

Support to the Preparation of Social Climate Plans

Summary of Deliverable 2

Report on the impacts of ETS2 and the identification of vulnerable groups

Final report for Belgium

REFORM/2021/OP/0006 Lot 1



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Rotterdam, 24/04/2025

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Support to the Preparation of Social Climate Plans

In association with:



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List of Abbreviations

Abbreviation / Acronym	Full Term / Definition
CO₂	Carbon Dioxide
CREG	Commission for Electricity and Gas Regulation
SG REFORM	Reform and Investment Task Force
DLV	Deliverable
EC	European Commission
EU	European Union
EU ETS	European Emissions Trading System
EU ETS2	EU ETS for buildings, road transport and additional sectors
EUR	Euro
Eurostat	Statistical office of the European Union
EUROMOD	European Union-wide tax-benefit model
EV	Electric Vehicle
FCO	Forced Car Ownership
GHG	Greenhouse gas
HBS	Household Budget Survey
IBSA	L'Institut Bruxellois de Statistique et d'Analyse
IEECP	Institute for European Energy and Climate Policy
IWEPS	L'Institut wallon de l'évaluation, de la prospective et de la statistique
JRC	Joint Research Centre
M&I	Measures and Investments
MS	Member State (of the European Union)
NACE	Statistical classification of economic activities in the European Community
NECP	National Energy and Climate Plan
Oeko	Institute for Applied Ecology
PACE	Plan Air Climate and Energy
SBS	Structural Business Statistics
SCF	Social Climate Fund
SCP	Social Climate Plans
SILC	EU Statistics on income and living conditions
SME	Small and Medium-sized Enterprise
TSI	Technical Support Instrument
VAT	Value-added tax
WG	Working Group

1. Introduction

This document is a summary of the second deliverable of the project *Support to the Preparation of Social Climate Plans*, funded by the European Union via the Technical Support Instrument, and managed by the European Commission Reform and Investment Task Force (SG REFORM). The project aims to support nine Member States (Belgium, Croatia, Czechia, Denmark, Finland, Latvia, Lithuania, Romania, and Slovakia) in the development of their Social Climate Plans (SCP). These plans set out national approaches to reduce the potential negative impacts of the introduction of the Emissions Trading System 2 (ETS2) on vulnerable households, transport users and micro-enterprises.

Deliverable 2 - Report on the impacts of ETS2 and the identification of vulnerable groups: Belgium provides an overview of the results of the impact assessment conducted to evaluate the potential effects of ETS2 on Belgium's vulnerable groups before the impacts of the measures and investments funded by the Social Climate Fund (SCF) are considered. The assessment examines the socioeconomic impacts of an increase in the cost of fossil fuels in buildings and transport, with a particular focus on identifying vulnerable groups and developing recommendations for filling data gaps and improving the administrative identification.

It is important to note that the majority of the analysis presented in this report focusses on the cost increases due to ETS2, and is based on conservative assumptions, for example in terms of consumers' elasticity to price increases. ETS2 is part of a broader package of policies which have been thoroughly assessed in other reports and have shown to have broadly positive impacts across Member States, thanks to the opportunities they present and the behavioural changes they promote, provided they are accompanied by adequate social safeguards.

1.1. Key steps undertaken

The development of this report followed a structured approach to ensure a comprehensive and tailored analysis for Belgium. Key steps included gathering datasets and indicators on the national context and statistics by the country teams with the Beneficiary Authorities, with institutional stakeholders (via thematic exchanges and meetings), and with all stakeholders during formal consultation activities (workshop held on 4 November 2024 and survey from 22 November to 6 December 2024). Discussions on the definitions and indicators to be used in the SCP process were held with institutional stakeholders.

The macro- and micro-modelling of ETS2 impacts on energy poverty and vulnerability, transport poverty and vulnerability, as well as the vulnerabilities of micro-enterprises was conducted with EU datasets (EU-SILC 2023 and HBS 2015). Parallel micro-modelling simulations were conducted by the Federal Planning Bureau, using the same datasets and EUROMOD model, to evaluate the impact on various “personae” (i.e. household types with different characteristics to evaluate the sensitivity to the impact among the population).

1.2. Main inputs

The analysis drew from a wide range of inputs, including:

- macro- and micro-modelling based on EU-level survey datasets and other EU-level sources;
- national and regional statistical data, including indicators such as energy usage, emissions levels, and socioeconomic metrics;
- expert consultations to validate assumptions and enhance the robustness of the impact assessment; and
- methodological discussions with the Commission.

Our analysis of households and transport users’ vulnerability is based on the EU Statistics on Income and Living Conditions (EU-SILC) 2023 and the EU Household Budget Survey (HBS) 2015. For the latter, we use the 2015 data to avoid the effects of the pandemic on the 2020 data. However, this is likely to overestimate the actual impacts of ETS2 as, between 2015 and 2027, the consumption of fossil fuels by households in heating and transport has reduced due to other energy and climate policies and changes in the overall price levels of energy. We do expect that, in the case of vulnerable groups, these reductions are less pronounced and the 2015 data are a better reflection of the current situation, as these groups lack the means to invest in climate-friendly alternatives. Enabling these investments is the goal of the Social Climate Fund.

Key figures

Table 1-1 Key figures based on EU data

	Number (thousands)	Notes
Population (2023)	11 743	Source: Eurostat. Also represents the number of transport users
Number of households (2023)	5 142	Source: Eurostat
Micro-enterprises	719	Source: European Commission SME Factsheet 2024 based on Eurostat SBS

		Share of Households	Number of Households	Share of population	Number of individuals	Notes
Vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2	Before ETS2	12%	608 263	10%	1 201 142	Based on EU HBS 2015
	€60/tCO ₂	16%	799 659	14%	1 681 802	
Affected by leak, damp, rot in their dwelling		14%	729 153	14%	1 702 335	EU-SILC 2023
Spending more than twice the median expenditure for heating		16%	822 768	17%	1 996 275	EU HBS 2015
Vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2	Before ETS2	10%	495 996	11%	1 257 171	Based on EU HBS 2015
	€60/tCO ₂	12%	600 742	14%	1 590 826	
Affected by enforced lack of a car		8%	411 384	6%	704 568	EU-SILC 2023
Experiencing very difficult access to public transport				7%	799 941	EQLS 2016

	Share of	Number of	Notes
Vulnerable micro-enterprises	4.7%	34 100	

2. National context

2.1. Definitions

2.1.1. Energy poverty

Belgium has recognised energy poverty as a significant and increasingly important societal concern. Consequently, the fight against energy poverty has benefitted from various action plans and policy measures, which are closely targeted at impoverished or low-income population groups.

According to its updated National Energy and Climate Plan (NECP), Belgium has stepped up its attention to the fight against energy poverty. It is considered as a top priority in the context of high energy prices.

Since April 2024, there is an official definition of energy poverty in Belgium, as per the Royal decree¹ establishing the criteria for assessing the number of households in a situation of fuel poverty comprises the following definitions:

- Energy poverty (Article 2, § 2.1°): “energy poverty’ is defined as a household’s lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes”²;
- Energy poverty indicators (Article 2, § 2.2°): statistics and data indicating the number of households finding themselves in a situation where:
 - a. a disproportionate share of disposable income is spent on energy costs;
 - b. energy consumption is reduced below their basic needs; and
 - c. they feel like they are having trouble paying their energy bills.

These definition and indicators are set at federal level, but no official definitions or indicators exist yet at the regional levels. Further consultation between the different government levels is needed within Concere/Enover to establish more regional/local indicators.

¹ [SPF/FOD Economie \(2024\)](#)

² Concept of energy poverty within the meaning of Article 2, 52 of Directive 2023/1791 of the European Parliament and of the Council of 13 September 2023 relating to energy efficiency and amending the Regulation (EU) 2023/955 (recast)

For more than 10 years, the King Baudouin Foundation has published an annual Energy Poverty Barometer³ to measure energy poverty⁴, using a series of three groups of indicators (in line with the Royal Decree), to grasp the multidimensional nature of energy poverty as listed below.

- **Measured energy poverty (mEP):** indicators are related to households that have to relinquish a too large part of their disposable income to energy bills (two times the median), after deducting the regular cost of housing, and that belong to the first five deciles of equivalent income.
- **Hidden energy poverty (hEP):** indicators target households belonging to the first five deciles of equivalent income that are suspected of restricting themselves in relation to basic needs, as their energy bill is “abnormally” low (potential situations of deprivation).
- **Subjective energy poverty (sEP):** indicators refer more specifically to people's experiences, belonging to the first five deciles of equivalent income, by asking households whether they are financially able to adequately warm their home.

At Federal level, Protected Consumers have access to social tariffs (automatically assigned for electricity, natural gas and district heating bills). The calculation of the tariff is made by the CREG (federal regulator), while eligibility criteria are defined by the federal government (FPS Economy).

At Regional level, the concept of a Protected Consumer is applied differently in each region. In Flanders, a ‘protected customer’ is a person who is entitled to the federal social tariff for energy, which is granted to individuals who receive certain social benefits or allowances. In the Brussels Capital Region, Protected Consumers are protected against gas and/or electricity supply interruption (by their supplier) in case of payment difficulties (arrears to pay energy bill), and have access to a regional social tariff. In Wallonia, Protected Consumers are granted access to certain complementary (to Federal) advantages and protections and have access to a regional social tariff. These two regional tariffs are similar to the federal social tariff but are financed by regional fees on distribution costs.

Households eligible for receiving funding from the Social Heating Fund (provided to heating oil, propane and kerosene consumers) comprise the following categories: persons entitled to an increased reimbursement for healthcare expenditures, to a disability allowance, having an annual income below a defined threshold and being in a situation of over-indebtedness.

³ [Baromètre de la Précarité Energétique 2024](#)

⁴ This Energy Poverty Barometer will be produced by Statbel every two years from now (the next will be released in 2026)

2.1.2. Transport poverty

No legal definition for transport poverty exists in Belgium. The number of households at risk of transport poverty has not yet been assessed, given the lack of uniform methodologies and indicators. In the Belgian context, the most important and relevant dimensions with regard to transport poverty are transport availability, accessibility, and affordability. Based on the identified dimensions, an individual or household can be considered as suffering from transport poverty when at least one of the following statements applies to the satisfaction of households' needs.

- There is no public transport available that is suitable for the necessary mobility, considering the person's physical capacity and skills.
- Existing public transport solutions do not provide access to destinations where the person can satisfy his/her daily needs to maintain a reasonable quality of life.
- After the essential transport costs, the residual income of the household falls below the official poverty threshold, leading to unaffordable transport.
- The person must spend an excessive amount of time on mobility, leading to time poverty or social isolation.

2.1.3. Micro-enterprises

In the EU a micro-enterprise is defined as an enterprise with less than 10 employees and with an annual turnover not exceeding EUR 2 million or an annual balance sheet total not exceeding EUR 2 million.⁵

There is no definition of energy or transport vulnerable micro-enterprises in Belgium. However, the Working Group for the Social Climate Fund (SCF WG) set by the National Climate Commission^{6,7} has proposed an output indicator for vulnerable micro-enterprises based on the number of micro-enterprises that have benefitted from at least one structural measure reducing their GHG emissions in their building or road transport vehicles.

2.2. Policies and measures

The federal government has set up a framework for Protected Consumers, complemented by regional measures. Energy poverty is addressed directly or

⁵ The definition of micro-enterprises in Belgium varies from the EU definition. However, for the purpose of this study, the EU definition was used. Micro-enterprises are defined by the Law of 28 March 2024 in Belgium: "Micro-enterprises are enterprises with less than 10 employees and a turnover not exceeding EUR 900 000 or annual balance sheet not exceeding EUR 450 000".

⁶ National Climate Commission. (n.d.). <https://www.cnc-nkc.be/en>.

⁷ The SCF WG is composed of the administrations of the four federal and regional entities and is in charge of the preparation of the SCP.

indirectly within the framework of energy and housing policies, which are designed and implemented differently in each region.

According to the NECP updated in 2023, an expert group on energy poverty proposed energy poverty indicators to be included in the Federal poverty reduction plan. Structural measures are being prepared to better coordinate and strengthen the different social energy funds. The federal government is competent for tariff policies (social tariff, social tariff grant and the Social Heating Fund). The regions are competent for preventive actions (e.g. improving energy efficiency in buildings as structural measures) and curative actions (e.g. assistance in the event of energy debt accumulation). Both the federal and regional authorities as well as municipalities have set up plans, policies and direct income or other support schemes that contribute to addressing energy and transport poverty. For instance, several categories of persons benefit from reduced tariffs for public transport use. Tax incentives are provided to stimulate home-to-work cycling. This measure indirectly also addresses transport poverty.

2.3. Context indicators

This section provides a summary of some key contextual information and the estimated impact of ETS2 on fuel prices. Throughout the report, we look at recurring costs for heating and transport. In heating, this applies to heating fuels and related equipment costs. In transport, this applies to fuels and expenditures for public transport. We do not include costs related to the purchase or operation of vehicles other than fuels costs.

2.3.1. Households' expenditures

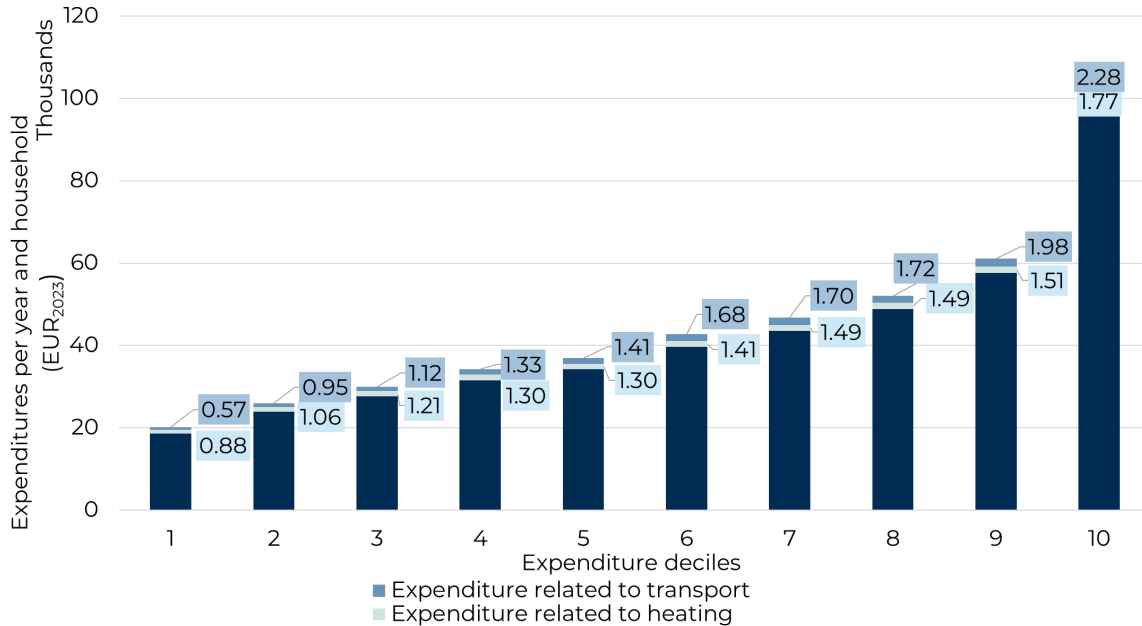
Figure 2-1 gives an overview of the households' overall spending and expenditures on heating and transport based on the HBS 2015 and inflated to EUR₂₀₂₃. As mentioned above, expenditures on heating and transport consider fuel expenditure for heating, as well as expenditures for petrol and diesel used in transport and recurring expenditures for public transportation.

On average, Belgian households spent 6% of their total expenditure on heating and transport in 2015, with heating expenditure exceeding transport expenditure until the third decile and transport expenditure exceeding heating expenditure from the fourth decile onwards.

Throughout this report, expenditure deciles are based on total expenditures of a household and constructed using new OECD equivalence weights. We use expenditure instead of income deciles as total expenditures are generally seen as a good approximation of lifetime income and because the variable related to total

expenditures is generally seen as more reliable in the EU HBS compared to the variable total income.

Figure 2-1 Overview of total household expenditure and expenditures on heating and transport, based on HBS 2015 and inflated to EUR2023



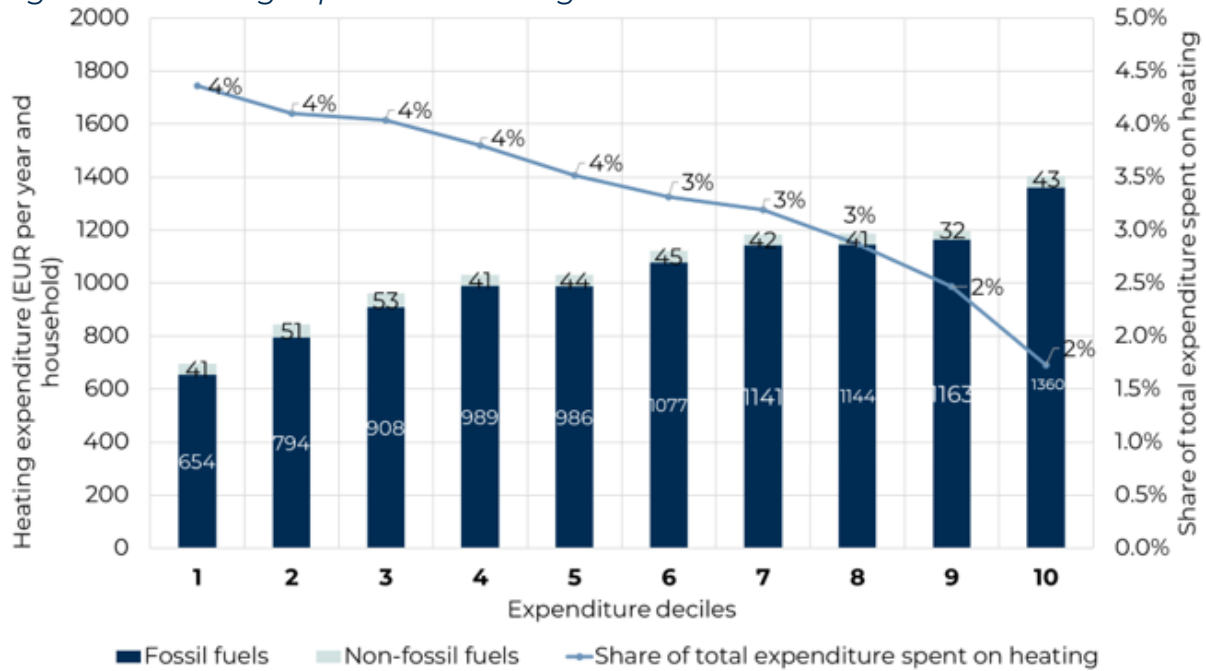
Source: HBS 2015, calculations with Oeko-Institut SEEK-EU micro model

Note: Expenditure deciles are constructed using new OECD equivalence weights. Inflated using the Eurostat all-items HICP for Belgium of 1.2607.

2.3.2. Households' energy use

Final energy consumption by households in Belgium totals approximately 84 TWh in 2022 (or approximately 16 485 kWh per household), a decrease of approximately 11% since 2017. Figure 2-2 shows the heating expenditure by Belgian households by expenditure deciles, from lowest total expenditures to highest total expenditures. Expenditures for heating fuels rise in absolute terms per income decile (higher-income households often have more floor space that they need to heat), while the share of total expenditure that needs to be spent on heating is higher for lower expenditure groups and decreases for the higher expenditure groups.

Figure 2-2 Heating expenditure of Belgian households

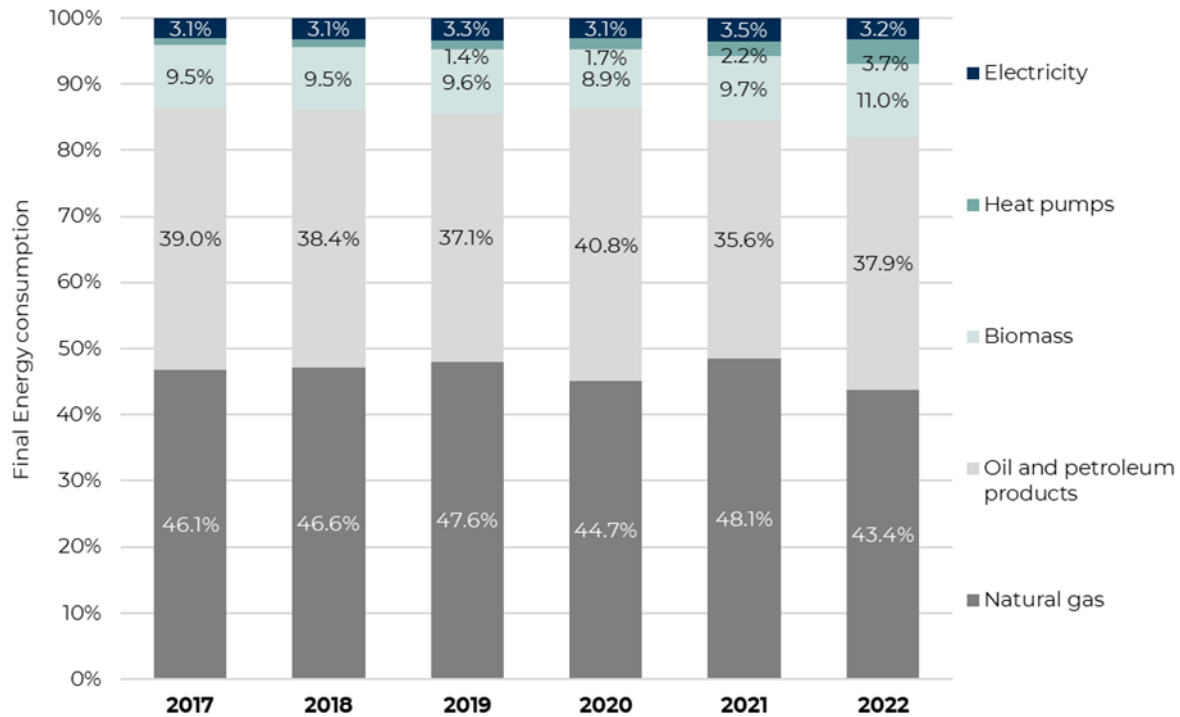


Source: HBS 2015, calculations with Oeko-Institut SEEK-EU micro model

Note: Expenditure deciles are constructed using the new OECD scale. Inflated using the Eurostat all-items HICP for Belgium of 1.2607.

Figure 2-3 focusses on final energy consumption for space heating use in households. A substantial portion of household energy consumption, approximately 72%, is derived from fossil fuels, which will thus be impacted by ETS2.

Figure 2-3 Household space heating energy use (2017–2022)



Source: [EUROSTAT \[nrg_d_hhq\]](#)

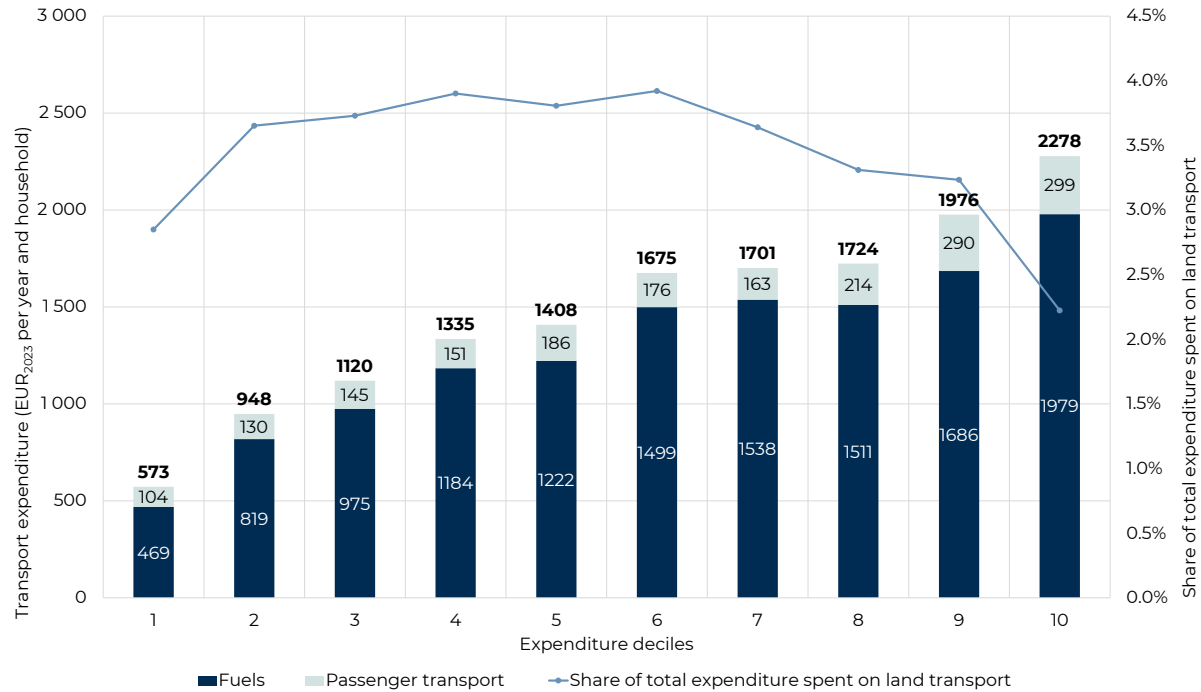
2.3.3. Transport users

Belgium remains heavily reliant on passenger cars as the main mode of transport, contributing approximately 92% of the total passenger transport km, while public transport contributes the remaining 8%.

The great majority of passenger cars were in 2022 petrol and diesel fuelled, representing approximately 97% of the total vehicle fleet. An increasing share now consists of hybrid vehicles (including Plug-in Hybrid Electric Vehicles). Fully electric vehicles represent only about 3% of the total, with 181 447 vehicles at the end of 2023. Consequently, passenger transport in Belgium will be affected by the ETS2 as the penetration of fossil based vehicles is still high.

Figure 2-4 shows the significant increase of expenditure for transport along the expenditure deciles. One reason for this increase is the fact that many lower-income households do not own a vehicle.

Figure 2-4 Transport expenditure by Belgium households by expenditure deciles according to the HBS 2015 inflated to EUR2023



Source: HBS 2015, calculations with Oeko-Institut SEEK-EU micro model

Note: Expenditure deciles are constructed using new OECD equivalence weights. Inflated using the Eurostat all-items HICP for Belgium of 1.2607.

2.3.4. Micro-enterprises

Based on data provided in the 2024 SME factsheet from the European Commission, the total number of micro-enterprises in Belgium is 719 242. Micro-enterprises employ 1 081 664 people.

The analysis of the vulnerability of micro-enterprises in Belgium focuses on two aspects (i.e. *building* and *transport*) and includes the following:

- Micro-enterprises active in the service-sectors using fossil fuels in their building (around 618 800 companies, 86% of ME);
- Micro-enterprises owning a vehicle and using transport fuel (around 150 200, 21%); and
- Transport-intensive micro-enterprises, owning and using vehicles significantly more than the average (e.g. taxi, good transport, public transport) (around 40 000, 5.5%).

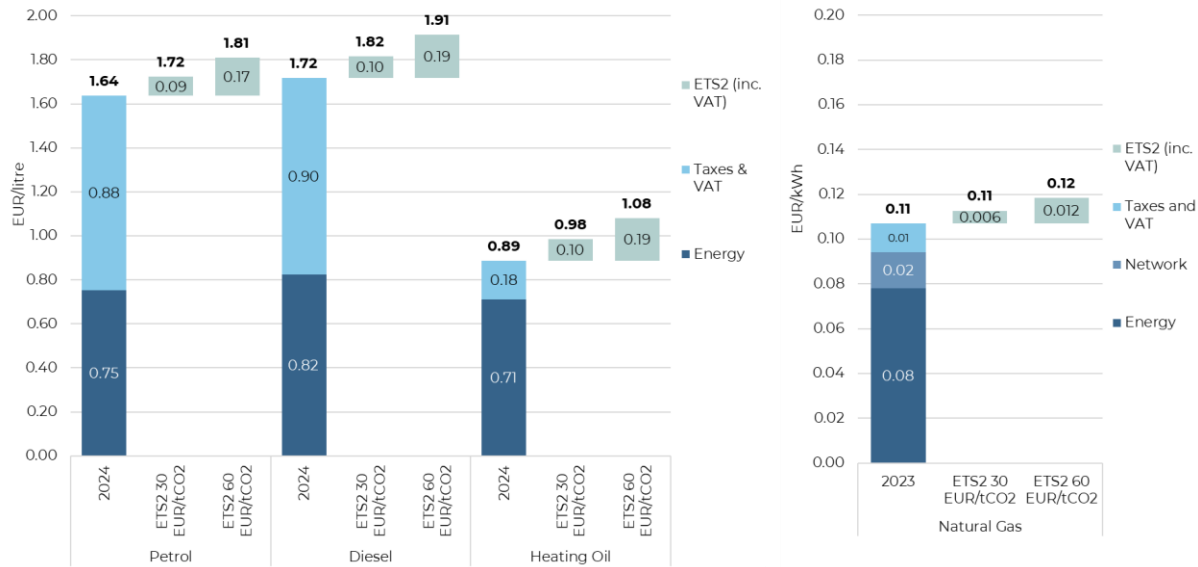
2.3.5. Estimated impact of ETS2 on fuel prices

The implementation of the ETS2 will add costs to fossil fuel suppliers which are expected to be passed onto consumers. For the purpose of the report, we assume 100% of costs are passed through. This is a standard assumption for this type of

analysis, although in reality suppliers may choose to introduce progressively the increase of costs or absorb some of it themselves.

Figure 2-5 puts ETS2 price (30 and 60 EUR/tCO₂) in the context of average 2024 prices in Belgium, showing for petrol, diesel, heating oil and natural gas the impact the ETS2 could have on the total price. The relative impact can be greater or smaller in reality depending on the actual fuel and ETS2 prices in the future.

Figure 2-5 Estimated unit price impact compared to 2024 prices, with ETS2 price assumptions of 30 EUR/tCO₂ and 60 EUR/tCO₂ (ETS2 price increase component includes VAT)



Note: The taxes and VAT component of prices includes any existing carbon taxes.

3. Initial approach for identification of vulnerable groups in Belgium

3.1. Application of the definitions of energy and transport poverty at the national level within the ETS2 context

In the context of the SCF, the group of vulnerable households consists of two (overlapping) subgroups (Art. 2(10) SCF Regulation):

- Households in energy poverty; and
- Households vulnerable to the introduction of the ETS2 “including low income and lower middle-income ones, that are significantly affected by the price

impacts [of the ETS2⁸] and lack the means to renovate the building they occupy”.

The group of vulnerable transport users also consists of two (overlapping) subgroups (Art. 2(12) SCF Regulation):

- individuals and households in transport poverty;
- *”individuals and households, including low income and lower middle-income ones, that are significantly affected by the price impacts [of the ETS2⁹] and lack the means to purchase zero- and low-emission vehicles or to switch to alternative sustainable modes of transport, including public transport”.*

The SCF regulation defines vulnerable micro-enterprises as those that *“are significantly affected by the price impacts and that lack the means either to renovate the building they occupy, or to purchase zero- and low-emission vehicles or to switch to alternative sustainable modes of transport”.*

This is a new concept for Belgium, and national policies do not refer to micro-enterprises specifically. Based on discussions with authorities and stakeholders, it is proposed to operationalise the definition of vulnerable micro-enterprises by focussing on micro-enterprises that:

- a. use fossil fuels for their buildings or vehicles, which both are not new or refurbished, and have inadequate funds to invest in renovation and purchase of vehicles, based on their profit account; and
- b. have currently a high energy expenditure and are energy dependent, either for building or transport – which means having fuel use in a sector significantly affected by ETS2.

The issue with the modal shift is still a discussion point, as companies that are transport – vulnerable are also those that cannot switch to public transport due to the nature of their core business activities.

3.2. Indicators used for identifying energy and transport poverty and vulnerable groups

3.2.1. Indicators measuring energy poverty and vulnerability of households in the SCF context

The foundation for defining indicators that address household energy poverty in Belgium is based on the common indicators established by the EU Commission. These have been further developed as part of this assignment (across the nine

⁸ This refers to “the inclusion of greenhouse gas emissions from buildings within the scope of Directive 2003/87/EC”.

⁹ This refers to “the inclusion of greenhouse gas emissions from road transport within the scope of Directive 2003/87/EC”.

Member States involved) and complemented by a set of additional national context indicators for vulnerability deemed relevant for Belgium.

Energy poverty indicators

Table 3-1 presents the three main indicators that are already used in the frame of the Belgian energy poverty reporting (i.e. Energy Poverty Barometer).

Table 3-1 Energy poverty indicators based on COM Recommendation on Energy Poverty (C/2023/4080 and SWD(2023) 647) provided by Expert Team for Belgium

Indicator Name	Definition/Description	Data Source	(1)*	(2)**
Inability to keep home adequately warm	Inability to keep home adequately warm for financial reasons, delineated to the 5 lowest income deciles (revenue equivalent) Royal Decree primary indicator 4 (sEP)	Eurostat, SILC 2023 Belgian SILC Additional analysis in the Energy Poverty Barometer	X	
High share of energy expenditure in relation to income (2M)	High share of energy expenditure in relation to <u>disposable</u> income after having extracted housing costs ¹⁰ (from real revenues), delineated to the 5 lowest income deciles (revenue equivalent), and using more than twice the median (and not the average) Royal Decree primary indicator 2 (mEP)	Eurostat, HBS 2023 Belgian HBS Additional analysis in the Energy Poverty Barometer	X	X
Low absolute energy expenditure (M/2)	Low absolute energy expenditure delineated to the 5 lowest income deciles (revenue equivalent), having excluded explained low costs (e.g. insulated dwellings ¹¹ , secondary house) Royal Decree primary indicator 3 (mEP)	Eurostat, HBS 2023 Belgian HBS Additional analysis in the Energy Poverty Barometer		X

*Indicator for energy poverty;

**Indicator for energy vulnerability

The combination of the three main indicators with a delineation of income groups (deciles 1 to 5) ensures that we can identify the impacted household groups and exclude the upper-middle-class and high-income groups from the scope. The limit to the five lowest income deciles is based on the SCF Regulation which refers to 'low income and lower middle-income households', as such indicating that assessments should not exceed the 5th percentile. Some stakeholders are advocating to extend the scope, arguing that the 6th or even 7th income decile, are also impacted by ETS2.

¹⁰ Additionally, housing costs are capped at twice the median ratio between housing costs and income.

¹¹ Information on insulation quality is not taken into account, since this information is not yearly available in SILC (only in ad hoc modules). The indicator excludes households heating with heating pumps or solar energy.

Expenditure-based indicators, such as 2M and M/2, are derived from the Eurostat Household Budget Survey (HBS) and reflect the relationship between household income and energy expenses. As stated earlier, throughout this report, expenditure deciles are based on total expenditures of a household and constructed using new OECD equivalence weights. We use expenditure instead of income deciles as total expenditures are generally seen as a good approximation of lifetime income and because the variable related to total expenditures is generally seen as more reliable in the EU HBS compared to the variable total income.

For each of these indicators we can rely on annually available data (SILC and HBS), which facilitates both processing and monitoring. Moreover, certain indicators are not consistently available, as the questions in the survey can evolve. These limitations are well known, but until today the SILC dataset remains the most valuable source for mapping energy poverty.

Energy vulnerability indicators

For the vulnerability indicators, the relevant factors of the definition are used, i.e. households and individuals in the lower or lower-middle incomes that are significantly affected by the ETS2 and that lack access to essential energy services¹². Important to note is that the vulnerability indicators should be adjusted to take into account the elements of the definition, i.e. relate to the heating fuels covered by the ETS2 (natural gas or heating oil), or the relevant income categories.

Vulnerable households are those that spend more than the 2M threshold based on their fossil-fuel heating costs, based on HBS 2015, before the introduction of ETS2. The threshold value is fixed at twice this median expenditure relative to income. For Belgium, the median value is equal to 2.9% and the 2M value equal to 5.8%. The 2M indicator then evaluates whether the heating fossil fuel expenditure's share in total expenditure is above the 2M value or not. The respective ETS2 prices are added to the 2015 expenditures, which are inflated to EUR₂₀₂₃ using the Eurostat all-items HICP. This 2M indicator is used to determine the share of the Belgian households and the share of the total population vulnerable to the introduction of the ETS2 in the heating sector.

Additional simulations made by the Belgian Federal Planning Bureau

The expenditure variables resulting from the simulations (absolute and relative increases compared to total income) can be calculated for different groups using a series of individual variables that define household categories. This allows targeted

¹² Where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes

analyses of specific vulnerable groups, and allows to estimate the impact and to measure its magnitude.

3.2.2. Indicators measuring transport poverty and vulnerability of transport users in the SCF context

Transport poverty indicators

Nine indicators are used to analyse the impact of ETS2 on target groups, showing the share of the Belgian population identified as facing transport poverty.

Transport vulnerability indicators

For the vulnerability indicators, the relevant factors of the definition are used, i.e. households and individuals in the 'lower or lower-middle incomes that are significantly affected by the ETS2 and that lack the means to purchase zero- or low-emission vehicles or to switch to alternative sustainable modes of transport, including public transport'.

The 2M indicator reflects the percentage of households that spend a high share of their disposable income on transport (only including recurrent expenditure such as fuels, tickets, insurance, etc.). A high share is defined as twice the national median. As such, vulnerable transport users are those in the first five income deciles who spend at least twice the national median of their disposable income on transport expenditure. For Belgium, the median is equal to 2.8% and the 2M threshold 5.6%.

Additional simulations made by the Belgian Federal Planning Bureau

Similar as for energy poverty and vulnerability.

3.2.3. Vulnerability of micro-enterprises in the SCF context

Two indicators are used to determine the number of vulnerable micro-enterprises, according to the ETS2 definition and the criteria mentioned above:

- Core indicator 1: Micro-enterprises that use fossil fuels and do not have the means to renovate the building they occupy, and/or purchase zero- or low-emission vehicles or switch to alternative sustainable modes of transport;
- Core indicator 2: Number of micro-enterprises that operate in sectors with significant energy expenditure.

To determine the economic feasibility for micro-enterprises to renovate their building or to purchase zero- and low-emission vehicles, the financial capability of the affected micro-enterprises to invest in renovation or new assets needs to be assessed. This is done using following methodology:

- Renovation costs are calculated based on the information from the BPIE

Recovery investment for deep renovation, used for the non-residential sector. Since this data is from 2020, the investment cost was adjusted using the construction analytics index to the period from 2025–2032. The investment is divided into annual instalments during the ETS2 implementation SCP scope (2027–2032).

- Low and zero-carbon emissions vehicles purchase costs are calculated based on average market prices for a 4-seater car, light duty vehicles (LDV), trucks and buses. The vehicle investment costs are also divided in six instalments.

Depending on whether a company is using only a building, only a vehicle, or both, and its yearly profit is not high enough to cover the additional energy expense resulting from ETS2 and the related investment instalment, it is considered to fall under Core Indicator 1.

The second part of the definition refers to the significant energy expenditure in transport or building (Core Indicator 2), which is combined to Indicator 1, to identify the vulnerable micro-enterprises according to the definition of the SCF Regulation.

They may be complemented by additional indicators, which would allow to further refine the number and to identify vulnerable micro-enterprises:

- limited access to capital;
- composition of the market and competitiveness;
- distribution of vulnerable companies per region;
- relevance of accessible public transport; and
- additional country-specific indicators (such as sector distribution of micro-enterprises).

Based on desk research and on discussions with federal and regional institutional actors, there are very limited datasets on micro-enterprises available in Belgium and even less related to their energy and transport use patterns.

4. Impacts of ETS2 and identification of vulnerable groups in Belgium

4.1. Modelling approach

As part of this report, we assess the impacts of ETS2 on vulnerable groups before the impacts of the measures and investments funded by the Social Climate Fund (SCF) are considered.

The micro modelling of households and transport users is based on Oeko-Institut's microsimulation model SEEK-EU with the datasets of the EU Household Budget

Survey (HBS) 2015 and the EU Statistics on Income and Living Conditions (EU-SILC) 2023 serving as the main inputs. As mentioned earlier, short-term price elasticities we apply in the main scenario are equal to -0.1 for fossil fuels used in buildings and -0.2 for fossil fuels used in road transport. Additionally, for the purpose of the report, we assume 100% of costs are passed through onto the consumers.

The EU HBS 2015 was compared to the Belgian national HBS of 2022. The comparison indicated that the expenditures for fossil fuels in the Belgian national HBS are lower than those observed in the EU HBS even after accounting for price changes between the years. This was further discussed with the Federal Planning Bureau and needs to be taken into account when interpreting the results, which may present an upper limit to the impacts. The analysis could also be repeated with a more recent national HBS.

In order to assess the impacts of ETS2 on micro-enterprises, IEECP's tool was used, which was developed based on work conducted to assess the impact of policies on vulnerable energy consumers. The datasets used in all countries include JRC IDEES 2021 data on energy consumption in the service and transport sectors and the EUROSTAT SBS 2022 dataset on companies, complemented with ORBIS database.

4.2. Impacts of ETS2 on energy poverty and vulnerability

There are approximately 5.16 million households in Belgium. In 2021, people living alone account for 15.6% of the population and 11.3% of Belgians are single parents (these two groups are overrepresented in city centres).

In Belgium, 67.2% of households are owners, 22.7% are tenants at market price, 6.8% are tenants in social housing and 3.3% benefit from reduced rent (via their family or employer) or free housing. There are important variations between the three regions.

4.2.1. Impact of the ETS2 on the number of vulnerable households

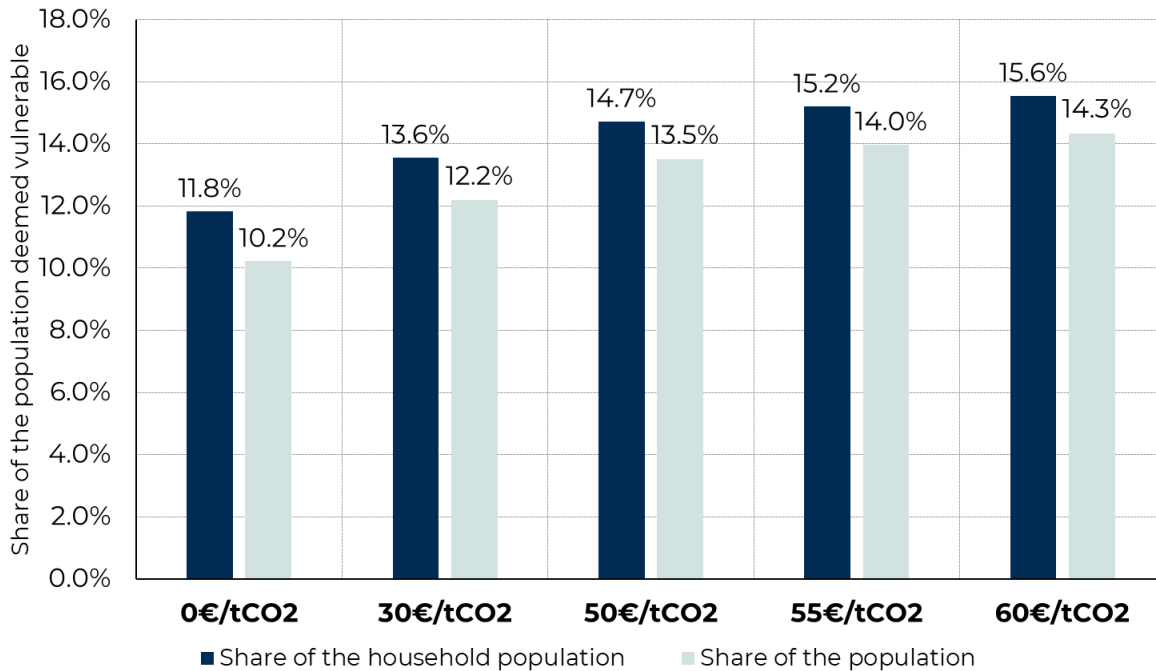
Figure 4-1 shows the share of the Belgian population deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 according to the modified 2M indicator for heating. It shows the share of the population deemed vulnerable to energy poverty related to heating based on their expenditures for fossil fuels according to the HBS 2015:

- before the introduction of the ETS2, at a price of 0 EUR/tCO₂;
- and particularly vulnerable to the introduction of ETS2, in terms of additional energy costs for different carbon prices (30–60 EUR/tCO₂).

As expected, the share of households and persons vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 in Belgium rises slightly with rising

CO₂ prices from 12% to 16% (share of households) and 10% to 14% (share of the total population).

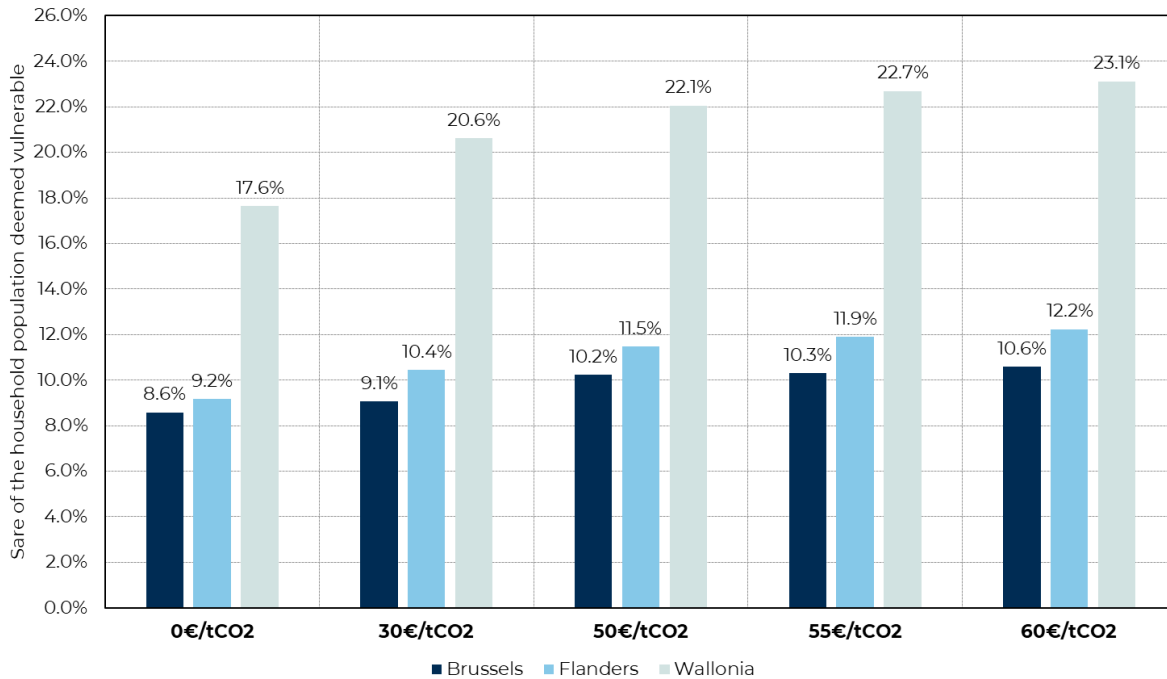
Figure 4-1 Share of the Belgian household population and share of the total Belgian population vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2



Source: Oeko-Institut SEEK-EU micro model

Figure 4-2 shows the share of Belgian households deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 in each Belgian region. The highest share of vulnerable households is expected in Wallonia, followed by Flanders and Brussels.

Figure 4-2 Share of the Belgian household population by region vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2



Source: Oeko-Institut SEEK-EU micro model

This trend aligns with the observation/analysis made in the frame of the Energy Poverty Barometer (2024)¹³. In 2022, measured energy poverty (MEP or 2M) affected around 13.5% of households, but with differences between regions: 9.7% in Flanders; 9.3% in the Brussels-Capital Region and 21.7% in Wallonia¹⁴. Several factors may explain Wallonia's greater vulnerability to measured energy poverty: a higher energy bill (due to higher natural gas prices, a less mild climate, generally larger housing and of lower building energy performance quality), lower disposable incomes than in Flanders, even if slightly higher than in the Brussels-Capital Region, and a higher proportion of households heating with oil.

4.2.2. Target group analysis of energy poverty indicators

Which households are most likely energy poor?

According to the Energy Poverty Barometer, 31.5% of households living in housing with a quality defect (defined as: presence of leaks in the roof, damp walls or floors, rotting woodwork, no bath/shower or toilet in the home, too dark) are in energy poverty compared to 19.5% for other households. This share declines with income, while the largest share is identified in densely populated areas, where the share of

¹³ Fondation Roi Baudoin. (2024). [Baromètre de la précarité énergétique](#). (Available in French).

¹⁴ The differences between the figures resulting from EU statistics and the outcomes of the Barometer come from the difference in the definitions of both indicators.

persons living in low quality housing is higher than the share of households, indicating a lot of affected households with many family members.

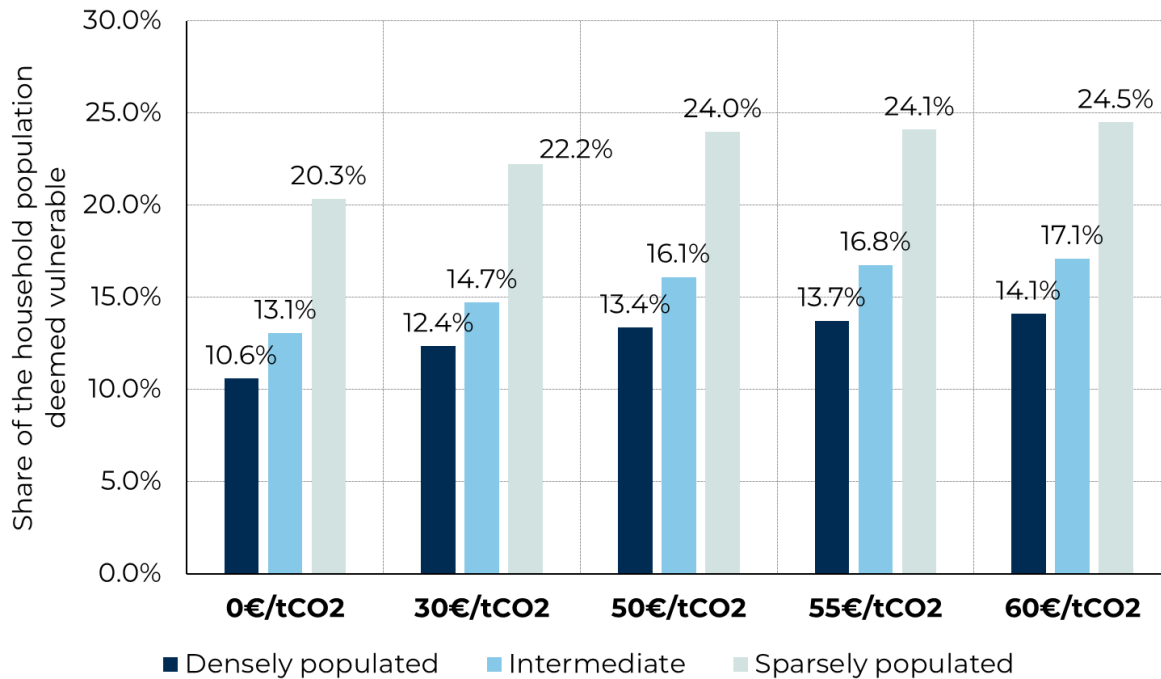
According to the Energy Poverty Barometer:

- households that heat mainly with natural gas are less affected by energy poverty, unlike those that heat mainly heating oil;
- 40.3% of households without professional work income and 15.8% of households with only one professional income are affected by energy poverty;
- single people and single-parent households are the most vulnerable to energy poverty, with 37.9% and 37.4% respectively affected;
- women are overrepresented in single-parent families and elderly single people, the profiles most vulnerable to energy poverty. In 2022, 27.8% of those aged 65 and over are in energy poverty compared to 12.4% of those under 49 years old;
- tenants are significantly more vulnerable to energy poverty: 45.5% of social tenants and 33.0% of tenants in the private sector are affected by energy poverty, compared to 15.0% of owners. However, many tenants benefit from social gas tariffs;
- 12.0% of households in Belgium received social assistance for energy or water in 2022.

Figure 4-3 shows the share of the Belgian household population deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 by degree of urbanisation. The highest vulnerability is calculated for sparsely populated areas, where 20–25% of households are deemed vulnerable, depending on the level of the ETS2 price (compared to 13-17% for intermediate population density and 11-14% for densely populated areas).

The distribution amongst the different population densities reflects the consumption of fossil fuels in these areas, as well as the level of total energy expenditures and incomes.

Figure 4-3 Share of the Belgian household population deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 by degree of urbanisation



Source: Oeko-Institut SEEK-EU micro model

The Barometer shows the effects of 2022 higher energy prices compared to the situation before the 2022 energy crisis. It also highlights that households heating with fuel oil are hit harder than those heating with natural gas.

4.2.3. ETS2 impact by target group

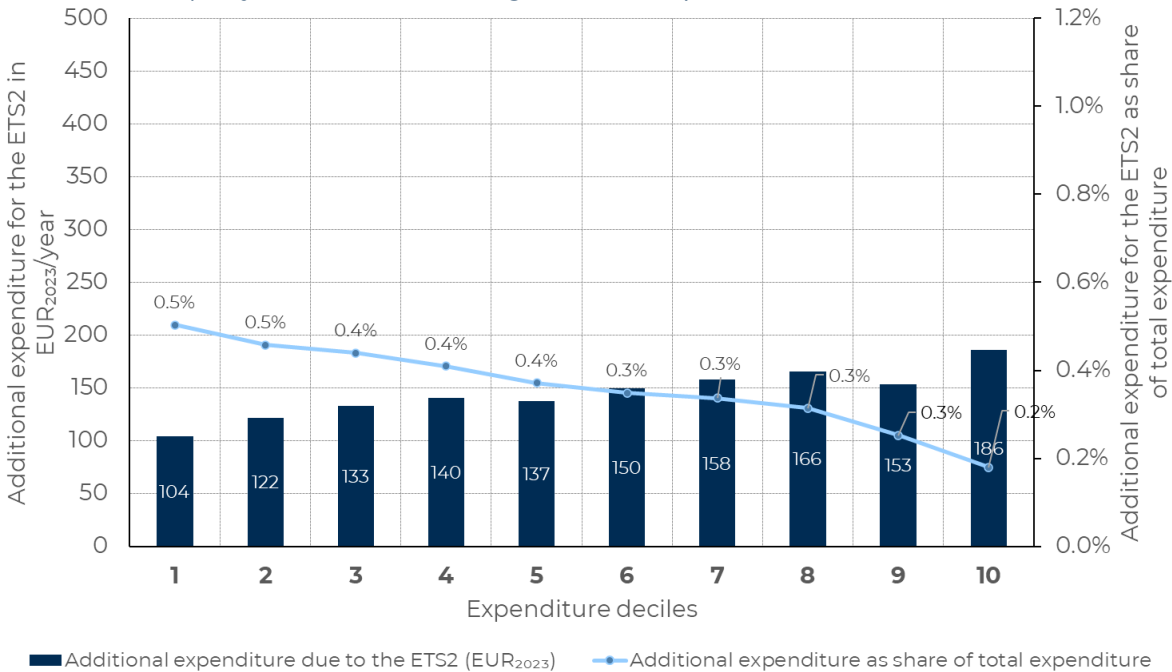
This analysis relies on the EU HBS 2015. As noted above, expenditures are generally higher than in the corresponding Belgian national HBS. This indicates that the following results may to some extent overestimate the ETS2 impacts at the given CO₂ prices.

Figure 4-4 and Figure 4-5 respectively show the estimated ETS2 costs at a carbon price of 30 EUR/tCO₂ and 60 EUR/tCO₂ in the heating sector for Belgian households for our main scenario that includes a price elasticity of -0.1 for heating. The figures show the impact by expenditure decile for households using fossil fuels for heating.

As households with higher overall expenditures use more natural gas and heating oil, the expected additional cost per year rises from 100 EUR/year in the first expenditure decile to 190 EUR/year in the tenth decile (at a carbon price of 30 EUR/tCO₂). At a higher carbon price of 60 EUR/tCO₂, it rises to 210 EUR/year (~1% of expenditure) in the first decile and 370 EUR/year in the tenth decile.

The share of total expenditure that needs to be spent on the ETS2 costs at a carbon price of 30 EUR/tCO₂ is highest at 0.5% in the first decile and declines to 0.2% in the tenth decile. This reflects the fact that higher income households can more easily accommodate the extra expenditure and need to spend less of their overall budget. However, this is an average within a decile category, and can hardly be used as such, but requires additional in-depth analysis.

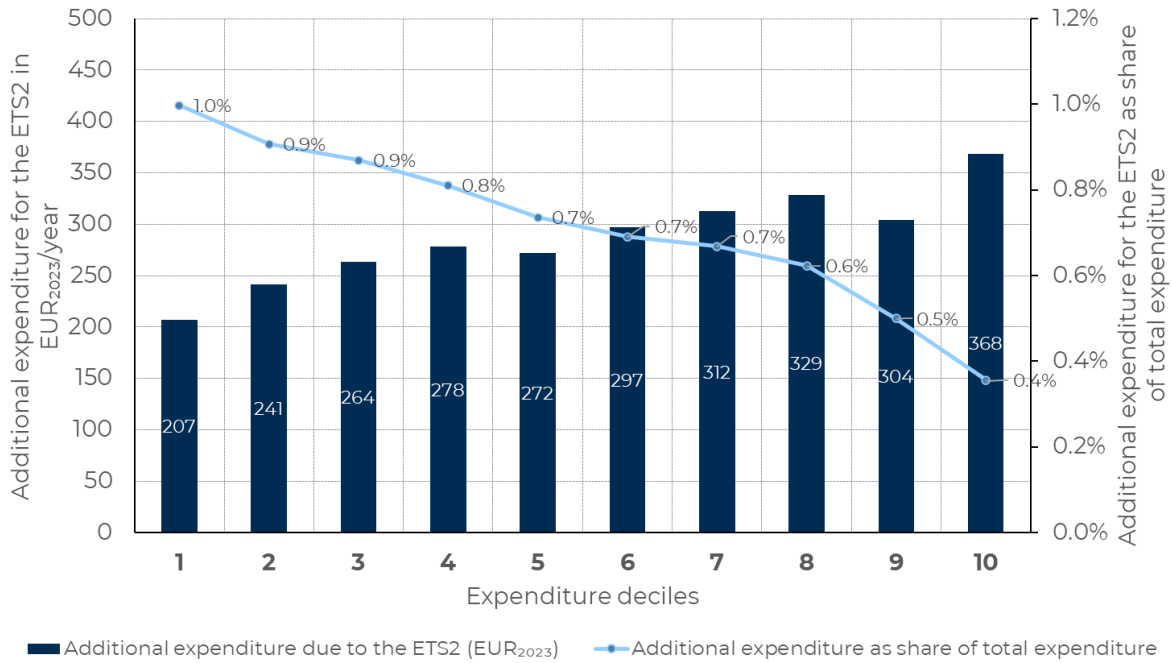
Figure 4-4 ETS2 costs related to heating for Belgian households at a carbon price of 30 EUR/tCO₂ (only households using fossil fuels)



Source: Oeko-Institut SEEK-EU micro model

Note: Expenditure deciles are based on total expenditures of a household that are equalised using the new OECD scale. We use total expenditures as a proxy for the long-term income of a household.

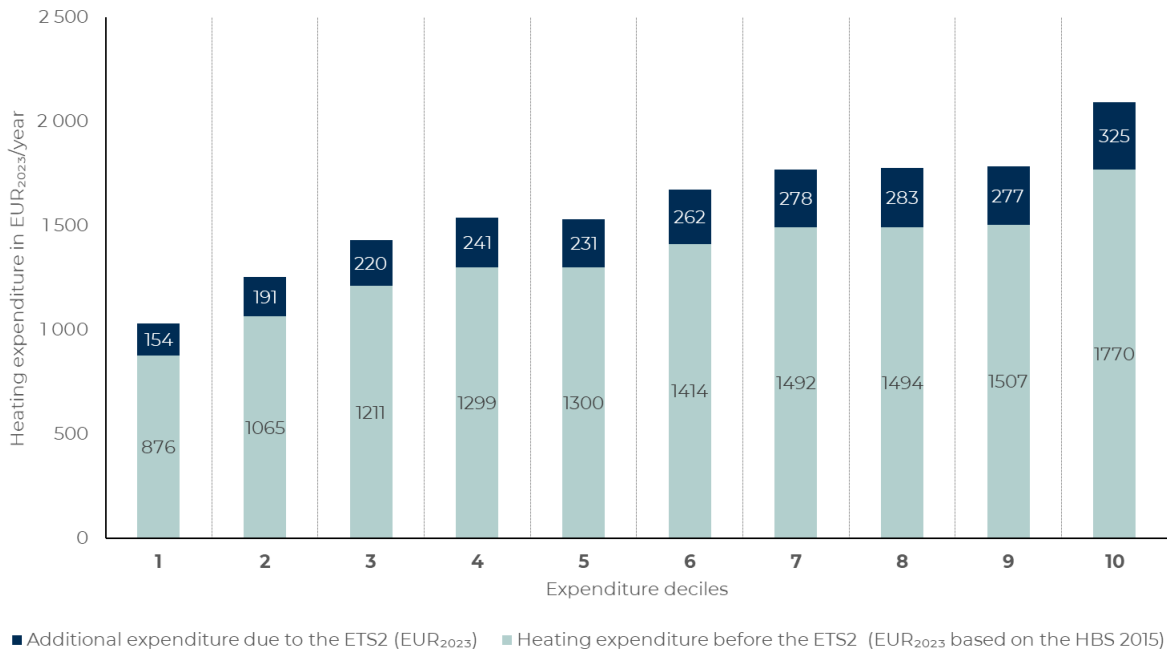
Figure 4-5 ETS2 costs related to heating for Belgian households at a carbon price of 60 EUR/tCO₂ (only households using fossil fuels)



Source: Oeko-Institut SEEK-EU micro model

Figure 4-6 compares expected ETS2 costs at a carbon price of 60 EUR/tCO₂ to total heating expenditures based on the HBS 2015 (inflated to EUR₂₀₂₃).

Figure 4-6 ETS2 costs related to heating for Belgian households at a carbon price of 60 EUR/tCO₂ compared to heating costs according to the HBS2015 (all households)

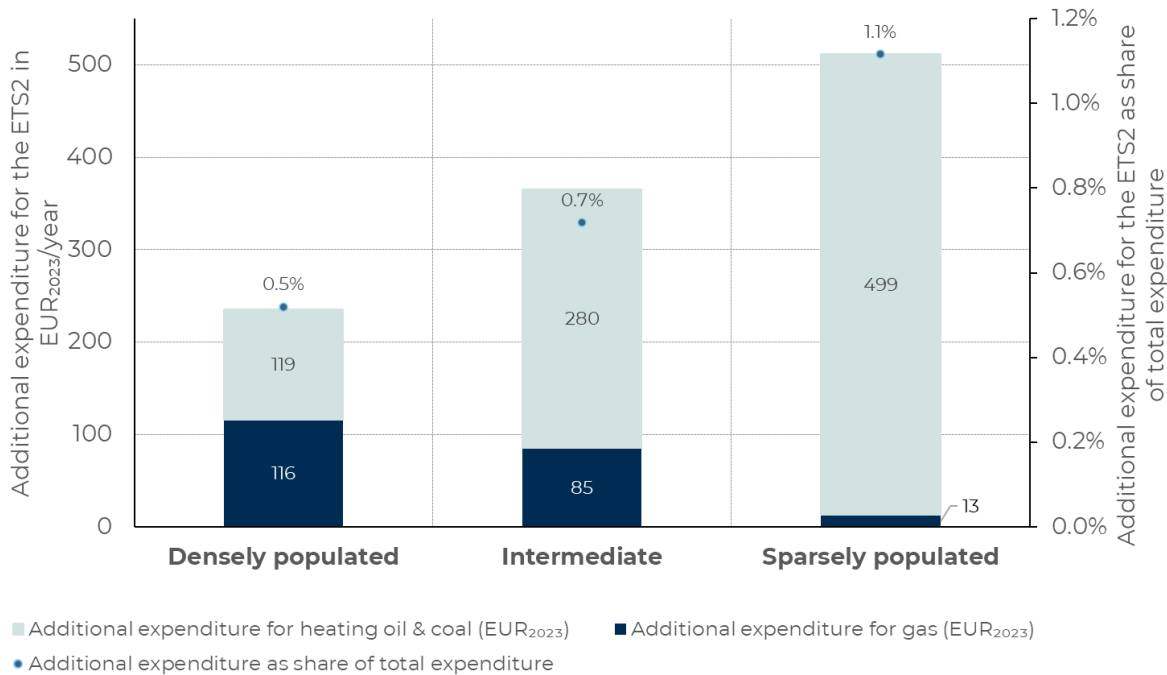


Source: Oeko-Institut SEEK-EU micro model

Note: A value of 1.2607 was applied to inflate expenditures to EUR₂₀₂₃, based on the Eurostat all items HICP [prc_hicp]

Figure 4-7 shows the estimated impact of the ETS2 by degree of urbanisation at a carbon price of 60 EUR/tCO₂ and only for those households using fossil fuels, splitting by fuel (natural gas vs heating oil). The estimated carbon costs are highest for an average household living in a sparsely populated area at 510 EUR/year and smallest for the average household living in a densely populated area at 240 EUR/year (with a share of expenditure of 1.1% and 0.5% respectively).

Figure 4-7 ETS2 costs related to heating for Belgian households at a carbon price of 60 EUR/tCO₂ (only households using fossil fuels) by degree of urbanisation



Source: Oeko-Institut SEEK-EU micro model

It is important to keep in mind that the figures show average impacts per decile or per degree of urbanisation and that there are households that will experience much lower or higher impacts.

Main take-aways from the micro-modelling analysis based on SEEK-EU

- For average households in Belgium, the ETS2 impact at prices of 30–60 EUR/tCO₂ lies at around 145–290 EUR/year for households using fossil fuels.
 - This average does not allow to identify precisely the many different situations, with discrepancies, e.g. a single old person living in a rural area in a badly insulated dwelling heated by heating oil will not face the same difficulties as a single-old person living in an apartment heated with natural gas in a city centre and benefiting from the social tariff.
- Households in the lowest expenditure deciles that use fossil fuels for heating are estimated to spend 0.5–1.0% of their total expenditures on ETS2 costs at prices of 30–60 EUR/tCO₂. These results reflect the average impact on households in that expenditure decile, but they do not make a distinction between households benefiting or not from a social gas tariff.
- The analysis by degree of urbanisation shows higher estimated impacts in sparsely populated areas both in terms of the additional costs in euros and the

share of total expenditures spent on ETS2 costs. The distribution of impacts is related to the use and the type of fossil fuels, as well as income levels, considering that sparsely populated areas have limited access to gas network and therefore to the social tariff. Household in sparsely populated areas do still have access to the Social Heating Fund if they use heating oil.¹⁵

- The highest impact both in terms of euros spent and share of total expenditures to be spent is expected for Wallonia.

4.2.4. Supplementary analysis of ETS2 impacts (Federal Planning Bureau)

The Federal Planning Bureau (FPB) has conducted simulations to assess the impact of ETS2 on Belgian households. These simulations provide insights to inform the effects of ETS2 on vulnerable groups¹⁶.

Expenditure indicators resulting from the simulations are calculated for different groups using a range of individual- and household-level variables. These groups are called “personae” as they represent an elaborated household archetype with 1, 2 or 3 characteristics. The Federal Planning Bureau analysis uses income deciles instead of expenditure deciles.

Key findings on illustrative “personae” showing a very high increase of their energy and transport expenditure relative to their income

- ETS2 impact is the highest on single person households in measured energy poverty living in rural areas, closely followed by single-parent households in rural areas.
- ETS2 impact is the highest on single person households in measured energy poverty.
- ETS2 impact is the highest on households in measured energy poverty living in Wallonia (2.07% vs 1.83% in Flanders and 1.67% in Brussels).
- Single person households using heating oil and living in rural areas are a vulnerable group (the first one without link to a “poverty” variable). This is mainly the case in Wallonia, given the larger rural territory.

Additional comments

- Single-person households are the most represented in the different archetypes, across all combinations. Single-parent households are also represented, but to a lesser extent, while households with three or more adults

¹⁵ The Social Heating Fund (‘Fonds Social Chauffage’/‘Sociaal Stookoliefonds’) provides financial assistance to low-income households who use heating oil (like fuel oil, petroleum, propane in bulk) to heat their homes.

¹⁶ The ETS2 simulations were conducted using the latest version of EUROMOD (J0.1+), released in September 2024. EUROMOD is a microsimulation model developed by the Joint Research Centre (JRC) of the European Commission. The model runs on SILC data with imputed expenditures from HBS

are regularly included, either with or without children (which does not allow to draw specific conclusions).

- For Brussels, several samples are not large enough to allow their selection for the concerned archetypes, leading to discard multiple first occurrences (highest values) of households living in Brussels.

Conclusions based on these Federal Planning Bureau simulations

- Single person households, particularly those living in rural areas, are among the most impacted.
- Single-parent households with children are also a highly impacted group.
- Households using heating oil are among the most impacted.

4.2.5. Supplementary analysis of impacts (made by the Consortium, based on the FPB modelling results)

From the modelling results, the assessment of the personae/archetypes, and the various sources, several different household profiles can be considered as vulnerable to fossil energy consumption for heating. There are also several overlaps, e.g. single-parent households using heating oil might fall under the lowest income deciles and consequently could be counted twice if we use both parameters separately. In addition, several key drivers - which are not included in the modelling as no data were collected, but have a direct influence on the vulnerability of the groups - are analysed.

Preliminary considerations

- It would be relevant to assess further how income deciles are correlated to the energy performance of the dwelling occupied by the concerned households, and whether they have the financial means to renovate.
- Budgetary elasticity of single-parent households is lower, especially if the other parent does not contribute to the children's costs.
- According to a report of the National Bank of Belgium, households in the lower income quartiles that are not entitled to the social energy tariff are experiencing above-average inflation, having had to spend relatively more on increased gas and electricity bills than households in medium and higher income quartiles. However, most households in the lowest income quartile benefited from the social energy tariff.
- Only a minority of social housing units are energy performant.
- Tenants in well renovated social housing are better protected from ETS2 impacts, than households in badly insulated social housing. Households that meet the criteria to have access to social housing but are deprived of it, have to rent on the private market at higher prices and low(er) dwelling quality which may increase their sensitivity to energy poverty.

- A tenant receiving a social integration income will find it more difficult to rent an energy performing flat or house than a household with a higher income.

Main categories of vulnerable groups based on key drivers

The list of vulnerable (sub)groups, based on the personae (profile archetype, responding to a series of well-defined characteristics), will be characterised to group them comprehensively along the following key variables:

- **Income** – emphasising the importance to pay first attention to the three lowest income deciles.
- **Owner/tenant** – tenants are significantly more vulnerable.
- **Household type** – focus on single person and single-parent with children households.
- **Population density** – less densely populated areas are more sensitive to energy poverty than urban areas.
- **Fuel type** – households using heating oil are more affected than those using natural gas for space heating.
- **Dwellings with leak, damp and rot dwellings** – are highly vulnerable, and increasing the energy performance can improve health conditions.

Two key drivers should be considered: building energy performance¹⁷ and social energy tariff¹⁸.

4.2.6. Summary of vulnerable groups characterisation

The following aspects characterise energy poor or vulnerable households in Belgium:

1. **Income level:** Energy poor households often belong to the 3 lowest income deciles, with monthly incomes less than EUR 3 058 (gross salary)¹⁹. This financial strain is higher when the energy bill is higher.
2. **Rental:** There are different types of tenants: those who have a low income are vulnerable and mostly live in poor quality dwellings while tenants with higher income live in better quality dwellings.
3. **Single person and single-parent households:** With single people households representing 15.6% of the population, and 11.3% are part of a single-parent household.

¹⁷ It can be assumed that the groups identified today as the most vulnerable and the most impacted by ETS2 live in dwellings with poor energy performance, although this cannot be objectively demonstrated by the statistics, as data on energy consumption is not regularly collected in existing household surveys.

¹⁸ A social gas tariff currently protects to some extent gas consumers, while households using heating oil can benefit from a specific allowance but do not have the same social protection as gas consumers.

¹⁹ Statbel. (2024). *Le salaire mensuel brut moyen s'élève à 4 076 euros.*

<https://statbel.fgov.be/fr/themes/emploi-formation/salaires-et-cout-de-la-main-doeuvre/salaires-mensuels-bruts-moyens>.

- 4. Population density:** Dwellings located in rural areas, will on average be more impacted by ETS2. The pressure increases with transport vulnerability.
- 5. Heating source:** Households using heating oil have been identified as a vulnerable group in relation to impacts of ETS2. Approximately 1.3 million households are still using heating oil in Belgium. Assuming an equal distribution across income deciles²⁰ would lead to around 402 000 of these being low-income households. Mainly rural areas are concerned, but heating oil is also to some extent still used in densely populated areas.
- 6. Leak, damp, rot dwellings (poor quality dwellings):** These dwellings are mainly occupied by low income households, and show to be highly impacted by ETS2 mainly in Wallonia and in the two first income deciles. Using these parameters could help narrowing down the vulnerable group further.
- 7. Energy performance:** The impact of ETS2 will be higher on dwellings with a poor energy and general quality performance. The likelihood of a dwelling being oil-heated and less energy performant increases with its age. Typically, residents in these buildings are older which might decrease their capability or willingness to renovate.
- 8. Social tariff:** In the low income deciles, households without specific social protection (i.e. using heating oil, and without social energy tariff) will be highly exposed to the impacts of ETS2. However, this has not been analysed as part of the modelling approach and can hence not be verified. In addition, households that benefited from increased compensation for health care costs²¹, who were given an extension of the social tariff during the 2022 energy crisis, may be another group at risk.

Households vulnerable in the heating sector and energy poor households

- The share of households vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 amongst the bottom third of the income distribution is estimated at 30.2%, and in the middle third of the distribution at 12.8%, at a carbon price of 30 EUR/tCO₂. This represents a relatively small increase of 3.6 and 2 percentage points respectively compared to a 0 EUR/tCO₂ case. The share of households vulnerable to the introduction of the ETS2 related to heating increases in average on the whole population from 11.8% at a carbon price of 0 EUR/tCO₂, to 15.8% at a carbon price of 60 EUR/tCO₂. The share of households vulnerable to the introduction of the ETS2 related to transport increases in average on the whole population from 9.6% at a carbon price of 0 EUR/tCO₂, to 11.7% at a carbon price of 60 EUR/tCO₂.

²⁰ We have no references to demonstrate this, this is a very simplistic assumption.

²¹ FPS Economy. (2024). *Tarif social pour l'énergie pour les personnes bénéficiant d'une intervention majorée*. <https://economie.fgov.be/fr/themes/energie/energie-sociale/tarif-social-pour-lenergie/tarif-social-pour-lenergie>.

- The share of total expenditure that needs to be spent on ETS2 costs related to heating at a carbon price of 30 EUR and 60 EUR/tCO₂ for fossil-fuel using households decreases progressively across deciles and is highest for households in the first decile – 0.5% and 1% of total expenditure respectively (second decile in the range 0.45–0.9%, and the third ~0.42–0.85%).
- The analysis by degree of urbanisation reveals that the impact of ETS2 is higher in regions that are sparsely populated, and smallest for the average household living in a densely populated area.
- More than 39% of households in the bottom quintile of the income distribution are identified as being affected by hidden energy poverty. This shows the limit of the modelling results²² and underlines the fact that besides looking at those vulnerable to the introduction of the ETS2 due to their fossil fuel use, investments and measures of the SCF could also be used towards households not heating their dwelling appropriately.

4.3. Impacts of ETS2 on transport poverty and vulnerability

4.3.1. Impact of the ETS2 on the number of vulnerable transport users

Figure 4-8 shows the share of the Belgian population deemed vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2 according to the modified 2M indicator.

The modified 2M indicator, for which results are shown in this section focusses on the affordability dimension of transport poverty and vulnerability, as we use it to investigate vulnerability to the ETS2 – a price instrument. The dimensions of the availability of transport and the accessibility of essential services are, however, equally important in defining transport poverty²³. We acknowledge this by showing a whole range of transport poverty indicators in this report²⁴. The threshold value of the modified 2M indicator is fixed at twice this median expenditure. For Belgium, the median related to costs for petrol, diesel and recurring expenditures for public transport is equal to 2.8% and the 2M threshold 5.6%.

The share of the population deemed vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2 is shown before the introduction of the ETS2, here shown at a price of 0 EUR/tCO₂, indicating the share of households deemed vulnerable based on their expenditures for transport fuels in the HBS 2015. We also

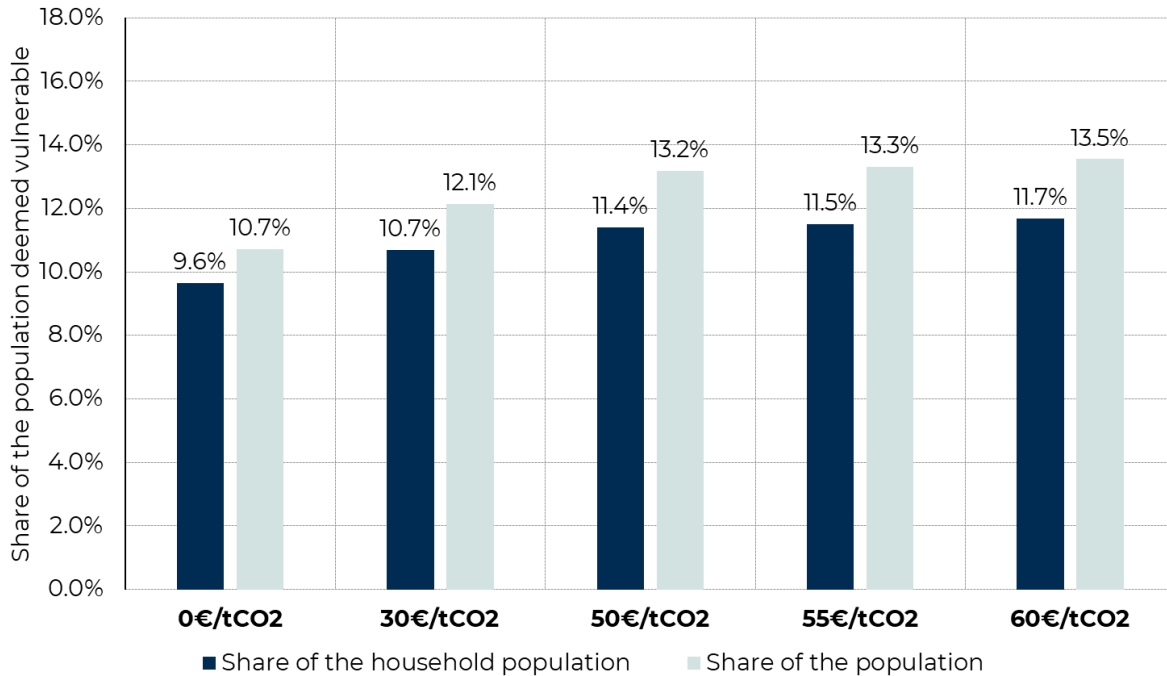
²² The limit of the modelling results is that the effects on some of the most vulnerable groups cannot fully be represented in the model as it focuses on the additional cost per household, and does not consider hidden energy poverty.

²³ European Commission. (2024). Transport poverty: definitions, indicators, determinants, and mitigation strategies. <https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=8651&furtherPubs=yes>.

²⁴ At the EU level, the data situation is challenging related to estimating indicators of availability and accessibility. In some countries, relevant national and local level data is available.

show the share of households and individuals vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2 for ETS2 prices of 30 EUR/tCO₂, 50 EUR/tCO₂, 55 EUR/tCO₂ and 60 EUR/tCO₂. The share of vulnerable households in Belgium is estimated at 10–12%, the share of the total population is estimated at 11–13.5%.

Figure 4-8 Share of the Belgian household population and share of the total population vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2



Source: Oeko-Institut SEEK-EU micro model

4.3.2. Target group analysis of transport poverty indicators

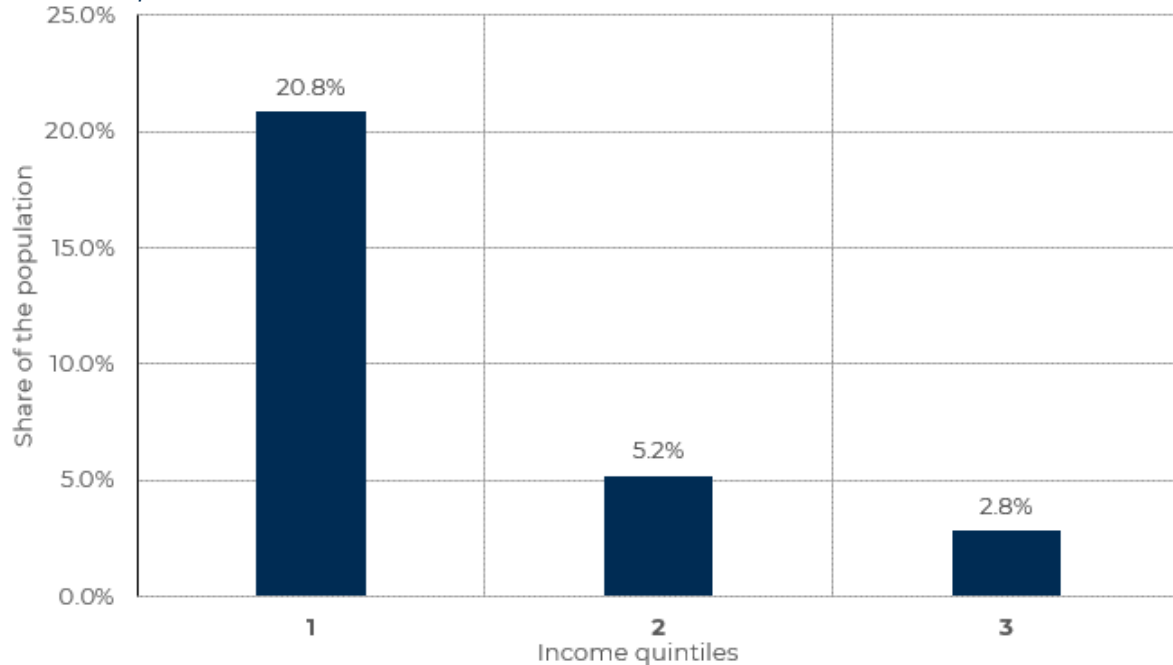
Which households are most likely transport poor?

The following target group analysis focusses on two indicators that highlight the lack of a car and difficult access to public transport. We choose these indicators, as they focus on additional aspects relevant to transport poverty that may not be fully covered by the vulnerability indicator that focusses on fossil fuel use. The indicators may thus help identifying additional target groups that could benefit from the SCF due to being transport poor.

Figure 4-9 shows the share of the Belgian population affected by enforced lack of a car by income quintile. This indicator identifies people that answer that they cannot afford a car to the question of whether they own one. The fourth and fifth quintile cannot be displayed due to low number of observations, meaning that in the top 40% of the income distribution, there are very few individuals facing enforced lack of a car.

Enforced lack of a car is a much bigger issue for the bottom quintile of the income distribution, where 21% say that they cannot afford a car.

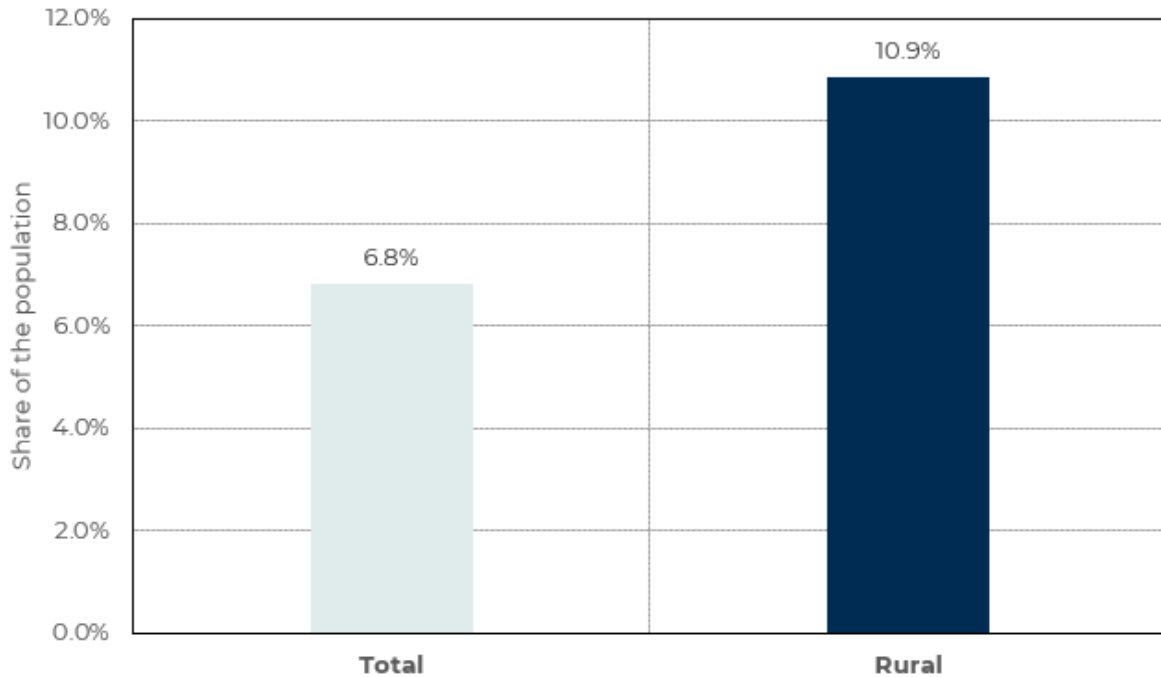
Figure 4-9 Share of the population affected by enforced lack of a car in Belgium by income quintile



Source: Oeko-Institut SEEK-EU micro model based on EU-SILC 2023
 Note: The third quintile should be flagged due to a low number of observations (20–49 observations). Quintiles 4 and 5 cannot be displayed due to a low number of observations (less than 20 observations).

Figure 4-10 shows the share of the population affected by very difficult access to public transport and indicates that the difficult access is a larger issue in rural areas.

Figure 4-10 Share of the population affected by very difficult access to public transport in Belgium: Total share and share in rural areas



Source: Oeko-Institut SEEK-EU micro model based on EQLS 2016

In Belgium, half of single people do not own a car in 2023, while 73% of Belgian households own at least one car (but only 45% in Brussels-Capital).

According to a recent research (Eva Van Eenoo, VUB 2024):

- The spatial distribution of the car-dependent society is nearly ubiquitous, except within inner cities;
- Less than 2% of company cars are used by the lowest income decile;
- In 2018, for the lowest income decile, more than 75% of households with one adult have no car, while this figure drops to around 38% for households with at least two adults.

In Wallonia, according to a report on social cohesion on 2018 datasets:

- 77% of daily trips are made by road (71% by car, 5% by bus, 1% by motorbike). For 18% of Walloons, the main transportation mode remains walking;
- 60% of Walloon inhabitants have an appropriate walking access to public transport (bus and train);
- The share of the population located in the pedestrian vicinity of stops well served by public transport varies greatly from one municipality to another.

In Brussels-Capital region (BCR), according to a recent study on transport poverty and car dependency (Brussels Mobility, 2024 on SILC 2023 datasets):

- in Brussels, 20.8% of households face enforced lack of a car (car deprived due to financial reasons). These “car deprived” households are also seriously deprived on various other aspects;
- around 19% of these “car deprived” households face space heating deprivation, while above 25% of the “forced car” households face space heating deprivation;
- the “car deprived” households are mainly isolated individuals, mono-parental households, couples with at least one kid below 25 years old;
- more than 45% are households with at least one member which is active;
- for non-motorised households (inc. enforced lack of a car), as general trend, the important use of public transport (43.8%) for the lowest income class reduces progressively until the highest class (22.2%). In average this use is mainly replaced by the use of bike.

In Flanders:

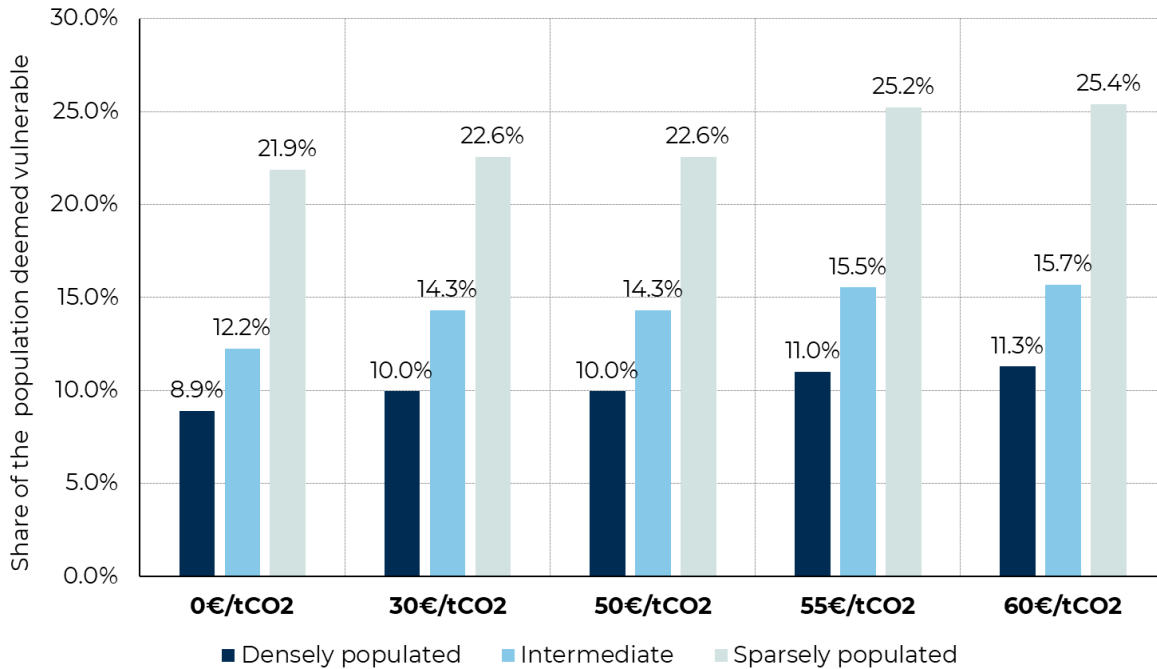
- in 2023, citizens still travel mainly by car (43% as a driver and 14% as a passenger), but for the first time car use dived below 60% in the modal split. Since 1994, bicycle use in Flanders has never been so high (18% of the trips are made by (electric) bicycle). Public transport is less used, with only 4% of Flemish journeys (compared to 7% in 2019);
- according to a recent study on transport poverty in Flanders (MORA, 2024), 9.2% of the population of households in cities are facing transport poverty.

According to a study on “Less mobile, a conscious choice? “ (UGent, VUB, network sustainable mobility, Mobiel21), there are five different profiles of less mobile people: mobile elderly, young starters, urban public transport dependent, suburban car dependent, older adults in rural areas. Transport poverty takes different forms and cannot be traced back to one particular group in society, which makes the identification of vulnerable groups more complicated.

Target groups analysis: Which transport users are most likely vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2?

The distribution amongst the different population densities reflects the consumption of fossil fuels for transport in these areas, as well as the level of total expenditures and incomes, as depicted by Figure 4-11. The highest vulnerability is calculated for sparsely populated areas, where 22–25% of the population are deemed vulnerable, depending on the level of the ETS2 price (compared to 12–16% for intermediate population density and 9–11% for densely populated areas).

Figure 4-11 Share of the Belgian population deemed vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2 by degree of urbanisation



Source: Oeko-Institut SEEK-EU micro model

For Wallonia, according to a report on social cohesion²⁵, on average, a Walloon household devoted 15% of its annual budget (i.e. 5 007 euros) to cover its transport costs in 2016. This share is below 10% for the lowest quartile, and above 17% for the highest quartile.

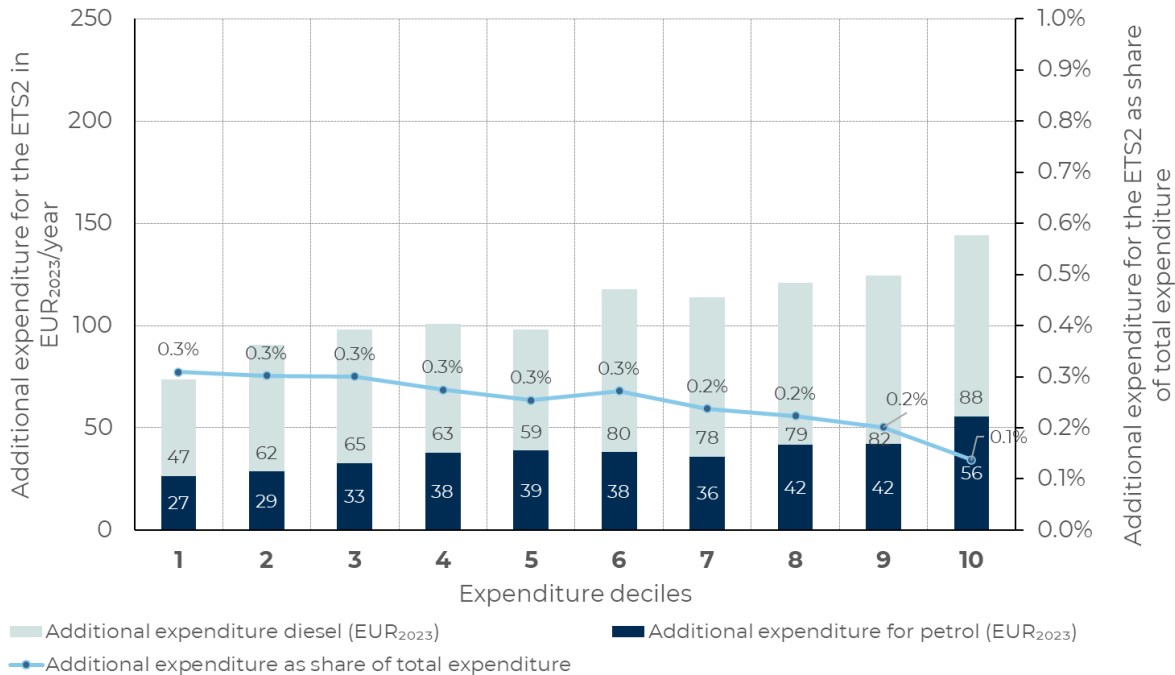
4.3.3. ETS2 impact by target group

Figure 4-12 shows the estimated ETS2 costs at a carbon price of 30 EUR/tCO₂ in the transport sector for Belgian households for the main scenario that includes an elasticity of -0.2 for transport²⁶. The figure shows the impact by expenditure deciles only for those households using petrol or diesel.

²⁵ IWEPS and SPW. (2020). Rapport sur la cohésion sociale en Wallonie – Droit à la mobilité – 2019. <http://cohesionsociale.wallonie.be/sites/default/files/RCS-Mobilit%C3%A92020.pdf>.

²⁶ Of course, it is to be expected that elasticities differ by income group and by population density: Berry, C. and Börjesson, M. (2024). Income and fuel price elasticities of car use on micro panel data. <https://doi.org/10.1016/j.eneco.2024.107661>.

Figure 4-12 ETS2 costs related to transport for Belgian households at a carbon price of 30 EUR/tCO₂ (only households using fossil fuels)



Source: Oeko-Institut SEEK-EU micro model

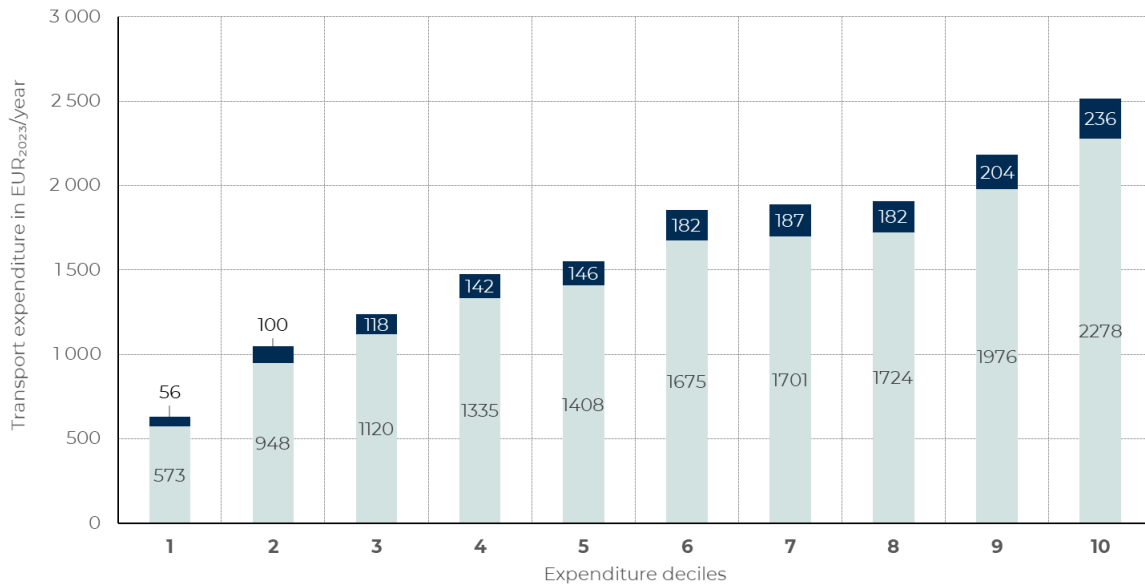
As households with higher overall expenditures use more petrol and diesel, the expected additional cost per year rises from 75 EUR/year in the first decile to 145 EUR/year in the tenth decile (at a carbon price of 30 EUR/tCO₂). It rises to 145 EUR/year (~0.6% of expenditure) in the first decile and 285 EUR/year in the tenth decile (at 60 EUR/tCO₂).

The share of total expenditure that needs to be spent on the ETS2 costs at a carbon price of 30 EUR/tCO₂ is relatively constant at 0.3% for the first six deciles dropping to 0.2% in the seventh decile and then 0.1% in the tenth decile. This reflects the fact that higher-income households are more easily able to absorb the additional costs.

Without taking the reaction of households into account, i.e. assuming an elasticity of 0 related to the carbon price, the impacts at a carbon price of 60 EUR/tCO₂ are slightly higher by 7 EUR/year in the first decile and 16 EUR/year in the tenth.

Figure 4-13 compares expected ETS2 costs at a carbon price of 60 EUR/tCO₂ to total transport expenditures based on the HBS 2015 (inflated to EUR₂₀₂₃).

Figure 4-13 ETS2 costs related to transport for Belgian households at a carbon price of 60 EUR/tCO₂ compared to transport costs according to the HBS2015 (all households)



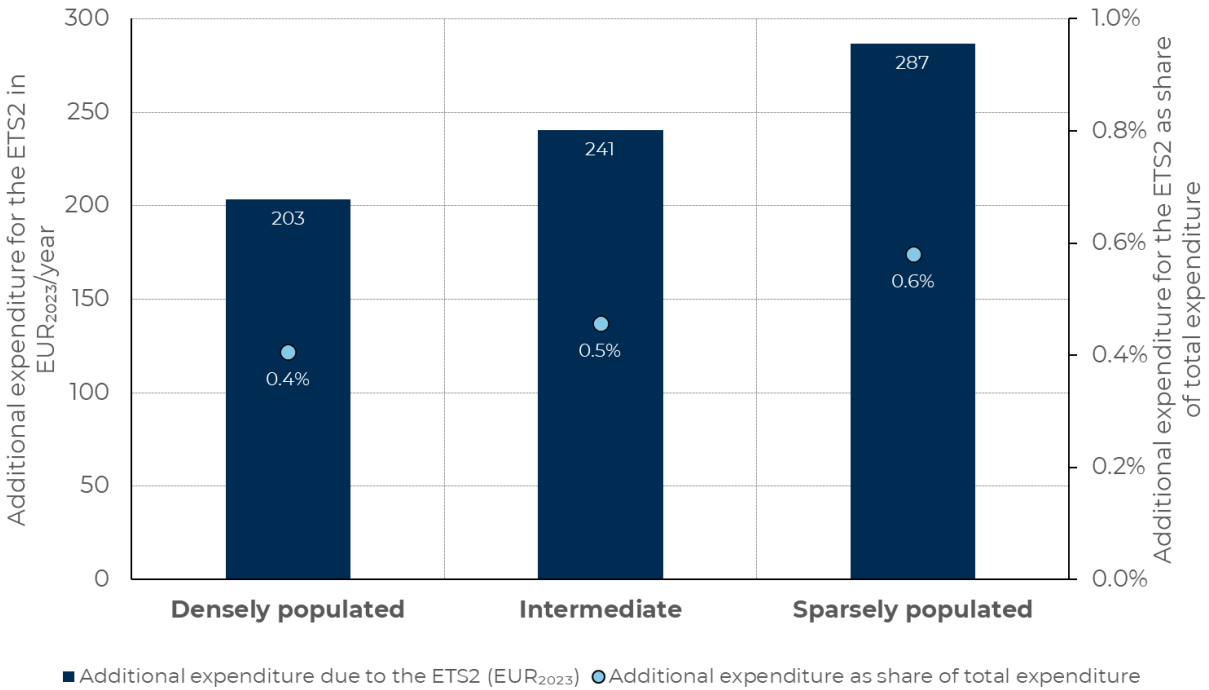
■ Additional expenditure due to the ETS2 (EUR₂₀₂₃) ■ Transport expenditure before the ETS2 (EUR₂₀₂₃ based on the HBS 2015)

Source: Oeko-Institut SEEK-EU micro model

Note: A value of 1.2607 was applied to inflate expenditures to 2023EUR, based on the Eurostat all items HICP [prc_hicp]

Figure 4-14 shows the estimated impact of the ETS2 by degree of urbanisation at a carbon price of 60 EUR/tCO₂ and only for those households using fossil fuels. The estimated carbon costs are highest for an average household living in a sparsely populated area at 290 EUR/year and smallest for the average household living in a densely populated area at 200 EUR/year. The share of expenditure that needs to be spent ranges from 0.4% in densely populated areas to 0.6% in sparsely populated areas.

Figure 4-14 ETS2 costs related to transport for Belgian households at a carbon price of 60 EUR/tCO₂ (only households using fossil fuels) by degree of urbanisation



Source: Oeko-Institut SEEK-EU micro model

It is important to keep in mind that the figures show average impacts per decile or per degree of urbanisation and that there are households that experience much higher impacts. Higher impacts are expected at high consumption of motor fuels coupled with low incomes, e.g. households living far away from their workplace and having to commute by car, while also having low incomes.

The fact that many low-income households do not own a car is important. These households can still be supported by the Social Climate Fund, if they are deemed to be in transport poverty.

4.3.4. Supplementary analysis of ETS2 impacts (Federal Planning Bureau)

In the energy simulations both heating and transport fuel expenditures were considered, while for transport the focus is on transport expenditure only. Consequently the values (i.e. shares of additional expenditure in total expenditure) are of course much lower.

Key findings on illustrative “personae” showing a very high increase of their energy and transport expenditure relative to their income

- Transport poverty (2M) is often linked to rural areas and to single or multi-adults households.

- ETS2 impact on households in transport poverty (2M) is the highest in the first equivalent income decile, in Wallonia, while the level remains quite high for the second and third income deciles, for expenditure related to transport only, and for the sum of transport and heating expenditure.
- ETS2 impact on households living in Wallonia in transport poverty (2M) is the highest for all households with regard to their transport expenditure, and with regard to their heating and transport expenditures when they do not own a car.
- Transport poverty (2M) is also linked to single person households in Wallonia, by considering transport expenditure alone (0.95%), or together with heating expenditure (2.25%).
- Transport poverty (11%) is by far the highest in Wallonia, by considering transport expenditure alone (1.09%), or together with heating expenditure (2.04%), and then in densely populated areas (0.92%).
- Transport poverty 11% is the highest in Wallonia for households owning a car.

Additional observations

- A household in Wallonia has a higher likelihood to be in transport poverty 2M when it does not own a car (2.28%), than with a car (1.79%). These figures relate to the impact on both heating and transport expenditures. It would be different by considering transport expenditures only, as the main expenses for transport are related to a car.

Conclusions based on these simulations

- The localisation of the household is a crucial parameter to identify risk of transport poverty, as households in Wallonia and rural areas in general will be more impacted by ETS2.
- The level of income has an influence, but the impact across the first four expenditure deciles should be considered.
- There are several elements that are not taken into account in the simulations (because the variables were not included or the sample size was not representative) but that would still require some attention, such as households with several children (having more complex transport patterns), elderly persons in remote areas, access to public transport, etc.

4.3.5. Supplementary analysis of impacts (made by the consortium, based on the FPB modelling results)

From the modelling results, the assessment of the persona/archetypes, and the various sources, several different household profiles can be identified as vulnerable to transport costs. There are also several overlaps, e.g. single-parent households with children might fall under the lowest income deciles and consequently could be

counted twice if we address both criteria separately. In addition, several key drivers - which are not included in the modelling as no data are collected, but have a direct influence on the vulnerability of the groups - are analysed.

Some preliminary considerations

Based on the literature (e.g. Lucas et al. 2016; Jeekel, 2019; Mattioli, 2021), the following groups (and their combination) show a higher risk of transport poverty in Belgium, that might be impacted by ETS2:

- Residents in less densely populated locations (limited public transport offer, longer distances);
- Households with children (more complex travel patterns, mobilities related care, school and hobbies);
- Single-parent households (one parent must organise (and pay for) the travel, women are overrepresented);
- Elderly persons (lower income + physical ability is, on average, lower);
- People with disabilities, confronted to lack of accessibility of transport and adapted mobility alternatives;
- Persons without access to a car (in particular in rural and suburban areas);
- Households with low income, for whom the cost of mobility represents a high share of their total budget.

Based on the stakeholders' feedback, the following groups should also be considered:

- households affected by forced car ownership;
- households with a motorised vehicle that is no longer allowed in low emission zones;
- households without (suitable) access to public transport due to the distance between their dwelling and the nearest bus/train stop, or due to inadequate public transport timetables or impossibility to reach the required destinations;
- individuals who cannot drive a car due to age constraints (older people or younger people without a license);
- individuals with physical or cognitive disabilities, or with temporary or occasional health limitations.

Other important considerations are:

- Lower-skilled jobs often involve shift work and/or unregular working hours, and therefore a car is needed; many of these jobs are located in areas without suitable public transport;
- Households with children have on average more than one car, due to the inadequacy of public transport infrastructure. Solutions to reduce the dependence on cars, and hence the related fossil energy costs are investments in safe and reliable public transport, especially in cities;

- Development of semi-collective transport solutions (collectivised / leased VTC) to overcome specific constraints (last km without public transport).

Main categories of vulnerable groups based on key drivers

The list of vulnerable (sub)groups, based on persona (profile archetype, responding to a series of well-defined characteristics), are characterized to group them comprehensively along the following key variables:

- **Population density** – is for transport the first influencing factor. It strongly influences car dependency and access to alternatives and can be used to start identifying the most vulnerable groups;
- **Income** - the share of the population deemed vulnerable to the introduction of the ETS2 is obviously higher for the lowest expenditure tercile;
- **Access to public transport (too difficult)** – access to public transport mainly impacts households living in rural areas, varying greatly from one municipality to another;
- **Household type and size** – from the modelling realised in this project, there is no correlation between the transport related impact of ETS2 and the household types and sizes. However, the literature does identify certain types of households that are more likely to be affected by transport vulnerability ;
- **Enforced lack of a car** – around 20.8% for the lowest income quintile is car deprived. This group is hardly identifiable for targeted M&I;
- **Forced car ownership** - households with forced car ownership will face directly the increase of ETS2. Their share is higher in Wallonia (12.7%) than in Brussels-Capital (5.7%) and Flanders (3.6%).

4.3.6. Summary of vulnerable groups characterisation

Multiple vulnerability factors have been identified, such as population density, low-income and access to public transport. Enforced lack of a car and forced car ownership can be used as monitoring indicators (to track impacts of ETS2) but not to identify specific vulnerable groups.

The following aspects can be summarised to characterise transport poor or vulnerable households in Belgium:

1. **Population density:** Households located in rural areas will be more impacted, although there are variations between rural areas.
2. **Income level:** Transport poor households often belong to the 3 lowest income deciles. This financial strain will be higher when the transport bill (due to the ETS2) will increase.

- 3. Access to public transport (too difficult):** this is a factor of already existing transport poverty, but it can significantly reinforce the impact on forced car ownership when limited alternatives to individual car ownership exist.

Vulnerable transport users and transport poor individuals

- At a carbon price of 30 EUR/tCO₂, households driving a combustion engine vehicle in the three first income deciles are expected to spend an additional 0.3% (0.6% at a carbon price of 60 EUR/tCO₂) of overall expenditures for ETS2 transport-related costs (diesel and petrol), while the highest decile is expected to spend around 0.13%.
- The analysis by degree of urbanisation for households using fossil fuels shows higher estimated impacts in terms of share of total expenditures spent on ETS2 costs (at price 60 EUR/tCO₂) in sparsely populated areas (expenditure increase ~0.6%), compared to densely populated areas (increase ~0.4%).
- The fact that many low-income households do not own a vehicle is important. These households can still be supported through the SCF if they are deemed to be in transport poverty. It is estimated that 20.8% of individuals in the first income quintile are affected by 'enforced lack of a car, mainly in cities (13% against the total population estimated at 6%).
- Households with very difficult access to public transport are estimated to represent 6.8% of the population and should be considered as a priority if public transport is deemed a pragmatic alternative to individual cars. In addition, households with forced car ownership are estimated to represent 5% of the population.

Combination of heating and transport poverty

There are several household types that show a high increase of their heating and transport expenditure relative to their income, among which:

- Single person households in transport poverty 2M living in rural areas with an increase of 2.40% and households with three or more adults and children in transport poverty 2M living in rural areas with 2.33%;
- Single person households in measured energy poverty 2M living in rural areas (2.28%) and in urban areas (2.13%);
- Souseholds living in Wallonia in measured energy poverty (2.07%) and in transport poverty (2.04%);
- Single person (1.97%) and single-parent households with children (1.85%);
- Single person households using heating oil and living in rural areas (1.96%), and in urban areas (1.91%), followed by those living in Wallonia (1.95%).

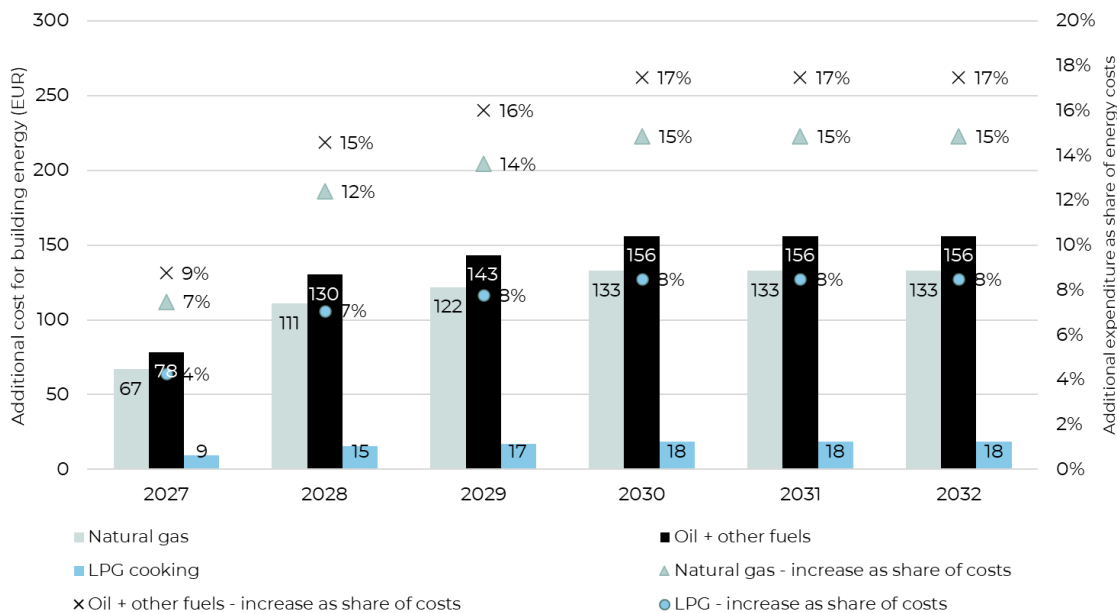
4.4. Impacts of ETS2 on micro-enterprises' vulnerability

4.4.1. Impacts of ETS2 based on micro-modelling

The impacts of ETS2 on buildings' and transport energy costs are evaluated on the basis of national fuel prices, CO₂ emission fuel factors, and expected changes in the price of ETS2. Our analysis also considers a reduction in the use of each fuel in response to the increase in price (elasticity).

Figure 4-15 shows the additional costs for the average micro-enterprise up to 2032 based on heating fuel. The majority of additional costs are due to increases in gas tariffs (around EUR 82 million from 2030 onwards).

Figure 4-15 Additional costs for energy in buildings for the average micro-enterprise that uses fossil fuels, excluding transport and transport-intensive companies



Source: Institute for European Energy and Climate Policy (IEECP) micro-modelling

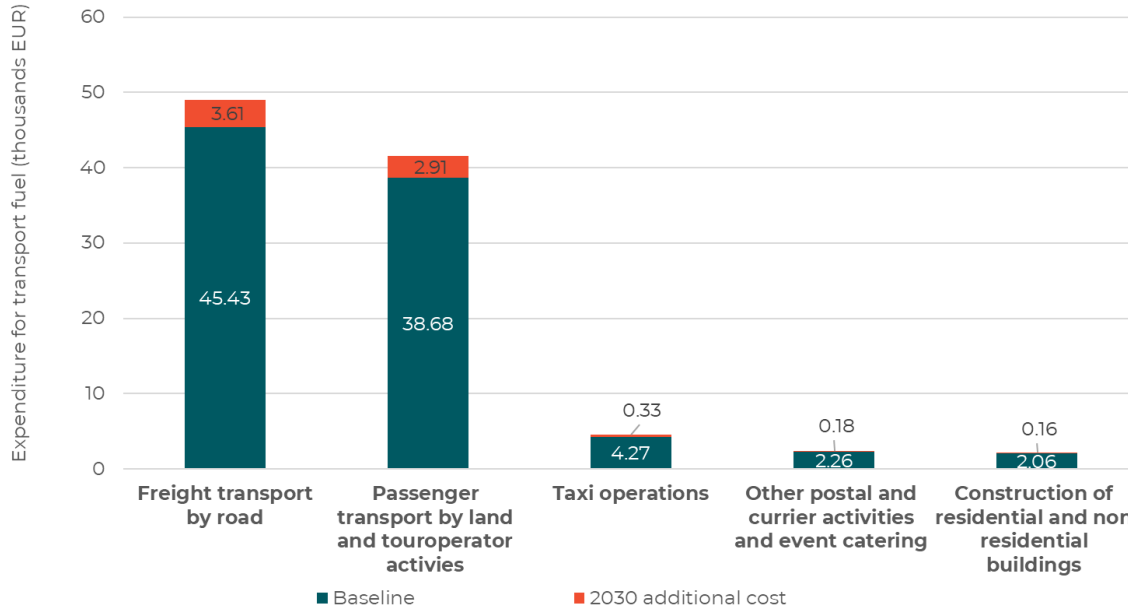
For transport-intensive micro-enterprises (identified with their NACE), the effects on energy consumption and cost changes are much higher than for average companies. They count among others: Construction of residential and non-residential buildings (20 070 ME); Taxi operations (2 600 ME); Freight transport by road (8 080 ME); Other postal and courier activities (4 360 ME); Event catering activities (3 600 ME).

The impact of ETS2 on these micro-enterprises is expected to reach over EUR 38 million per year from 2030 onwards, considering a slight reduction in mileage following the increase in fuel prices (elasticity).

Figure 4-16 shows additional costs per micro-enterprise in these sectors in 2030, showing that companies operating in Freight transport by road are the most affected (around 3 600EUR/year, due the high number of vehicles, 17 500 km/y annually, and

~35 litres/100 km), followed by tour operators and companies operating in road passenger transport (2 900 EUR/year).

Figure 4-16 Additional cost per micro-enterprise for transport and transport-intensive sectors in 2030



Source: [Institute for European Energy and Climate Policy \(IEECP\) micro-modelling](#)

Modelled number of vulnerable micro-enterprises / Identification of vulnerable micro-enterprises

Based on the chosen indicators, a simulation and approximation of the number of vulnerable micro-enterprises is provided in Table 4-1.

Table 4-1 Estimation of the number and share of micro-enterprises vulnerable to ETS2 based on the definition of vulnerable micro-enterprises according to the FSC Regulation

Indicator number	Indicator name	Number of vulnerable ME	Share of total micro-enterprise
Core Indicator 1	Micro-enterprises that use fossil fuel, which do not have the means to renovate the building they occupy, purchase zero- and low-emission vehicles or switch to alternative sustainable modes of transport (means to renovate):	112 000	15.6%
Core Indicator 2	Micro-enterprises with significant energy expenditure	34 400	4.8%

Indicator number	Indicator name	Number of vulnerable ME	Share of total micro-enterprise
CORE indicator 2.1	Significant energy expenditure for on-site fossil fuels consumption after introduction of the ETS2	18 800	2.6%
Core indicator 2.2	Significant energy expenditure for transport after introduction of the ETS2	15 600	2.2%
Additional Indicators			
5	<i>Vulnerable enterprises once micro-enterprises operating from refurbished and new buildings are excluded</i>	34 100	4.7%

(*) a portion of the 34 400 micro-enterprises is based in new or refurbished buildings. Based on JRC IDEES 2021 available dataset, around 1.4 % of all companies are located in new or refurbished buildings

4.4.2. Summary of impacts

In the buildings sector, the most common fuel used by service-sector companies is natural gas, which is used in 61% of buildings for heating, domestic hot water (DHW), and cooking; 21% of companies use oil for heating and DHW, while LPG is used for cooking in 4% of the total building sum²⁷.

In the transport sector, 21% of micro-enterprises own vehicles, and approximately 40 000 businesses are considered transport-intensive.

Among a series of combinations of building fuel and transport fuels, micro-enterprises that use heating oil for their building (space and DHW) in combination with vehicle fuels are going to incur the highest cost increase, with over EUR 280 of additional yearly costs from 2030 onwards.

Approximately 112 000 micro-enterprises lack the financial resources to invest in energy-efficient building renovations, transition to low-carbon vehicles, or adopt alternative modes of transport. Among these, 34 100 micro-enterprises are identified as critically vulnerable due to their significant energy expenditure and low profit margins. Based on the JRC IDEES 2021 available dataset, around 1.4% of all companies are located in new or refurbished buildings. If we assume the share is equally distributed between vulnerable and non-vulnerable companies, we can assume that roughly 300 vulnerable micro-enterprises may be located in these buildings. This brings the number of vulnerable micro-enterprises down to 34 100, which is around 4.7% of all micro-enterprises.

²⁷ The remaining 14% of buildings occupied by micro-enterprises use fuels out of the scope of the ETS2

4.4.3. Supplementary analysis of impacts

In 2022, a study was conducted by the Brussels Institute for Statistics and Analysis (IBSA) on the economic activity of Brussels during the energy crisis²⁸. The methodology developed by IBSA to understand the specific effects of the energy crisis on economic activity in Brussels can be relevant to identify the sectors that are most likely to be affected by the rise in energy bills due to ETS2 considering their specific energy and transport consumption patterns. However, as the structure of economic activity in Brussels is very different from the other regions, the results of the analysis conducted by IBSA can only be used as a proxy to reflect the Belgian economic context.

The study shows that depending on the quantity and type of energy consumed, rises in energy prices have a larger or lesser impact on economic activities. Additionally, the transport sector, the manufacturing industry and the construction sectors are the most dependent on fossil fuels (gas and petrol mainly for transport, given there is little use of heating oil in Brussels). Also, administrative and support/social services are quite dependant on fossil fuels.

From stakeholders' experience, the following elements can be highlighted:

- micro-enterprises will be impacted by both their building related energy consumption and their transport costs;
- according to survey respondents key factors that can lead to energy poverty or vulnerability for micro-enterprises are high energy prices, high initial costs of energy-saving technologies and lack of energy performance of in buildings;
- according to survey respondents the main causes of transport poverty for micro-enterprises are high fuel costs and inadequate public transport.

Another study on the impact of the energy crisis on entrepreneurship in Brussels indicates that the economic activities that were most impacted by the energy crisis were productive activities, catering sector (hotels, restaurants, cafes) and convenience stores²⁹.

4.4.4. Summary and conclusions

Among the concerned micro-enterprises, the following activities are the most vulnerable to transport poverty.

- Freight companies, with important transport fuel expenditure;
- Passenger transport and tour operator companies;

²⁸ Institut Bruxellois de statistique et d'analyse. (2022). L'activité économique bruxelloise face à la crise énergétique. https://ibsa.brussels/sites/default/files/publication/documents/Focus-51_FR_0.pdf. (Available in French).

²⁹ Hub Brussels (2022). [Impact de la crise énergétique sur les entreprises bruxelloises](#).

- Construction activities, with on-site use but also transport of material and employees; and
- Support/health/social services and some administrative, highly dependent on transportation.

From the analysis of a series of combinations of different building and transport fuels, micro-enterprises that use heating oil for their building (space and domestic hot water), in combination with vehicle fossil fuels are going to incur the highest cost increase, like for:

- Manufacturing or processing activities, with important energy use for building and process heat (e.g. micro-food industry such as bakeries);

4.5. The hotel, restaurant and catering sectors (horeca), which consume large amounts of energy for heating, cooking and hot water, and are often dependent on commercial vehicles for delivery or event services. Impacts of the implementation of the EU energy and climate targets

The ETS2 is part of a broader set of measures (the Green Deal) that Member States will be implementing at the same time. Isolating the effect of this single measure is therefore complicated, and the results provided include a significant margin of uncertainty. Technology changes as a part of the clean energy transition and other measures and policies associated with the Fit for 55 package and the Green Deal should be considered. We estimate that once these are incorporated, the heating-related fuel expenditure are expected to increase by 0.1% to 0.2% of total expenditure of goods and services for low and high-income households respectively.

5. Conclusion

In Belgium, both energy and transport poverty have been recognised as important issues for many years, and are being addressed by various policy frameworks to aimed at reducing their impact on affected households. **There is a clear incremental impact of ETS2 on the energy bill of households, although the impact remains moderate.** For example, for households in the first income decile that use fossil fuels for heating, the share of total expenditure required to cover ETS2-related costs lies between 0.5% (at a carbon price of 30 EUR/tCO₂ in 2027) and 1% (at a carbon price of 60 EUR/tCO₂ in 2030). **The impact will however vary significantly from one household to another.** The measures implemented in the context of the SCF might support households and transport users already facing energy and/or transport poverty, but also those that are vulnerable or at risk of being affected by energy and/or transport poverty.

Both households using fossil fuels for heating (mainly natural gas and heating oil) and those using diesel or petrol vehicles will face additional costs. The high usage level of fossil fuels in Belgium leads to a high number of households vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2, in various and intertwined configurations. Households in low-income deciles are obviously the most affected, with single person and single-parent households being the most represented “personae” (household types) affected by energy poverty. Households using heating oil are more exposed to the impacts of ETS2. This may be linked to their geographical location (often in sparsely populated areas) and the fact they benefit from the Social Heating Fund but not from social tariffs (which only exist for natural gas, electricity and district heating) combined with the low energy performance of their dwellings. The energy performance of dwellings is an essential parameter to consider in the assessment of options to mitigate the impact of ETS2 on the affected households. The quality of housing (e.g. leaking roof, damp walls, floors or foundation, or rot in window frames or floor) is also an essential parameter that should be addressed in parallel with the energy performance.

Hidden energy poverty has to be properly addressed to avoid exacerbating the risk that the concerned households further reduce their comfort to avoid the cost impacts (e.g. reducing indoor temperature).

The measures proposed in the SCF should address households in measured energy poverty (MEP), in hidden energy poverty (HEP) and those vulnerable to the introduction of ETS2 and that were not addressed by the two first categories (MEP and HEP). The income level of this last group is usually just above the income of households benefiting from social protection (and consequently accessing social tariffs) but they face a similar increase of their expenditure.

The households living in sparsely populated areas will be facing the highest carbon cost impacts for transport, which will in particular be challenging for households in the three lowest income deciles.

The ETS2 is part of a broader set of measures (the Green Deal) that Member States will be implementing at the same time. Isolating the effect of this single measure is therefore complicated, and the results provided include a significant margin of uncertainty. Technology improvements and other measures and policies associated with the Fit for 55 package and the Green Deal should be considered. **We estimate that once these are incorporated, the heating-related fuel expenditure are expected to increase by 0.1% to 0.2% of total expenditure of goods and services for high and low-income households respectively.**

Micro-enterprises, that use fossil fuels for heating and domestic hot water (natural gas, heating oil and LPG), or diesel and petrol for transport, will also face cost increases resulting from the implementation of ETS2. In terms of transport vulnerability of micro-enterprises, most of the additional costs will be borne by companies operating in road freight transport, followed by taxi operations and construction-sector companies. In terms of energy vulnerability of micro-enterprises, most of the additional costs will be borne by companies operating in the manufacturing, trade, food, health and social & health service sectors.

This impact assessment provides a foundation for developing Belgium's comprehensive Social Climate Plan. **By addressing the challenges identified in this report with the right mix of measures and investments, the Belgian plan will aim to support a fair transition towards climate neutrality, helping alleviate the social and economic impacts of the ETS2 so that the most affected vulnerable groups, such as households in energy or transport poverty, are directly supported, and not left behind during the green transition.**