups (action plan, requesting and assessment of offers, supervision of works, support of delivery, application for premiums, etc.).
    - Drawing up a financing proposal tailored to the owner/dwelling.
- **Neighbours' premium**. The neighbours' premium has existed since October 2017. This is a premium for project supervisors who collectively supervise a number of dwellings (at least 10) to make them energy-efficient. The project supervisor provides support for the citizen in the realisation of energy-saving investments. To this end, the supervisor takes on as many of the citizen's tasks as possible, such as energy screening of the home, timing, advice on the energy renovation and action plan, drawing up measurement data, searching for contractors, site follow-up, administrative support for premium applications and financing. At the end of 2019, 195 such projects involving at least 10 dwellings or housing units has been launched for a total of 3 657 dwellings and housing units.

- The 2019-2024 Coalition Agreement states: 'In order control the energy consumption and the energy bill of new owners and at the same time to achieve our climate objective, we are promoting, from 2021, deep energy renovation of non-energy-efficient dwellings within a maximum of five years of a notarial deed transferring full ownership, by relaxing the conditions for an energy loan, among other measures, in order to achieve a maximum EPC figure per building typology.' A package of measures is in preparation for this purpose which, in addition to interest-free loans, may contain one or more of the following measures:
    - Reduction of the property tax on non-energy-efficient dwellings after deep energy renovation.
    - Increase in the energy premiums linked to EPC label improvement for new owners.
    - Support in drawing up a BENOvatie master plan that guides the Association of Co-owners and the trustee in the renovation of large apartment buildings.
    - A public-private rolling fund for the renovation of apartments so that the duration of loans to the Association of Co-owners can be extended from 10 to 30 years. Provision for a government guarantee can act as a lever to attract private capital.

  Pending further research, it is assumed that the dwellings will be renovated at least to label C within 5 years of transfer.
- The **sunshine map** provides advice for each building concerning the suitability of the roof in terms of orientation for the placing of solar panels and/or a solar boiler. For each ideal or usable roof, the sunshine map calculates the cost price and payback time for solar panels and a solar boiler, and also the annual savings of energy costs and CO_2 emissions.
- To support owners in their choice in favour of a sustainable heating system, a **decision tree** will be developed in 2020, with an overview of the most important steps and framework conditions for making the transition to sustainable heating.
- In addition, communication and awareness-raising campaigns will be carried out on the energy efficiency of heating and air-conditioning systems, via '*Veilig verwarmen*' (Safe heating) (www.veiligverwarmen.be) among others, focusing on both citizens and technicians and local authorities and intermediary organisations (e.g. housing organisations) and '*Koel je goed*' (Cool yourself well) (www.koeljegoed.be).
- **Local heat zoning plans**. The possibilities for the use of residual heat or production of green heat are heavily dependent on the local (spatial) context. Provision of the heat supply must be area-specific. It is therefore desirable for local authorities to draw up heat plans (or have them drawn up) for their territory. A heat plan comprises a heat zoning plan, a heat vision and measures to bring about the transition. Local authorities will be supported in drawing up local heat plans.
- **Introduction of the digital meter.** Since July 2019, the existing energy meters are gradually being replaced by digital meters. In implementation of the Coalition Agreement, and in line with European Directive 2019/944, it will be stipulated that the full roll-out of digital meters must be completed by 1 July 2029 and that 80% of the meters must be installed by 31 December 2024. The digital meter offers the user opportunities to become more aware of consumption, which can be consulted daily online. Prosumers will be able to obtain maximum information on how they can gear their consumption as closely as possible to their production.
- In cooperation with the Association of Flemish Cities and Municipalities (*Vereniging van Vlaamse Steden en Gemeenten*), the Flemish Government is setting up a centre of expertise in local energy and climate policy in 2020. This centre of expertise will promote the structural dialogue between the regional and local authorities and offer cities and municipalities professional support in the development and implementation of the local energy and climate policy. By aligning the regional energy objectives and the local action plans of cities and municipalities more effectively, the centre of expertise facilities a consistent, efficient implementation process.

- **Local climate roundtables (*locale klimaattafels*).** Our cities and municipalities play a key role in the Flemish energy and climate policy. They fulfil an important exemplary role in relation to their inhabitants and businesses. The Flemish authorities therefore wish to provide further support for the local authorities and to involve them more closely in the implementation of the energy and climate policy. A Climate and Energy Pact will therefore be concluded in 2020 in consultation between the Flemish authorities, cities and municipalities and the Association of Flemish Cities and Municipalities. This Pact lays the foundations for structural cooperation and through mutual commitments guarantees a vigorous local climate and energy policy. One of the aspects addressed in this partnership is enhancement of an approach to renovation at district level, including through the local climate roundtables. Climate roundtables culminate in projects in which various stakeholders are involved through a varied range of participation processes. For district renovation, these include the local authorities, the citizens and businesses involved in the district to be renovated, the local energy and housing service point, the financial sector and the local suppliers and installers of sustainable products. The input gathered though these local climate roundtables will also provide useful information for the participation process for the monitoring and implementation of the long-term renovation strategy for 2050 *(see below*). The local centre of expertise also ensures that good practices arising from these local climate roundtables will also be communicated to the other local climate roundtables so that they are rolled out as widely as possible in the near future. The starting point for this is existing local action. 269 Flemish cities and municipalities have already signed a Covenant of Mayors and committed in this way to local climate action. A **'call for local climate action projects'** was therefore launched on 4 March 2020. The purpose of this call is to identify excellent, local, participative exemplary projects, to select them and to scale them up by providing them with financial support. These projects may be the result of climate roundtables to be organised or already organised.
- **In the plan for asbestos-safe Flanders, various initiatives have been announced to relieve the burden.** Their feasibility has been assessed through pilot projects and they will be expanded further in the future. These initiatives can also offer inspiration for example to encourage owners to take the necessary measures with a view to increasing their own comfort and the value of the dwelling. Here it is not so much a matter of (pure) financial support, but above all to relieve the burden entirely during the implementation of the measures.

A COMMUNICATION AND MARKETING PLAN

- More clear, reliable and substantiated information, which will be offered via a user-friendly website to be newly developed.
- Obtaining better insight into the type of buildings and information on the type of households living in these buildings and obstacles to renovation.
- Enhancing awareness of why renovation is necessary and on the various direct and indirect benefits, such as increasing the value of the dwelling or building, increasing comfort, reducing the energy bill.
- Better communication on major energy renovation.
- General raising of awareness of the renovation process to 2050.
- Deployment of thermography.
- Renovation coaches who are linked locally to the service provision of the energy houses and whom citizens can call on for customised renovation advice.

4.2. MEASURES CONCERNING SUPPORT OF DEEP RENOVATIONS FOR NON-RESIDENTIAL BUILDINGS

The non-residential buildings form a complex market with a wide range of typologies. Energy efficiency is often not a priority because of the economic focus of the activities. For instance, business start-ups regularly have no long-term perspective regarding the building in which they are operating. For non-residential buildings, there is also often an incentive problem to proceed to renovate: many buildings are rented, which means that the costs of measures are for the owner, but the benefits for the tenant. The current measures for this type of buildings are insufficient. **For this reason, the 2019-2024 Coalition Agreement provides for a stricter strategic approach with additional ambitious measures to be introduced in the near future (see below).**

An overview is given below of the current and planned measures for the deep renovation of the non-residential building stock to the long-term objective for 2050.

INFORMATION TOOLS

Following the example of the Housing ID for residential buildings, the 2019-2024 Coalition Agreement provides for the development of a **Building ID**, as an information and activation tool for non-residential buildings. Provision has already been made for the basis of the Decree. The Building ID is to enable the digital storage, consultation and exchange of information and recommendations relating to the building, site and environment by the owner or user to improve the energy performance of the non-residential building. During the development of the Building ID, consideration is given to the complementarity with the business centre and the TERRA database for public authorities, schools and healthcare institutions.

Few detailed data are available for the non-residential building stock. The 2019-2024 Coalition Agreement provides for the development of a **data platform for non-residential buildings**, which is to provide insight into the energy data and civil engineering properties of buildings. In this way, a precise idea can be obtained of the number of buildings per sector, floor areas and energy performances. This data platform is made available to the public for benchmarking, while respecting confidentiality, so that building managers and owners can also obtain insight into the energy performance of their building compared to other (similar) buildings.

ENERGY PERFORMANCE CERTIFICATE – NON-RESIDENTIAL (EPC-NR)

From 2020, the EPC is compulsory on the sale or rental of small non-residential buildings.

In order to be considered as a small non-residential unit, the conditions set out below must be met:

- Be functionally independent (the unit functions autonomously).
- Be accessible via its own lockable access from the public road, a yard or a shared circulation area.

- Be a small unit: a useful floor area of ≤ 500 m².
- The unit does not form part of a large non-residential whole: the useful floor area of an interconnected whole of non-residential units is ≤ 1000 m².

The 2019-2024 Coalition Agreement specifies that from 2025 all large non-residential buildings in which provision is made for the possibility of heating or cooling must have an energy performance label. From 2030, these buildings must achieve a minimum energy performance label. The government buildings within Flemish territory are setting a good example by complying with the minimum energy performance label at least two years earlier.

ENERGY PREMIUMS NON-RESIDENTIAL

Energy premiums. The energy premiums for residential buildings are also available for non-residential buildings. In addition, for this type of buildings, a premium applies for relighting and other energy-saving investments after an energy audit has been carried out (EUR 0.035 per kWh primary energy saved with a maximum of EUR 25 000 per project).

Ecology premium+. The Ecology premium+ has been devised for non-residential buildings of businesses: a support measure for increasing the sustainability of businesses. The support amounts to between 15% and 55% of the additional cost of the investment. Measures included on a pre-established exhaustive list of uncommon best available techniques are eligible. Examples currently on this list include connection to heating networks, heat pumps using residual heat as a source, an active, smart daylight system, etc.

The Coalition Agreement provides for further simplification of the various premiums for businesses by integrating the above. The intention is to achieve this at a first stage by having everything run through a single e-service point.

TAX MEASURES TO ENCOURAGE INVESTMENTS IN RENOVATION

Increased investment deduction: businesses can reduce their taxable profit with an increased investment deduction for energy-saving investments. Energy-saving investments, such as insulation, low-emission glass, relighting, heat pumps, etc., are eligible for the increased investment deduction. The investment deduction amounts to 13.5%.

Reduction of property tax for major energy renovations. The amount of the reduction in property tax depends on the E-level of the building. For major energy renovations with a building permit from 1 October 2016 to 31 December 2019, the reduction amounts to 50% for a maximum E-level of E90 and 100% for a maximum E-level of E60. From 2020, only the 100% reduction over five years for a maximum E-level of E60 remains.

1% for non-commercial legal persons and cooperatives.
Certain non-commercial legal persons and cooperatives (schools, hospitals, non-profit organisations, etc.) can borrow up to EUR 15 000 at 1% (for ten years) from the energy houses from 1 October 2017 until at least the end of 2020.

REQUIREMENTS AND STANDARDS FOR NON-RESIDENTIAL BUILDINGS

The energy performance for non-residential buildings (EPN) legislation imposes requirements for the energy performance of non-residential buildings. There are, for example, standards concerning insulation, ventilation and energy performance. These requirements differ depending on whether a new construction, a major energy renovation or an ordinary renovation is concerned.

Mandatory renovation after transfer of ownership. In order to reduce the climate footprint of non-energy-efficient tertiary buildings, the 2019-2024 Coalition Agreement specifies that from 2021 they must undergo must undergo deep energy renovation within no more than five years of a notarial deed of transfer of full ownership. The specific approach for this is under preparation and consultations are taking place with various actors.

Mandatory energy performance label. From 2025, all large non-residential buildings with the possibility of heating or cooling must have an energy performance label (currently under development).

Mandatory minimum energy performance from 2030. From 2030, these buildings must achieve a minimum energy performance label still to be defined. The government buildings within Flemish territory are setting a good example by complying with the minimum energy performance label at least two years earlier.

Mandatory inspection of heating and air-conditioning systems. Articles 14 and 15 of the EPBD lay down requirements concerning the inspection of heating and air-conditioning systems.

For heating systems, the provision is met through the heating audit (Article 9 of the Heating Appliances Decree). This heating audit comprises a thorough assessment of the sizing, the efficiency of the heating appliance and an assessment of the energy performance of the entire heating system, taking into account the heating requirements of the building. The owner receives a heating audit report with recommendations with regard to the possible replacement of the system and other energy-saving measures. The owner must also supply a copy of the report to the user (tenant). The frequency of the heating audit is dependent on the rated output and the fuel type and varies from every two years to every five years.

There is an air-conditioning energy inspection for air-conditioning systems. In accordance with Article 15 of the EPBD, regular inspections must be carried out of air-conditioning systems with a rated cooling output of over 12 kW. This requirement was included in Article 5.16.3.3 of the Order of the Flemish Government of 1 June 1995 concerning general and sectoral provisions relating to environmental safety (*Besluit van de Vlaamse Regering van 1 juni 1995 houdende algemene en sectorale bepalingen inzake milieuhygiëne*) (VLAREM II). The inspection comprises an assessment of the efficiency and sizing of the air-conditioning system, taking into account the cooling requirements of the building, a check of the available documentation, a visual inspection of the air-conditioning system, an assessment of the correct use of the air-conditioning system and a check of a number of

operating parameters of the air-conditioning system. This frequency of inspection for air-conditioning systems is dependent on the rated cooling output and varies from every two years to every five years.

Mandatory energy audit of large enterprises. Under Article 8 of the Energy Efficiency Directive, large enterprises are required to undergo an audit. This refers to all enterprises which employ more than 250 persons or which have an annual turnover exceeding EUR 50 million and an annual balance sheet total exceeding EUR 43 million. This mandatory energy audit covers building-related energy consumption as well as process energy and transport. The audit is carried out by an internal or external energy expert and the VEA conducts a quality control of the audits. The audit must be updated every four years.

RELIEVING THE BURDEN AND AWARENESS-RAISING

Mini-energy policy agreements: Energy policy agreements small and medium-sized enterprises (SMEs). In order to encourage SMEs to take energy-saving measures, sectoral schemes have been developed to relieve the burden for the target group of SMEs. Since the target group of SMEs is diverse in terms of size, processes and saving measures, it has been opted to establish energy-saving processes at sectoral level. Within these mini-energy policy agreement processes, the sector federation appoints an energy coach, financed by the Flemish authorities, to support the SMEs in taking energy efficiency measures. The energy coach assists the SMEs in:

- carrying out an energy scan;
- comparing offers;
- monitoring the installation;
- applying for existing premiums and subsidies.

The sector federation is responsible for the promotion and dissemination of the process. Where possible, framework contracts are also concluded with suppliers for specific investments concerning measures which occur frequently in the sector.

4.3. MEASURES TARGETING THE WORST PERFORMING BUILDINGS

As mentioned in the description of the building stock, the Flemish housing stock is aged and a considerable proportion of dwellings are of poor quality. Approximately 310 000 dwellings do not comply with the minimum standards regarding safety, health, basic comfort and energy performance defined in the Flemish Housing Code.[24]

[24] The 2018 Housing Survey (*Woonsurvey*) contains more details (https://steunpuntwonen.be/Documenten_2016-2020/Onderzoek_Werkpakketten/WP_1_Nieuwe_woonsurvey_en_woningschouwing/WP1-2_TOELICHTING)

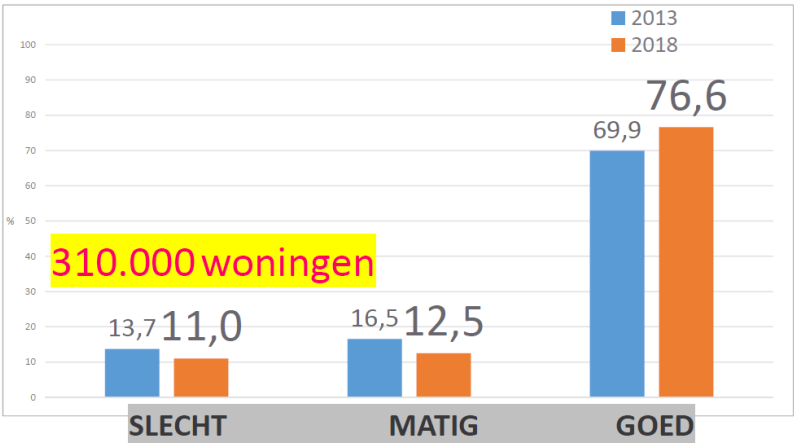
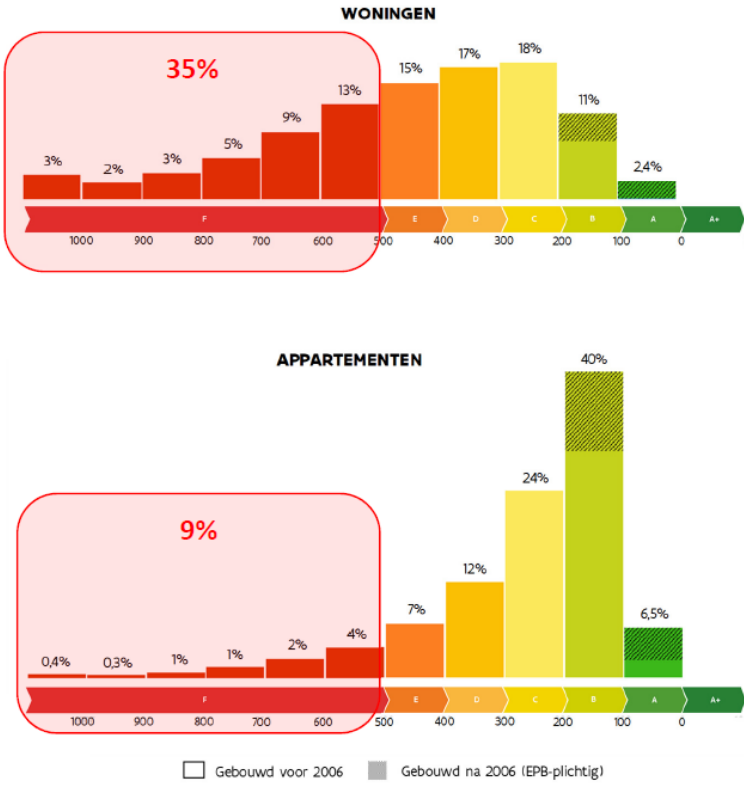


Figure 16: Quality of Flemish dwellings as a % of the housing stock (Housing Survey 2018)

Key
woningen = dwellings
slecht = poor
matig = moderate
goed = good

At the same time, on the basis of the data in the EPC and EPB databases, currently only 2.4% of houses and 6.5% of apartments meet the long-term objective for 2050. At the other end of the spectrum, 29% of all dwellings have label F with an EPC figure exceeding 500: 35% of dwellings and 9% of apartments (which by definition have a better energy performance due to their compactness and enclosed location).



PROGRESSIVE PHASING-OUT OF THE WORST LABELS

The dwellings with the worst labels have very great potential for energy saving.

In addition to encouraging deep renovations and maximising the potential of trigger points, we are **focusing our strategy on the sustained phasing-out of the worst performing labels.**

The path of the maximum EPC figure per housing type will be determined in alignment with the minimum housing quality requirements in the Flemish Housing Code.

Figure 17: Proportions of dwellings with F label for single-family houses and apartments (source: EPC database)

Key
woningen = houses
appartementen = apartments
gebouwd voor 2006 = built before 2006
gebouwd na 2006 (EPB-plichtig) = built after 2006 (subject to EPB requirements)

As mentioned in the description of the building stock, about 55% of single-family dwellings and just over 40% of the apartment buildings in Flanders date back to before the 1970s. The year of construction of a sizeable proportion of single-family dwellings (28.5%) is before World War II and they are therefore more than 75 years old. There is a strong correlation between energy performance and year of construction.

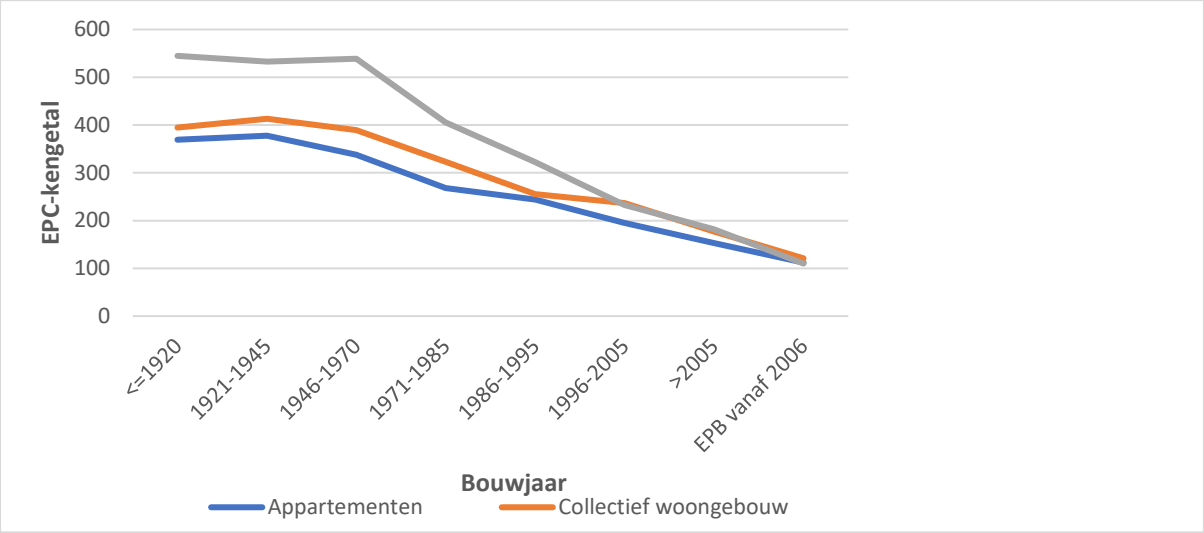


Figure 18 Correlation between year of construction and energy performance February 2020 (VEA)

Key
EPC-kengetal = EPC figure
EPB vanaf 2006 = EPB from 2006
Bouwjaar = Year of construction
Appartementen = Apartments
Collectief woongebouw = collective residential building

There are 850 000 dwellings (mainly single-family dwellings) with an F label. In view of their age and the average very poor energy performance, **it is appropriate for these dwellings to weigh up between the potential for (deep) renovation towards the 2050 objective and the alternative of demolition and reconstruction**, in which one or more dwellings can be built which amply meet the requirements in terms of modern comfort, shrinking family size and high energy performance. This weighing-up also takes account of aspects such as heritage value, environmental costs and energy for demolition and production of building materials.

If a phased renovation is opted for, there is a significant risk of technical lock-in, which can be mitigated by specific advisory and accompanying measures. The EPC and the Housing ID constitute the instrumental basis for this, which can be further supplemented by the extension of customised advice by renovation advisers in energy houses, provincial sustainable housing support centres and intermunicipal housing service points. In addition, the role of the building federations and architect organisations can increase further in this respect.

The Flemish policy has long been strongly focused on the residential building stock. This has the consequence that there are likewise major challenges for the non-residential buildings. An estimated

nearly 70% of the non-residential buildings date back to before 1975. These buildings have significantly poorer energy performances than the more recent buildings. Priority should therefore be given to these buildings, which are responsible for the bulk of energy consumption within the non-residential building stock.

In the short term, the following measures have been devised specifically for the worst performing housing segment:

- From 2021, new owners who within 5 years renovate a dwelling with a poor label to label C or better can apply for an interest-free loan. The terms and conditions for this are currently being worked out.
- For the same target group, a higher energy premium for renovation to label C or better is also under consideration, which is to be introduced from 2021.
- For the same target group, a reduction in the annual housing tax (property tax) is being examined for those who renovate to label A.
- Premium of **EUR 7 500 for demolition and reconstruction.** Since 2019, there has been a premium of EUR 7 500 for private individuals for the demolition of one or more buildings located in the Flemish Region and the associated reconstruction of one or more houses or an apartment building. The premium runs as a temporary measure for permit applications up to the end of 2020, pending a general reduction in VAT.
- Elimination of regulatory obstacles that curb demolition and reconstruction instead of encouraging it.

In addition, most of the measures mentioned in the section on deep renovation also offer support for the renovation of the worst performing dwellings. However, a number of these measures are particularly relevant here, in view of the average poorer baseline situation for the renovation process, in which demolition and reconstruction may be considered more often:

- The EPC+ provides an overview of the measures to be taken, with an indicative cost price for single-family dwellings. Especially in the case of sale, this information may reduce the sale price, as a result of which buyers of a poorly performing dwelling have a budget left for renovation works.
- The total renovation bonus offers extra financial support to owners who carry out at least 3 renovation works.
- The demolition premium of EUR 7 500 can help to convince owners to undertake demolition and reconstruction.
- The minimum energy performances, as stated in the Flemish Housing Code, are particularly relevant in this segment of poorly performing buildings. The 2019-2024 Coalition Agreement provides for gradual tightening-up of the standards of the Flemish Housing Code concerning the maximum EPC figure, taking into account the benchmarks of the long-term objective for 2050. This applies in particular to this residential building segment.
- Targeted communication on the 2050 objective, especially for these dwellings which often fall far short of the target. In this respect, the secondary benefits of deep renovation in terms of comfort, health, child-raising situation, household budget, etc., are highlighted.
- Accumulation of knowledge on the type of households mainly living in these dwellings so that they can be reached and their awareness raised in a more targeted way, and appropriate policy measures can be developed.
- Acceleration of the renovation programme for the worst performing segments of social housing with quantitative objectives and milestones.

- Assessment framework for demolition and reconstruction.
- In a number of municipalities there is currently a requirement to present a certificate of conformity for private rental housing. Local authorities are made aware of this possibility. Some municipalities opt for an alternative approach by reducing the period of validity of the certificate (standard 10 years).
- Targeted communication on the increase in the value of the property from such interventions.

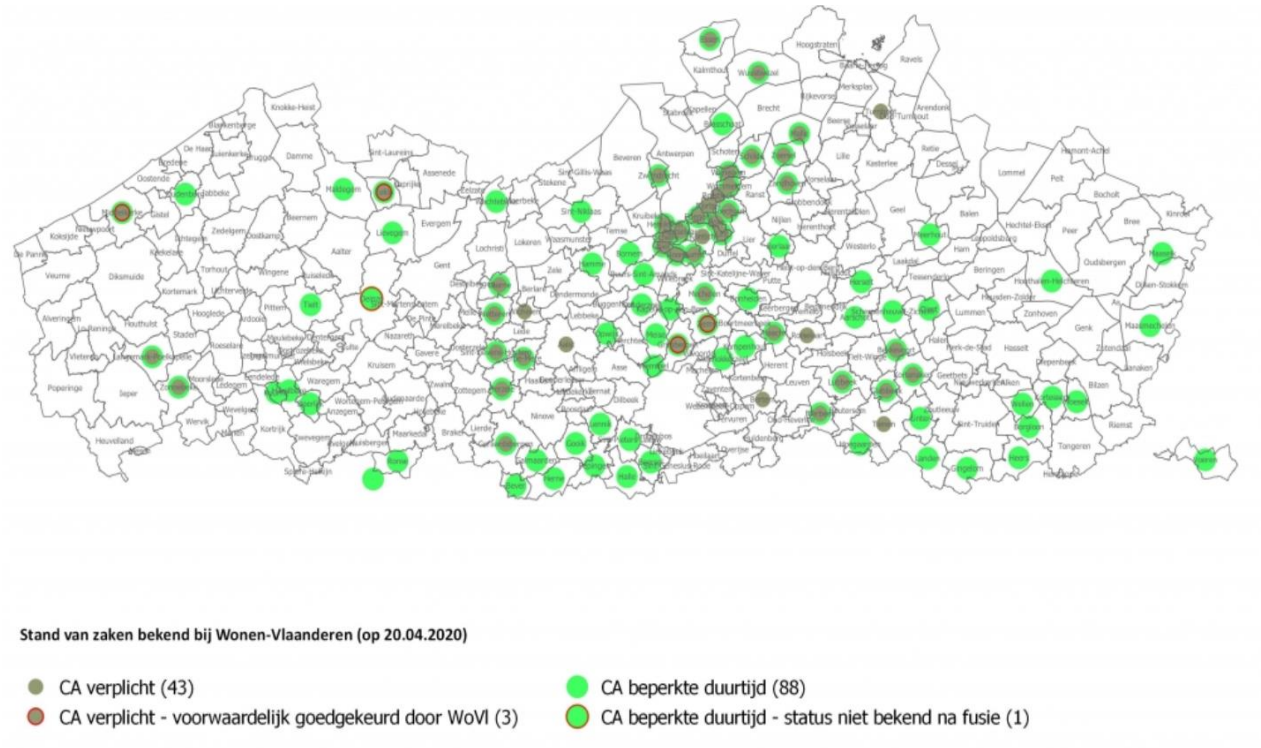


Figure 19: Map of municipalities with mandatory certificate of conformity/reduced duration (Wonen-Vlaanderen, April 2020)

Key
Stand van zaken bekend bij Wonen-Vlaanderen (op 20.04.2020) = Situation as known at the Flemish Housing Agency (on 20.04.2020)
CA verplicht = certificate of conformity mandatory
CA verplicht – voorwaardelijk goedgekeurd door WoVI = certificate of conformity mandatory – provisionally approved by the Flemish Housing Agency
CA beperkte duurtijd = certificate of conformity with limited duration
CA beperkte duurtijd – status niet bekend na fusie = certificate of conformity of limited duration – status not known after merger

For non-residential buildings, reference is made to the adopted policy measures mentioned above:
- Mandatory renovation after transfer of ownership;
- Mandatory energy performance label from 2025;
- Mandatory minimum energy performance from 2030. From 2030, these buildings must achieve a minimum energy performance label which is yet to be defined.

4.4. POLICY MEASURES AND ACTIONS TO ELIMINATE THE SPLIT INCENTIVE

In Flanders, a relatively high percentage of dwellings are owner-occupied. The 2018 Housing Survey shows that 72% are owner-occupiers in Flanders. Of all rented housing in Flanders, 27% is social

housing and 73% private rented housing. In general, the supply on the rental market is too small and a shortage prevails of high-quality, affordable rental housing.

The 2013 National Housing Survey established that the intention to renovate housing is generally considerably less marked in rented housing than in owner-occupied housing. When it comes to renovation, there are considerable differences between owners and tenants. The former generally renovate far more than the latter. In addition, for all kinds of works included in the survey, there is a greater probability that renovation would be carried out by owners than by tenants. Within the rental sector, there are no differences between tenants of private and of social housing.

In addition to the general barriers, such as lack of financial resources, lack of knowledge and motivation, etc., the split incentive is an important factor hampering the implementation of energy-saving investments by landlords. The advantage (= fall in the energy bill) benefits the tenant and the investment cost cannot be offset directly in the rent for dwellings with a rental agreement before 1 January 2019, due to the Rented Accommodation Act (*woninghuurwet*).

An overview is given below of the present and planned measures to eliminate the split incentive in the rental market.

- For rental agreements from 1 January 2019, there is the legally regulated possibility to pass on the costs of energy-saving measures implemented in the rent. The Flemish Rented Accommodation Decree (*Vlaamse Woninghuurdecreet*) (Article 35, §2) provides that if, as a result of the investments, the normal rental value of the rented property is at least 10% higher than the current rent, the court may allow a revision of the rent.
- Energy correction for social housing: In order to eliminate the split-incentive, an energy correction has been introduced for social housing (cf. energy performance compensation in the Netherlands). Article 44 of the Framework Decree on Social Rents (*Kaderbesluit sociale huur*) states: 'An energy correction shall be applied for housing for which the expected energy consumption for space heating and domestic hot water is lower than the reference energy consumption.' On 7 June 2019, the Ministerial Decree establishing and updating the energy correction (*ministerieel besluit houdende vaststelling en actualisering van de energiecorrectie*) was signed. This enables a correction to be made to the social rent due to better energy performance of the rental property. The energy correction for the calculation of the social rent entered into force on 1 January 2020. The housing company that renovates the social housing in terms of energy efficiency may raise the rent to a limited extent. As a result of the housing company's investment, the tenant also has certain advantages, for example a lower energy bill. Part of this gain can be offset in the rent. It is not therefore a matter of just any renovation costs, they must clearly have an impact on the tenant's energy bill.
- The 2019-2024 Coalition Agreement provides for gradual tightening up of the standards of the Flemish Housing Code concerning the maximum EPC figure, taking into account the benchmarks of the long-term objective for 2050. This applies in particular to this residential building segment.
- Opening of the unified housing renovation premium to landlords is being examined, even if they do not rent through a social housing rental office (*Sociaal Verhuurkantoor*, SVK). There must be a guarantee that the dwelling meets the minimum housing quality and that it is rented out at a reasonable rent.

4.5. MEASURES CONCERNING THE ELIMINATION OF LABOUR MARKET DEFICIENCIES

Vacancies in the construction sector in Flanders account for nearly 10% of all vacancies (13 400 out of 139 000, Statbel 2019). There is currently a great demand from construction companies for workers with a wide range of skills and qualifications. A key role is played by new developments in ICT, robot technology, artificial intelligence, the Internet of Things and Big Data. Construction is consequently a priority in 'STEM' (science, technology, engineering and mathematics) training. This concerns highly educated people such as construction engineers, but craftsmen also remain much in demand.

The public employment service of Flanders (*Vlaamse Dienst voor Arbeidsbemiddeling en Beroepsopleiding*, VDAB) publishes annual data on professions in which there is a labour market shortage. These are professions in which it is more difficult to fill vacancies than in other professions. Of these, a large number are in the construction sector, such as site manager/building superintendent, industrial installations technician, heating installers, building calculators and construction engineering office technician. There is a shortage in terms of both quantity and quality for a large number of professions. In addition, it appears that in a large number of building professions, jobseekers do not make themselves available for vacancies due to the specific onerous working conditions.

According to a recent analysis of the 6% VAT declarations (rate for renovation) by the university partnership Steunpunt Wonen, the investments for residential maintenance and renovation works (Vastmans, 2019[25]) in Flanders in 2018 can be estimated at approximately EUR 6 billion. Since the works to which the reduced VAT applies will consist only partly in works necessary to achieve the long-term objectives (and for example also cover maintenance, comfort and housing extensions), the conclusion is that the present residential investments for comfort and energy are significantly lower than the necessary annual investment. In addition, the expectation is that the group of households which currently invest sufficiently will not reduce their rate of investment. This means that a significant expansion of activity in the construction sector is necessary.

A recent study by Eurofound (Foundation for the Improvement of Living and Working Conditions) makes it clear that employment in the European Union must rise on average by 0.5% by 2030 in the case of a well-thought-out and far-reaching climate plan that complies with the Paris Agreement. For Belgium, this may even be as much as double.

[25] https://steunpuntwonen.be/Documenten_20162020/Onderzoek_Ad_hoc_opdrachten/Ad_hoc_15_Drempels_voor_renovatie/Ad_hoc_15-1_RAPPORT

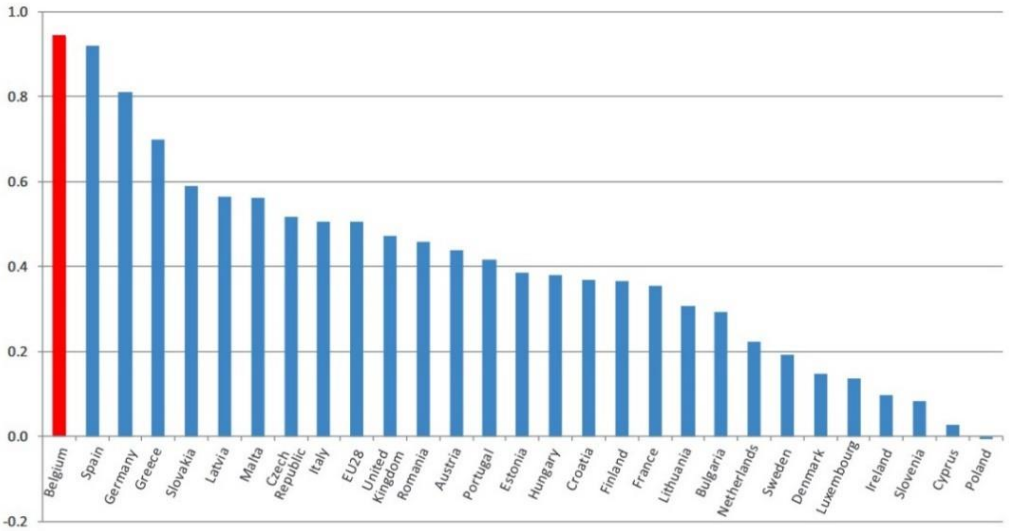


Figure 20: Estimate of impact on employment of the Paris Climate Agreement (Future of manufacturing; Eurofound (December 2019))

In particular, employment in the construction sector appears to progress by 2030.

Construction firms have difficulty in finding new workers. There have never been more people working in Flanders, which means that only a limited number of jobseekers are available on the labour market. The labour reserve is totally inadequate to boost the renovation rate to the necessary number of renovations to label A required to renovate the housing stock by 2050. The number of apprentices in construction and technical fields is falling. The lack of capacity in the construction sector is severely hampering the implementation of the renovation strategy. The Renovation Pact steering group made the urgent recommendation to establish an overall employment plan in the construction sector, focusing on: more efficient construction techniques, intake in construction education, VDAB and Syntra vocational training, increasing the attractiveness of construction professions and examining additional intake from abroad.

An overview is given below of the current and planned measures to tackle shortfalls in the market.

Dual learning. In dual learning, an apprentice obtains skills at the workplace and in a school. This provides an ideal combination of theory and practice.

Jobseekers can follow **individual vocational training**. This not only involves technical skills, but also, for example, language coaching in the work context. The various forms of workplace learning are free of charge or relatively cheap for employers.

The 2019-2024 Coalition Agreement states: 'We are devising an action plan with the construction sector to ensure the supply of craftsmen so that high-quality implementation of ambitious renovation targets can be guaranteed.'

The structural consultation between the Flemish Government and the broad construction sector takes place within the framework of the annual meetings of the **Flemish Construction Consultation Committee (*Vlaams bouwoverlegcomité***, VBOC). This consultative body discusses all matters directly or indirectly related to the construction sector and coming under the competence of the Flemish Government. The VBOC can be consulted when Flemish ministers wish to take new initiatives which may have far-reaching consequences for the construction sector. At the VBOC meeting of 10 February

2020, the Flemish Government and the construction sector emphasised the existing intensive cooperation between the public employment service of Flanders (VDAB) and the construction sector. In this cooperation, the focus is not only on the current acute shortages but also on professions for which a strong demand is expected in the future. The VDAB tries to align as well as possible with the labour market and this requires constant updating of training. The VDAB examines on an ongoing basis the ways in which to respond even more to the growing demand for certain profiles in the construction sector. By involving the right partners, a flexible response is given to needs. The good cooperation has manifested itself in a structural offer of training for jobseekers and retraining modules for workers.

4.6. POLICY MEASURES AND ACTIONS TARGETING ENERGY POVERTY

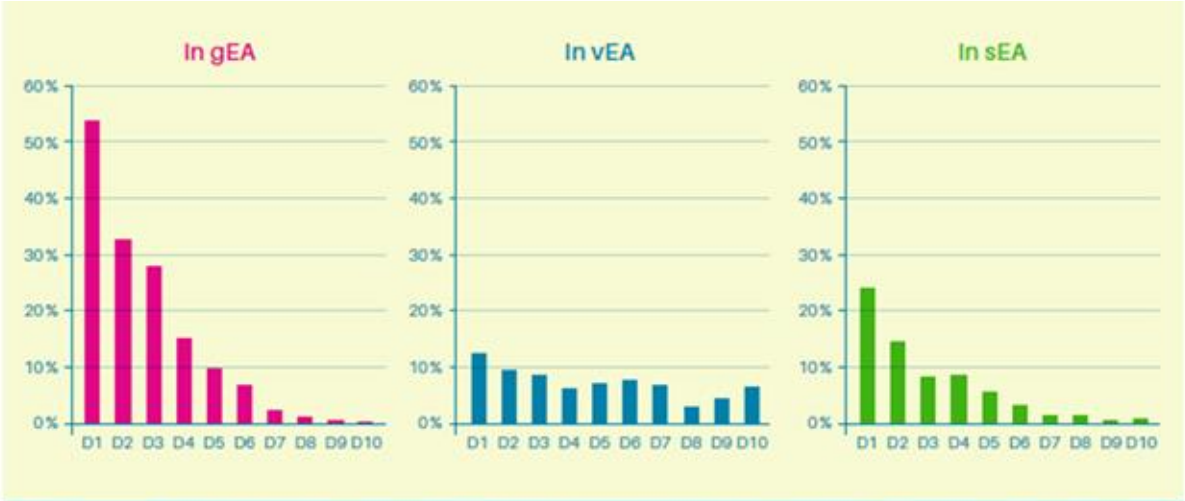
No formal or unique definition of energy poverty has been established in Flanders and Europe. However, the problem is mapped from different angles, both from the context of energy policy – more in the qualitative sense – and from a scientific approach, which tends to adopt a more quantitative approach to energy poverty. Traditionally, a rather abstract definition is used from the policy context: 'experiencing problems with paying energy bills.' Indicators of this are: the number of repayment plans for energy debts, the number of cancelled supply contracts, the number of customers who after cancellation of the contract with a commercial supplier are supplied by the grid operator, the number of budget meters with prepayment function. These indicators are directly linked to the social public service obligations that provide maximum protection to Flemish energy consumers against disconnection of the energy supply via a cascade of measures. On the basis of an annual report to the Minister for Energy, the Flemish Regulator for the Electricity and Gas Market (*Vlaamse Regulator voor de Elektriciteits- en gasmarkt,* VREG) maps the trend in these indicators.

A more scientific approach to energy poverty is based on the costs associated with housing and energy consumption. The Platform against Energy Poverty (*Platform tegen Energiearmoede*), which consists of energy producers and distributors, grid operators, civil society and academic experts, publishes an annual energy poverty barometer. This measures energy poverty on the basis of three synthetic indicators:

- Families in 'measured energy poverty' (gEA) spend too large a proportion of their disposable income on energy costs (11.0%).
- Families in 'hidden energy poverty' (vEA) save significantly on their energy consumption, as a result of which their energy costs are abnormally low compared to families living in a similar situation (3.3%).
- Families in 'subjective energy poverty' (sEA) indicate that they have financial difficulties in adequately heating their home (2.5%).

Taking into account the overlap between these categories, **15.9% of families (445 000) contend with energy poverty in the Flemish Region.**

The energy barometer shows that above all single-parent families and (older) single people run the risk of energy poverty. The 2018 Housing Survey also shows that the number of single people renting social housing in 2018 has increased further (52%). These families have to live on a single income, which makes them extra vulnerable. Because the income often does not come from work, it is also lower. 37.2% of single-parent families have no earned income. In addition, 45.2% of single women and 36.1% of single men under 65 years of age have no earned income. In addition, the majority of older single people live on a retirement pension.



* In 2016 and 2017, the hidden poverty indicator (vEA) could not be calculated as in previous years because it was not possible to exclude families with a relatively well insulated dwelling from the population. These data are therefore not directly comparable with those for the period 2013-2016. Source: BE-SILC 2017; own calculations

Figure 21: Proportion of families in gEA, vEA en sEA per equivalent income decile (Source: Energy Poverty Barometer 2019)

In addition, the Flemish Region also has more tenants than owners who are contending with energy poverty. It is mainly social housing tenants who are particularly vulnerable. The reason for this can be found in the lower disposable income than owners with a housing loan and a much higher housing cost than owners without a housing loan. Moreover, they cannot choose to change or replace their heating source themselves.

Since the 2018 Housing Survey shows that the condition of the housing of certain groups of persons with a weaker socio-economic profile is significantly worse, it can be assumed that families in energy poverty more often live in poor quality dwellings. For instance, higher proportions of dwellings in poor to very poor condition are observed among the unemployed (29%), single-parent families (20%), households with a reference person with a non-EU nationality (19%), the sick or disabled (17%) and households with an income in the lowest income quintile (16%).

Only 55% of the over-65s have an energy-efficient heating system, compared to 68% in the 35 to 44 year age group. In the case of single persons and single-parent families too, the proportion with an energy-efficient central heating boiler is lower compared to the group of couples (with and without children). In the case of the unemployed and the sick or disabled households, the proportion is lower compared to their socio-economically stronger counterparts.

For double glazing, roof insulation, wall insulation and pipe insulation too, it appears that the vulnerable households are more likely to live in a dwelling which does not have them.

In the field of renewable energy, it is seen that single people, unemployed, sick or disabled people and the over-65s are lagging behind. Within these groups, the proportion of households using a system that generates renewable energy is under 10%. In the case of single-parent families, this proportion is 13% and for the total sample 16%.

A group that deserves special attention is the ‘buyers under duress’ and ‘owners under duress’. These are owners who do not seem to have the opportunity to improve the quality of the dwelling in which

they live so that it meets the minimum housing quality standards. According to the 2013 National Housing Survey, there are about 118 000 owners in Flanders (or 4% of the Flemish housing market) who have both quality problems and affordability problems. 83 000 of these owners (or 3% of the Flemish housing market) also have an income from the three lowest income quintiles and as a result come under the definition of buyers or owners under duress (= housing quality problems + affordability problems + belong to the 3 lowest income quintiles).

On the basis of the previous Coalition Agreement and the accompanying policy document, the VEA, in cooperation with 29 stakeholders, devised an **Energy Poverty Programme** in 2015. This led to a concept paper addressed to the Flemish Government, which was approved on 4 March 2016. The programme described 34 actions which aimed at both protection against disconnection and target group-oriented measures for energy saving (free energy scans, higher premiums, interest-free loans, etc.).

In implementation of the Energy Poverty Programme, processes were started up to develop the selected measures and, where applicable, to incorporate them in legislation and to report on them annually to the Flemish Government. Two years after the approval of the Energy Poverty Programme, a thorough evaluation was carried out. In 2018, a broad stakeholder survey was set up to evaluate the existing actions and to gather suggestions for complementary or additional actions. This process led to an overview of all recommendations made by the stakeholders, on which the Flemish Government can carry out further work.

The current measures for families in energy poverty can be broken down into various categories.

FINANCIAL SUPPORT MEASURES

The rent and insulation premium (formerly known as Social Energy-Efficiency Projects) for dwellings inhabited by vulnerable private tenants. In addition to a lump-sum premium of EUR 200, which the project promoter receives for each work carried out for the process guidance, the owner-tenant receives:

- EUR 20 per m² roof or cellar insulation installed;
- EUR 12 per m² cavity wall insulation installed;
- EUR 85 per m² low-emission glazing installed.

In cooperation with an external communications agency, a communication campaign focusing on landlords was prepared and launched on 18 April 2019 (www.huur-en-isolatiepremie.be/).

The Flemish energy loan. Interest-free energy loan for the priority target group: EUR 15 000 and a duration of 10 years. Since 2010, 21 000 energy loans have been granted for a total of EUR 175 million.

Fund for purchase in duress. For certain target groups who do not have sufficient financial resources to make their dwelling energy-efficient, a fund for purchase in duress was set up (Flemish Government Decree of 17 May 2019). An interest-free loan with deferred repayment amounting to up to EUR 25 000 can be granted to the buyers in duress, poor owners who purchase poor quality housing from necessity. Only when the dwelling is sold, or at the latest after 20 years, must the loan be repaid. A first call (EUR 15.5 million, providing 625 loans) was launched by the Minister for Energy at the beginning of 2020.

Increased energy premiums for protected purchasers (beneficiaries of the social maximum energy prices). For everyone who invests in a number of energy-saving works, the Flemish Region provides

for financial support in the form of a premium which is paid by the electricity distribution system operator. For protected customers, who generally have fewer financial resources, the legislation provides for increased amounts for the energy premiums.

- Basic principle: 50% increase in energy premiums;
- For solar boiler, heat pump, heat pump boiler, the increase amounts to 20%;
- For some investments, the increased premium amounts to more than 50%:
    - Roof insulation (EUR 10.5 per m² instead of EUR 4);
    - Low-emission glass (EUR 56 per m² instead of EUR 10);
    - Premium for installation of a condensing boiler: EUR 1 800 (for protected customers only).

In addition, there is also a 50% increase in the bonus amounts granted under the total renovation bonus from the third measure.

Rent subsidy and installation premium when vulnerable tenants move from an uninhabitable or seriously unsuitable dwelling to a suitable dwelling (measures under the housing policy).

Integration of housing and energy premiums. The 2019-2024 Coalition Agreement provides that, to promote customer-friendliness and transparency, as many premiums as possible aimed at energy saving, quality improvement and housing adaptation are combined in a single service point with a view to an overarching housing renovation premium with differentiation of premium amount based on income categories. A preparatory process was started in autumn 2019. Within this framework, work will be carried out on further harmonisation based on the income of the various vulnerable/priority target groups for energy measures.

SOCIAL HOUSING

The budget provides each year for an investment volume for the construction and renovation of social housing for rent. A portion of this is reserved for new construction of social housing for rent (including with a view to achieving the growth path 2009-2025 in order to provide 50 000 additional social dwellings for rent). An overview is given below of the total annual investment volume provided in the period 2014-2019, subdivided in the portion earmarked for new construction and a portion earmarked for renovation and replacement construction. In 2019, the expenditure ratio is 55% for new construction and 45% for renovation.

	2014	2015	2016	2017	2018	2019
New construction	€ 565 408 701	€ 518 566 066	€ 654 900 745	€ 514 201 000	€ 495 181 200	€ 458.247.350
Renovation/ replacement	€ 132 505 213	€ 102 169 934	€ 175 519 255	€ 303 519 000	€ 330 120 800	€ 374.929.650
Total	**€ 697 913 914**	**€ 620 736 000**	**€ 830 420 000**	**€ 817 720 000**	**€ 825 302 000**	**€ 833 177 000**

Table 14: Distribution of budget between construction and renovation of social housing 2014-2019

In the period 2016–2019, the Flemish Climate Fund provided EUR 20 million per year for additional investment in energy renovation of social housing for rent. In 2018, a one-off amount of EUR 16 million was allocated in addition for the energy renovation of social housing for rent. These funds are used for the subsidisation of energy measures in the renovation and replacement construction of existing dwellings and the installation of low-emission glass, insulation of the external building envelope and technical equipment, including heat pumps, condensing boilers or solar boilers.

In 2018, the social housing companies drew up an inventory of their assets by means of a limited condition measurement. On this basis, they drew up a renovation plan for the next five years. By 2050, all social housing for rent must achieve an EPC label A. In cooperation with the social housing companies, the Flemish Agency for Social Housing (*Vlaamse Maatschappij van Sociaal Wonen*, VMSW) is drawing up an action plan to achieve this objective by 2050. The VMSW has devised the Design and Insulate procedure to make it easier for the social housing companies to carry out energy renovations of their properties. In the first instance, the sector will launch this procedure for roof insulation works, which will then be followed by procedures for other energy works.

At the end of 2018, the European Commission approved financial support for the VVH ASTER project via the European Investment Bank's ELENA programme, which comes under Horizon 2020. The starting point is to set up an investment structure (ASTER) in order in the first instance to install solar panels for 20 000 families, which represents an investment of EUR 42 million and a reduction of approximately 10 000 tonnes of CO_2. Tenants will certainly not pay more energy costs after the installation of the solar panels. The basic principle is effective and guaranteed saving. The project therefore makes a contribution to combating energy poverty.

INCENTIVE AND REGULATORY MEASURES

Free energy scan. An adviser looks round the dwelling for possibilities to save energy. The residents are given energy-saving tips that are to be applied immediately. Where it would be helpful, the energy scanner installs energy-saving materials free of charge (water-saving shower head, energy-saving bulbs, radiator foil, pipe insulation). The resident receives a report with energy tips and further savings opportunities. After this basic scan, a further follow-up scan can be requested. This scan is a follow-up to the basic scan and proposes possible additional adaptations. These may be small-scale energy-saving measures, but also guidance in the case of larger-scale energy-saving measures, such as the installation of low-emission glazing, roof insulation or an energy-efficient heating system. From 2019, this type of follow-up scan was also incorporated in the services provided by the energy houses. More than 20 000 energy scans are offered free of charge each year.

The H2020 **Assist project**,[26] with partners from 6 Member States, aims to tackle energy poverty and offer specialised services via a network of trained energy advisers for vulnerable consumers. In the Flemish Region, grid operator FLUVIUS and research institute VITO participate in this project, in which the years of experience in working with free household energy scans are turned to account. The VEA is part of the Flemish steering group and thus receives first-hand policy advice.

Five energy consultant projects on energy poverty 2019-2021 contribute to the achievement of the objectives of the energy poverty programme (https://www.energiesparen.be/energieconsulenten). They provide information on the energy scans, (increased) energy premiums and interest-free energy loan. The energy consultants inform the target group about the long-term objective for 2050 under the Renovation Pact and the measures and initiatives that have been devised in this context to renovate every dwelling, including those of vulnerable families, to the 2050 objective. Moreover, the energy consultants set up concrete actions to provide the target group with direct encouragement and support to invest in energy saving.

[26] https://www.assist2gether.eu/

Social management right. In accordance with the new Article 90 of the Flemish Housing Code, the municipality is granted the right to place a dwelling which, for at least two years, has been listed in the vacant property register, the register of derelict buildings and dwellings or the register of unsuitable and uninhabitable buildings, under social management for a period of nine years. The dwellings are brought up the housing quality standards and used as social housing for rent. In addition, the management of unoccupied dwellings which do meet the housing quality requirements can be taken over for use as social housing for rent. This policy instrument aims firstly to contribute to improving the housing quality and secondly to increase (temporarily) the social housing supply.

Minimum energy performance requirements in the Flemish Housing Code. By 2020, all roofs of independent dwellings (single-family dwellings, one-room flats and apartments, i.e. not rooms) must be insulated with an R-value of at least 0.75. By 2023, all dwellings must be provided with double glazing. From 1 January 2020, the roof insulation standard can also be met if the energy rating of the dwelling, established in an EPC, is lower than the limit value established by the Flemish Government. These limit values are:

- 600 kWh/m² for a detached building;
- 550 kWh/m² for a semi-detached building;
- 500 kWh/m² for a terraced building;
- 400 kWh/m² for an apartment.

The 2019-2024 Coalition Agreement provides that the standards of the Flemish Housing Code with regard to the maximum EPC rating must be tightened up gradually, taking into account the benchmarks of the long-term objective for 2050. This measure, which is being developed, is expected to provide a significant impetus for the improvement of the housing quality of (private) housing for rent.

PROVISION OF INFORMATION AND GUIDANCE OF THE TARGET GROUP

In the municipalities, the energy houses fulfil a one-stop-shop function, i.e. they are an accessible, approachable contact point which all residents can turn to with their questions concerning energy in the broad sense. In addition to an obligatory basic package of tasks, the energy houses also perform supplementary service tasks. This range of services is offered according to local needs. The energy consultants for the target group can act as partner of the energy houses and in this way offer the target group a total package of support (information, relieving the burden, financing, monitoring). The combination of this customised guidance and the provision of an interest-free loan in particular provides the vulnerable target group with an appropriate response to their needs.

4.7. POLICY MEASURES AND ACTIONS TARGETING PUBLIC BUILDINGS

4.7.1. Current situation and challenges

Public buildings are defined as: buildings located in the Flemish Region in which public organisations are located that provide public services to a large number of people and which are frequently visited by the public. This refers to buildings of:

- the federal authorities, including parastatal agencies;
- the Flemish authorities, including internal and external autonomous agencies;
- the provincial authorities;
- the municipal authorities, including public centres for social welfare;
- public undertakings;
- all educational institutions;
- welfare services;
- healthcare services.

This is therefore a category of buildings which covers **a large number of different types of buildings**. Schools and healthcare institutions account for the largest share of public buildings, with average EPC figures of 191 kWh/m² and 179 kWh/m² respectively. The greatest gains can be achieved by placing the focus of the long-term renovation strategy for public buildings on these categories. Naturally, this does not affect the imposed exemplary role for the other categories. For the healthcare sector, EUR 23 million was earmarked for carrying out energy scans and granting the accompanying premiums. An estimated EUR 570 million is needed to roll out this measure for 50% of the property assets. To meet this need, the possibilities of innovative financing instruments will be explored.

For the Flemish authorities' public buildings, there are government agencies for the various sub-segments, which deal specifically with the facilities management of these sectors. These bodies are involved by them in the management of their buildings. Both provision of information and financial aspects ae dealt with here.

SCHOOLS

In Flanders, the education landscape is divided into official education (*officieel onderwijs*) and free education (*vrij onderwijs*). Within official education, there are two networks, i.e. community education (GO!) and government-aided public education. The former is organised by the Flemish Community and the latter by the local authorities (provinces and municipalities). One network operates within free education, the government-aided private education, with various umbrella organisations under it. Under these umbrella organisations, there are a wide range of organising powers which take the investment decisions.

To finance their operating resources, the schools are subsidised by the Flemish Community. The operating resources cover the payment of energy bills, but also for example the water bills and teacher training. The available amount is determined on the basis of the number of pupils per school. The school has freedom to decide how it spends these operating resources, although this is also dependent on the school group concerned. In community education, the school board determines how the operating resources are deployed. In the case of free education, the latter only has to give its opinion. In addition, the school boards must account for the spending of the operating resources to the Flemish authorities.

However, the financing of the infrastructure is different for the various networks. The government-aided private education and the government-aided public education must have recourse to infrastructure subsidies from the Agency for School Infrastructure (*Agentschap voor Infrastructuur in het Onderwijs*, AGION). There is currently an annual budget available for this purpose of approximately EUR 192 million. For the other necessary financial resources, a loan can be concluded which is guaranteed by AGION or own funds must be used. Since February 2020, schools can borrow up to

EUR 500 000 interest-free, for a term of 15 years, for investments in insulation, high-efficiency boilers and solar panels. Previously, schools had to pay 1% interest and only solar panels were eligible.

GO! cannot have recourse to financing via AGION and receives an annual budget of approximately EUR 60 million from the Flemish authorities for new construction and renovation. Of these EUR 60 million, approximately EUR 35 million is assigned to new construction, EUR 5 million to deep renovations and EUR 20 million to small-scale renovations and maintenance works. In addition, it is very difficult for GO! to enter into loans, due to statutory restrictions. This is a factor which makes the financing of energy-efficient investments even more difficult within GO!. In addition, financing via alternative models, such as Energy Service Companies (ESCOs), is not obvious because ESCOs often take out a loan or assign a claim at a bank to finance projects. In legal terms, this is difficult to achieve at GO!. For this reason, ESCO projects already carried out have so far mainly been limited to a focus on quick returns. Partly for this reason, it is important that sufficient provision is made for schools in general for opportunities to relieve the burden and adequate financing possibilities. Combined financing models will be needed to leverage public funds to mobilise more investment from the private sector. The Eurostat paper (19 September 2017) made it possible to deconsolidate part of the investment in a Maintenance and Energy Performance Contract, although this applies only for a very limited part of the most profitable measures. If the focus remains on this, we run the risk of creating lock-ins by 'picking low-hanging fruits' only, without working towards structural measures in the building envelope. Under the Horizon 2020 project 'CitizEE' (Citizens Finance for Energy Efficiency), the VEB devised a structural financing solution combining European funding (EIB, EUInvest), ESCO financing and citizen participation.

The school building monitor of 2013[27] contains interesting data on the school building stock. For instance, it is pointed out that only 25.4% of school buildings have energy-efficient lighting and the pipes are insulated only in 40% of the buildings. However, these are measures that can be carried out at a low investment cost and effort and are quickly recouped. There is therefore potential to use the financial savings made from carrying out these measures to finance more in-depth investments. However, a bottleneck here is that the staff in many schools have virtually no knowledge of the energy performance of the school building and which measures can improve the energy performance of school buildings. Moreover, this is not their main task. There is therefore a very great need for relieving burden at schools. Projects which are described further, such as Climate Schools 2050, meet part of this need for relieving the burden, but these projects are still on a small scale. For this reason, it is important that alternative possibilities for carrying out renovations, such as citizens' cooperatives and ESCOs, are provided with extra support and made widely known so that they can help relieve the burden on schools.

Estimates of the investment amounts needed to make the entire building stock of the compulsory education sector (19.7 million square metres at the end of 2019) CO_2-neutraal, are not yet available. AGION does not have the necessary data available on the current situation of the building stock to be able to make a pronouncement on this subject. In future, it would be best to centralise the data in the TERRA database. GO! has made estimates for the necessary investments for its own building stock. It is estimated that an annual budget of approximately EUR 350 million is necessary to work towards a CO_2-neutral building stock by 2050. Other forms of financing, apart from the usual ones, are necessary for this with, in addition to public funds, also the use of private funds with a guaranteed return. The

[27] The school building monitor of 2013 is available at https://www.vlaanderen.be/publicaties/de-schoolgebouwenmonitor-indicatoren-voor-de-kwaliteit-van-de-schoolgebouwen-in-vlaanderen

use of the maintenance and energy performance contracts generates stable cash flows for both the school group and the ESCO party, which makes third-party financing possible.

A well-substantiated investment plan for the education sector is necessary. It is already clear that more possibilities for financing investments and a wide range of possibilities to relieve the burden for the education sector will be necessary to be able to achieve the long-term renovation objective. For example, the VEB has recently been making framework contracts available to lower the threshold for the purchase of renovation works. In addition, large-scale guidance programmes are useful, as the VEB has established for VIPA (first step: insight and interpretation of the possibilities).

These principles and framework conditions also apply in the context of the efforts towards asbestos safety. Where possible, energy renovation will also be linked to the asbestos approach and vice versa.

HEALTHCARE SECTOR

The infrastructure subsidies for healthcare are granted by the Flemish Infrastructure Agency for Person-related Matters (*Vlaamse Infrastructuuragentschap voor Persoonsgebonden Aangelegenheden*, VIPA). For the smaller sectors (special youth assistance, general welfare work, psychiatric care homes, etc.), VIPA intervenes in the construction costs at a fixed amount per m² corresponding to approximately 60% of the estimated construction costs. This refers to the costs of construction and initial equipping of new construction and building extensions. In the case of renovation, the maximum subsidy amounts to 75% of the subsidy amount for new construction. New construction is in this way encouraged more than renovation. In the case of major energy renovation, this subsidy ceiling is the same as that for new construction. VIPA has approximately EUR 100 million per year available for intervention in the construction costs of the aforementioned smaller subsectors.

In addition, VIPA intervenes on a flat-rate basis for infrastructure works in larger sectors (hospitals, residential homes for the elderly, etc.). The annual budget here is approximately EUR 750 million.

The Agency for Facility Operations (*Facilitair Bedrijf*, HFB) supports the agency Growing Up (*Opgroeien*) via master plans and management of a number of buildings, *inter alia*. HFB is responsible for technical management for youth courts and special youth assistance.

For the healthcare sector a declaration was concluded with 13 climate commitments on 12 January 2017. This commitment declaration was drawn up and signed by the umbrella associations, the competent minister, VEB and VIPA. EUR 23 million has been released from the Climate Fund to support the realisation of the commitments. A number of commitments relate to energy efficiency:

- Aiming for annual energy savings of 2.09% (per healthcare institution) and savings of 27% by 2030.
- Funds are made available to finance customised energy performance diagnoses. This should lead to an action plan with various possible investments and a feasibility study of ESCO contracts.
- In return for the free provision of services, the institutions undertake to carry out the measures with a payback time of less than 5 years. If they do not do so, the energy performance diagnosis must be repaid.
- For measures with a longer payback time, a subsidy instrument has been developed with the climate fund resources to provide a financial incentive for these investments. However, the application of these measures remains voluntary. From 2018, all new construction in the sector is nearly zero energy (defined as cost-optimal in the EPN methodology) and sustainable.
- Tools for monitoring and benchmarking are being developed, in cooperation with the Flemish Energy Company (*Vlaams Energiebedrijf*).

The Flemish Government Decree of 30 March 2018 regulates the implementation of the first four commitments. It stipulates that energy performance diagnoses are free of charge if measures with a payback time of less than five years are carried out within a period of three years.

In order to meet the fourth commitment, two subsidy measures were introduced: the energy performance contract subsidy and the climate investment subsidy for long-term projects. The energy performance contract subsidy is granted if a package of energy-saving measures can be carried out in combination under an energy performance contract. The subsidy covers 10% of the cost price of the facilitation process to an EPC contract, with a maximum of EUR 8 000. In this way, energy-saving measures can be carried out more quickly. The aim of the climate investment subsidy for long-term projects aims to reduce the payback time of investments to five years. The subsidy is provided for energy-saving measures with a major impact on CO_2 saving and amounts to 60% of the estimated investment cost.

In the meantime, about 1 200 energy scans have been carried out in buildings, representing about 10% of the total addresses of all healthcare institutions.

The energy scans system identifies the savings potential in detail and the data are collected centrally in the TERRA data platform. On the basis of data from the energy scans already carried out, VIPA made a forecast of the investments needed to carry out the process surrounding the energy scans and accompanying subsidised investments at 50% of the healthcare sector building stock. This would amount to some EUR 570 million.

Doubling this amount of EUR 570 million to obtain an estimate of the costs for the entire building stock is not accurate. The amount of the subsidies granted to carry out the investments varies in particular according to the scale of the projects. It is considered that there will not be a straight-line correlation between larger and smaller files at present, but that larger files for the time being are taking on the role more of forerunner and are already more present in the total subsidy cost. The amount obtained from doubling EUR 570 million will therefore probably be too high compared to the real costs of rolling out the process surrounding the energy scans and accompanying subsidisation to the entire building stock of the healthcare sector.

The EUR 570 million funding relates to the current system of carrying out energy scans and granting the accompanying premiums. To meet this need, the possibilities of innovative financial instruments will be explored. The total cost price of the investments plus relieving the burden via energy scans would amount to approximately EUR 1.6 billion to attain 50% of the building stock in the healthcare sector.

These principles and framework conditions also apply in the context of the efforts towards asbestos safety. Where possible, energy renovation will also be linked to the asbestos approach and vice versa.

CENTRAL GOVERNMENT BUILDINGS

An annual renovation target of 3% of the floor area of central government buildings[28] applies. This target was set in Article 5 of the Energy Efficiency Directive. There is also the possibility to opt for an alternative approach, which offers more freedom but leads to energy savings of at least the same magnitude.

The Flemish authorities have opted here for the alternative approach. To reinforce this alternative approach, the Energy Efficiency Action Plan was developed for the Flemish authorities, which provides for an **annual reduction in primary energy consumption by 2.09% for each entity. This is a target which goes further than the renovation obligation of 3% of the floor area.** For the largest consumers, this action plan also provides for an annual 2.09% reduction in the energy budget. The funds saved from this, together with funds from the Climate Fund, are used to finance the implementation of energy-saving measures. The first results of the action plan show that the annual savings target has been met for the time being.

The objectives of this action plan are to reduce CO_2 emissions by 40% and to consume 27% less primary energy in 2030 compared to 2015. This has been converted into an annual savings target of 2.09% of primary energy consumption for the entities belonging to the Flemish authorities. In the first instance, this annual savings target runs from 2017 to 2020. In implementation of the 2019-2024 Coalition Agreement, the annual savings target will be raised to 2.5% from 2021.

Two key actors have been designated to achieve this target. Firstly, the Agency for Facility Operations (HFB), under which all the Flemish authorities' real estate – with the focus in the first instance on office buildings – is lodged. HFB ensures a long-term strategy in which high standards are set for new construction with regard to energy consumption (*inter alia*) and major energy renovations are carried out and the most energy-intensive buildings are abandoned. The Tool to Optimise the Total Environmental impact of Materials 'TOTEM' is imposed by the Agency for Facility Operations in public buildings tendering procedures. For the existing building stock, the focus is placed on energy management for the head offices, which come under the ISO50001 scope. Secondly, entities of the Flemish authorities can regularly subscribe to calls by the Flemish Energy Company (VEB) for energy-efficiency projects. In addition, entities can also make use of the VEB's regular offer to relieve the burden. This includes, for example, scans of potential, guidance for insulation, relighting, heating renovations, etc.

These principles and framework conditions also apply in the context of the efforts towards asbestos safety. Where possible, energy renovation will also be linked to the asbestos approach and vice versa.

SPORTS INFRASTRUCTURE

Regarding the sports infrastructure, the full focus will be on sustainability on the basis of the Decree of 5 May 2017 on support for supra-local sports infrastructure and top sports infrastructure (*decreet*

[28] The scope of the Energy Efficiency Directive 2012/27/EU relates to central government buildings. The central government is defined in Article 2(9) of the Directive as 'all administrative departments whose competence extends over the whole territory of a Member State'. In view of their exclusive powers and the fact that they do not come under the hierarchical supervision of the federal government, the regions and communities are considered as central government in Belgium.

van 5 mei 2017 houdende de ondersteuning van bovenlokale sportinfrastructuur en topsportinfrastructuur). For the fourteen sports centres of its own, Sport Vlaanderen will continue to cooperate with the VEB on energy efficiency and strive for the sports centres to become forerunners as centres of excellence regarding numerous aspects, including ecology (energy efficiency, water recovery, waste policy, etc.).

CULTURAL AND YOUTH SECTORS

For the cultural sector, the Flemish Government approved a decree under which investments in cultural infrastructure will prioritise energy-saving measures. For instance, cultural associations can apply for subsidies for a whole series of energy-saving measures: implementation of an energy audit, installation of smart energy monitoring, general relighting, roof insulation, exterior wall insulation, floor insulation, replacement of fuel oil system by a gas system, installing a heat pump, installing a solar boiler, etc. Where the subsidies are approved, the applicant undertakes to carry out annual monitoring of energy consumption for ten years.

In 2018, the Flemish Government launched the energy loan for cultural and youth infrastructure. Cultural and youth associations operating at Flemish, provincial or local level under the policy themes of Culture and Youth, are eligible for the cheap energy loan.

4.7.2. Current and planned measures

INFORMATION TOOLS

TERRA. The Flemish Energy Company (VEB), as part of its task of promoting energy efficiency in government buildings, is developing a data platform called 'TERRA'. This database enables public entities to monitor their energy consumption easily without having to set up a system for this purpose themselves.

The underlying objective in setting up this database is to encourage the entities which use the data platform to take energy-saving measures. This takes the form firstly of drawing up reports for the entities which provide insight into their consumption (for example, via benchmarking) and include concrete proposals for measures and secondly of making the platform publicly accessible so that other suppliers of energy services can also develop an offer of services based on an analysis of the published data.

TERRA is also used for monitoring the savings targets under Article 5 of the Energy Efficiency Directive and the Energy Efficiency Action Plan for the Flemish authorities. Due to the importance of data collection in the context of the energy transition, the Flemish Government decided on 5 April 2019 to allocate an additional EUR 1.575 million to the further development of TERRA, with a view to the further software development of TERRA to promote smooth reporting on the energy and climate objectives within the Flemish authorities.

E-lyse. E-lyse is the energy management tool for local authorities provided free of charge by grid operator Fluvius. This tool enables local authorities to monitor their energy consumption. This can be undertaken manually or automatically by installing data loggers. E-lyse offers the possibility of comparing their own buildings with other, similar buildings by means of a benchmark tool. At present,

an estimated some 95% of the local authorities already use E-lyse, which is tantamount to the monitoring of more than 10 000 buildings and technical installations.

INITIATIVES TO RELIEVE THE BURDEN

The immovable property of the various entities of the Flemish authorities comes under the Agency for Facility Operations which will take care of the building management. This relieves the burden on the various entities and they can focus on their main task. By upscaling and centralising the necessary expertise, the Agency for Facility Operations can tackle the climate objectives more efficiently, in line with the ISO50001 energy management principles.

OEPC facilitation by the VEB (Maintenance and Energy Performance Contracts). The Flemish Energy Company (VEB) facilitates energy performance contracts between ESCOs and public institutions. This is to remove the burden on public institutions as far as possible: the VEB provides knowledge and experience at technical, legal and project levels so that the ESCO process can be successfully completed.

Under the Horizon 2020 project SURE2050,[29] the provinces, VEB, Fluvius, Factor4 and the Agency for Facility Operations will assist the local authorities and central government departments in drawing up **building stock planning**, with climate neutrality in 2050 as the ultimate goal. 75 local authorities have signed up for this. The focus of the project is on drawing up a real estate strategy in order to take well-founded decisions on the basis of that strategy. Through information sessions via TOTEM and change-oriented building, the participants of this project are encouraged to broaden their outlook from just climate neutrality with regard to direct emissions and also to take account of indirect environmental impact. Concrete cases also illustrate the advantages of change-oriented, circular construction.

A structural financing solution for deep energy renovations in the school building stock via performance contracts is what the Horizon 2020 CITIZEE[30] project aims to achieve. The VEB is cooperating to this end within a European consortium and is trying to match various European financing sources with ESCO and citizen participation for the individual school projects.

In 2019, the VEB obtained the confidence of the European Investment Bank to use Elena funds to mobilise investments, amounting to EUR 99 million within three years, in energy saving and renewable energy projects within the public sector in Flanders. For each euro obtained from Europe, a minimum of EUR 35 must be made in investments. The VEB uses these funds for rapid expansion of the supply of energy-efficient and renewable energy services and to eliminate investment barriers by means of discounts.[31]

In order to continue to see the wood from the trees regarding the energy efficiency and renewable energy measures, the VEB devised the **Energy Master Plan**. The measures are mapped out, preferably by carrying out customised energy scans or energy audits. This results in a concrete action plan for the short and medium term, with which the public service can start work immediately. The VEB then also provides support in the actual implementation via its framework contracts.

Energy care plans of grid operator Fluvius. Fluvius relieves the burden on local authorities not only by making E-lyse available free of charge, but also by drawing up energy care plans. On the basis of an analysis of the energy consumption of the local authority, Fluvius draws up an energy care plan

[29] http://sure2050.be/
[30] https://www.citizee.eu/results/
[31] https://www.veb.be/elena

designed to give local authorities insight into potential measures to bring down their energy consumption. Fluvius then also offers guidance in the coordination, implementation, adjustment and delivery of the measures.

Healthcare climate commitments. In 2017, the healthcare sector entered into a number of climate commitments with the Flemish authorities. Resources have been released from the Climate Fund to support these climate commitments.

An annual energy-saving target of 2.09% (27% by 2030) has been set for the healthcare sector. In order to achieve this target, healthcare institutions can have energy performance diagnoses carried out free of charge, which result in an action plan with various possible energy-saving investments and a feasibility study for energy performance contracts. In return for these free energy performance scans, the healthcare institutions undertake to implement the measures resulting from the energy performance scan with a payback time of less than five years. For measures with longer payback times, a rolling fund has been announced so that the implementation of these measures can be financed with funds from the Climate Fund. Furthermore, all new construction in the sector is nearly zero energy from 2018. For monitoring the energy consumption, energy performance scans and monitoring the implementation of energy-saving measures, the healthcare cooperates with the VEB, which makes TERRA available, *inter alia*.

The climate commitments of the education sector tend to be separate initiatives on top of the existing support programme for new construction and renovation. Examples includes a call for projects for energy-saving investments, a subsidy for the correct adjustment of heating boilers, a call for projects to map possible energy-efficiency investments, etc.

AGIOn also makes available an interest-free energy loan with which energy-efficient and renewable energy projects can be financed. In addition, there are two partnerships between AGIOn and the VEB:

- The VEB facilitates 5 Maintenance and Energy Performance Contract (OEPC) projects to demonstrate the duplicability of the model in the education sector, as an additional instrument to the waiting list.
- The VEB investigates the solar potential on school buildings, automatically draws up feasibility studies for this purpose and proactively facilitates these entities.

Climate schools 2050. In cooperation with six citizens' cooperatives, the Catholic Education of Flanders launched the Climate Schools 2050 initiative. The aim of the project is to provide strong relief of the burden of schools in increasing the sustainability of their energy consumption by means of monitoring consumption and drawing up an action plan tailored to the school's needs.

Youth work sector. The subsidy possibilities for energy-efficient measures in the cultural sector also apply to youth infrastructure. Efforts are being made to improve the approach and examination of other opportunities so that those responsible actually set to and make use of the possibilities for subsidies and loans. In particular, the threshold for taking action is lowered, and more intensive guidance for own-initiative works is provided. A follow-up is being devised to the Bivouac Master Plan, with the continued aim of giving every child the opportunity to go camping and of providing sufficient resources for houses and centres and youth accommodation. The focus will be on sustainability in the broad sense, i.e. including the heating and electricity needs of the buildings and any local renewable sources.

OBLIGATIONS

EPN regulations. The EPN regulations[32] impose standards for the energy performance of non-residential buildings. For instance, there are obligations in connection with insulation, ventilation, energy performance and share of renewable energy. These standards vary according to whether new construction, major energy renovation or ordinary renovation is involved and also depend on the purpose of the building.

EPC public buildings. Public buildings are required to have an energy performance certificate (EPC) drawn up. The certificate is mandatory for buildings with a useful floor area exceeding 250 m². In total, 11 573 EPCs were drawn up in the period 2008-2020. A breakdown by subcategory is shown in the table below.

Subsector	No of EPCs drawn up
Administration	1 684
Culture	1 699
Education	4 815
Public services	377
Police and Justice	184
Sport	937
Welfare	1 877
Total	**11 573**

Table 15: Number of public EPCs drawn up per subsector, February 2020

To raise citizens' awareness, there is an obligation to display EPCs. The EPC for public buildings is valid for a period of 10 years and must be renewed thereafter.

Compulsory EPC. To provide the building owner with clearer insight into the current energy performance of non-residential buildings, as required in the 2019-2024 Coalition Agreement, by 2025 all large non-residential buildings (where there is a possibility of heating or cooling) must have an EPC. From 2030, these buildings must have attained a minimum energy performance label. Government buildings within the Flemish Region set a good example by complying with this label before 2028.

Energy-saving obligation for Flemish government buildings. In order to emphasise the exemplary role of public buildings, **an Energy Efficiency Action Plan** has been running **since 2016**. The objectives of this action plan are to reduce CO_2 emissions by 40% and to consume 27% less primary energy in 2030 compared to 2015. This has been converted into an annual savings target of 2.09% of primary energy consumption for the entities belonging to the Flemish authorities. In the first instance, this annual savings target runs from 2017 to 2020. In the 2019-2024 Coalition Agreement, the commitment was made to raise the annual savings target to 2.5% from 2021.

Commitment for annual energy saving by local authorities of 2.09%. The Flemish Government is asking municipalities, cities, intermunicipal associations, public centres for social welfare, provinces and autonomous municipal enterprises to make an extra effort to make an average annual primary energy saving of 2.09% from 2020 in their buildings (including technical infrastructure, excluding building heritage). Local authorities manage an estimated total of 15 000 buildings. This will be achieved through close cooperation between all actors involved, with particular attention paid to

[32] https://www.energiesparen.be/EPB-pedia/eisen-per-aanvraagjaar.

short lead times and cost efficiency. These energy-saving commitments too will be discussed with the local authorities in the context of the local energy and climate pact.

4.8. POLICY MEASURES AND ACTIONS TO PROMOTE THE USE OF SMART TECHNOLOGIES

SMART READINESS INDICATOR

The Smart Readiness Indicator (SRI) is a new (optional) policy instrument developed by the European Commission under the revised Energy Performance of Buildings Directive (EPBD) to create awareness of the benefits of smart building technology. It may be a matter of technology that can assist in keeping the air quality in a room stable or of enabling technologies to interact more effectively. The underlying idea is that by obtaining an opinion of the 'smart readiness' of a building, the owner, resident or user is persuaded to invest in smart technology.

The VEA is closely following the developments at European level regarding the smart readiness indicator. VITO and the firm Waide carried out a first study on the smart readiness indicator (SRI) on behalf of the European Commission. This study started in March 2017 and the final report was completed in August 2018. This involved devising a definition and calculation methodology for the SRI. The VEA followed this study closely and took part in each of the stakeholder consultations on the subject. VITO and Waide are also carrying out a second study on the SRI. This study was launched in December 2018 and focuses not only on the calculation method but also on the implementation itself of the SRI. The Member States are consulted in this respect. This second technical study will run until June 2020.

For the further development of the European regulations (delegated and implementing act of the European Commission), the European Commission has set up an expert group with experts from the various Member States. The VEA is participating in this. In the course of 2020, the Member States will further discuss the implementation of the SRI in two workshops in the context of the Concerted Action EPBD meeting.

A catalogue on the SRI has been developed, covering 9 areas (heating, cooling, hot tap water, ventilation, lighting, dynamic building envelope, electricity, charging electric vehicles and monitoring/control). Each of these areas is tested against the following impact criteria: energy saving on own site, maintenance/error forecasting, comfort, ease of use, health/welfare, information for the user and grid flexibility/storage. These parameters are weighed up according to a fixed scheme, from which an SRI indicator is determined. The aim of the SRI is to be technology-neutral and to strike a good balance between time for building inspection and complexity of the calculation methodology.

DIGITISATION AND FLEXIBILITY – EVOLUTION TOWARDS BUILDINGS AS ELECTRICITY GENERATORS

The digital meter has been gradually rolled out since 1 July 2019.

In implementation of the Coalition Agreement and in line with European Directive 2019/944, it will be stipulated that the complete rollout of digital meters must be completed by 1 July 2029 and that 80% of the meters must be installed by 31 December 2024.

The rollout of digital meters and the new European legislation concerning the electricity market offer an opportunity to create a Flemish framework around flexibility and to facilitate the development of new energy services at distribution grid level. A general regulatory framework for flexibility in

accordance with the recently adopted EU legislation (including the EMD) will be put in place, which offers clarity, transparency and certainty for market players.

In this process, flexibility is considered from various angles and sectors (not only electrical, but also thermal, (green) gas, power-to-x, (electric) mobility, buildings, etc.), from various technologies (storage, demand management, etc.) and from the various types of market players and end customers (businesses, families, neighbourhoods, energy communities, etc.).

During this legislature, initiatives are being developed to encourage the consumption of own renewable energy and to provide prosumers with maximum information on how they can gear their consumption as effectively as possible to their production.

A policy framework will be developed by the end of 2020, in implementation of the Electricity Directive, that facilitates the development of local energy communities and eradicates administrative burdens and legal impediments. Informing, raising awareness and relieving the burden of initiators and participants play a key role. Additional supporting instruments may also be provided. At the same time, it will be ensured that solidarity is maintained between all grid users through a fair contribution to financing the climate and energy policy and the energy infrastructure that provides security of supply for all.

4.9. POLICY MEASURES AND ACTIONS TO ENHANCE SKILLS AND EDUCATION IN THE GENERAL CONSTRUCTION SECTOR

In the Flemish Region, the building federations Bouwunie and Vlaamse Confederatie Bouw offer advice, information and training to contractors from various disciplines of the construction sector. In addition to a dynamic training offer, tools are also offered that contractors can use for, among other things, calculations of heat loss, U-values, ventilation rates, etc. The building federations also publish online databases of contractors. After a training cycle and an examination, Bouwunie awards the label Energy-Conscious Contractor to building firms that adopt a conscious approach to sustainable, energy-conscious construction and renovation. The participants acquire sound theoretical basic knowledge in the field of insulation, ventilation, heating, cooling, etc. The Energy-Conscious Contractor can better inform its customers and successfully assist them in their choices.

Various architects' organisations or architects' interest groups (Architects' Association (*Orde van Architecten*), Flemish Architects Organisation (*Netwerk Architecten Vlaanderen*, NAV)) offer a wide range of training and publications. The dissemination of knowledge concerning energy-conscious design has been combined on a website www.energiebewustontwerpen.be/.

Both the two building federations and the NAV have cooperated closely with the VEA over the past 10 years through subsidised energy consultancy projects. In this way, these partners could always relay the most up-to-date policy developments to their members.

With the aim of rationalising the use of raw materials in the construction sector, the Public Waste Agency of Flanders (*Openbare Vlaamse Afvalstoffenmaatschappij*, OVAM) developed the policy programme 'Material-aware construction through circular supply chains' (*Materiaalbewust bouwen in kringlopen*). Totem (Tool to Optimise the Total Environmental impact of Materials www.totem-building.be/) is a transparent, simple, digital interface with which the Belgian construction sector has been working since 2018 to objectify and reduce the environmental impact of buildings. In public

buildings tendering procedures, the Agency for Facility Operations imposes a TOTEM calculation via the Flemish sustainability meter GRO.

INDU-ZERO 'Industrialisation of house renovations towards energy-neutral' is a European research project within the Interreg North Sea Region (01/07/2018 - 30/06/2021). INDU-ZERO aims to accelerate the energy renovation of the existing housing stock in the North Sea region by using prefabricated systems (wall and roof elements) for renovation. The packages contain various components that are necessary to make houses sustainable, such as, for example, insulation material for walls and roofs, heat pumps, solar panels, energy converters and ventilation systems. The components are put together in a way that is as circular as possible. The main aim of this project is to develop a blueprint that can be replicated for a production facility in which circular renovation packages are reproduced. The aim is to produce 15 000 units/year at 50% of the current cost price. After development and evaluation, this blueprint will be made available free of charge. In Flanders, the University of Ghent and the provincial centre for sustainable construction Kamp C are partners in this project. In 2020-2021, renovation packages will be tested in Belgium and 5 other countries.

4.10. POLCIY MEASURES AND SUPPORT FOR THE ASBESTOS REMOVAL POLICY

The presence of asbestos is an investment barrier for energy renovations. The probability of the presence of asbestos is high in buildings built before 2001, especially when no major (energy) renovation has taken place. The majority is located in the outer envelope and heating infrastructure of buildings. This location sometimes prevents energy interventions to the building envelope (insulation, solar panels[33]) or the heating system. An integrated policy and renovation strategy generates a win-win situation for the building owner and the Flemish climate and asbestos safety objectives.

With the approval of the Flemish Asbestos Removal Action Plan (20 July 2018), the Flemish Government decided gradually to make Flemish buildings and infrastructure asbestos-safe by 2034 and by 2040 at the latest. This is already an obligation for public buildings.

The introduction of the asbestos certificate on sale in 2022 will be a strong incentive for (new) building owners to plan for renovation to remove asbestos, which will then be a trigger to consider improved insulation of the building envelope, a renovated heating system or the installation of solar panels.

OVAM has initiated various support instruments to encourage building owners to make their building asbestos-safe. For priority target groups, such as school buildings, healthcare institutions, agriculture and social housing, sectoral protocols have been initiated to establish the commitments and support. A strong focus is on the use of win-win asbestos removal with an energy improvement: envelope and heating system.

For citizens, local authorities and associations, OVAM offers subsidies for the organisation of regional projects for cheap collection of asbestos waste or grouped disposal. The Asbestos Plan itself and the Flemish Energy and Climate Pact provide for additional initiatives to relieve the burden.

[33] Installing solar panels is prohibited if asbestos is present.

5. ROADMAP FOR THE FLEMISH LONG-TERM RENOVATION STRATEGY

5.1. CONTEXT

According to Article 2a(2) EPBD, 'in its long-term renovation strategy, each Member State shall set out a roadmap with measures and domestically established measurable progress indicators, […] in order to ensure a highly energy efficient and decarbonised national building stock and in order to facilitate the cost-effective transformation of existing buildings into nearly zero-energy buildings. The roadmap shall include indicative milestones for 2030, 2040 and 2050, and specify how they contribute to achieving the Union's energy efficiency targets in accordance with Directive 2012/27/EU.'

This objective also contributes to the overarching long-term strategy for the EU, under the name of 'A Clean Planet for All'. It sets out the ambition of achieving an overall balance by 2050 between emissions and removals of greenhouse gas emissions (= net zero emissions or climate neutrality) at EU level. This objective was ratified by the European Council in December 2019. In the Belgian context, it is the regions which each individually give substance to the strategies and guidelines applicable at Member State level.

The present roadmap for the renovation pathway up to 2050 for the Flemish Region has been defined for both residential buildings and non-residential buildings:
- Residential buildings have been broken down into single-family houses and apartments, each categorised according to the distribution of the types over the EPC labels in the base year 2018.
- Non-residential buildings have been broken down into 1) public buildings, 2) (semi-)public buildings (schools, healthcare) and 3) private buildings.

The methodology used to arrive at the roadmap consists of:
- Determining the starting point (2017).
- Establishing the long-term objective for 2050.
- Defining milestones and the accompanying timeline.

This applies to both the energy performance of the buildings and the technologies to meet the heating needs.

The most important outputs of the analysis conducted are:
- The trend in final energy consumption, the trend in the use of fossil fuels and the associated greenhouse gas emissions.
- The renovation activity, in terms of interventions in the building envelope and replacement of heating systems towards sustainable heating and in terms of the extent to which dwellings with the poorest housing quality and the poorest energy performance are renovated.
- The estimate of the investment funds needed to carry out the renovations.

5.2. METHODOLOGY USED

Flanders wishes to achieve a highly energy-efficient and sustainably heated building stock with low CO_2 emissions by 2050. Defining clear milestones is of crucial importance to this end in order:

- to determine which efforts are needed in the coming months and years to bring the renovation rate to the desired and necessary level and to periodically assess the adequacy of the existing and planned policy measures;
- to reduce risks and uncertainties for investors, both owners and financial institutions;
- to monitor progress in the implementation of the strategy.

The roadmap is intended to provide such milestones. Various scenarios have been examined, each with a typical possible pathway to attain the long-term objectives. In cooperation with Climact, a calculation model has been developed for this purpose that can also be used in the future to monitor progress and to make any adjustment to the strategy.

These scenarios were based on the following underlying findings and assumptions:

- Nearly all buildings (96.5%) must be renovated (or where more appropriate demolished and replaced by highly efficient new construction) to improve their energy efficiency and to meet the residual energy needs in a sustainable manner.
- A significant increase in both the rate and depth of renovation activity is required.
- Priority segments in the building stock are identified:
    - Either to exploit the great potential for energy-saving, emissions reduction and secondary benefits (comfort, health, energy poverty, etc.) for certain dwellings and target groups;
    - Or to increase the proportion of one-off deep renovations, starting with the most cost-effective segments of the building stock;
    - Or to fulfil the exemplary role of public buildings.

The analysis of these scenarios leads to the following general conclusions:

- Certain trigger points in the lifecycle of a building are ideal to exploit the potential for deep renovation at the most appropriate moment and with the greatest cost-effectiveness. Encouraging deep renovation at these trigger points helps to spread out the efforts more evenly over the period up to 2050. In addition, increasing renovation outside these trigger points is an ongoing focus.
- A prerequisite for the large-scale use of renewable energy to heat buildings is a prior major reduction in the energy needs of buildings.
- A rapid improvement in the energy performance is of crucial importance to meet the Flemish objectives for the period 2021-2030 regarding greenhouse gas reductions in the non-ETS sectors.

The roadmaps for residential buildings and non-residential buildings are described below.

5.3. ROADMAP FOR RESIDENTIAL BUILDINGS

For residential buildings, the long-term objective consists of achieving EPC label A, differentiated according to the different housing typologies. The progress towards label A inherently includes further sustainability in the heating demand. The roadmap maps the necessary progressive improvements in the performance of the building envelope and heat generation, taking account of the gradual switch to renewable energy.

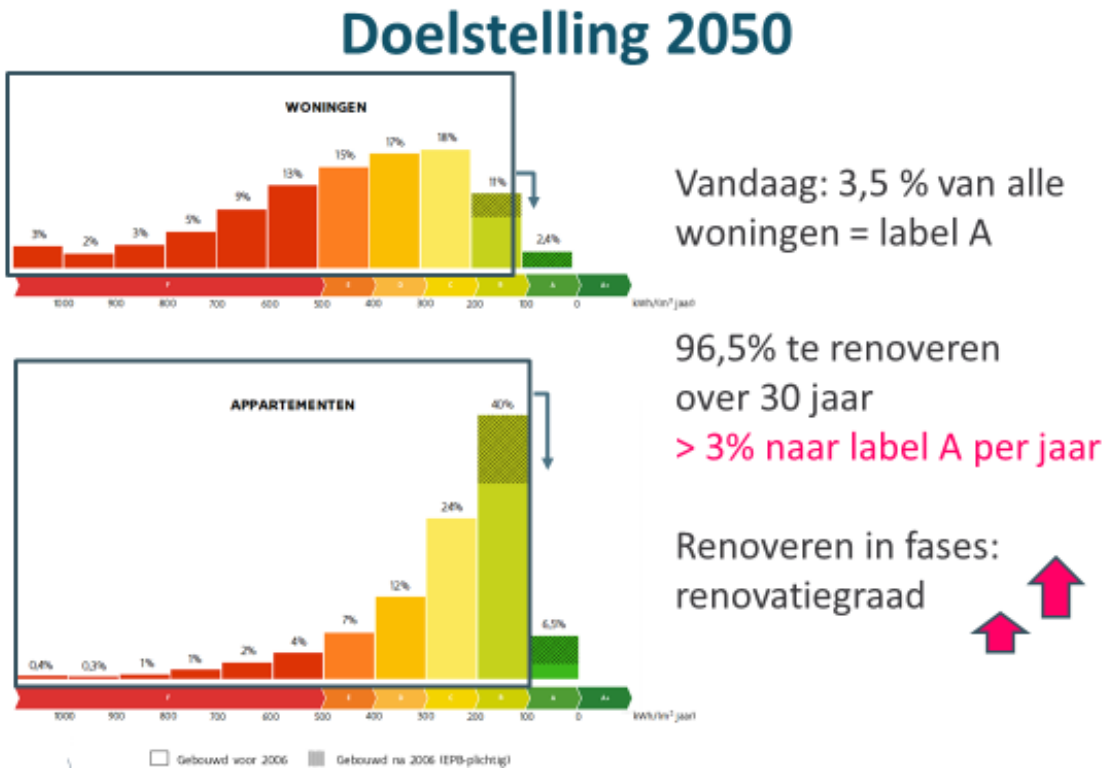


Figure 22: Necessary renovation rate 2020-2050

Key
Doelstelling 2050 = Objective 2050
WONINGEN = HOUSES
kWh/m2 jaar = kWh/m2 per year
APPARTEMENTEN = APARTMENTS
Gebouwd voor 2006 = Constructed before 2006
Gebouwd na 2006 (EPB-plichtig) = Constructed after 2006 (subject to EPB requirements)
Vandaag: 3,5 % van alle woningen = label A = Currently: 3.5% of all dwellings = label A
96,5 % te renoveren over 30 jaar = 96.5% to be renovated over 30 years
> 3 % naar label A per jaar = > 3% to label A per year
Renoveren in fases: renovatiegraad = Phased renovation: renovation rate

Based on the existing distribution of residential buildings over the EPC labels, it is found that 96.5% of the existing dwellings still need to progress to label A. Taking into account a period of 30 years and using a linear calculation, this means that on an annual basis more than 3% of the housing stock must move to label A.

If the renovations are carried out in phases, this will significantly increase the required annual renovation rate in the sense that renovation works are carried out in substantially more dwellings (see Figure 2 in Chapter 1).

Three scenarios were calculated in the model and on this basis conclusions were drawn on the impact of each scenario on the pathway to attaining the long-term objective for 2050:

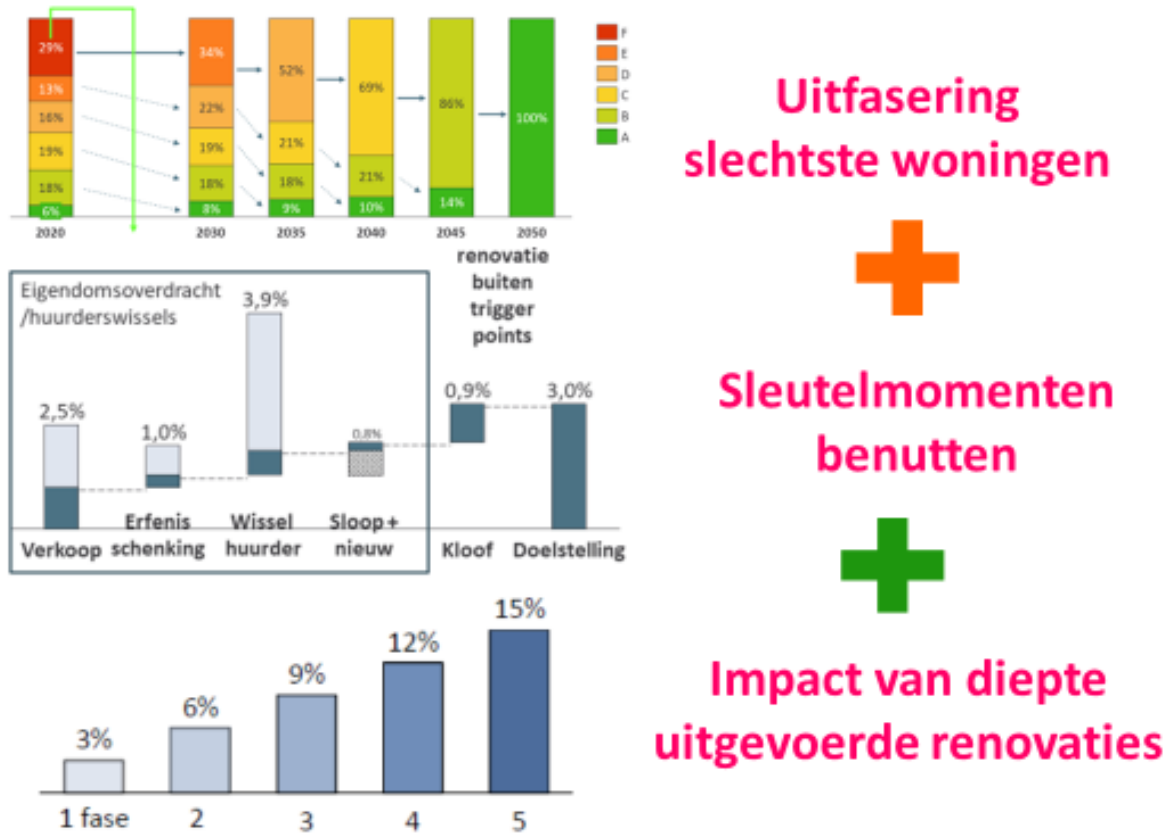


Figure 23: Combination of scenarios in the Flemish residential renovation strategy

Key
Eigendomsoverdracht/huuderwissels = transfer of ownership/change of tenant
Verkoop = sale
Erfenis/schenking = inheritance/gift
Wissel huurder = change of tenant
Sloop + nieuw = demolition + new
Renovatie buiten trigger points = renovation outside trigger points
Kloof = shortfall
Doelstelling = objective
fase = phase
Uitfasering slechtste woningen = phasing-out of poorest dwellings
Sleutelmomenten benutten = exploiting trigger points
Impact van diepte uitgevoerde renovaties = impact of deep renovations carried out

Scenario 1: Advancing minimum compulsory energy performances leads to progressive phasing-out of the worst performing dwellings

The focus here is unilaterally on the phasing-out per time period of the dwellings with the least efficient label. The section about 'Actions targeting the worst performing segment of the housing market' described existing and announced measures to encourage this phasing-out. Taking into account the large number of dwellings with an F label (29% of the dwellings, nearly 900 000 units), a 10-year period is foreseen for phasing them out, followed by 5-year periods for each of the following labels up to B. The progress to a following label presupposes on average the implementation of one

energy-saving investment (insulation of building envelope, efficient heating). After each period of phasing-out, there is a different distribution of the housing stock over the EPC labels.

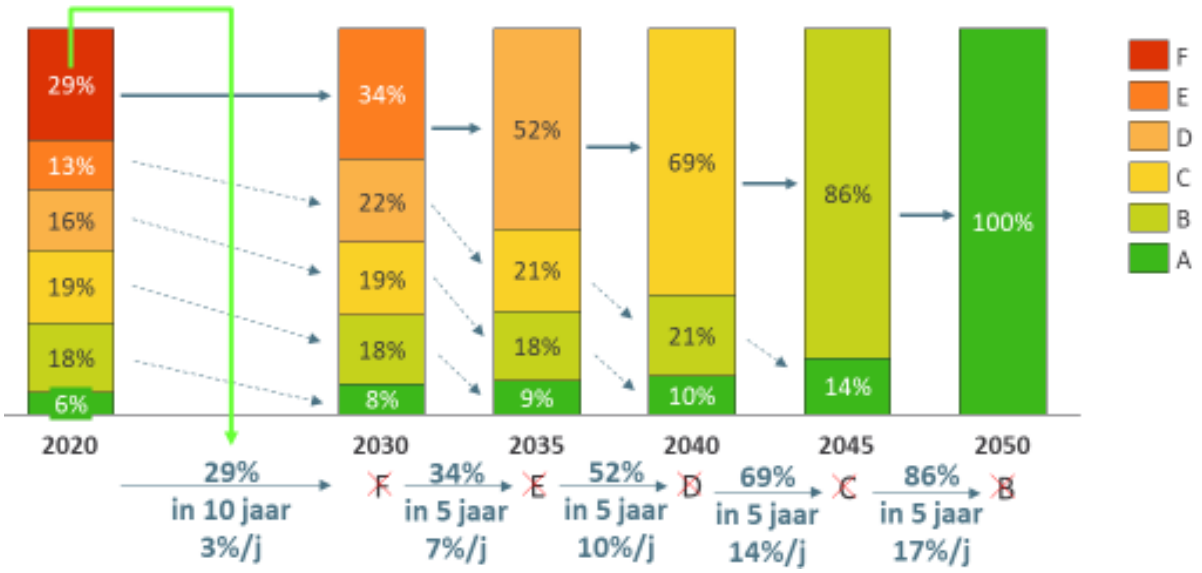


Figure 24: Distribution of % of dwellings over EPC labels in scenario 1

Key
in x jaar y%/j = in x years, y% per year

This scenario is characterised by the hefty increases in the proportion of dwellings in which an intervention is required on an annual basis. This number grows systematically from 90 000 (3%) in the period up to 2030 to 510 000 (17%) in the period from 2045 to 2050 (Figure 24), since ever more partly renovated dwellings are added in the better labels. For the period 2020-2050, on average renovation work must be carried out in nearly 10% of dwellings (300 000) each year, as a result of which the dwelling improves by 1 label. From the homeowner's perspective, this means frequent inconvenience and this course is not optimal regarding the total renovation costs either. Moreover, this presupposes the need for strong and increasing concentration of the (currently limited) deployable capacity in the construction sector in the second half of the period up to 2050.

Advantages	Disadvantages
- (first) measures are feasible in terms of both implementation and costs	- Focus lies unilaterally on the worst dwellings in each period. - The worst dwellings more than average are inhabited by people with limited financial resources. - The renovation efforts must increase very significantly (10% = 300 000 dwellings per year, 17%= 510 000). - Probably more expensive than total renovation. - Renovation drags on for several decades. - Chance of suboptimal technical implementation and lock-in.

This scenario shows that a limited average depth of renovation (improvement by only 1 label) has a significant impact on the number of interventions on an annual basis.

In order to arrive at a more stable number of renovations on an annual basis in this scenario of phasing-out of dwellings with the worst labels, in each period the worst dwellings should be renovated to level A in one go.

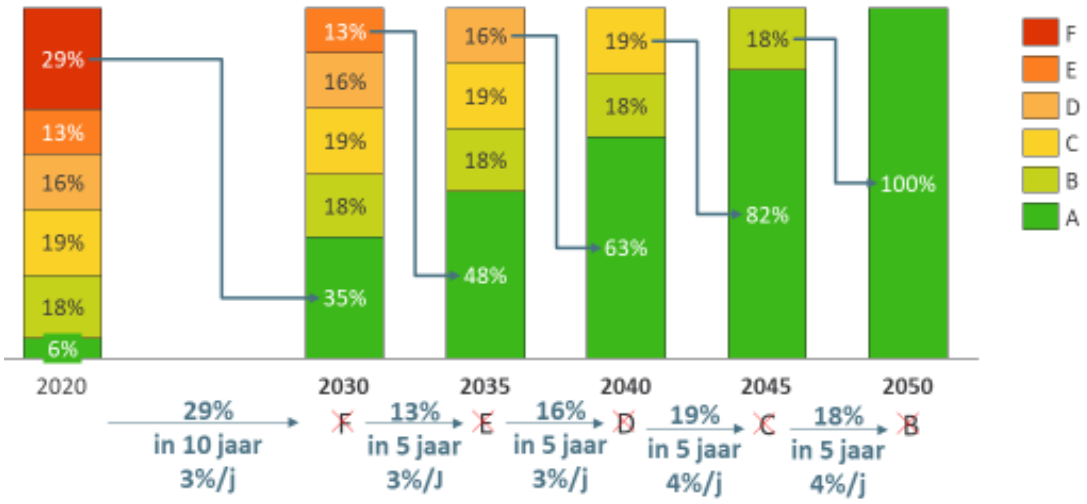


Figure 25: Distribution of % dwellings over EPC labels in scenario 1 – theoretical variant whereby in each case renovation is to label A

Key
in x jaar y%/j = in x years, y% per year

However, the feasibility of renovating 90 000-100 000 dwellings on an annual basis from the worst label F to label A is extremely low due to the high investment costs, apart from for a currently still limited proportion of dwellings that are demolished and replaced by one or more newly constructed dwellings.

Conclusion scenario 1:

The feasibility of achieving the 2050 objective with this scenario for the entire housing stock is low. Either dwellings shift by only 1 label, which is feasible, but the downside is that the number of dwellings in which an intervention must take place is extremely high in the long run. Or the dwellings with the poorest label are renovated to label A in one go, which is highly unrealistic in terms of affordability.

Although this scenario, which will mainly be driven by setting standards for phasing out the poorest dwellings, has the merit of speed and feasibility, it does not focus specifically on the great potential for renovation of the natural decision-making times which were described in detail earlier in this long-term strategy.

Scenario 2: Scenario 1 supplemented by the use of the potential of trigger points

In addition to scenario 1, measures are provided for here to exploit the great potential of trigger points so that both the speed and the depth of renovations increase. The potential for each trigger point is

defined here, taking into account the numbers on an annual basis and a distribution over the EPC labels corresponding to the overall distribution of the housing stock in the EPC database. For each of the trigger points, the 'renovation depth' is determined for each EPC label, with the following assumptions:

Transfer of ownership (sale, gift, inheritance)	Encouragement of renovation in two steps, with half the pathway towards label A achieved in each step.
Change of tenant	For each change of tenant, the dwelling progresses by one label on average.
Vacancy	Policy measures are in force, as a result of which all vacant dwellings are renovated to label A.
Renovations with building permit	All renovations requiring a permit also focus on energy saving so that in 80% of the renovations, the dwelling progresses by 1 label and in 20% of the renovations by 2 labels.
Demolition and reconstruction	Dwellings constructed after demolition by definition, according to the current EPB regulations, easily comply with the 2050 objective.

For other renovations (apart from trigger points (e.g. depending on increasing the value of the dwelling or better comfort)) outside these preferential times, it is assumed that the energy performance improves on average by 1 label.

The modelling also provides for variation in the depth of the renovations per trigger point:
- For transfer of ownership, it was assumed that 70% of the dwellings move to C, 10% to B and 20% to A;
- For renovations with permit, it was assumed that 70% move to label E, 10% to label D and 20% to A;
- Of the dwellings demolished with a view to reconstruction, 100% are renovated to label A, in line with the current EPB regulations;
- Change of tenant: for each change of tenant, the dwelling progresses by 1 label on average, whereby an even distribution of the dwellings over labels E to A is assumed after renovation.

For the period 2020-2030, as illustration:

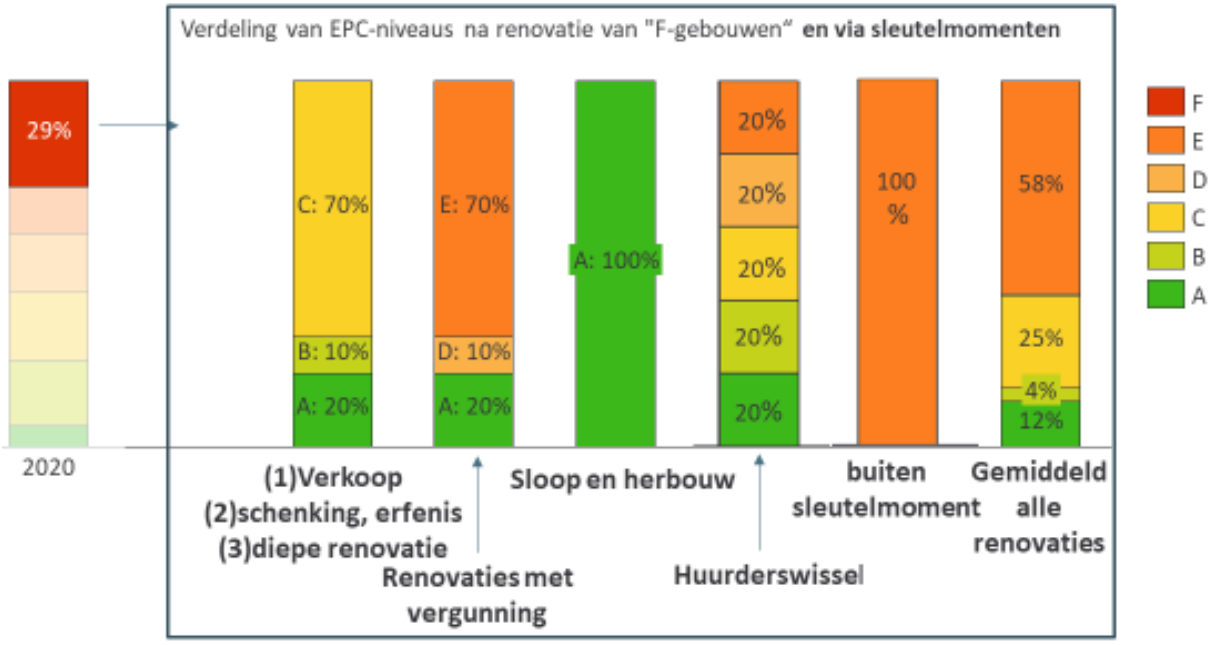


Figure 26: Distribution of % of dwellings over EPC labels in scenario 2 in 2030

Key
Verdeling van EPC-niveaus na renovatie van "F-gebouwen" en via sleutelmomenten = Distribution of EPC levels after renovation of 'F buildings' and via trigger points
(1) Verkoop = sale
(2) Schenking, erfenis = Gift, inheritance
(3) Diepe renovatie = Deep renovation
Renovaties met vergunning = Renovations with permit
Sloop en herbouw = Demolition and reconstruction
Huurderswissel = Change of tenant
Buiten sleutelmoment = Outside trigger point
Gemiddeld alle renovaties = Average all renovations

In the Figure above, the right-hand bar shows the distribution over the labels in 2030. As a result of this approach, 58% of the dwellings move from label F to label E, 25% to label C, 4% to label D and 12% to label A. Compared to scenario 1, where for the period up to 2030 the dwellings with the F label only move to E, here a more in-depth renovation will therefore be carried out for considerably more dwellings with an F label.

Conclusion scenario 2:

In scenario 2, approximately one third of the required renovation rate label A equivalent is achieved by activating the trigger points (see Figure 27). On an annual basis, level A-equivalent renovations must therefore still be carried out outside these trigger points (own-initiative renovations of other labels) for 1.7% of the housing stock. Since many renovations are also carried out in phases in this scenario, works must be carried out on an annual basis from 2020 to 2050 in 8.5% of dwellings (250 000) (compared to 10% in scenario 1) which is still very high.

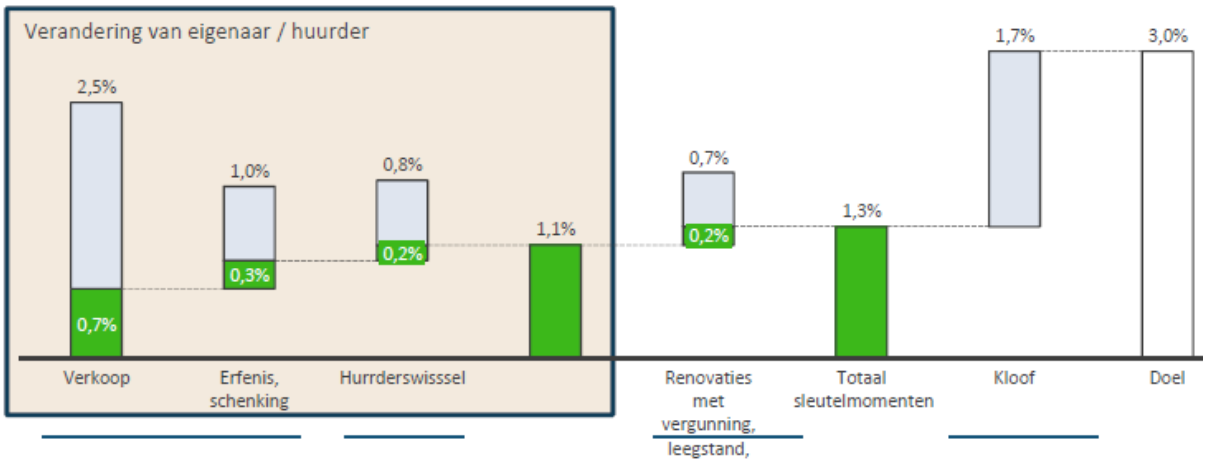


Figure 27: Contribution of exploitation of trigger points to the 3% label A-equivalent renovation rate - scenario 2 (VEA)

Key
Verandering van eigenaar/huurder = Change of owner/tenant
Verkoop = sale
Erfenis, schenking = Inheritance, gift
Huurderswissel = Change of tenant
Renovaties met vergunning, leegstand = Renovations with permit, vacancy
Totaal sleutelmomenten = total trigger points
Kloof = shortfall
Doel = target

A third scenario reduces the number of dwellings in which interventions must be carried out per year by encouraging deep renovation outside the trigger points too.

<u>Scenario 3</u>: Scenario 2 supplemented by encouraging deep renovation outside the trigger points

In addition to a normative approach to phasing out the worst labels and specific policy measures to encourage owners at certain trigger points to carry out deep renovation, this scenario assumes targeted general supporting measures or targeted information (increase in value or comfort of the dwelling after renovation) which prompt additional owners to carry out deep renovation to label A. Since it will not be possible to renovate all dwellings to label A in one go, this will often take place in several phases. For the period 2020-2030, it is assumed in the modelling that after renovation these dwellings are spread uniformly over the labels E to A.

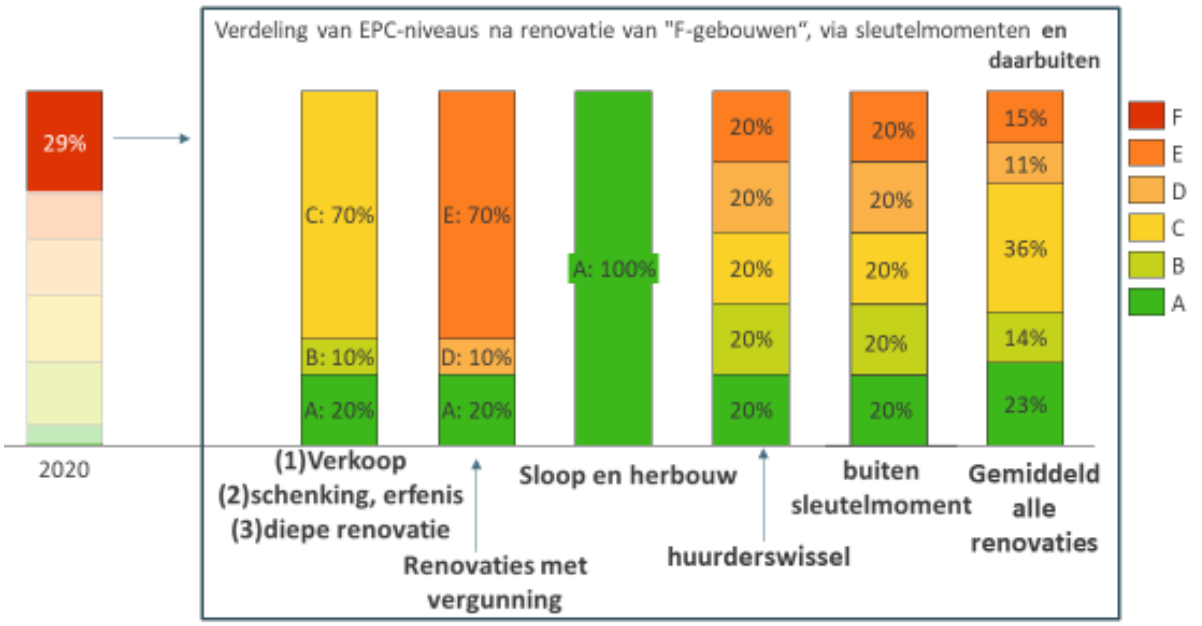


Figure 28: Distribution of % dwellings over EPC labels in 2030 in scenario 3

<u>Key</u>
Verdeling van EPC-niveaus na renovatie van “F-gebouwen”, via sleutelmomenten en daarbuiten = Distribution of EPC levels after renovation of ‘F buildings’, via trigger points and outside them
(1) Verkoop = sale
(2) Schenking, erfenis = Gift, inheritance
(3) Diepe renovatie = Deep renovation
Renovaties met vergunning = Renovations with permit
Sloop en herbouw = Demolition and reconstruction
Huurderswissel = Change of tenant
Buiten sleutelmoment = Outside trigger point
Gemiddeld alle renovaties = Average all renovations

In the Figure above, the right-hand bar, just as in the previous Figure for scenario 2, shows the distribution over the labels in 2030. It is clear that this scenario leads to a significant increase in the depth to which the dwellings are renovated.

Conclusion scenario 3:

Scenario 3 offers the most balanced option, spreading the efforts broadly and in a balanced way. Nevertheless, this option too assumes that on an annual basis and on average over the period 2020-2050, renovation works will be carried out in over 6% of the dwellings (180 000), which again shows the scale of the renovation challenge. Consequently, a large number of owners will still have to be encouraged to renovate outside the trigger points too. This is currently already being addressed via the energy premiums, the renovation premiums, the services provided in the energy houses and in the housing service points, the EPC. In addition, the aforementioned asbestos removal policy, which will be fully developed in the coming years, contributes to the renovation outside the trigger points. Together with the aforementioned measures to be developed in addition, important steps will be taken in the coming years to increase the general level of renovation further. This can also be achieved, *inter alia*, by pointing out the importance of renovation in terms of increasing the value of the immovable property or the comfort for the residents.

It is clear from the above that each scenario is characterised by different pathways to improve the energy performance of the housing stock, as shown in the following Figure.

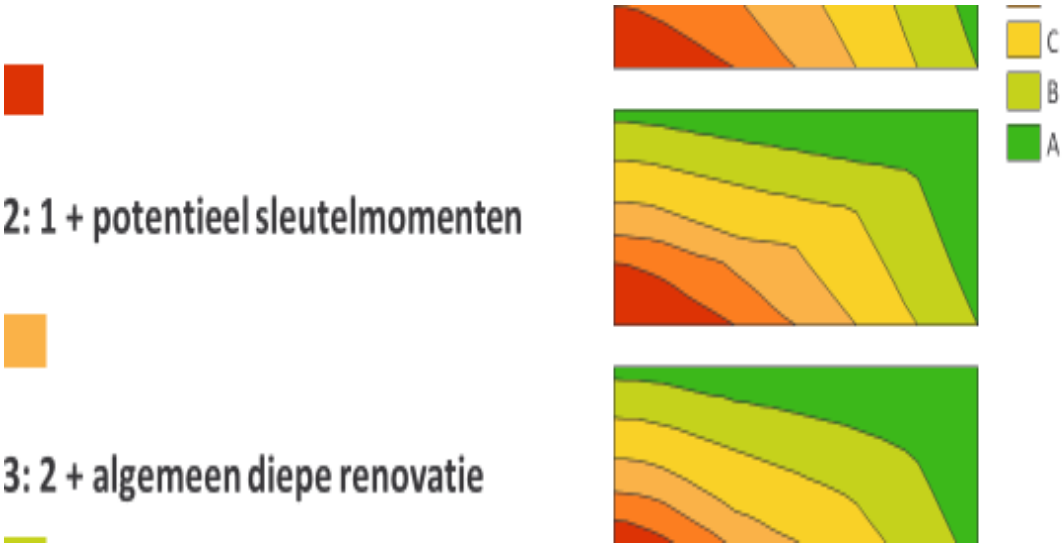


Figure 29: Trend in the distribution according to the EPC labels for the three residential renovation scenarios

Key
Minimale prestatie-eisen = Minimum performance requirements
potentieel sleutelmomenten = potential trigger points
algemeen diepe renovatie = general deep renovation

Although the end result for the three scenarios is the same in 2050, there are nevertheless differences in milestones in 2030-2040, as the following Figure shows.

The energy performance of the housing stock improves by 75% by 2050. In 2030, this improvement is still limited in scenario 1, in which the emphasis is on improving the energy performance by 1 label, to 18%. For scenario 2, this rises to 26% and for scenario 3, it increases further to 33%.

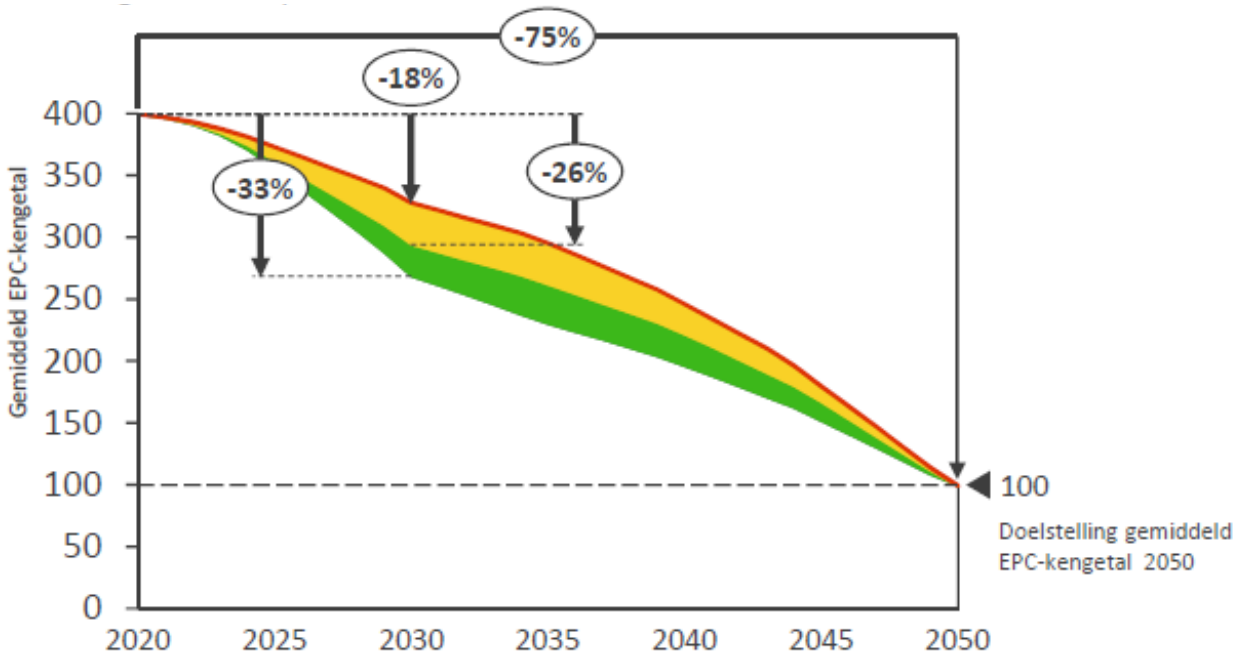


Figure 30: Trend in the energy performance of the housing stock in the three renovation scenarios

Key
Gemiddeld EPC-kengetal = Average EPC figure
Doelstelling gemiddeld EPC-kengetal = Target average EPC figure

Renovating the housing stock to label A will require a combination of efforts for most dwellings regarding the insulation of the building envelope and the sustainability of the heating systems. Various scenarios are therefore possible with respect to the trend in final energy consumption for heating and domestic hot water (thus excluding lighting and electrical appliances) and the trend in the percentage of fossil fuels that can lead to the final target of a maximum of 2.3 million tonnes of CO_2 emissions in 2050. The replacement of conventional heating systems by heating networks and individual sustainable heating technologies, such as heat pumps, will, together with the greening of gas, contribute significantly to the greening of the heating demand. Further digitisation will optimise efficiency at both building and system levels. Efforts will also be made at this level too.

The scenario below assumes a far-reaching improvement with regard to energy efficiency by insulating the building envelope. Limited sustainability is assumed for the systems: phasing-out of fuel oil and coal is taken into account.

This option was prompted by the 'Energy Efficiency First' principle, as postulated by the European Commission. At present there is still of course no surplus of sustainably generated heat. The available green heat must be used as a priority where energy efficiency is less obvious.

A number of other combinations are possible, in which, for example, there is less intensive insulation and the higher heating demand is met by heating networks or renewable energy sources. These scenarios can be further developed in the future depending on the availability of green heat and possible further technological developments.

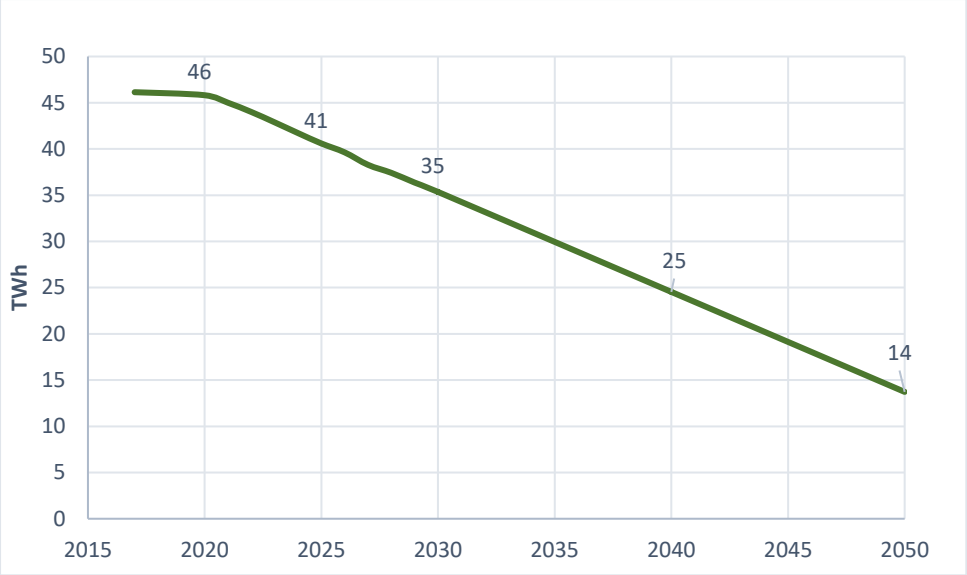


Figure 31: Possible trend in final energy consumption for heating and domestic hot water (therefore excluding lighting and appliances) of Flemish residential buildings

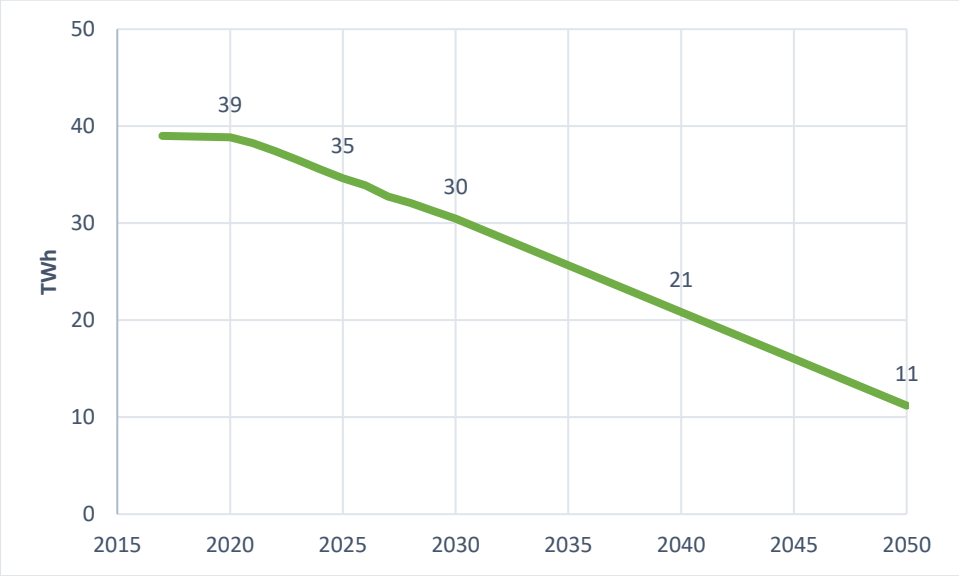


Figure 32: Possible trend in the use of fossil energy sources in Flemish residential buildings

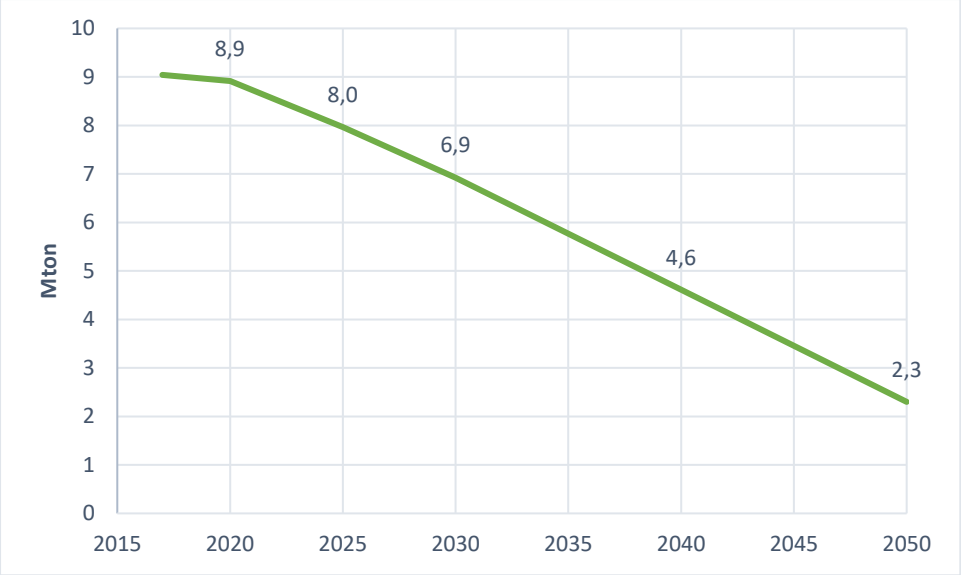


Figure 33: Possible trend in greenhouse gas emissions in Flemish residential buildings

5.4. ROADMAP FOR NON-RESIDENTIAL BUILDINGS

For the existing non-residential building stock, the aim is for a carbon-neutral building stock by 2050 in terms of heating, domestic hot water, cooling and lighting.

The following methodology was used to determine the roadmap for the renovation of the non-residential buildings:

- Determination of the current final energy consumption in the non-residential sector;
- Taking account of the great potential for reducing the final energy consumption for heating and cooling;
- A timeline geared to the target year in order to achieve the objective for sub-segments of the non-residential building stock.

The current energy consumption for heating and cooling in non-residential buildings was assessed on the basis of the Energy Balance Sheet and statistics on the distribution of non-residential energy consumption over end use and energy vectors. The roadmap was also based on the exemplary role of public buildings supported by the Flemish Government. For each of the different sub-segments of the non-residential building stock, the strategy determines a first period in which the renovation rate is increased to then remain at cruising speed for a second, longer period. For the public buildings (offices and other), it is proposed to fulfil the exemplary role by already complying with the long-term objective of a carbon-neutral building stock in 2045. The increase in the renovation rate for these buildings is already started from 2020 and reaches cruising speed from 2028. On that date, these buildings must also meet the minimum energy rating described above. The same applies for the semi-public buildings (schools, healthcare), which, however, will be allowed until 2050 to comply with the long-term objective. For purely private buildings too (offices, commerce, hospitality business and other), the increase in the renovation rate starts from 2020. From 2025, they must have an EPC. From 2030, they must comply with the minimum energy rating still to be defined. Between 2030 and 2050, this segment too will then be further renovated up to the long-term objective.

The following Figure shows this agenda:

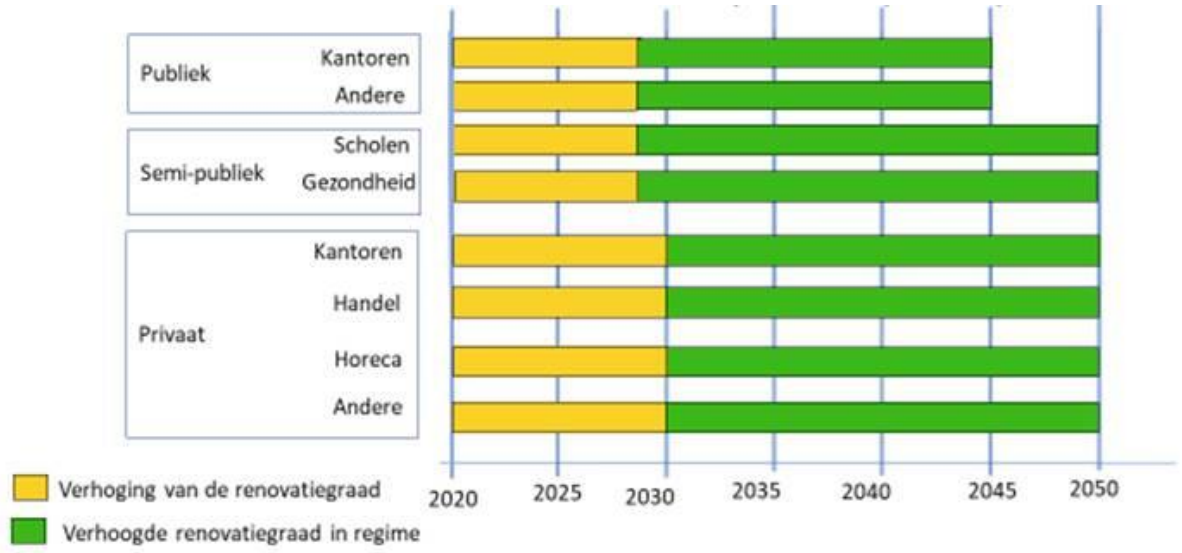


Figure 34: Roadmap for the renovation of non-residential buildings 2020-2050

Key
Publiek = public
Kantoren = offices
Andere = other
Semi-publiek = semi-public
Scholen = schools
Gezondheid = healthcare
Privaat = private
Kantoren = offices
Handel = commerce
Horeca = hospitality business
Andere = other
Verhoging van de renovatiegraad = increasing of renovation rate
Verhoogde renovatiegraad in regime = increased renovation rate at cruising speed

The strategy for non-residential buildings assumes that a drastic reduction in energy consumption, as envisaged for the residential buildings, is not very feasible. That is partly attributable to the building typologies and partly to their use. Overall a reduction of 33% of energy consumption in 2050 compared to 2020 is projected. The strategy for non-residential buildings places maximum emphasis on the trend to carbon neutrality for heating, domestic hot water, cooling and lighting

The following Figures show the milestones associated with the planning mentioned for the reduction in final energy consumption and greenhouse gas emissions. The milestones for 2030 for the greenhouse gas emissions correspond to the milestones from the WAM scenario (with additional measures) of the Flemish Energy and Climate Plan 2021-2030 (3.1 million tonnes CO_2-equivalent in 2020, falling to 2.4 million tonnes in 2030 or a reduction of 23% over that period).

- For the public and the public and semi-public non-residential buildings:

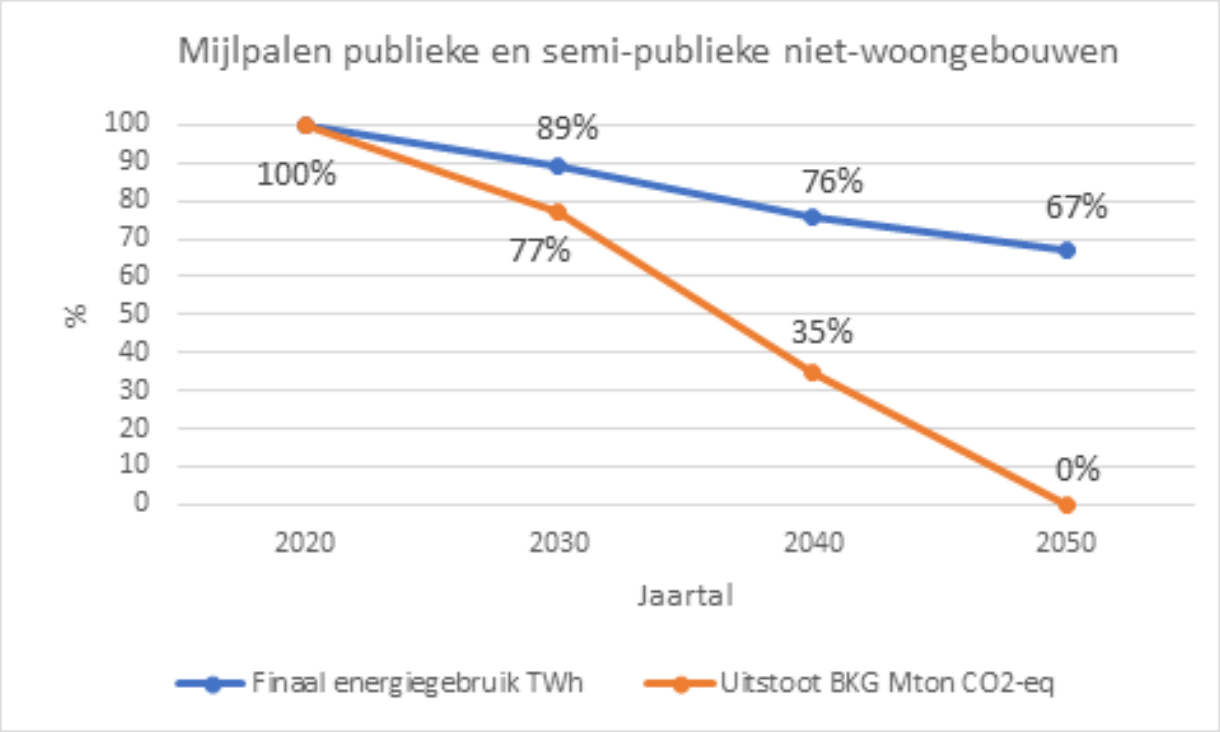


Figure 35: Milestones for final energy consumption and greenhouse gas emissions of the renovation strategy 2050 for non-residential buildings (public and semi-public)

Key
Mijlpalen publieke en semi-publieke niet-woongebouwen = Milestones public and semi-public non-residential buildings
Finaal energiegebruik TWh = Final energy consumption TWh
Uitstoot BKG Mton CO2-eq = Greenhouse gas emissions in million tonnes CO_2 equivalent

- For private non-residential buildings:

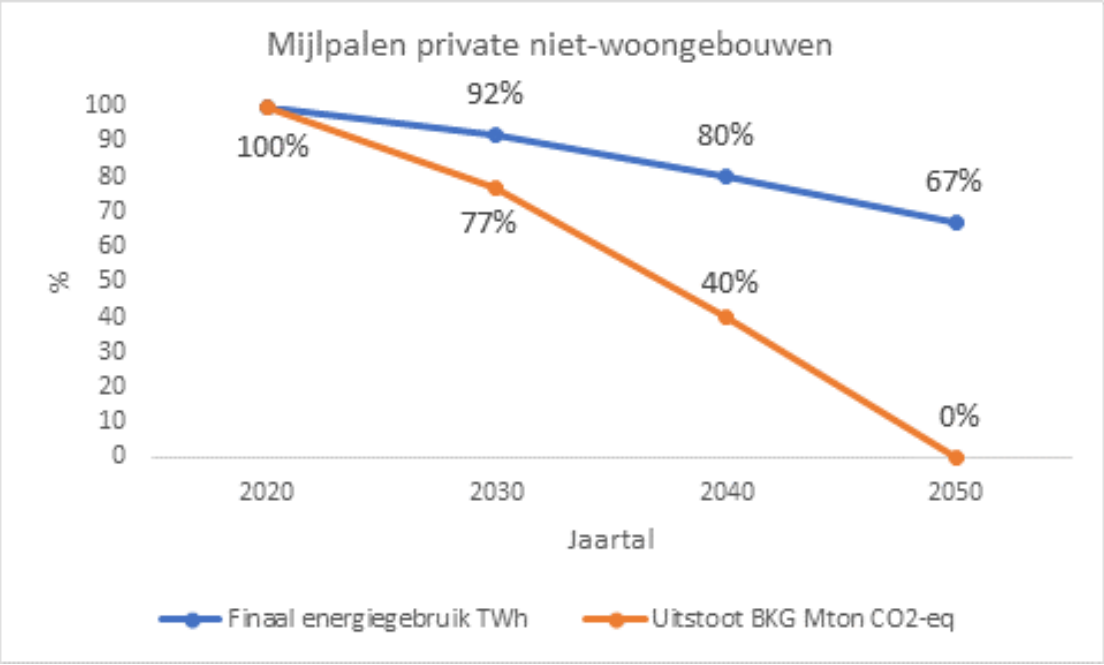


Figure 36: Milestones for final energy consumption and greenhouse gas emissions of the renovation strategy 2050 for non-residential buildings (private)

Key
Mijlpalen private niet-woongebouwen = Milestones private non-residential buildings
Finaal energiegebruik TWh = Final energy consumption TWh
Uitstoot BKG Mton CO2-eq = Greenhouse gas emissions in million tonnes CO_2 equivalent

Strategic approach for non-residential buildings

For non-residential buildings, the expectation is that the existing measures and those provided for in the current Coalition Agreement are sufficient to raise the renovation rate in accordance with the schedule. It is typical of a large number of buildings in this segment that, in contrast to housing, there is a higher rate of user rotation, as a result of which several opportunities for carrying out renovation will arise between now and 2050. The renovation rate of this type of building is also higher, so that renovation or demolition and reconstruction will be undertaken more quickly.

The key points of the renovation strategy for **non-residential buildings** are:
- Further elaboration of the long-term objective, namely carbon neutrality for heating, domestic hot water, cooling and lighting.
- Development of a Building ID on the same lines as the Housing ID to inform owners and managers about the energy performance and to advise them on the pathway towards the long-term objective.
- Mandatory EPC for all large non-residential buildings. The 2019-2024 Coalition Agreement provides that from 2025 all large non-residential buildings with the possibility of heating or cooling must have an energy performance label. From 2030, these buildings must achieve a minimum energy performance label.
- In order to reduce the climate footprint of non-energy-efficient tertiary buildings, the 2019-2024 Coalition Agreement specifies that from 2021 they must undergo must undergo deep energy renovation within no more than five years of a notarial deed transferring full ownership. The specific approach for this is in preparation.
- In addition to the above: exemplary function of government buildings. Government buildings within Flemish territory must comply with the minimum energy performance label from 2028. Government buildings of the Flemish public authorities must achieve an annual savings target of 2.5% of primary energy consumption from 2021 onwards.
- The Flemish Government is asking municipalities, cities, intermunicipal associations, public centres for social welfare, provinces and autonomous municipal enterprises to make an extra effort to make an average annual primary energy saving of 2.09% from 2020 in their buildings (including technical infrastructure, excluding building heritage).
- Under the asbestos reduction policy, work on various measures must be accelerated as part of the role of setting an example.

Conclusion of strategic approach for non-residential buildings

For non-residential buildings, the strategy provides for a mix of measures of both an incentive and a regulatory nature. It is expected that the announced measures will be adequate to increase the renovation rate for non-residential buildings sufficiently to achieve the stable level necessary to renovate the entire building stock by 2050 to the long-term objective of 2050. The exemplary role imposed by the Region on public buildings must provide inspiration for the other segments.

An important strategic action line for the non-residential building stock is additional data collection so that the strategy can be further refined and the results monitored accurately.

5.5. INDICATORS WITH A VIEW TO REDUCING GREENHOUSE GAS EMISSIONS, DECARBONISING THE BUILDING STOCK AND FACILITATING COST-EFFECTIVE TRANSFORMATION

A number of indicators are presented below which are already available today. In the coming years, additional indicators will be developed, on the basis of which the progress in the renovation strategy can be monitored and periodically reported to the European Commission, which is expecting a first report in 2023 and every two years thereafter. Progress will also be reported to the Flemish Government at those times. A large amount of data are already available for public consultation via an online Energy Map (https://www.energiesparen.be/energiekaart), which will be expanded further in the coming years.

A. Indicators for the overview of the building stock

- Number of buildings/dwellings (per type)
- Overall annual energy consumption of buildings
- Estimate based on extrapolation of distribution of dwellings over the EPC labels
- Trend in the number of dwellings without insulation (based on surveys/research)

Since the end of 2018, the owners of a dwelling have access free of charge to the Housing ID, which contains all publicly available information on the parcel and the building and provides advice on the pathway to be followed towards the long-term objective for 2050.

B. Indicators for measures and milestones for deep renovation

- Number of buildings per year subject to major energy renovation (environmental permits)
- Figures on the use of the supporting measures for deep renovation:
    - Number of building permits and EPB files for major energy renovation
    - Number of dwellings with exemption from property tax
    - Number of total renovation bonus energy premiums
    - Number of interest-free loans granted to new owners who from 2021 undertake deep renovation within five years of acquisition of ownership
    - Number of increased energy premiums granted to new owners who from 2021 undertake deep renovation within five years of acquisition of ownership
    - Number of owners to whom, from 2021, a reduction on housing tax (property tax) is granted who undertake deep renovation within five years of acquisition of ownership
- Trend in the number of heat pumps, heat pump boilers, solar boilers, PV installations
- Trend in the number of dwellings connected to heating networks

C. Policy indicators for worst performing buildings, split incentive and energy poverty

- Trend in % of buildings (residential and non-residential) with energy performance in worst label(s) (EPC database)
- Trend in the number of dwellings not complying with the Flemish Housing Code standards
- Number of demolition permits granted
- Budget spent for target group-oriented energy-saving measures

- Number of energy scans carried out
- Trend in the number of interest-free loans granted for vulnerable households
- Energy poverty:
    - Number of payment defaults and cancelled supply contracts
    - Number of repayment plans for energy debts
    - Number of prepayment budget meters installed
    - Trend in the indicators from the annual Energy Poverty Barometer (measured energy poverty (gEA), hidden energy poverty (vEA) and subjective energy poverty (sEA))

D. Policy measures and actions targeting all public buildings

- Trend in achievement of the energy-saving obligation
- Renovated area (in m²) in public buildings: per building type and by building size
- The annual effective energy and CO_2 consumption of all public buildings, as recorded in TERRA

E. The trend in the achievement of wider benefits

- Trend in the average energy consumption per household
- Fall in final energy consumption achieved (Energy Balance Sheet)
- Reduction in greenhouse gas emissions
- Improvement in air quality
- Trend in employment in the construction sector
- Trend in turnover in the construction sector (renovation segment)
- Trend in asbestos removal in residential buildings (OVAM asbestos removal policy):
    - From 2019: annual trend in disposal figures of asbestos cement of Flemish origin (based on annual survey addressed to all licensed landfill site operators);
    - periodically from 2022: monitoring based on updates of asbestos inventory certificates (OVAM asbestos inventory database);
- Trend in circular use of materials in the construction sector.

6. ESTIMATE OF THE INVESTMENTS, ENERGY-SAVING AND WIDER BENEFITS

6.1. ESTIMATE OF THE NECESSARY INVESTMENTS

Various sources are used to estimate the necessary investment to achieve the long-term objective for 2050.

The study '*Inschatting van de renovatiekosten om het Vlaamse woningpatrimonium aan te passen aan de woningkwaliteits- en energetische vereisten*' (Estimate of the renovation costs to adapt the Flemish housing stock to the housing quality and energy requirements), conducted by the interuniversity partnership Steunpunt Wonen, mapped the necessary investments in 2019 to adapt the Flemish housing stock by 2050 to the housing quality requirements from the Flemish Housing Code and to the long-term objective for 2050. Overall, it was estimated that 57% of the dwellings need repairs, renovations or a total renovation to comply with the minimum Flemish housing quality requirements. The average estimated renovation cost for these dwellings with deficiencies amounts to EUR 22 000

per dwelling. The total investment cost to adapt the Flemish dwellings to the housing quality requirements amounts to EUR 34 billion. In 96.5% of Flemish dwellings, work needs to be carried out to achieve the long-term objective for 2050. The average cost price per dwelling is estimated at EUR 43 000. The total additional price to adapt the Flemish housing stock to the energy requirements, on top of the costs needed to remedy housing quality deficiencies can be estimated at EUR 103 billion to EUR 110 billion. The average renovation costs to adapt the dwelling to the housing quality and energy requirements for 2050 is estimated in this study at EUR 52 000 to EUR 55 000 per dwelling. This amounts to a total investment cost of EUR 137 billion to EUR 145 billion.

The strongest differentiation according to renovation costs is found when examining the construction period of the dwellings: the pre-1945 dwellings record a total renovation cost of EUR 72 000 to EUR 75 000 on average per dwelling, whereas this figure for the most recent dwellings after 2000 decreases to EUR 29 000 to EUR 31 000 on average per dwelling. Since vulnerable groups often live in poorer housing, the renovation costs are also higher than average there. Especially for the first income quintile, the total renovation costs, therefore including for the energy renovation, are also significantly higher at EUR 61 000 to EUR 64 000 on average per dwelling compared to an overall average of EUR 52 000 to EUR 55 000.

A second source is the study commissioned by the VEA from the Flemish Institute for Technological Research (*Vlaams Instituut voor Technologisch Onderzoek*, VITO), which was delivered in December 2019. This study mapped out the costs of complying with the long-term objective for a series of non-energy-efficient typical dwellings. The investment costs needed to comply with the long-term objectives are on average the highest for detached buildings, then for semi-detached buildings and terraced buildings. The total investment cost is the lowest for apartments. These theoretical calculations were applied to dwellings in which no energy-saving measures had yet been carried out. The data from the EPC database provide insight into the current average energy performance of the various housing types. On the basis of extrapolation of the current distribution of the housing types over the EPC labels, the following average investment costs were calculated to attain label A:
- Detached building: EUR 51 000
- Semi-detached building: EUR 42 000
- Terraced building: EUR 35 500
- Apartment: EUR 6 000

Taking into account the large proportion of detached and semi-detached buildings and the fact that the real renovation cost in practice is often significantly higher, partly due to additional costs for finishing, in this strategy the average investment per dwelling is estimated at EUR 55 000, which brings the total cost for the residential buildings to EUR 150 billion. For non-residential buildings, for which the total floor area is estimated at 124 million square metres, the necessary investment is estimated at EUR 57 billion (renovation cost of EUR 460 per m²).

The total investment to renovate all existing buildings to the 2050 objective is estimated at over EUR 200 billion (EUR 150 billion for residential buildings and EUR 57 billion for non-residential buildings).

The various renovation scenarios for residential buildings (see roadmap) show an upward trend overall. For residential buildings, the annual investments follow a sharply rising trend in scenario 1 (phasing-out of worst labels). For scenarios 2 and 3, the rise is less pronounced and also starts only after 2035. For non-residential buildings, the necessary investment costs stabilise after 2030 in line with the stable renovation rate proposed for this segment.

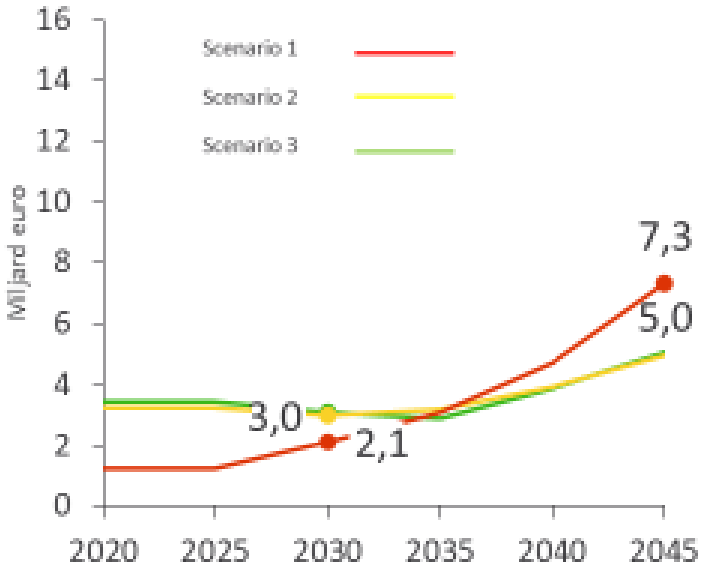


Figure 37: Annual investment costs for renovation of buildings to the 2050 objective for residential buildings

Key
Mijard euro = billion euro

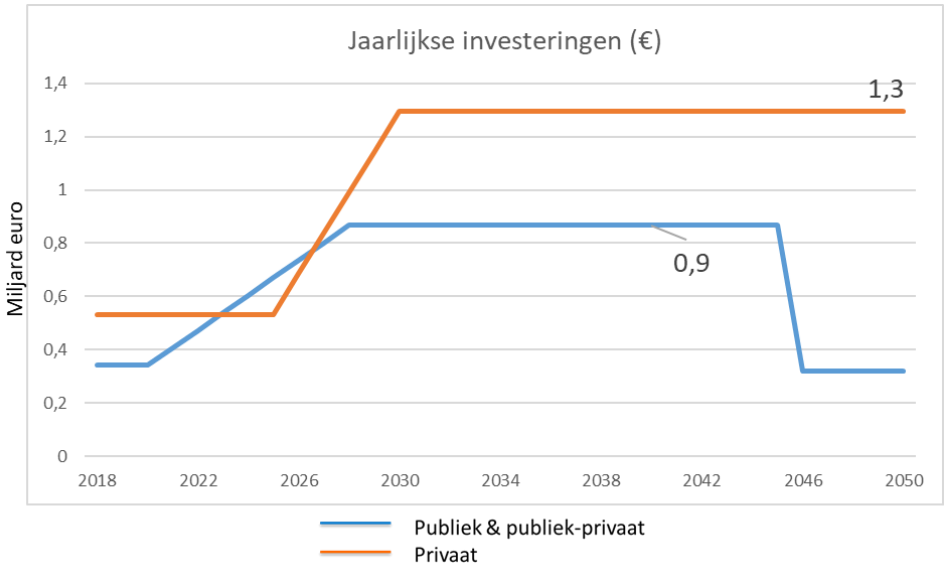


Figure 38: Annual investment costs for renovation of buildings to the 2050 objective for non-residential buildings

Key
Mijard euro = billion euro
Jaarlijkse investeringen = annual investments
Publiek & publiek-privaat = public & public-private
Privaat - private

In the cost price estimate described, the costs associated with the asbestos removal policy were not taken into account.

In the study '*Maatschappelijke kosten-batenanalyse voor asbestafbouwbeleid in Vlaanderen*' (Social cost-benefit analysis for asbestos removal policy in Flanders) (E&Y, 2017), the discounted (3%) asbestos removal cost was estimated at EUR 3.2 billion for the period from 2019 to 2040. The discounted cost price of the (prior) asbestos inventory was estimated at EUR 1.02 billion. This covers only the housing segment and buildings dating back before 2001. The estimated asbestos removal cost includes only the costs of dismantling, removal and processing of the asbestos-containing materials. The reconstruction costs (new materials, etc.) are not included in this figure.

The aforementioned investment costs cannot be calculated separately from the estimated investment costs for achieving the long-term objective for 2050. Asbestos removal is often an inherent part of a renovation or demolition project. The asbestos removal costs are included in the demolition phase of a renovation process. A considerable amount of the asbestos liabilities stem from its removal associated with an energy intervention:

- roof and façade cladding for insulation, airtightness and the installation of solar panels;
- plaster insulation around the central heating system for the renewal of the heating system.

The asbestos inventory is also an inherent market reality when the renovation works are carried out by a contractor with employees. Drawing up an asbestos inventory before the start of the works is already mandatory to comply with the employer's obligation.

6.2. ENERGY-SAVING AND REDUCTION OF GREENHOUSE GAS EMISSIONS

See part 5 (Roadmap) for data on the energy saving and reduction of greenhouse gas emissions associated with the implementation of the 2050 renovation strategy.

6.3. WIDER BENEFITS

The in-depth renovation of the building stock offers Flanders a series of possibilities to achieve the energy and climate policy objectives. In addition to the fact that renovations generate cost savings in the long term, they also go hand in hand with a structural positive impact on the quality of life of the population and on the environment, and they have a direct positive impact on the Flemish economy. Investments in a renovation programme boost the economy, create jobs, improve the health of the population and strengthen the security of the energy supply. Improving the thermal comfort of dwellings results in lower energy bills. Improving indoor and outdoor air quality reduces health problems and the associated costs. As regards security of the energy supply, renovations contribute to lower investment costs in the electricity system through, among other things, the integration of decentralised electricity generation and provide economic benefits in the field of reduced dependence on fossil fuel imports.

Studies at EU level show that each euro invested in energy efficiency can generate between one and five euro in terms of the economy, health, avoided climate impact, energy security and use of resources.

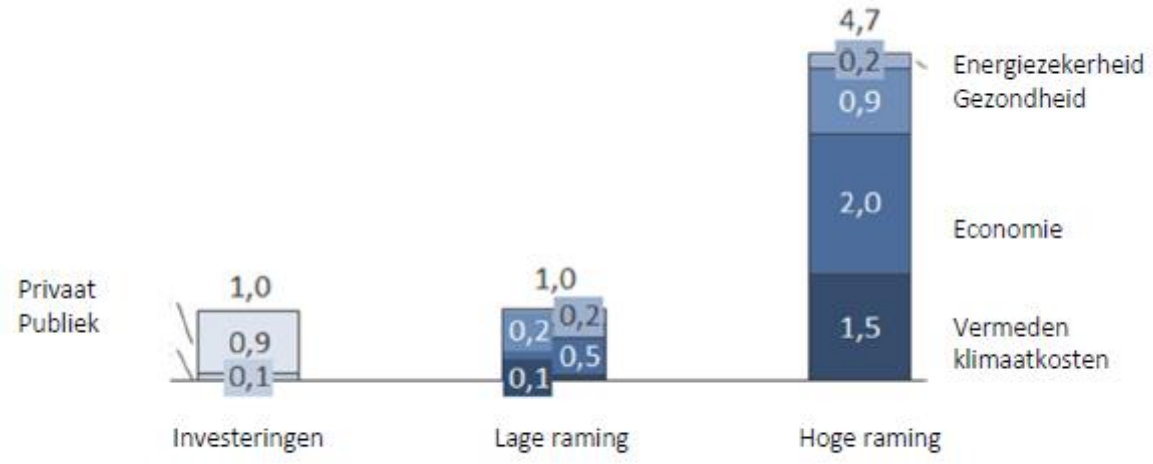


Figure 39: Macroeconomic leverage effect of investments in energy efficiency (low and high estimates)

Key
Privaat = Public
Publiek = Private
Investeringen = Investments
Lage raming = Low estimate
Hoge raming = High estimate
Energiezekerheid = Energy security
Gezondheid = Health
Economie = Economy
Vermeden klimaatkosten = Avoided climate costs

These studies indicate that the greatest benefit is to the economy through economic growth, additional stable employment and a positive return on the public budget. Climate-related benefits are in second place. These refer, *inter alia*, to the avoided costs of extreme events as a consequence of climate change, provided that other trading blocs also take responsibility for limiting global warming to a maximum of 2 degrees Celsius (impact on groundwater resources, risk of flooding, lower agricultural yields, an increase in health problems and mortality linked to heat stress). According to a literature study by Climact, the benefits appeared to outweigh the costs, even in scenarios in which the lowest estimates were used. At EU level, this leads to the following estimates (billion euro per year):

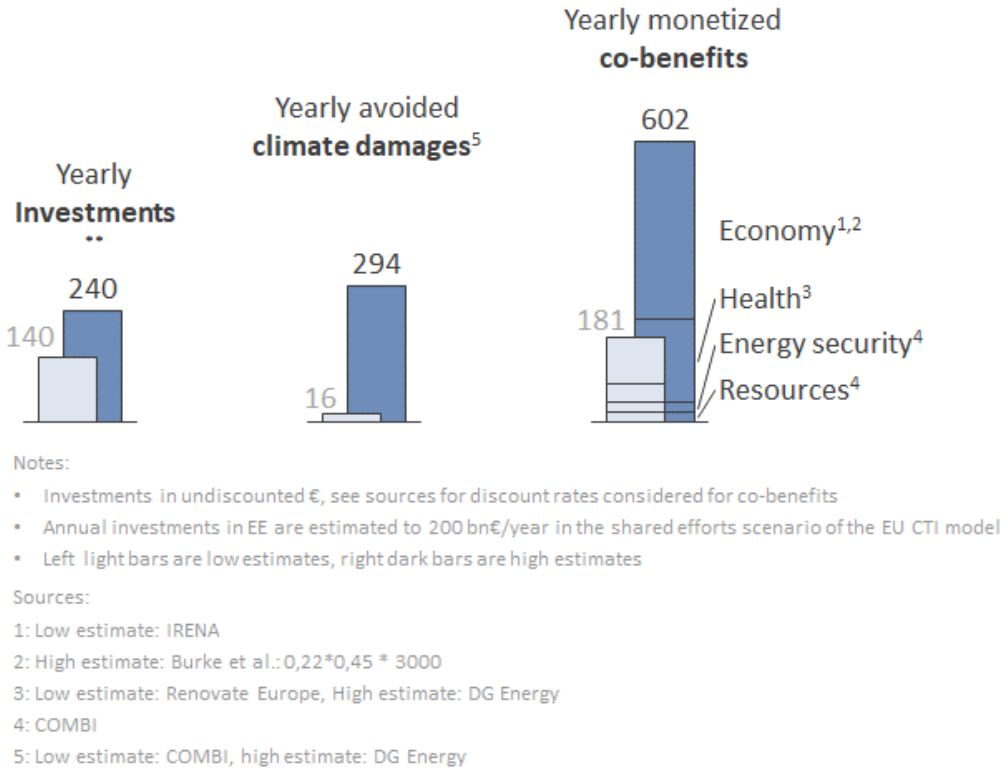


Figure 40: Annual investments in EE in the EU and associated benefits

Wider benefits per sector.

Economy. The investments to renovate the existing buildings to the 2050 objective are estimated at over EUR 200 billion. These investments constitute an important and stable impetus for the economy and GDP with a significant return for the public budget.

Employment. The construction sector in Flanders accounts for 190 000 jobs out of a total of 2.9 million, or 6.5% of employment. Due to the aging of the population, this sector will experience a large outflow in the coming years. The present Flemish Government aims for a labour force participation rate of 80% at the end of the current legislature (120 000 extra jobs by 2024). The implementation of the renovation strategy can contribute to meeting this challenge by creating at least 25 000 local stable jobs in the next 4 years. The need for additional capacity will then continue to grow to 40 000 and more by 2030.

Depending on the source, EUR 1 million in investments in renovation will generate between 10 and 19 jobs during the implementation of the renovation. In this strategy, pending further supporting evidence, for the sake of caution, 10 jobs per million euro of investment are assumed.

For the housing construction sector, the three scenarios proposed each create considerable growth in employment in construction. Scenarios 2 and 3 stabilise in the period 2025 to 2040 at 30 000 to 35 000 jobs and then grow to 50 000. Scenario 1 provides fewer jobs in the initial period, but from 2030 the demand then rises sharply to over 73 000 in the final period, as shown in the following Figure:

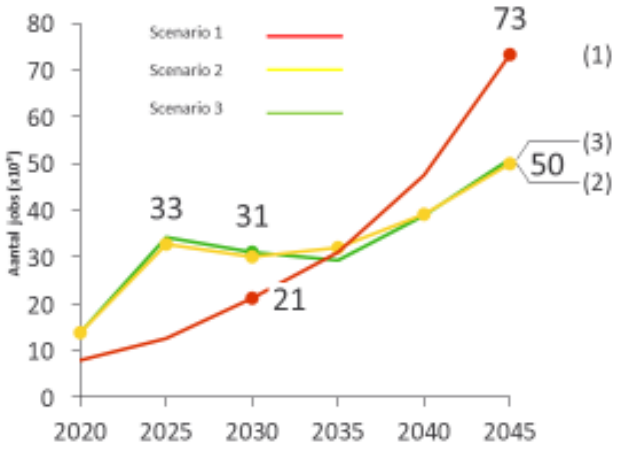


Figure 41: Number of additional jobs (x 10^3) for renovation of residential buildings for 3 different strategic options under the renovation strategy 2050

Key
Aantal jobs = number of jobs

For the non-residential buildings, the number of additional jobs rises in an initial period in line with the proposed phasing to reach a peak in 2030 of 21 500 additional jobs, which is then sustained until at least 2045.

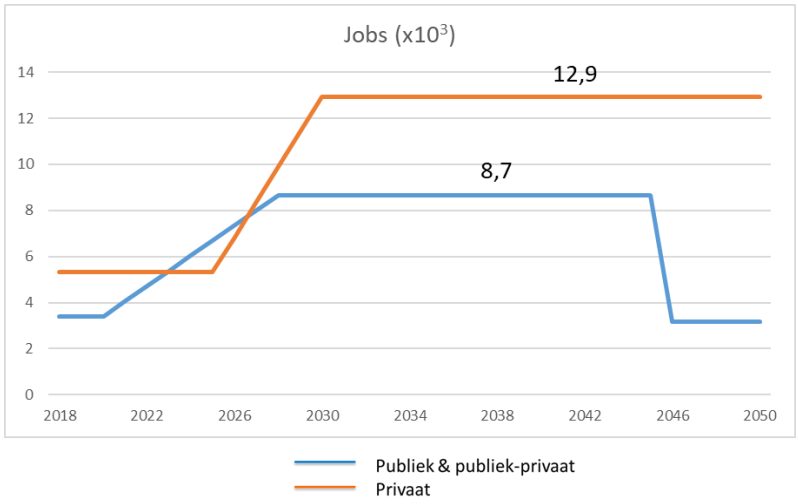


Figure 42: Number of additional jobs (x 10^3) for renovation of residential buildings for 3 different strategic options and for non-residential buildings (public and private)

Key
Publiek & publiek-privaat = public & public-private
Privaat = private

Energy poverty. The Energy Poverty Barometer shows that households in energy poverty experience more health problems and assert far more frequently than the average population:

- that they are in poor or very poor health (18.3% of individuals belonging to a household in energy poverty compared to 6.5% of individuals belonging to a household without energy poverty);

- that they are contending with chronic illnesses or health problems (36.9% of individuals belonging to a household in energy poverty compared to 22.6% of individuals belonging to a household without energy poverty);
- that they ae (seriously) restricted in their activities as a result of health problems (38.5% of individuals belonging to a household in energy poverty compared to 21.8% of individuals belonging to a household without energy poverty).

A 2019 Buildings Performance Institute Europe (BPIE) study of 2019 ('Quantifying the benefits of energy renovation investments in schools, offices and hospitals') indicates that well renovated buildings increase user comfort and performance in schools, offices and hospitals:

- **Schools: Efficient school classrooms obtain high figures for pupils' performance.** School buildings which have been poorly designed or have obsolete systems affect pupils' health, attendance, concentration and learning performance. The occupancy density in classrooms is much higher than in houses or offices and children are more vulnerable to indoor air pollution, as they breathe a greater volume of air relative to their body weight compared to adults. In fact any fall in indoor CO_2 concentration indoors is associated with a relative decline in absenteeism as a result of illness.
- **Offices (public and private workplaces): As energy demand falls, productivity rises.** People spend eight hours a day in offices and about 90% of operating costs are linked to employees. Renovations into comfortable, healthy, well-lit, well-ventilated and carefully designed workplaces can increase employees' productivity.
- **Hospitals: Faster recovery means that more patients can be served.** In hospitals, good ventilation reduces the risk of infections. Thermal comfort and good sound insulation accelerate the patient's recovery time. Healthcare renovations can shorten patients' average length of stay, while medication costs and employee turnover are also reduced.

A recent study by the German Fraunhofer Institute 'Energy Savings Scenarios 2050'[34] maps additional savings potential linked to non-linear social trends, such as:
- Digitisation: building automation and interconnection of appliances;
- New social and economic models: sharing economy, reduction of energy poverty;
- More prosumers, greener public spending;
- Industrial transformation: more efficient use of raw materials and circular economy, move towards carbon-neutral industry;
- Focus on quality of life: growing interest in health (air quality, noise pollution, heat), growth of urban living (living on a smaller scale), etc.

The policy promotion of these trends with a positive impact on energy consumption will offer additional opportunities in the further development of renovation strategies to express the benefits of deep renovation not only in terms of financial savings on the energy bill.

[34] https://www.isi.fraunhofer.de/content/dam/isi/dokumente/ccx/2019/Report_Energy-Savings-Scenarios-2050.pdf

7. PROMOTION OF ACCESS TO MECHANISMS FOR SMART FINANCING IN SUPPORT OF INVESTMENTS

Several initiatives facilitating access to financing exist in the Flemish Region to support the cost-effective transformation of the Flemish building stock to the 2050 goal.

7.1. PROJECT AGGREGATION

Neighbours' premium. The neighbours' premium has existed since October 2017. This is a premium for project supervisors who collectively supervise a number of dwellings (at least 10) to make them energy-efficient. The project supervisor provides support for the citizen in the realisation of energy-saving investments. To this end, the supervisor takes on as many of the citizen's tasks as possible, such as energy screening of the home, timing, advice on the energy renovation and action plan, drawing up measurement data, searching for contractors, site follow-up, administrative support for premium applications and financing. At the end of 2019, 195 such projects involving at least 10 dwellings or housing units had been launched for a total of 3 657 dwellings and housing units.

LIFE IP BE REEL! 2018-2024. Under this project, the Flemish cities of Antwerp and Mechelen are organising various demonstration projects relating to collective renovation. In concrete terms, this concerns the following projects:

- Antwerp: renovation of 500 dwellings into low-energy buildings;
- Antwerp: renovation of 250 dwellings into nearly zero-energy buildings.
- Mechelen: renovation of 75 dwellings to 30kWh/m^2.
- Mechelen: renovation of 50 dwellings to 50kWh/m^2

Projects of local authorities in which a collective approach has been chosen to remove barriers. An example:

- **Further roll-out of RenoseeC model.** 'Renovating with Social, Economic and Ecological benefit through a Collective approach'. The aim of RenoseeC is affordable renovation of family dwellings collectively, on the basis of a list of innovative technical, financial and legal solutions. The roadmap, business model and list of solutions developed from practice in this project between 2014 and 2018, were refined for application in different towns and municipalities in the Province of East Flanders. At the end of 2019, together with the city of Sint-Niklaas and the Province of East Flanders, RenoseeC launched the project 'Sint-Niklaas renovates' in three districts near the station of Sint-Niklaas. The basic principles
    - Customised renovation guidance for each client for the entire renovation process.
    - Single point of contact (SPOC): a single local point of contact as independent partner where necessary between clients, building partners and local authority.
    - For the implementation of the renovation works, a call was made on construction teams of architects (in the case of deep renovations), main contractors, contractors and installers.
    - Standardisation of building technology solutions devised in cooperation with the Catholic University of Leuven and Pixii.

Many local initiatives already exist today. The Flemish authorities, in cooperation with the local authorities, will put extra effort into such local projects. Also see local climate roundtables described earlier in this strategy.

Energy service company (ESCO) services for local authority buildings by grid operator FLUVIUS. Fluvius helps local authorities to obtain insight into their energy consumption with an online energy management tool E-lyse (baseline energy consumption, benchmark with other local authorities, integration of digital meters and telemetry). Fluvius guides local authorities in carrying out projects for total energy renovation, heating, ventilation and air-conditioning (HVAC) renovation, relighting and the installation of solar panels and supports in the design (specifications, bills of quantities, plans), purchase & award (framework contracts), site coordination, adjustment and delivery.

OEPC facilitation by the VEB (Maintenance and Energy Performance Contracts). The Flemish Energy Company (VEB) facilitates energy performance contracts between ESCOs and public institutions.

7.2. REDUCING THE FINANCING RISK

The H2020 Energy Efficient Mortgages Initiative (EEMI)[35] works on mortgages/loans taking into account the positive impact of the improved energy efficiency of a project on the value of the assets and the credit risk. The EEMI consists of the Energy Efficient Mortgages Action Plan (EeMAP) and the Energy Efficient Data Portal & Protocol Initiative (EeDaPP):

- EeMAP aims to create a mortgage financing mechanism according to which building owners are incentivised to improve the energy efficiency of their buildings or to acquire an already energy-efficient property by way of preferential mortgage conditions. At the heart of the initiative is the assumption that energy efficiency has a risk mitigation effect for banks as a result of its impact on a borrower's ability to service their loan and on the value of the property.
- EeDaPP aims to support the energy-efficient mortgage financing mechanism by delivering a market-led protocol that facilitates the gathering of large-scale data relating to energy-efficient mortgage assets. In the long term, it will be possible to access the data by way of a common, centralised portal, allowing for continuous tracking of the performance of the energy-efficient mortgage assets, thereby also facilitating the tagging of such assets for the purposes of energy-efficient bond issuance.

The Union Professionelle du Crédit/Beroepsvereniging van het Krediet (UPC/BVK) and Febelfin are cooperating in the implementation, at Belgian level, of EeMAP. For some time now, this has been coordinated with the VEA. The 2019-2024 Coalition Agreement states the following in this respect: 'In order to achieve the interim and long-term objectives, a great deal more effort has to be devoted to renovation and a substantial increase in the renovation rate is necessary. To this end, we are entering into consultation with the construction, financial and energy sectors. Where necessary, we provide them with tools to take up an active role here. For instance, we shall give lenders the opportunity to use the digital EPC certificate for the property concerned in the context of an application for real estate credit and/or for energy-saving renovations.' Together with the financial sector, the VEA is currently

[35] https://energyefficientmortgages.eu/

determining how EPC data can be shared so that lenders can determine in a uniform manner by means of simulations, scenarios, building plans, etc., which extra borrowing capacity or benefit can be granted, for the credit entered into, to owners who achieve a substantially improved energy saving on renovation. Coordination can be sought in this respect with the De-risking Energy Efficiency Platform (DEEP).

7.3. PUBLIC FUNDING

Energy Fund. The Flemish Energy Fund is used in accordance with the Energy Decree (*Energiedecreet*) for the implementation of the energy policy of the Flemish Government. Revenue is allocated directly to this Energy Fund, such as the proceeds from energy bill levies and administrative fines. The Flemish Government has appropriations of the Energy Fund at its disposal, including the authorisation to grant subsidies with them, for the implementation of its energy policy, including the implementation of the public service obligations relating to the rational use of energy, social energy policy, the cogeneration policy and policy on renewable energy sources.

Climate Fund. In 2012, the Flemish Government also established a Climate Fund. The Flemish Climate Fund is funded by the proceeds from the auction of European emission rights, *inter alia*. Through this Fund, recurrent income is available to the Flemish Government to finance the Flemish climate policy.

Green bonds. The Flemish Community placed a sustainable bond issue for the first time on 12 November 2018. An amount of EUR 500 million was raised through a public issue from 61 institutional investors from 11 different countries. The bonds mature on 21 November 2033. 'Sustainable bonds' are bonds intended to finance sustainable green or social investments. Flanders uses the amount raised to improve the energy efficiency of its buildings, to build affordable homes and to finance 'passive schools' in the context of 'Schools of Tomorrow'.

The Flemish energy loan: Interest-free energy loan for the priority target group: EUR 15 000 and a 10-year term. Since 2015, 21 000 energy loans have been granted for a total of EUR 175 million. This also includes the 2% loans granted from 2015 to 2018 to the non-priority group. Since 2019, only interest-free loans to people from the priority target group are still granted.

Fund for purchase in duress. For certain target groups who do not have sufficient financial resources to make their dwelling energy-efficient, a fund for purchase in duress was set up (Flemish Government Decree of 17 May 2019). An interest-free loan with deferred repayment amounting to up to EUR 25 000 can be granted to the buyers in duress, poor owners who purchase poor quality housing from necessity. Only when the dwelling is sold, or at the latest after 20 years, must the loan be repaid. A first call (EUR 15.5 million, providing 625 loans) was launched by the Minister for Energy at the beginning of 2020.

Section 4.6.1. 'Measures for families in energy poverty' provides more details on a number of measures financed with public funds, such as:

- Increased energy premiums for protected purchasers (beneficiaries of the social maximum energy prices);
- The rent and insulation premium for dwellings inhabited by vulnerable private tenants.

Integration of housing and energy premiums. The 2019-2024 Coalition Agreement provides that, to promote customer-friendliness and transparency, as many premiums as possible aimed at energy saving, quality improvement and housing adaptation are combined in a single service point with a

view to an overarching housing renovation premium from 2022 with differentiation of premium amount based on income categories..

Rolling fund for the renovation of apartments. The policy document Energy 2019-2024 provides for research into the start-up of a public-private rolling fund for the renovation of apartments so that the duration of loans to the Association of Co-owners can be extended from 10 to 30 years. Provision for a government guarantee can act as a lever to attract private capital.

7.4. ACCESSIBLE AND TRANSPARENT ADVISORY TOOLS AND ENERGY ADVISORY SERVICES

A network of Energy Houses operates throughout the Flemish Region offering integrated services for renovation and financing. For more details, reference is made to section 4.1.1 'Measures concerning support of deep renovation for residential buildings'.

8. PUBLIC CONSULTATION

Article 2a(5) EPBD states that: '*To support the development of its long-term renovation strategy, each Member State shall carry out a public consultation on its long-term renovation strategy prior to submitting it to the Commission. Each Member State shall annex a summary of the results of its public consultation to its long-term renovation strategy. Each Member State shall establish the modalities for consultation in an inclusive way during the implementation of its long-term renovation strategy.*'

The present renovation strategy was developed on the basis of extensive research work and stakeholder input, which were available through various processes.

- Firstly, a great deal of knowledge and stakeholder input have been gathered through the **Renovation Pact** since December 2014. In a wide-ranging partnership with 34 organisations from the construction and energy sectors, under the coordination of the Flemish Energy Agency, cooperation has taken place since 2014 on specific areas that are necessary to increase the rate of renovation of residential buildings. Through a consensus-based approach, policy recommendations were gathered for key actions and priorities of the renovation strategy: the long-term objective 2050 for housing renovation, the joint development of the Housing ID, the new EPC, a standpoint on dealing with possible renovation obligations. Every year in December, the most important progress and milestones are discussed at a **seminar**, which each time attracts over 230 stakeholders and partners. At each seminar, ample opportunity is provided for input from all participants during workshops on the various aspects of the strategy. During the seminar of 13 December 2019, the outlines of the long-term strategy for 2050 were presented to over 200 interested parties.[36]

- **Rapid Acceleration (*Stroomversnelling*)** is the stakeholder process launched in 2016 under the coordination of the Minister for Energy. Various stakeholders from the energy sector, knowledge institutions, the public authorities and civil society cooperate thematically within Rapid Acceleration on priority topics (Rapid Acceleration Working Groups). In the first phase (2016-2017)

[36] The presentations and reports of the various workshops are available at https://www.energiesparen.be/studiedag-5-jaar-renovatiepact-de-start-van-een-nieuwe-fase

work was carried out on developing common building blocks for a Flemish Energy Vision. From 2019, the five Rapid Acceleration Working Groups have worked on recommendations, points for improvement and new action proposals for the Flemish Energy and Climate Plan.[37] Various action proposals have been retained and integrated in this strategy.

- **BE-REEL!** aims at permanent cooperation with the other regions for exchange of best practices at regional and local levels. This also ensures a link between the regional long-term renovation strategies.

- The annual survey on energy awareness and behaviour.

- Research work by the interuniversitity partnership Steunpunt Wonen.

- Under the Energy Poverty Programme, an Energy and Poverty Standing Working Party is active, with participants from the public authorities, the poverty alleviation sector, the local authorities and grid operator FLUVIUS.

In view of the short time between the forming of the Government and the delivery of this renovation strategy, no broad public consultation has yet taken place apart from the ongoing cooperation and participation initiatives mentioned above. However, the 2019-2024 Flemish Coalition Agreement provides for an effective participation process to closely involve all interested parties – citizens, civil society, businesses and the various public authorities – in the further development of the Flemish climate policy. This long-term strategy will also be discussed further in the coming months and years with the various interested parties, as part of the participation process also mentioned in the Flemish Energy and Climate Pact. On the basis of this process and further supporting evidence, the strategy can be further refined and where necessary adjusted.

[37] The recommendations of the five Rapid Acceleration Working Groups were published at: https://www.energiesparen.be/Vlaams_energieplan.

9. ANNEX: ADDITIONAL INFORMATION ON THE HOUSING ID

On 3 December 2018, the first version of the Housing ID was launched. The Flemish Energy Agency, the Public Waste Agency of Flanders (*Openbare Vlaamse Afvalstoffenmaatschappij*, OVAM), the Department of the Environment and Wonen-Vlaanderen joined forces to create a digital ID for Flemish dwellings. This cooperation was also supported by Informatie Vlaanderen, Vlaanderen Radicaal Digitaal and the OmgevingsInformatieSamenwerkingsverband (OIS).

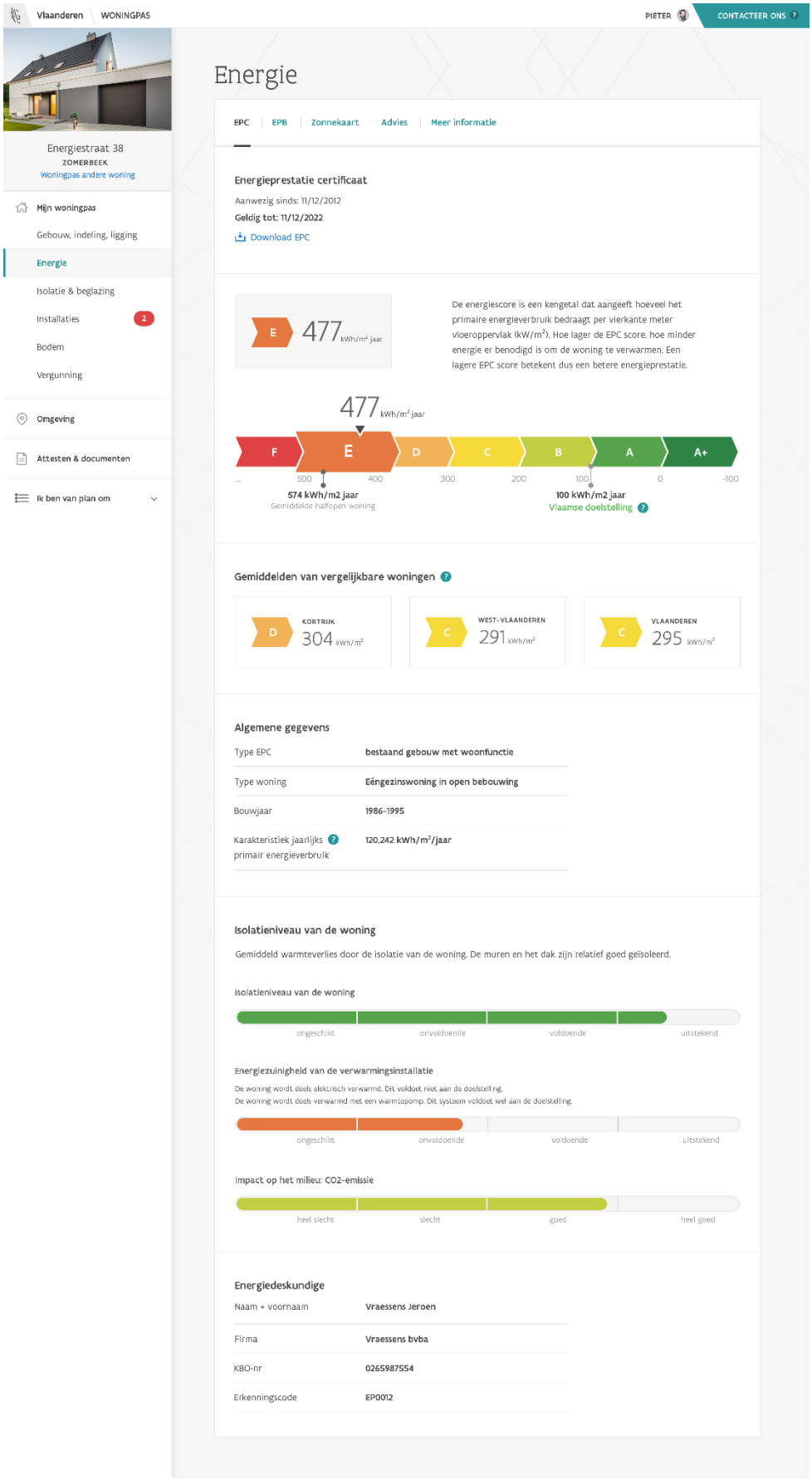
The Housing ID is completely free of charge for the owner and is automatically compiled on the basis of underlying data sources. The Housing ID belongs to the dwelling. On sale of a dwelling, the housing ID is automatically allocated to the new owner, with all the information the public authorities have about that dwelling.

The Housing ID is accessible by logging in with an electronic identity card, token or itsme-app. After identification, the user's properties are searched for and it is checked whether the Flemish authorities have any digital information on them on the subjects of energy, environment, housing quality and soil. This is then shown in a user-friendly manner.

Owners will see the following information in the Housing ID:
- General information about the building, such as location, layout, etc.
- Energy
    - If an energy performance certificate or an EPB declaration has already been drawn up for the dwelling, it can be consulted or downloaded here.
    - The energy rating of the dwelling, with an (indicative) label, can be compared in the Housing ID with the average ratings in the municipality, per province and in Flanders;
    - The renovation roadmap with measures and cost price to comply with the long-term objective for 2050.
    - An overview of available energy premiums.
- Insulation and installation
    - In the event that an EPB declaration has been drawn up for a renovation subject to EPB regulations, the insulation ratings and installations present are shown. Renovation works carried out without a permit (and EPB declaration) are (currently) not yet included in the Housing ID.
    - These data and ratings are also present for an existing dwelling or newly constructed dwellings.
- The sunshine map tool, which indicates the potential and cost price of solar panels and a solar boiler, supplemented by the annual saving, the payback time and CO_2 benefit.
- Soil data from the Land Information Register.
- Background to the urban development permit.
- The 'mobiscore', which gives an indication of the environmental impact of journeys from your dwelling to the amenities.
- Environmental information: susceptibility to flooding, real estate heritage, land use according to regional plan, and more useful maps, etc.

The Housing ID also gives the citizen an overview of which useful and necessary certificates, inspections or permits must be present when selling, renting, renovating or constructing a dwelling. Finally, the Housing ID is also linked to the Citizen Profile of the Flemish Information Agency (*Agentschap Informatie Vlaanderen*).

Overview of a number of relevant screens of the Housing ID


Vlaanderen
WONINGPAS
PIETER
CONTACTEER ONS
Energie
Energiestraat 38
ZOMERBEEK
Woningpas andere woning
Mijn woningpas
Gebouw, indeling, ligging
Energie
Isolatie & beglazing
Installaties
2
Bodem
Vergunning
Omgeving
Attesten & documenten
Ik ben van plan om
EPC | EPB | Zonnekaart | Advies | Meer informatie
Energieprestatie certificaat
Aanwezig sinds: 11/12/2012
Geldig tot: 11/12/2022
Download EPC
E 477 kWh/m² jaar
De energiescore is een kengetal dat aangeeft hoeveel het primaire energieverbruik bedraagt per vierkante meter vloeroppervlak (kW/m²). Hoe lager de EPC score, hoe minder energie er benodigd is om de woning te verwarmen. Een lagere EPC score betekent dus een betere energieprestatie.
477 kWh/m² jaar
F E D C B A A+
500 400 300 200 100 0 -100
574 kWh/m2 jaar
Gemiddelde halfopen woning
100 kWh/m2 jaar
Vlaamse doelstelling
Gemiddelden van vergelijkbare woningen
D KORTRIJK 304 kWh/m²
C WEST-VLAANDEREN 291 kWh/m²
C VLAANDEREN 295 kWh/m²
Algemene gegevens
Type EPC bestaand gebouw met woonfunctie
Type woning Eéngezinswoning in open bebouwing
Bouwjaar 1986-1995
Karakteristiek jaarlijks primair energieverbruik 120,242 kWh/m²/jaar
Isolatieniveau van de woning
Gemiddeld warmteverlies door de isolatie van de woning. De muren en het dak zijn relatief goed geïsoleerd.
Isolatieniveau van de woning
ongeschikt onvoldoende voldoende uitstekend
Energiezuinigheid van de verwarmingsinstallatie
De woning wordt deels elektrisch verwarmd. Dit voldoet niet aan de doelstelling.
De woning wordt deels verwarmd met een warmtepomp. Dit systeem voldoet wel aan de doelstelling.
ongeschikt onvoldoende voldoende uitstekend
Impact op het milieu: CO2-emissie
heel slecht slecht goed heel goed
Energiedeskundige
Naam + voornaam Vraessens Jeroen
Firma Vraessens bvba
KBO-nr 0265987554
Erkenningscode EP0012
Vlaanderen
verbeelding werkt
Dit is een officiële website van de Vlaamse overheid
Uitgegeven door Vlaams Energie Agentschap, Openbare Vlaamse Afvalstoffenmaatschappij, Wonen Vlaanderen en Departement Omgeving
over woningpas
disclaimer
toegankelijkheid

Vlaanderen | WONINGPAS

PIETER | CONTACTEER ONS

Energiestraat 38
ZOMERBEEK
Woningpas andere woning

- Mijn woningpas
  - Gebouw, indeling, ligging
  - Energie
  - Isolatie & beglazing
  - Installaties 2
  - Bodem
  - Vergunning
- Omgeving
- Attesten & documenten
- Ik ben van plan om

Isolatie & beglazing

Status | Advies | Meer informatie

Jouw isolatie score

U-WAARDE
0,8
W/m²K

De **U-waarde** geeft de hoeveelheid warmte aan die per seconde, per m2 en per graad (Celsius of Kelvin) temperatuurverschil tussen de ene en de andere zijde van een wand doorgelaten wordt. Hoe lager de waarde, hoe beter de thermische isolatie.

ongeschikt | onvoldoende | voldoende | uitstekend

Gemiddelden van vergelijkbare woningen

KORTRIJK	WEST-VLAANDEREN	VLAANDEREN
0,8 W/m²K	0,8 W/m²K	0,8 W/m²K

Mijn evaluatie per onderdeel voor EPB-aangifte 2015: Renovatie (standaard)

Deze informatie is afkomstig uit uw EPB-aangifte van jaartal x en/of uw EPC van jaartal y. Enkel de buitenconstructies werden meegenomen in dit overzicht, geen binnenconstructies. Als u daarna zelf isolerende werken hebt uitgevoerd, is dit niet opgenomen in het overzicht. Bij een renovatie ziet u mogelijk enkel de gerenoveerde delen.
Uitleg **huidige norm** Lorem ipsum Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Cras justo odio, dapibus ac facilisis in, egestas eget quam.

Muren [1] Onvoldoende
Niet energiezuinig — Heel energiezuinig
meer info
0,40 W/M2 K — Norm bij aangifte
< 60 — Streefdoel 2050

Vloeren [1] Uitstekend
Niet energiezuinig — Heel energiezuinig
meer info
0,94 W/M2 K — Norm bij aangifte
0,40 W/m2 K — Streefdoel 2050

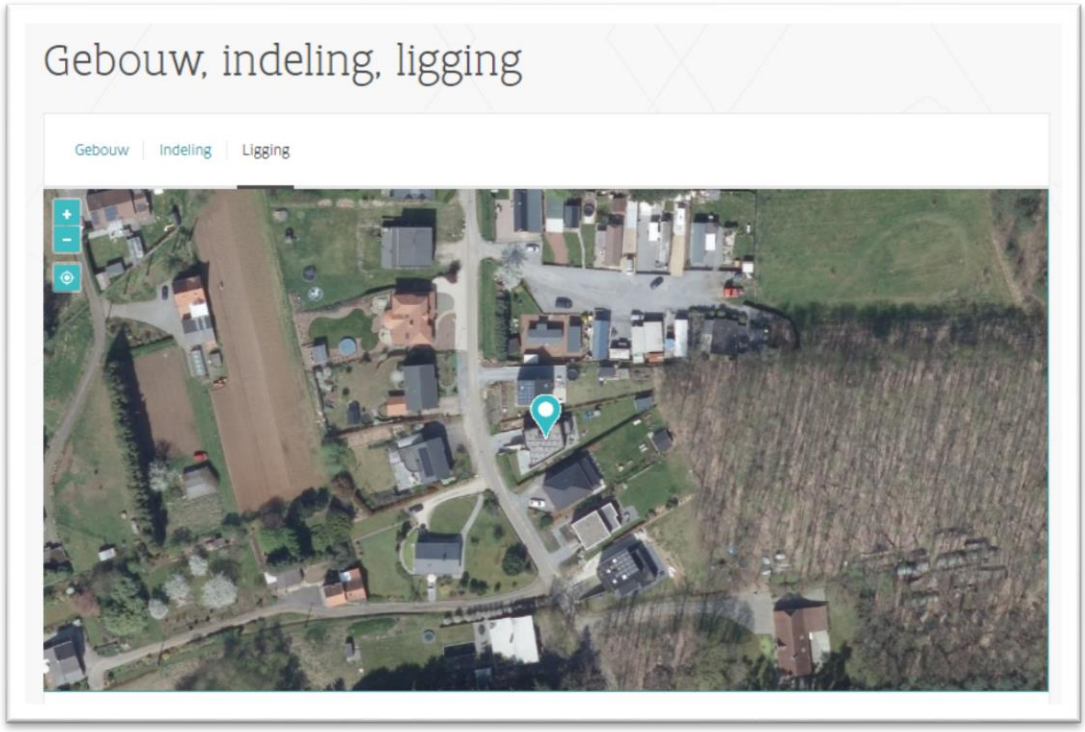
Daken / plafonds [1]
0,78 W/m² K
Meer info
Norm bij aangifte 0,94 W/m2 K
Streefdoel 2050 0,40 W/m2 K

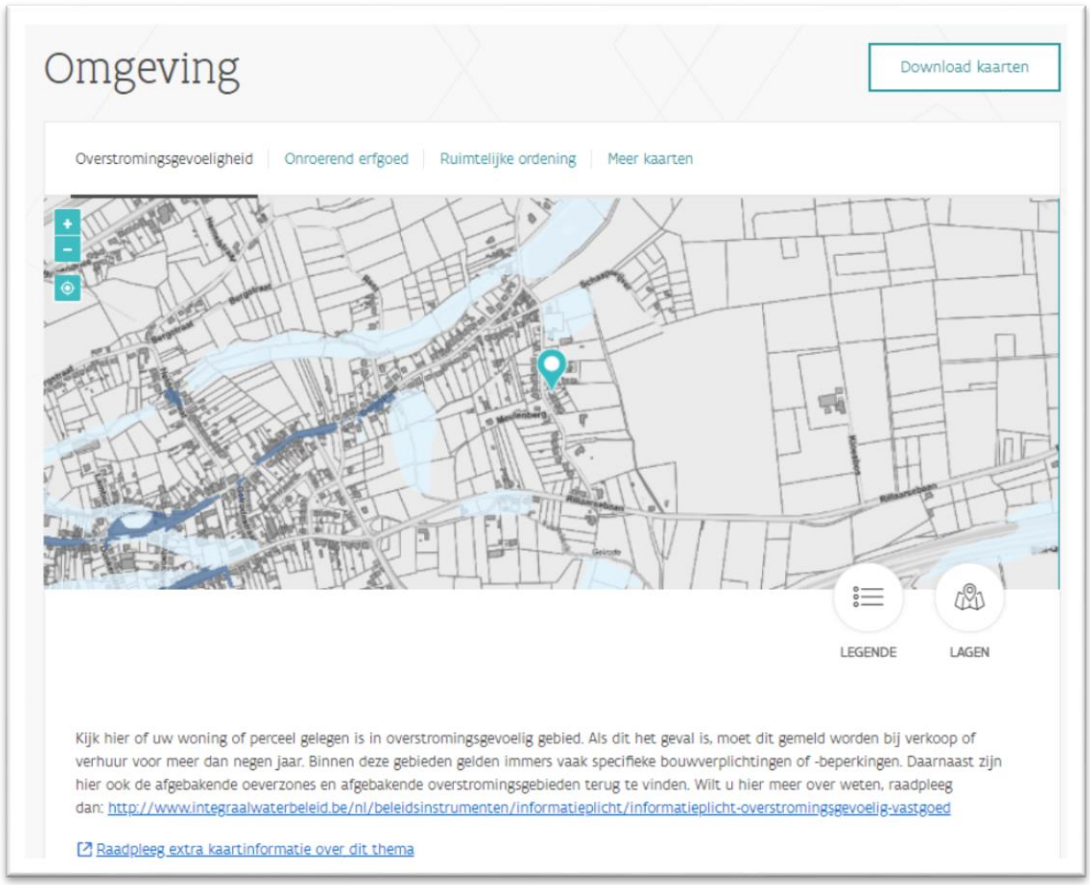
Vensters [1] Voldoet niet aan minimale woonkwaliteit
0,25 W/m² K
Meer info
Norm bij aangifte 0,19 W/m2 K
Streefdoel 2050 0,40 W/m2 K

Deuren / poorten [1] Uitstekend
0,25 W/m² K
Meer info
Norm bij aangifte 0,19 W/m2 K
Streefdoel 2050 0,40 W/m2 K

BRONNEN

[1] Energieprestatiecertificaat, laatste upate: maart 2005


Gebouw, indeling, ligging
Gebouw
Indeling
Ligging


Omgeving
Download kaarten
Overstromingsgevoeligheid
Onroerend erfgoed
Ruimtelijke ordening
Meer kaarten
LEGENDE
LAGEN
Kijk hier of uw woning of perceel gelegen is in overstromingsgevoelig gebied. Als dit het geval is, moet dit gemeld worden bij verkoop of verhuur voor meer dan negen jaar. Binnen deze gebieden gelden immers vaak specifieke bouwverplichtingen of -beperkingen. Daarnaast zijn hier ook de afgebakende oeverzones en afgebakende overstromingsgebieden terug te vinden. Wilt u hier meer over weten, raadpleeg dan: http://www.integraalwaterbeleid.be/nl/beleidsinstrumenten/informatieplicht/informatieplicht-overstromingsgevoelig-vastgoed
Raadpleeg extra kaartinformatie over dit thema

Key
Flanders Housing ID

Energiestraat 38
ZOMERBEEK
Housing ID other dwelling

My Housing ID
Building, layout, location
Energy
Insulation & Glazing
Installations
Soil
Permit
Environment
Certificates and documents
I am planning to

ENERGY
EPC EPB Sunshine Map Advice More information

Energy performance certificate
Present since 11/12/2012
Valid until 11/12/2022
Download EPC

The energy figure is an indicator showing the primary energy consumption per square metre floor area (kW/m^2). The lower the EPC figure, the less energy is needed to heat the home. A lower EPC figure therefore means a better energy performance.

574 kW/m^2 per year	100 kW/m^2
Average semi-detached house	Flemish target

Averages of comparable dwellings

KORTRIJK	WEST FLANDERS	FLANDERS
304 kW/m^2	291 kW/m^2	295 kW/m^2

General data

Type of EPC	Existing building with residential function
Type of dwelling	Single-family detached house
Year of construction	1986-1995
Characteristic annual primary energy consumption	120.242 kW/m^2 per year

Insulation level of the dwelling
Average heat loss through insulation of the dwelling. The walls and roof are relatively well insulated.
Insulation level of the dwelling
unsuitable insufficient sufficient excellent

Energy efficiency of the heating system
The dwelling is partially heated by electricity. This does not comply with the objective.
The dwelling is partially heated by a heat pump. This system complies with the objective.
unsuitable insufficient sufficient excellent

Environmental impact: CO_2 emissions
very bad bad good very good

Energy expert
Surname and first name
Firm

KBO No
Code No

Key
Flanders Housing ID

Energiestraat 38
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INSULATION & GLAZING
Status Advice More information

Your insulation rating
U-value
The **U-value** indicates the quantity of heat let through per second, per m2 and per degree (Celsius or Kelvin) temperature difference between one side and the other side of a wall. The lower the value, the better the thermal insulation.
unsuitable insufficient sufficient excellent

Averages of comparable dwellings

KORTRIJK	WEST FLANDERS	FLANDERS
0.8 W/m²K	0.8 W/m²K	0.8 W/m²K

My opinion per section for EPB declaration 2015: Renovation (standard)

This information comes from the EPB declaration of year x and/or your EPC of year y. Only the outdoor structures were included in this overview, no indoor structures. If you have subsequently yourself carried out insulation work, this is not included in the overview. In the case of a renovation, you possibly see only the renovated parts.
Explanation of current standard [for Latin see original Dutch]

Walls Insufficient
Not energy-efficient Very energy efficient
More information
Standard at issue Target 2050

Floors Excellent
Not energy-efficient Very energy efficient
More information
Standard at issue Target 2050
Roofs/ceilings
More information
Standard at issue Target 2050
Windows Do not comply with minimum housing quality
More information
Standard at issue Target 2050
Doors/gateways Excellent
More information
Standard at issue Target 2050
Sources
Energy performance certificate, latest update: March 2005

Building, layout, location

Environment download maps

Susceptibility to flooding Heritage real estate Spatial planning More maps

Look here whether your dwelling or parcel is located in an area susceptible to flooding. If this is the case, this must be stated on sale or rental for more than nine years. Within these areas, specific construction obligations or restrictions often apply. The defined riparian zones and the defined flood plains can also be found here. More information can be found at: http://www.integraalwaterbeleid.be/nl/beleidsinstrumenten/informatieplicht-overstromingsgevoelig-vastgoed

consult extra map information on this topic.

The first version of the Housing ID focuses on correctly informing the citizen and aims:
- to cut red tape;
- to provide insight concerning the energy efficiency of the building;
- to raise awareness of the energy objectives for 2050 concerning the Flemish building stock.

In January 2020, the Housing ID was extended to include an overview of available and relevant energy premiums tailored to your dwelling.

In 2020, the following further functionalities will be released:
- Access to soil certificates and possibility to apply for a soil certificate via the Housing ID. For this purpose, the Housing ID will be extended to include a payment module.
- The housing quality guide: a check tool with which citizens can test the housing quality of a dwelling themselves.
- Relevant data and certificates from the Flemish Housing Quality Service Point (*Vlaams Loket Woningkwaliteit*, VLOK): technical reports in the case of a housing quality survey, the certificate of conformity, decisions concerning unsuitability and uninhabitability.

In addition, owners will be able to share their Housing ID with third parties, for example interested purchasers, tenants, architect, estate agent, energy expert, contractor, etc. In addition, legal persons will be able to have access through the Housing ID to the housing of their business. In this respect, a link will also be provided with the business centre (VLAIO electronic service for enterprises).

Work is also being carried out on a digital safe, where the owner or authorised persons can add relevant documents to the Housing ID, such as non-digital certificates, building plans, offers and invoices, etc. The history of energy premiums granted will also be accessible. In addition, owners will also be able to supplement their Housing ID to include the renovation work they have carried out themselves. On the basis of their EPC, owners will be able to benchmark their dwelling in terms of energy performance.

The Housing ID will be developed further in the coming years. An extension to new topics such as heritage real estate (Agentschap Onroerend Erfgoed), undeveloped plots, nature and forest (Agentschap Natuur en Bos), water (VMM, Aquaflanders, Vlario) and energy consumption (Fluvius) is planned in the coming years (2021-2024).

The fact that the Housing ID has grown into a success in a relatively short period of time is shown by the award of the prestigious Henri Van de Velde Design Award in the category Digital Product on 14 November 2019. In addition, on 5 December 2019, the Housing ID received an E-gov Award for User-friendliness and a nomination in the category ‘Cooperation’ from the technology firm umbrella organisation Agoria.