Support to the Preparation of Social Climate Plans

Deliverable 2

Report on the impacts of ETS2, the identification of vulnerable groups and stakeholder engagement plans

Final report for Slovakia

REFORM/2021/OP/0006 Lot 1

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Presented by

Trinomics B.V.

Mauritsweg 44

3012 JV Rotterdam

The Netherlands

Contact person

Andrea Demurtas

E: Andrea.Demurtas@trinomics.eu

Date

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REFORM/2021/OP/0006 Lot 1

Support to the Preparation of Social Climate Plans

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List of Abbreviations

Abbreviation / Acronym	Full Term / Definition
ACEA	European Automobile Manufacturers Association
AMEDI	Assessing and Monitoring Employment and Distributional Impacts
AZZZ	Asociácia zamestnávateľských zväzov a združení
BA	Beneficiary Authority
BIPV	Building-integrated photovoltaics
CCEG	Climate Change Expert Group
CET	Central European Time
CTP	Climate Target Plan
CO_2	Carbon Dioxide
DG CLIMA	Directorate-General for Climate Action
DG EMPL	Directorate-General for Employment, Social Affairs and Inclusion
DG ENER	Directorate-General for Energy
DG MOVE	Directorate-General for Mobility and Transport
DG RECOVER	Directorate-General Recovery and Resilience Task Force
DG REFORM	Directorate-General for Structural Reform Support
DG REGIO	Directorate-General for Regional and Urban Policy
DLV	Deliverable
DNHS	Do no significant harm
EC	European Commission
ECO	Energy Company Obligation
EED	Energy Efficiency Directive
EGD	European Green Deal
ENBEE	Environment and Building Energy Efficiency
EPAH	Energy Poverty Advisory Hub
EPBD	Energy Performance of Buildings Directive
EPCs	Energy performance contracts
EPOV	EU Energy Poverty Observatory
ERV	Energy Recovery Ventilation
ET	Expert Team
EU	European Union
EU ETS	European Emissions Trading System
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
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
GHG	Greenhouse gas
HBS	Household Budget Survey
IA	Impact Assessment

Abbreviation / Acronym	Full Term / Definition
IDS BK	Integrated transport system of Bratislava
IDS BBSK	Integrovaný dopravný systém Banskobystrického kraja
IDS Východ	Integrovaný dopravný systém IDS Východ
IEA	International Energy Agency
IEECP	Institute for European Energy and Climate Policy
INFOREG	Informačný systém na podporu rozvoja regiónov
IR	Inception Report
ISA	Institute for Strategies and Analyses
JRC	Joint Research Centre
KO Meeting	Kick-off Meeting
LFS	Labour Force Survey
LIHC	Low Income High Cost M&I Measure and Investment
LTR	Long Term Renovation Strategies
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
NGO	Non-governmental organisation
NIKA	National Implementation and Coordination Authority
NUTS	Nomenclature of Territorial Units for Statistics
NTA	National Transport Authority
Oeko	Institute for Applied Ecoloogy
PAS	Podnikateľská aliancia Slovenska
PM	Project Manager
PMT	Project Management Team
QA	Quality Assessment
QAM	Quality Assurance Manager
RES	Renewable Energy Sources
RRF	Recovery and Resilience Facility
RRP	Recovery and Resilience Plans
SAMP	Slovenská asociácia malých a stredných podnikov a živnostníkov
SBS	Structural Business Statistics
SCF	Social Climate Fund
SCP	Social Climate Plans
SIEA	Slovak Innovation and Energy Agency
SILC	EU Statistics on income and living conditions
SME	Small and Medium-sized Enterprise
SPP	Slovenský plynárenský priemysel
SSE	Stredoslovenská energetika
SWD	Staff Working Document
ŠFRB	State Fund for Housing and Development
TATR	Toronto's Tower Renewal Program
ToR	Terms of Reference

Abbreviation / Acronym	Full Term / Definition
TSI	Technical Support Instrument
URSO	National Regulatory Authority
WAM	Projections scenario 'with additional measures'
ZSE	Západoslovenská energetika
ZSSK	Železničná spoločnosť Slovensko

Executive Summary

This document is 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 Directorate General for Structural Reform Support (DG 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. 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, the identification of vulnerable groups and stakeholder engagement plans: Slovakia provides an overview of the results of the first impact assessment conducted as part of efforts to evaluate the potential effects of ETS2 on Slovakia'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 key measures and investments, with a particular focus on identifying vulnerable groups and developing recommendations filling data gaps and improving the 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 it is based on conservative assumptions, for example in terms of consumer elasticity to price increases. ETS2 is part of a broader package of policies which have been thoroughly assessed in other reports and have been shown to have broadly positive impacts across Member States.

Key Steps Undertaken

The development of this report followed a structured approach to ensure comprehensive and tailored analysis for Slovakia. Key steps included gathering datasets and indicators on national context by the country teams and stakeholder engagement by beneficiary authority and country team to discuss and validate information regarding definitions and indicators to be used in the SCP process. Another input to the analysis were results from macro- and micro-modelling of ETS2 impacts on energy poverty and vulnerability, transport poverty and vulnerability, as well as the vulnerabilities of micro-enterprises. 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[1]. For the latter, we use the 2015 data to avoid the effects of the pandemic on the 2020 data. However, this is likely to overstate the actual impacts of ETS2 as, between 2015 and 2027, the consumption of fossil fuels by households

[1] See Annex A for more details on the data used in the model.

in heating and transport is reduced due to other energy and climate policies and changes in the overall price levels of these fuels.

Lastly, this report presents the first steps undertaken in identifying the national long list of measures that will be shortlisted for Deliverable 3.

Key figures

The table below provides an overview of key figures estimated and analysed in this report. While we generally provide relative figures throughout the report (for example, "as share" of total population), here we present the absolute figures.

Table 0-1 Key figures

	Number (thousands)	Notes
Population (2023)	5 429	Source: Eurostat. Also represents the number of transport users
Number of households (2023)	1 700	Source: Eurostat.
Micro-enterprises	665	Source: Eurostat SBS

		Share of Hhs	Number of Hhs	Share of population	Number of individuals	Notes
Vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2	Before ETS2	4%	64 200	3%	152 500	Based on EU HBS 2015
	€60/tCO₂	5%	93 500	5%	264 800	
Inability to keep house warm		7%	120 900	8%	438 700	EU-SILC 2023
Spending more than twice the median expenditure for heating		10%	172 000	13%	705 700	EU HBS 2015
Vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2	Before ETS2	7%	128 500	10%	518 700	Based on EU HBS 2015
	€60/tCO₂	9%	151 300	11%	618 800	
Affected by enforced lack of a car		3%	51 600	2%	108 600	EU-SILC 2023
Experiencing very difficult access to public transport				3%	164 900	EQLS 2016

	Share of	Number of	Notes
Vulnerable micro-enterprises	6%	40 800	Based on Eurostat SBS

Key findings

Chapter 1 of this report presents the estimated impact of ETS2 on fuel prices while also introducing the current state of play for buildings, transport poverty and microenterprise vulnerability through the use of context indicators. The ETS2 is part of a broader set of measures (i.e., the Fit for 55 package implementing 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, heating-related fuel expenditure would be expected to drop by -1.9% to -1.0% of total expenditure for goods and services for low and high-income households respectively (see Chapter 3.6).

It is important to note that in line with the revised Emissions Trading System (ETS) Directive[2], Member States will receive significant revenues from the sale of allowances beyond the amounts included in the Social Climate Fund (SCF). The use of these additional revenues is less constrained compared to the SCF, although this is also to be spent in climate action, energy transition and other environmental measures.

Chapter 2 puts forward the proposed approach for the identification of vulnerable groups in Slovakia based on definitions set out in the Social Climate Fund Regulation and supported by both EU and national indicators. National indicators were discussed in detail within the Working Group on the preparation of the Social Climate Plan in Slovakia organised by the National Implementation and Coordination Authority (NIKA). The indicators are not only elaborated on in Chapter 2, but also in Annex F.

The results presented in Chapter 3 of this report are based on Household Budget Surveys and EU SILC data. These are the most complex surveys containing both the data on income and expenditures and social conditions of households collected on a regular basis in EU Member States. Similarly, data from EUROSTAT SBS 2022 and the JRC IDEES 2021 database were used to prepare analyses on micro-enterprises by the Expert Team. The analyses put forward by the Expert Team were further supported by additional analyses based on national HBS data and other surveys focused on energy poor households as well as field research. National analyses were used to present the current Slovak landscape and complement the micro and macro modelling analyses.

[2] Directive (EU) 2023/959

Energy poverty of households and households vulnerable to the introduction of the ETS2

Slovak households have one of the highest shares of energy expenditures on disposable income amongst EU countries – with a median value of 7.6% of total expenditures spent on heating. Energy prices do not significantly contribute towards such a bad position in comparison with the other countries as energy prices belong to the lower ones within EU region. Slovak Government has been subsidising energy prices for households in recent years. High relative energy costs in Slovakia are caused by low disposable income, climatic conditions and the energy inefficiency of Slovak dwellings, especially family houses.

Based on EU SILC data, 5% of households are living in dwellings with a leaking roof and damp walls, 6% have arrears on utility bills, and 7% of households are unable to keep their home adequately warm. Slovakia also has 10% of the population living in hidden energy poverty, i.e. spending less than half the national median on heating fuels and having total expenditures below the national median. Finally, 8% of households spend more than twice the national median on heating fuels and their total expenditure is below the national median. These households have more household members than the average, so the number of affected persons is even higher.

Households in the lowest income quintile are in the worst situation. 23% of the population in the lowest income quintile is not able to keep their homes adequately warm. Significantly affected by the inability to keep their home warm are also households in the second lowest income quintile (8%) and also in the two highest income quintiles (4%). Affected households are mostly located in rural areas, i.e. 9% of the rural population compared to 6% in the urban population.

Based on national indicators, regardless of the introduction of ETS2, Slovakia already has up to 16% of households in energy poverty. Households that are most exposed and vulnerable to energy poverty are families with at least one child (29% of energy poor households), single pensioners (14%), and single parents (8%). The aforementioned household compositions predominantly live in family houses in rural areas.

Based on deep analysis of energy poverty taking into consideration the indicators on technical conditions of dwellings, income, energy expenditures and air pollution (serious problem in regions of Slovakia indicating energy or transport poverty) the regions the most exposed to energy poverty are the same as the most lagging behind regions in southern and eastern part of Slovakia.

3.7% of households are estimated as vulnerable before the introduction of the ETS2 (i.e. with an ETS2 price of 0 EUR/tCO_2) according to the 2M indicator[3]. This share

[3] A dedicated indicator showing vulnerability to the introduction of the ETS2 estimated as part of this project based on EU-level data (see chapter 2 for more details).

increases by around 1–2% with an introduction of the ETS2 depending on the ETS2 price. The share of vulnerable households in Slovakia rises moderately with rising CO_2 prices. Approximately 4.5% of households are deemed vulnerable with an ETS2 of 30 EUR/tCO_2) and to 5.4% at an ETS2 price of 60 EUR/tCO_2. In practice, most of the households and individuals identified as vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 are already vulnerable before the introduction of the ETS2.

At an ETS2 price of 60 EUR/tCO_2 there is expected the increase in energy costs for heating for households using fossil fuels of 140 EUR/year. The first decile has to spend 1.45% of their total expenditure for this increase, reducing to 0.45% of total expenditures for the tenth decile. The highest increase is expected to be in sparsely populated areas where households are expected to spend an additional 1.6% of total expenditures. They will have to spend an estimated additional EUR 230 per year, while households in urban areas will only spend EUR 50 more per year.

Transport poverty of households and transport users vulnerable to the introduction of the ETS2

A similar situation as that presented above can be observed in transportation. 19% of the population spend more than 6% of their expenditures on transport and 15% of the population spends more than twice the national median on transport and has total expenditure below the national median. Transport expenditures form an average 3.7% of total households' expenditures. The increase in price due to the ETS2 will be felt most acutely by those using private cars to commute. Individual motorised transport is used more frequently in rural areas to commute to cities where basic services are provided such as schooling, health care, and more employment opportunities. In rural areas, 14.5% of the population can be considered vulnerable at the carbon price of 60 EUR/tCO_2 with the lowest expenditure deciles more exposed to transport vulnerability as a result of ETS2 – 20% of the population of the lowest expenditure tercile is expected to be vulnerable. Overall, 11.4% of households are deemed vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2 for a carbon price of 60 EUR/tCO_2, a limited increase compared to a situation without ETS2, in which 9.6% of households are vulnerable.

The average cost increases due to the ETS2 for those households using petrol or diesel is estimated at an average EUR 130/year at an ETS2 price of 60 EUR/tCO_2. Households in the highest income deciles will in absolute values spend more on ETS2 costs for transportation compared to the lowest deciles. In relative terms, the share of total expenditures households spend on the ETS2 is estimated at around 0.7%, showing the fact that higher-income households can more easily absorb the additional cost. There is an equal distribution within regions of different degrees of urbanisation at the level of around 0.6–0.7%. The fact that many lower-income households do not own a car is important. While they may not be directly affected

by the ETS2 price, they can still benefit from the ETS2, if they are deemed to be in transport poverty.

Analyses based on the latest national data from the HBS 2023 could more accurately describe the current situation regarding energy and transport poverty - both the size and the groups affected by poverty and vulnerability based on increase in ETS2. The TSI Country Team has requested, via NIKA, the data from the Statistical Office of Slovak Republic. National HBS 2023 was not delivered in due time and thus DLV 2 Impact assessment cannot be updated anymore.

Micro-enterprises

For micro-enterprises, the most affected will be those that use a combination of oil for heating and hot water, LPG for cooking and gasoline for car with EUR 184 increase in costs per year from 2030 onwards. The increase in costs is expected to be significantly higher for transport intensive micro-enterprises (passenger and freight transport, taxi, etc.), at over EUR 2 000 per year. Based on our analysis of micro-enterprises energy costs and capacity to invest, 6% of micro-enterprises is expected to be vulnerable to ETS2.

Measure and Investments

Well designed and effectively implemented measures and investments can prevent enlargement of the group of people seriously affected by the increase of the energy price based on establishment of ETS2. At the same time, these measures can significantly improve the living condition of households in energy poverty as a secondary objective. Effective design of the SCP is very important to target the most vulnerable households and microenterprises.

We have prepared a list of recommended measures and investments as a part of this report. It is comprised of measures targeting energy and transport poverty. These can be categorised into the following groups (table below and additional analysis in Chapter 4 and Annex D provides additional details).

Buildings measures and investments:

- improvement of energy efficiency of the dwellings (in apartment buildings, family houses and social housing) by support of reconstruction of the building combined with replacement of heating sources, construction of social housing to ensure affordable energy costs for vulnerable households;
- decarbonisation support based on usage of renewable energy sources can decrease the energy expenditures in sustainable way. The effort should be supported by technical assistance with documentation needed for reconstruction or for obtaining renewable energy sources and by information and education campaigns.

Transport measures and investments:

- emphasis in solving transport vulnerability should be placed particularly on support, optimisation and, if necessary, enlarging public transport services

especially in rural and remote areas. The support of active transport (by supporting of bikes/e-bikes and building bicycle infrastructure) in urban areas can improve the situation of transport vulnerable in a sustainable manner.

Table 0-2 Overview of the national long list of measures and investments

Building sector - national long list of measures and investments	
Building renovations	1.1 Family houses renovation
	1.2 Apartment buildings renovation
	1.3 Buildings of micro-enterprises renovation
Affordable housing	2.1 Renovation of social housing in apartment buildings and renovation of social service facilities managed by municipalities and including non-public providers
	2.2 Development of social housing – apartment buildings owned by municipalities and by non-profit sector (construction and reconstruction)
	2.3 Self-help construction of family houses
Decarbonising heating and cooling	3.1 Support for connection to and development of decarbonised small heating networks at the community level
	3.2 Support of renewable energy sharing and energy communities
	3.3 Solar energy installations on individual buildings
Information, education, awareness and advice	4.1 Advice, professional assistance, combining one-stop-shops according to the EPBD and EED and community / field social work
	4.2 Education of local governments and other professionals, Training and capacity-building programs for stakeholders involved in the implementation of SCF
Support public and private entities	5.1 Public-private partnerships (renovation loans, guarantee funds, energy performance contracting, pay-as-you-save financial schemes with financial institutions and investors)
	5.2 Financial support for compliance with stricter minimum energy performance requirements (e.g. EPBD Art. 9 for micro-enterprises)
	5.3 Support for deployment of solar energy
	5.4 Fiscal incentives (reduced tax rates on renovation works and materials, on-tax schemes, on-bill schemes regulatory reforms to facilitate building renovations)
Transport sector – national long list of measures and investments	
Public transport	1.1 Increase of the quality of public transport, optimisation of public transport connections and frequency via National Transport Authority (NADA)'s continuation of the public transport reform, including data collection

Building sector - national long list of measures and investments	
	1.2 Support schemes for buying new zero- or low-emission vehicles for public transport and fleet expansion with charging points
	1.3 Maintaining reduced fare for selected groups like students, seniors (62 years old and above), disabled persons
Cycling infrastructure	2.1 Building bicycle infrastructure
	2.2 Support scheme for e-bikes and cargo bikes
Individual mobility	3.1 On demand transport for selected groups
	3.2 The promotion of a second-hand market with EV/BEV
Multimodal mobility and support of non-motorised modes of transport	4.1 Multimodal mobility points (integrated terminals)
	4.2 Campaigns promoting the use of transport modes other than individual car mobility
Direct income Art. 8, par. 2	37.5 % of the estimated total costs of the Plan can be used for direct income. The details to be completed when measures are selected. Impact is an immediate relief from the cost burden, with a short-term effect that does not address the root cause of vulnerability or energy or transport poverty and does not have a positive impact on emissions.

Next steps

Further and more up-to-date analyses were planned to be prepared by the TSI Country Team based on national HBS 2023 data with more recent outlook and analysis of the current state of play and vulnerability at the household and individual level. The data was not delivered in due time, so the analyses cannot be incorporated it DLV 2 Impact Assessment.

Simultaneously, meetings with key stakeholders will take place with the aim to address any gaps identified in the assessment and the existing lack of data, focus on administrative identification of vulnerable households, and communicate the outputs of the analysis and the suggestions for solving the problem of poverty and vulnerability in a sustainable manner. The suggested measures will be communicated with the stakeholders with the goal to build consensus around priority actions and prepare the short list of measures that are most suitable in the national context.

This impact assessment provides a foundation for creating Slovakia's comprehensive Social Climate Plan. By addressing these challenges identified in this report with targeted, inclusive measures, the plan aims to support a just transition to a low-carbon economy and protect the most vulnerable by supporting their individual transition to clean heating and mobility.

1. Introduction

This is the draft DLV 2 report for the project *Support to the Preparation of Social Climate Plans*. This project is funded by the European Union via the Technical Support Instrument and is managed by the European Commission Directorate General for Structural Reform Support (DG REFORM). The contractor (a consortium led by Trinomics and including Ecorys, E3-Modelling, IEECP, Oeko-Institut, Copenhagen Economics, Sweco Finland (formerly Gaia), EpV, EGÚ Brno, ENBEE, ELLE, as well as several independent consultants) support nine Member States (Belgium, Croatia, Czechia, Denmark, Finland, Latvia, Lithuania, Romania, and Slovakia) in the development of their national Social Climate Plans. These plans set out national approaches to reduce the potential negative impacts of the introduction of the Emissions Trading System 2 (ETS2) on vulnerable people, households and micro-enterprises.

This report provides a detailed approach to assessing the impact of ETS2 and identifying vulnerable groups. This report presents the results of activities carried out during the second phase of the project, excluding the Stakeholder Engagement Plan, which is presented in a separate document.

During this assessment, we encountered several challenges that should be carefully considered when interpreting the results. First, data limitations posed a significant constraint, as the analysis relied on incomplete coverage, outdated indicators, and gaps in relevant data, which restricted the depth and precision of insights. While this report utilises a whole range of datasets at the national and EU-level, some data gaps and caveats still exist. For example, related to the energy performance of the building stock or to spatial indicators of transport availability and the accessibility of essential services. Data on micro-enterprises also suffers from many limitations. Some data sources would benefit from more regular and thorough updating. The recent energy crisis has had a substantial impact on several trends analysed in this report, with its long-term implications, particularly regarding sustained price increases, remaining unclear. Additionally, the introduction of emerging concepts in the Social Climate Fund regulation, such as vulnerable transport users and vulnerable micro-enterprises, presented another challenge, as standardised assessment methodologies for these groups have not yet been established. Finally, the ETS2 operates within a broader policy context as part of the Green Deal, which includes multiple measures being implemented simultaneously by Member States. This overlap makes it inherently complex to isolate the specific impact of ETS2, adding a significant margin of uncertainty to the findings, besides the underestimation of users' reaction to price signals.

Overall, it is expected that the results on ETS2 effects, notably from the micro-analysis, are over-estimating the effects of ETS2, due to (i) the use of HBS 2015 data (while fossil fuel consumption will have already gone down by 2027), (ii) the application of only short-term elasticities, (iii) the 100% cost pass through

assumption. Nevertheless, some factors also contribute to some underestimation, such as some households underreporting their heating and transport expenditure in the HBS 2015 data.

As regards the transport side, it needs to be flagged that the report heavily focusses on affordability dimension of transport poverty, as spatial data on transport availability and accessibility is scarce.

1.1. Reading Guide

This report is structured as follows:

- ✓ **Chapter 1** (the current chapter) provides an introduction to the aims of the project phase that identifies ETS2 impacts and also provides national context on the sectors targeted by SCF;
- ✓ **Chapter 2** outlines the approach that has been taken for assessing the impacts of ETS2 and identification of vulnerable groups, including the definitions and indicators that will be used nationally;
- ✓ **Chapter 3** provides the impacts of ETS2, based on the macro- and micro-modelling;
- ✓ **Chapter 4** provides a preliminary long list of measures considered and identified during national stakeholder consultations;
- ✓ **Chapter 5** provides the recommendations for the collection and use of data, indicators and criteria to identify and estimate the size of the vulnerable groups;
- ✓ **Chapter 6** outlines the next steps.

1.2. Context indicators

In this chapter, we provide a summary of some key contextual information and the estimated impact of ETS2 on fuel prices. Throughout the report, we look at recurring costs in heating and transport. In heating, this applies to heating fuels and heating 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.

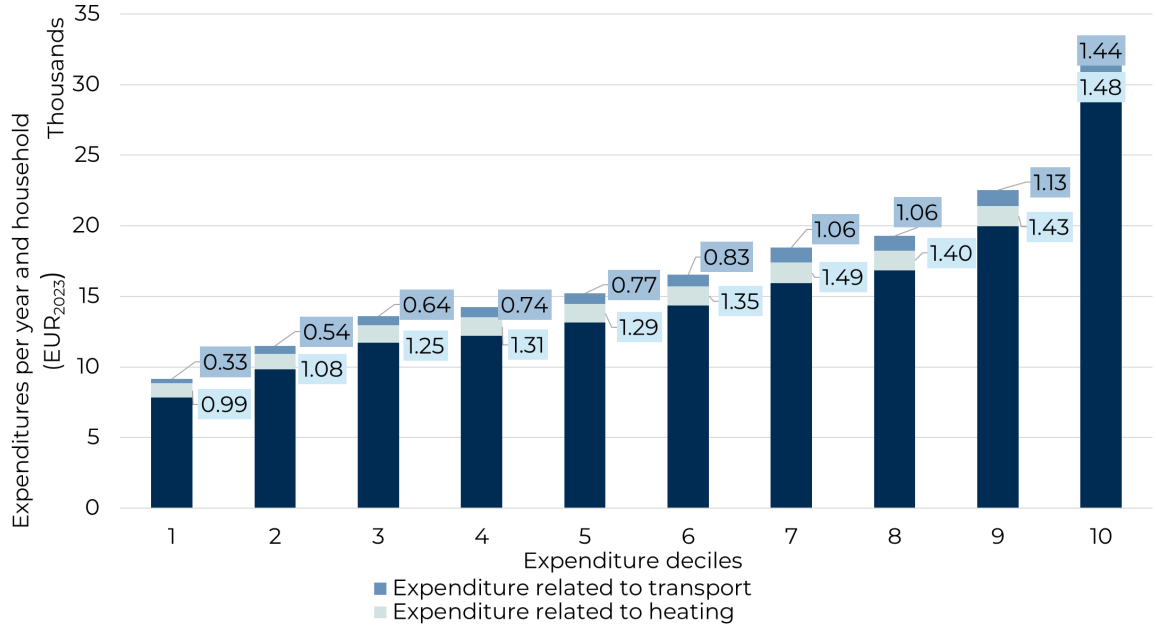
1.2.1. Household expenditure

Figure 1-1 gives an overview of total household overall spending and expenditures on heating and transport based on the HBS 2015 and inflated to EUR_{2023}. 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. We do not include costs related to purchasing a vehicle of operational costs beyond fuel costs.

On average, Slovak households spent 12.5% of their total expenditures on heating and transport in 2015 and inflated to EUR_{2023}, with heating expenditures the larger of the two across all deciles.

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 1-1 Overview of total household expenditure and expenditures on heating and transport, based on HBS2015 and inflated to EUR$_{2023}$.



Source: 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 Slovakia of 1.3879.

1.2.2. Household energy use – context indicators

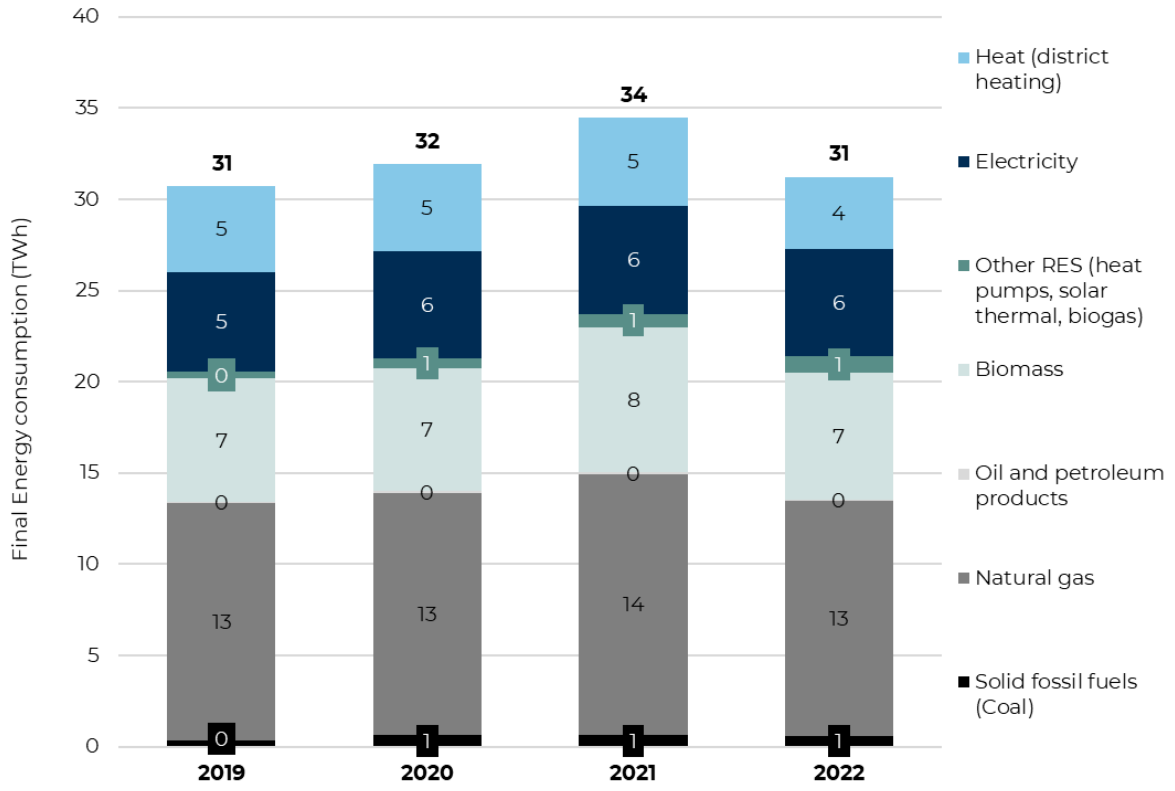
Final energy consumption by households in Slovakia totals approximately 31 TWh in 2022 (or approximately 16 865 kWh per household), an increase of approximately 28% since 2017. Figure 1-2 shows the split of households final energy consumption (all uses) per fuel type[4]. Since 2019, renewable energy resources contribute approximately 25% of the total, with biomass (solid primary biomass i.e. wood and wood pellets) providing around 22% and other renewables, including heat pumps, providing around 3%. The use of other renewables has increased by just under 1 TWh (+1 266%) since 2017. The use of natural gas has remained the predominant fuel type over the measured time period, contributing around 41% of the total, though it has decreased by 25% since 2017 in the total energy consumption. Electricity consumption for appliances, lighting and heating of around 6 TWh has

[4] Original Eurostat data measured final energy consumption in terajoules. These data points were converted to terawatt hours for ***Chyba! Nenašiel sa žiaden zdroj odkazov.***.

consistently represented approximately 18.5% of the total, whilst district heating of 4 TWh represents approximately 12.6% of the total.

Figures prior to 2019 are not shown as there was an adjustment in methodology and data reporting which boosted household biomass which the Slovak Statistical Office did not process in the previous years[5].

Figure 1-2 Total final energy consumption in households (2019–2022), TWh



Source: EUROSTAT [nrg_d_hhq]

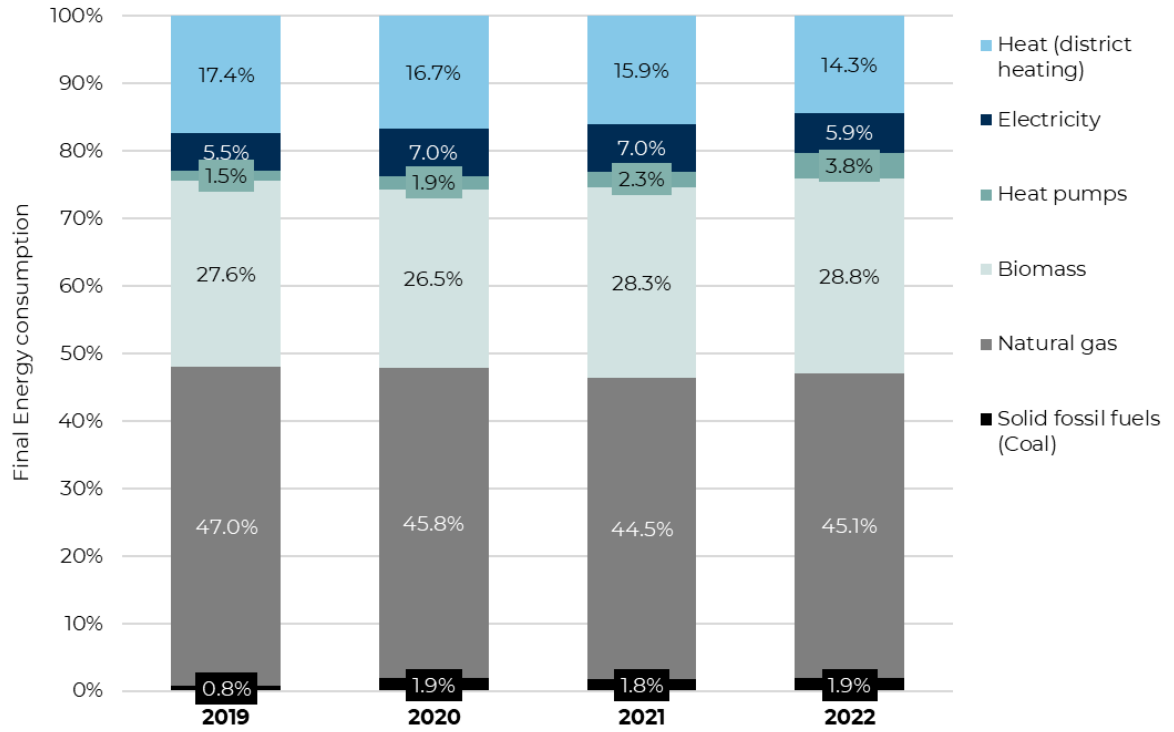
Figure 1-3 zooms in on final energy consumption for space heating use in households. In the case of single-family houses, the energy consumption incorporates hot water preparation too. This is important as the consumption type most likely to be impacted by ETS2, it is also typically the largest household energy consumption category, responsible for approximately 70% of all final energy consumption by households in Slovakia. As noted above, the role of natural gas in Slovakia is significant, it contributed 45.1% to space heating energy use in 2022. The 6% contribution of electricity of the total represents a significant use of electric resistance heating. Heat pumps account for around 3.8% of the total space heating final energy consumption. Biomass and heat represent a significant share of total space heating, representing 28.8% and 14.3% of the total respectively.

[5] Aktuality.sk. (2021). Aký je skutočný dôvod veľkého nárastu obnoviteľných zdrojov energie na Slovensku? https://www.aktuality.sk/clanok/860305/aky-je-skutocny-dovod-velkeho-narastu-obnovitelnych-zdrojov-energie-na-slovensku/.

Heat pump sales totalled approximately 12 000 units in 2023, with about 56 000 units installed in total[6]. This represents roughly 3% of the 1.72 million households in Slovakia[7].

Figures prior to 2019 are not shown as there was an adjustment in methodology and data reporting which boosted household biomass which the Slovak Statistical Office did not process in the previous years[8].

Figure 1-3 Household space heating energy use (2019–2022)



Source: EUROSTAT [nrg_d_hhq]

Note: A small residual of heating oil (0.2% in every year) is not shown in the graph.

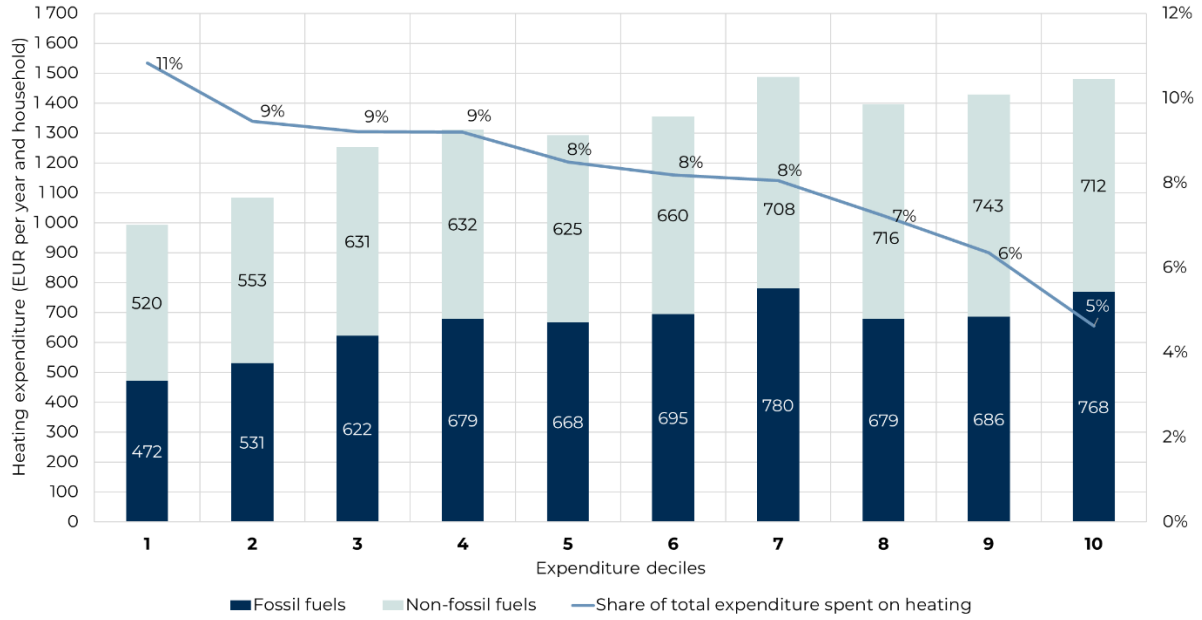
It is clear that a significant proportion of households will be exposed to gas price increases.

Figure 1-4 shows the heating expenditure by Slovak households by expenditure deciles, from lowest total expenditures to highest total expenditures[9]. Fossil fuels shown in the graph include natural gas, heating oil and coal, while non-fossil fuels include district heating and biomass. The chart shows how much the average

[6] EHPA. (2024). European Heat Pump Market and Statistics Report *2024*. *https://www.ehpa.org/wp-content/uploads/2024/08/Executive-summary_EHPA-heat-pump-market-and-statistic-report-2024-2.pdf*.
[7] Eurostat. (2024). Number of households by migration status, working status and household composition (lfst_hhmgscomp). https://ec.europa.eu/eurostat/databrowser/view/lfst_hhmgscomp/default/table?lang=en.
[8] Aktuality.sk. (2021). Aký je skutočný dôvod veľkého nárastu obnoviteľných zdrojov energie na Slovensku? https://www.aktuality.sk/clanok/860305/aky-je-skutocny-dovod-velkeho-narastu-obnovitelnych-zdrojov-energie-na-slovensku/.
[9] Expenditure deciles are 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.

household in each expenditure decile spends for the two fuel categories, noting that within each decile, some households use fossil fuels while other use non-fossil fuels. The chart's figures therefore depends on the share of each fuel category used within each decile, and the amount spent on that fuel. Expenditure for heating fuels rise in absolute terms along the expenditure distribution (higher-income households often have more floor space that they need to heat), the share of total expenditure that needs to be spent on heating falls significantly from 11% in the first decile to 5% in the tenth.

Figure 1-4 Average total heating expenditure by Slovak households by expenditure deciles according to the HBS in 2015 inflated to EUR$_{2023}$



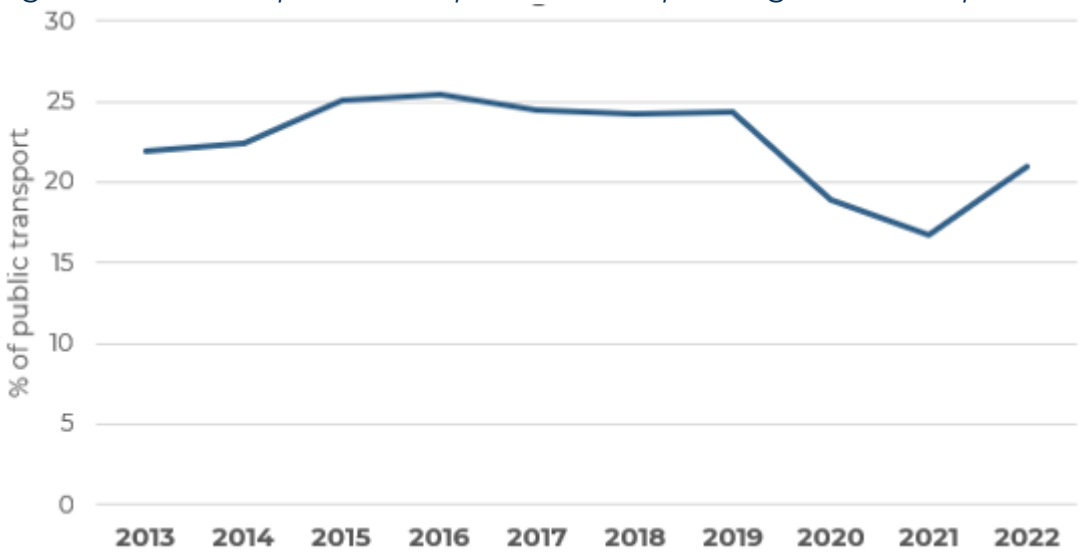
Source: HBS 2015, calculations with Oeko-Institut SEEK-EU micro model

Note: Expenditure deciles are constructed using new OECD equivalence weights. For the category 'fossil fuels' all deciles except decile 8 should be flagged due to a low number of observations (20–49 observations); deciles 1 and 2 are combined due to low number of observations. Fossil fuels include natural gas, heating oil and coal. Inflated using the Eurostat all-items HICP for Slovakia of 1.387.

1.2.3. Transport user context indicators

Slovakia remains heavily reliant on passenger cars as the main mode of transport, contributing around 75–85% of the total inland passenger transport km. Public transport contributes the remaining 15–25% of the total, as shown in Figure 1-5 below**Chyba! Nenašiel sa žiaden zdroj odkazov.**. A sharp decrease in public transport use in 2020-2021 can be attributed to the lockdown measures related to the COVID-19 pandemic; the 2022 trend implies a return towards the pre-COVID levels of around 25% modal share for public transport.

Figure 1-5 Share of public transport in inland passenger/km transport

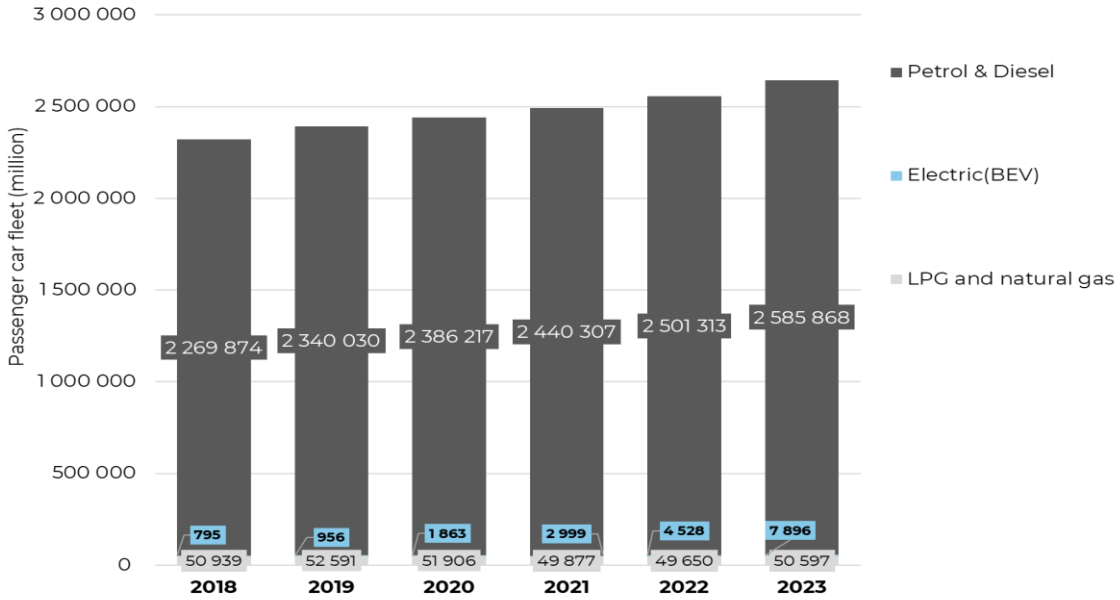


Source: EUROSTAT [tran_hv_psmod]

Note: Figures for the years 2013, 2014 and 2015 are estimated.

Car ownership in Slovakia is increasing, as shown in Figure 1-6, with car ownership totalling around 2.64 million in 2023, equivalent to around 500 cars per 1000 population, or 1.54 per household (1.72 million households in Slovakia), which is slightly higher than the EU average of 1.28 cars per household[10]. The great majority of passenger cars are petrol and diesel vehicles, representing around 98% of the total. 2% of vehicles run on LPG or natural gas. Fully electric vehicles represent only 0.3% of the total or around 8 000 vehicles at the end of 2023.

Figure 1-6 Passenger car fleet by fuel (2018–2023)



Source: Eurostat

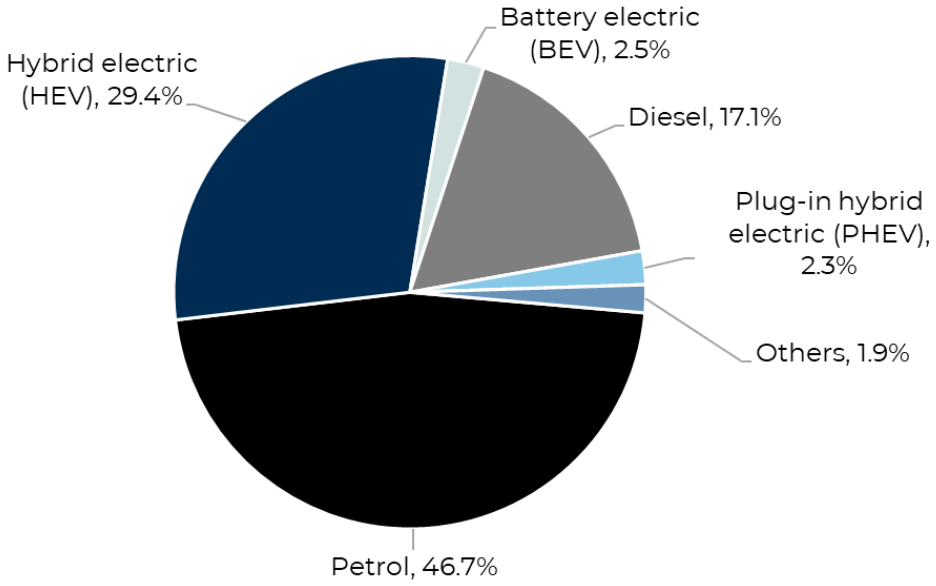
[10] Calculated on the basis of Eurostat passenger car fleet data [road_eqs_carhab] and household composition data [lfst_hhnhtych].

Note: dataset does not separate petrol and diesel

Looking at market trends, around 80 000–100 000 new passenger cars are sold each year in Slovakia, and latest year-to-date (Jan–Sep) 2024 data (see Figure 1-7) shows that full battery electric vehicles (BEV) take a 2.5% market share. Whilst hybrid electric vehicles represent a further 32% of the total, the great majority of new vehicles remain petrol (47%) or diesel (17%) fuelled. At the same time, it is important to note that 29.4% of the cars are HEVs, but only 2.6% are PHEVs.

Almost all passenger transport in Slovakia will be affected by the ETS2. Boosting public transport and currently very low EV take-up could be priorities, in addition to other measures supporting alternative transport modes such as walking and cycling.

Figure 1-7 Year to date (Jan–Sep) 2024 new car registrations by power source, Slovakia

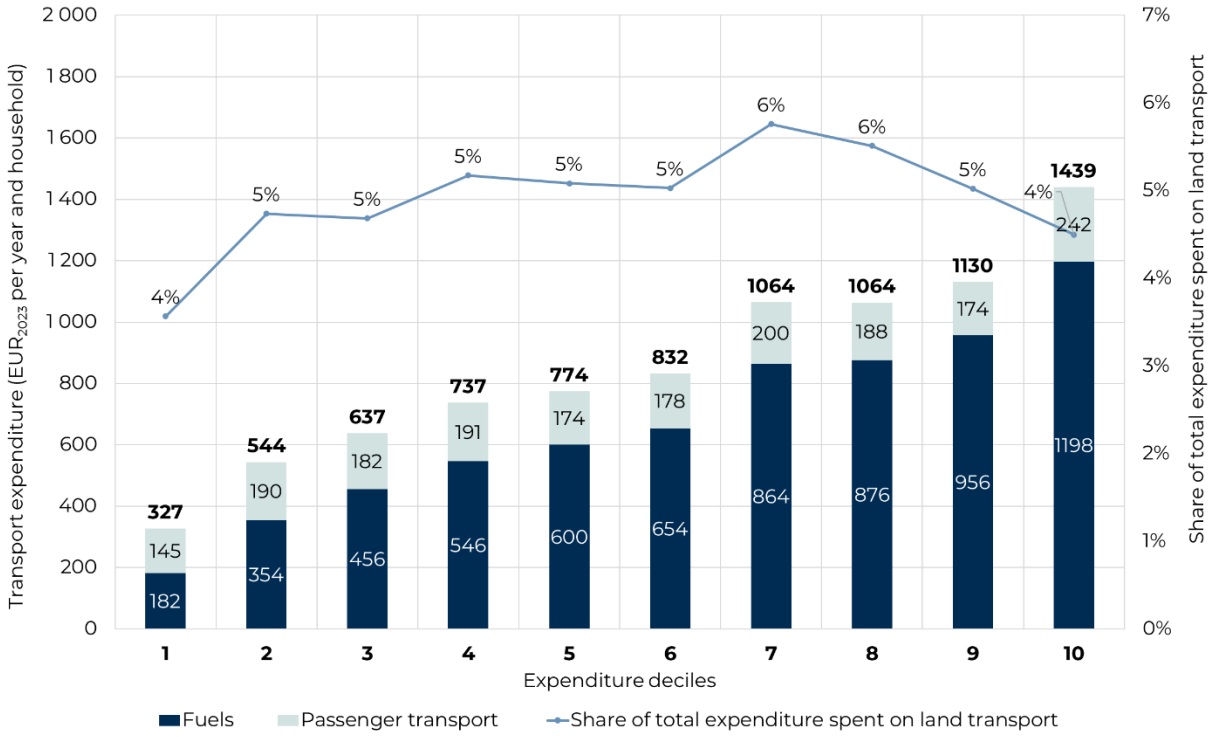


Source: European Automobile Manufacturers' Association [New car registrations]

Figure 1-8 shows the significant increase of expenditures for transport along the expenditure deciles. One reason for this increase is the fact that many lower-income households do not own a vehicle at all. As stated in Chapter 1.2.1, 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.

The share of total expenditures that is spent on transport is relatively stable across deciles, showing that higher-income households can more easily absorb transport costs. Only in the first and tenth decile the share spent on transport is significantly lower. Fuels (petrol, diesel) represent the most important expenditure element related to transport. According to the EU-SILC 2023, car ownership in Slovakia rises from 59% in the first income decile to 94% in the tenth.

Figure 1-8 Transport expenditure by Slovak households by expenditure deciles according to the HBS 2015, inflated to EUR$_{2023}$



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 Slovakia of 1.3879.

1.2.4. Current state of play – micro-enterprises

Based on data provided in the EUROSTAT SBS, the total number of micro-enterprises in Slovakia is 664 680. Micro-enterprises employ 835 822 people, meaning that the average micro-enterprise has 1.3 employees.

The analysis of the impacts of ETS2 includes the following categories of micro-enterprise:

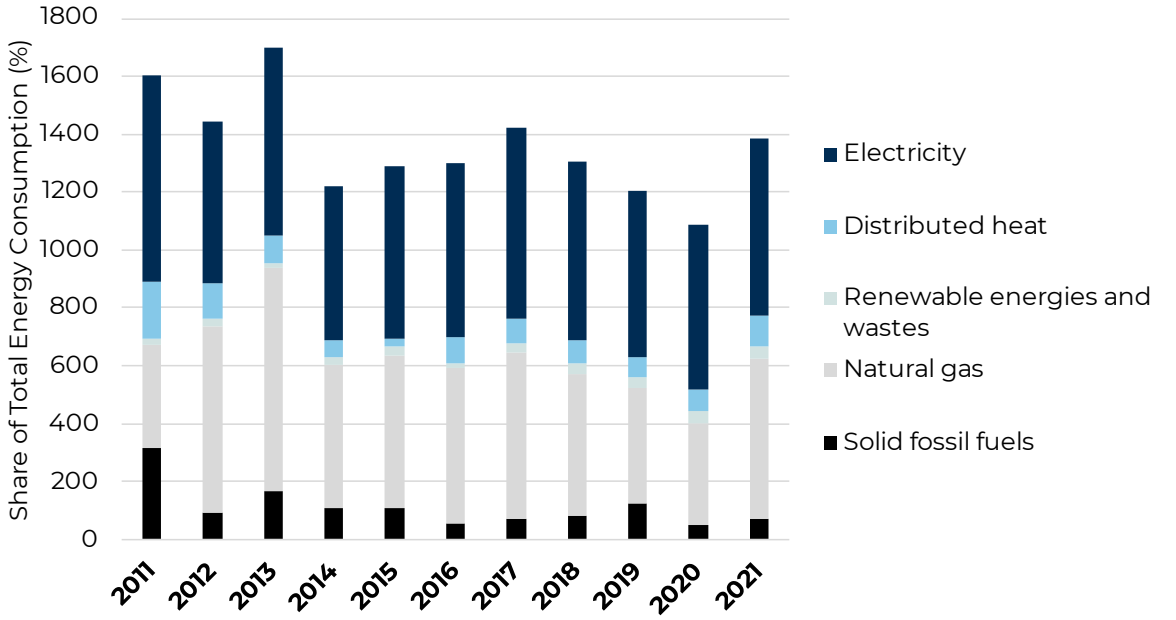
- **Service-sector micro-enterprises using fossil fuels in their building**. This includes around 48% of micro-enterprises in Slovakia (around 310 400 companies), which are analysed in terms of their buildings' energy expenditure based on different possible fuel mixes.
- **Service-sector micro-enterprises that own a** vehicle, excluding companies operating in the transport sector or transport-intensive sectors. This includes an estimated percentage of around 48% of all micro-enterprises in Slovakia (around 309 200 enterprises), for which we calculate the impacts in terms of transport fuel expenditure.
- **For transport intensive micro-enterprises**, companies that own and use passenger vehicles significantly more than average (such as taxi companies), and companies that own and use trucks, LDV or buses. We estimated that there is a total of 50 000 enterprises that can be considered transport and transport-intensive companies.

The groups can be estimated based on datasets available in the JRC-IDEES database[11], supported by data from the ORBIS database[12].

Buildings energy use

Figure 1-9 shows the energy consumption of the (entire) service sector per fuel type. This shows that natural gas and electricity are by far the largest fuel categories in consumption. The consumption of solid fossil fuels has decreased significantly since 2011. The share of renewable energy and wastes in consumption is low, but it has more than doubled since 2011. Additionally, distributed heat has fluctuated since 2011, and still does so.

Figure 1-9 Energy consumption by fuel for the service sector (2011–2021)



Source: JRC-IDEES [JRC-IDEES-2021_SK]

To estimate the number of micro-enterprises using different combination of fuels, we use the number of employees (common trait). We analysed statistics on number of employees per building, and estimate the number of micro-enterprises based on the average number of employees per micro-enterprise (1.3). This results in the following number of micro-enterprises (numbers are rounded:)

- 303 900 micro-enterprises use natural gas for all mentioned final thermal uses;
- 6 500 micro-enterprises use oil for heating and DHW, same number uses LPG for cooking.

The most common fuel used by service-sector companies' buildings is natural gas which is used in 47% of buildings for heating, domestic hot water (DHW) and

[11] European Commission. (n.d.). EU Science Hub – JRC-IDEES. https://joint-research-centre.ec.europa.eu/scientific-tools-databases/potencia-policy-oriented-tool-energy-and-climate-change-impact-assessment-0/jrc-idees_en.
[12] Moody's. (n.d.). Orbis. https://www.moodys.com/web/en/us/capabilities/company-reference-data/orbis.html.

cooking; 1% of companies use oil for heating and DHW, and LPG for cooking. The remaining 52% of buildings occupied by micro-enterprises is not included as none of the fuels used is in the scope of the ETS2.

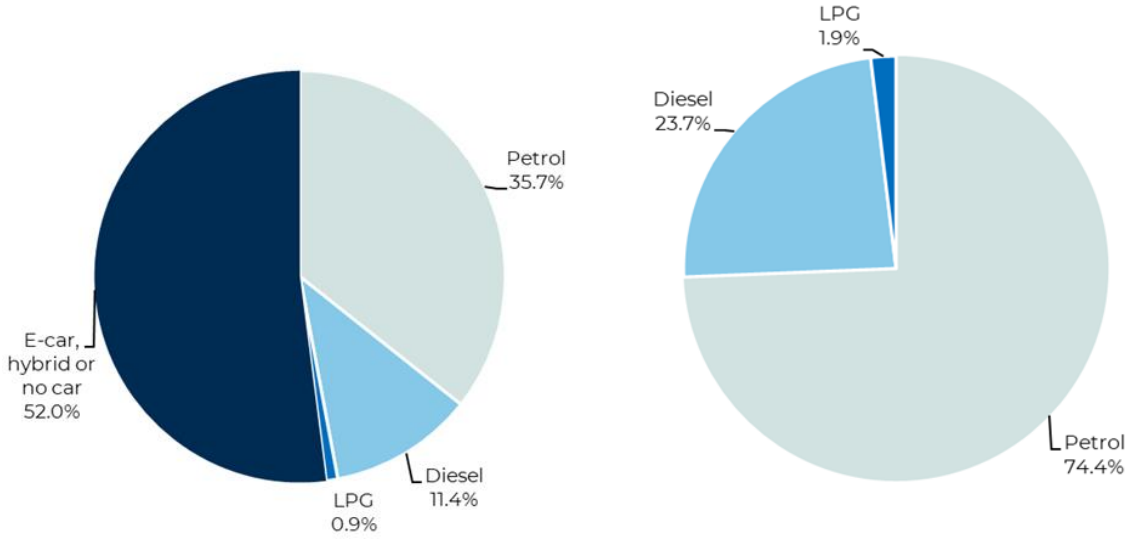
Transport energy use

Besides the energy consumption in buildings, micro-enterprises that own vehicles will incur additional costs. The impact will be different for micro-enterprises that: (1) own a company vehicle; and (2) those operating in the transport sector, which may own several cars, trucks or buses. To estimate the number of companies that own a vehicle, we used from JRC IDEES and national database[13].

Figure 1-10 shows the share of fuel used by company vehicles in Slovakia in 2021. The pie chart on the left hand side shows that 52% of micro-enterprises do not own a vehicle or own a vehicle that will not be affected by ETS2 (electric and hybrid cars, the latter only part-affected by ETS2); The pie chart on the right hand side shows that the most common type of fuel is petrol. In absolute figures (rounded):

- 229 900 micro-enterprises use petrol vehicles;
- 73 400 micro-enterprises use diesel vehicles;
- 5 900 micro-enterprises use LPG vehicles.

Figure 1-10 Distribution of fuel in vehicles owned by micro-enterprises



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

1.2.5. 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 standard practice, although in reality suppliers may choose to phase-in the increase or absorb some of it themselves). Accurate estimates of the effect on unit fuel prices can be made as the CO_2 content

[13] Ministry of Transport of the Slovak Republic – Institute of Transport Policy. (2022). (Ne)Máš na výber? Modelovanie výberu dopravného prostriedku. https://www.mindop.sk/uploads/media/d80501ba9a911d0a10f1351df52d5e7210098b92.pdf. (available in Slovak).

of key fuels is known. As shown in Table 1-1, ETS2 is expected to increase petrol and diesel prices by approximately 7–8 cents/litre (excluding VAT) at an ETS2 price of 30 EUR/tCO_2 in 2027, increasing to 14 cents (petrol) and 16 cents (diesel) per litre with an ETS2 price of 60 EUR/tCO_2 by 2030. The estimated impact on heating oil mirrors that of diesel as the carbon content is the same.

For natural gas, the estimated impact per kWh is for a price increase (excluding VAT) of approximately 0.5 cents/kWh at an ETS2 price of 30 EUR/tCO_2 in 2027, and by 1.1 cents/kWh with an ETS2 price of 60 EUR/tCO_2 by 2030.

For brown coal, the carbon content is approximately double that of natural gas per kWh, consequently the price impact is also approximately double, and is estimated to be priced at 1.1 cents/kWh in 2027, increasing to 2.1 cents/kWh in 2030.

The increase in price attributed to ETS2 will also lead for small further increase in VAT charged for the fuel. The rates for VAT vary per Member State and per fuel, in Slovakia rates of 3% are levied on all fuels. Therefore, the full effect would see the values in the table below increased by this percentage.

Table 1-1 Calculated impact of ETS2 on fuel prices, EUR per unit, excluding VAT, based on stated ETS2 price assumptions[14]

Unit	Carbon content [tCO_2/l /kWh]	ETS2 impact on unit cost [EUR per litre/kWh], excluding VAT	2027	2028	2029	2030	2031	2032
litre	0.00240079	Petrol	0.07	0.12	0.13	0.14	0.14	0.14
litre	0.00267628	Diesel	0.08	0.13	0.15	0.16	0.16	0.16
litre	0.0026728	Heating Oil	0.08	0.13	0.15	0.16	0.16	0.16
kWh	0.00018204	Natural Gas	0.005	0.009	0.010	0.011	0.011	0.011
kWh	0.00035712	Brown coal	0.011	0.018	0.020	0.021	0.021	0.021

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

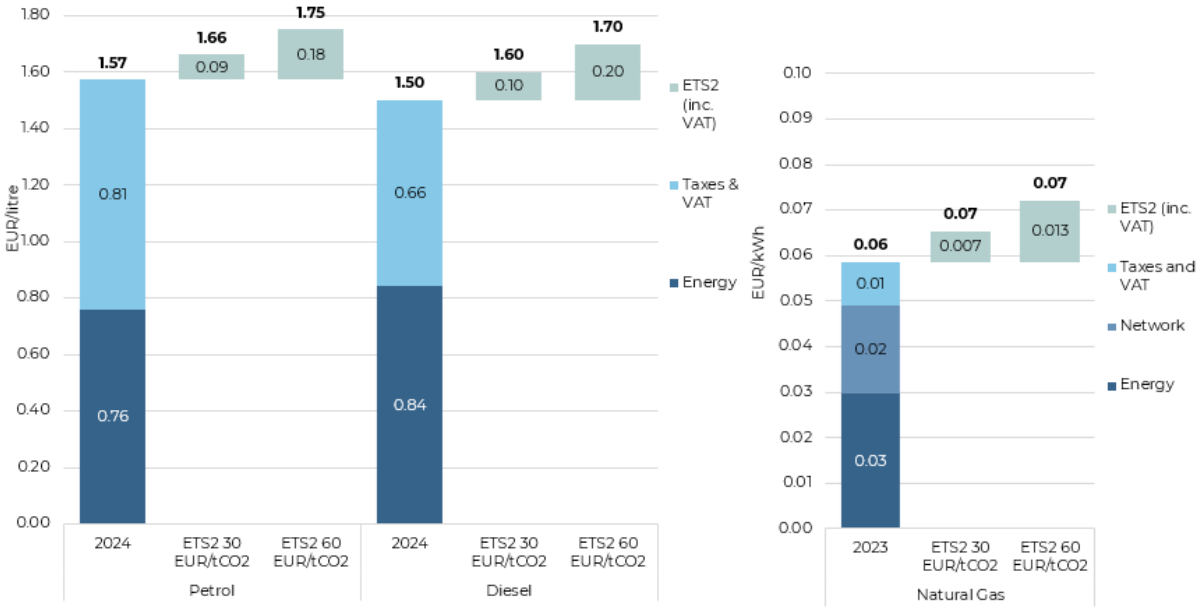
Note: The estimated impact on petrol and diesel prices is based on a 100% mix of these fuels. In reality a small share (typically <7%[15]) of blending with biofuels is likely to occur. This biofuel share would not be subject to the ETS2 impact. The calculated impact of ETS2 would be reduced by the % of biofuels, at 7%, this equates to a roughly 0.01 EUR per litre lower impact on the prices of both fuels by 2030.

Figure 1-11 puts these ETS2 price increases in the context of average 2024 prices in Slovakia, this shows for petrol, diesel and natural gas the relatively small 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 this period. Natural gas and coal are not shown as price data is unavailable (due to very low usage).

[14] According to the European Commission, the ETS2 price assumption to be taken is 30 EUR/tCO_2 in 2027, 50 EUR/tCO_2 in 2028, 55 EUR/tCO_2 in 2029, and 60 EUR/tCO_2 in 2030–2032. All values in 2023 EUR.

[15] See Figure 42 in Possible extension of the EU Emissions Trading System (ETS) to cover emissions from the use of fossil fuels in particular in the road transport and the buildings sector (2021) CITEPA et al, for more detail.

Figure 1-11 Estimated unit price impact compared to 2024 prices, with ETS2 price assumptions of 30 EUR/tCO$_2$ and 60 EUR/tCO$_2$ (ETS2 price increase component includes VAT)

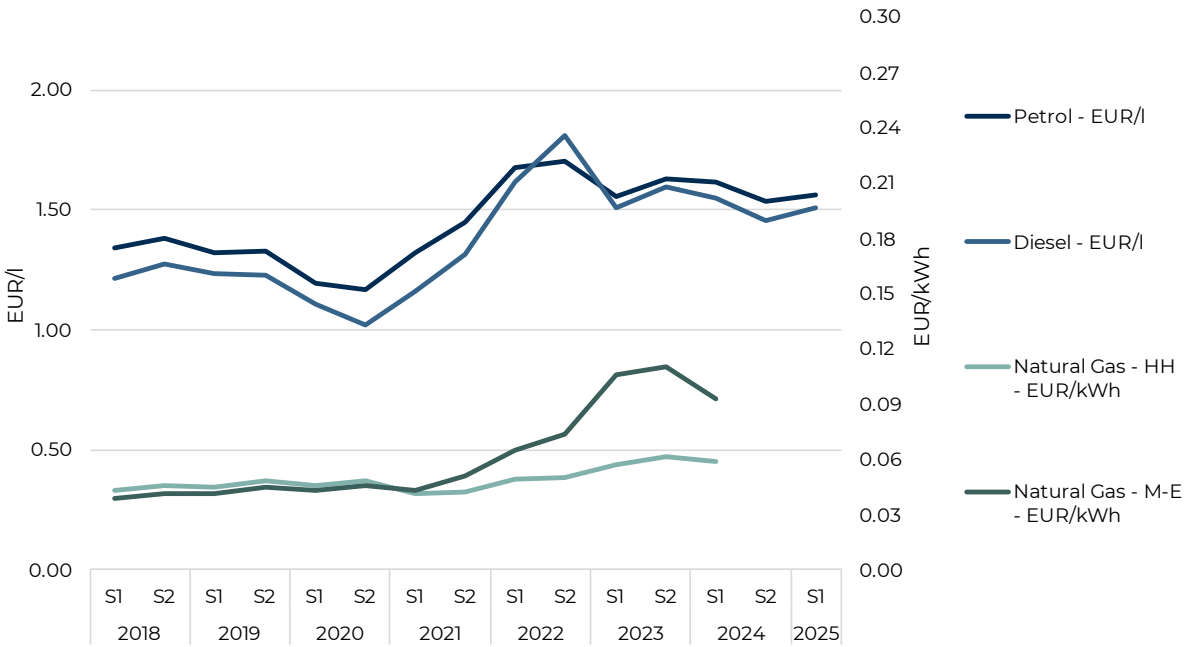


Source: Own elaboration based on Eurostat

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

Energy prices have been an important issue in the last few years with the price crisis that started at the end of 2021 leading to significant additional costs for most households, individuals, enterprises and governments. These have had important impacts on poverty and vulnerability. The price evolution of key fuels relevant for this work is shown in Figure 1-12, where the price crisis is clearly visible for all relevant fuels. For the oil-derived fuels, prices remain significantly higher than 2018–2019 prices.

Figure 1-12 Evolution of fuel prices for households and micro-enterprises, 2018–2025



Source: Own elaboration based on EUROSTAT [nrg_pc_203] and EU Oil Bulletin

Note: Gas prices for micro-enterprises (non-household consumers) are prices excluding VAT and all recoverable taxes and levies for band I1 (i.e. the band with the smallest consumption of <1 000 GJ per year). It is unclear if micro-enterprises, given that they are often home-based, would pay the non-household rate in reality, however, the difference is very small between non-household and household prices. (2) Carbon taxes, where these exist, are included in the prices presented above, these are not typically recoverable for micro-enterprises.

2. Initial approach for identification of vulnerable groups in Slovakia

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

2.1.1. Energy poverty

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;
- Households vulnerable to the introduction of the ETS2.

'Energy poverty' in the SCF Regulation is defined in exactly the same way as in the Energy Efficiency Directive (EED) 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*' (Art. 2(52) SCF Regulation).

If there is already a national definition of energy poverty in place, Member States do not need to change this definition, but need to explain how it is applied in the SCF context and how it aligns with the EED definition.

The concept of 'households and vulnerable to the introduction of the ETS2' is a new concept introduced by the SCF Regulation. Although some Member States currently use the concept of vulnerability in certain contexts, only the SCF Regulation definition should be applied in the SCP. The focus of the analysis and the measures should lie on this vulnerable group. However, energy-poor households are also eligible for measures.

In the Slovak context, it is firstly important to define the term household. According to Article 2, Point (8) of Regulation (EU) 2023/955 a household means 'a private household as defined in Article 2, point (15), of Regulation (EU) 2019/1700 of the European Parliament and of the Council'. It defines a private household as 'a person living alone or a group of people who live together, providing oneself or themselves with the essentials of living'. This term corresponds to the definition used for Housing Budget Survey by the Slovak Statistical Office and stems from Regulation (EC) No 1980/2003 where private household 'comprises of one or more persons satisfying two basic conditions: (i) they live together in the same dwelling

(residence) and (ii) they share expenditures, especially related to housing and catering"[16].

The Ministry of Economy formed the Working Group on Definitions. They suggest to use the definition of household in line with the above mentioned as: 'a person living alone or a group of people living together who provide the basic necessities of life'.

Slovakia has the official definition of energy poverty stated in Article 2, letter n of Act No 250/2012 Coll. on Regulation in Network Industries. It defines energy poverty as a situation where the average monthly household's expenditure on necessary utilities (electricity, gas, heat, hot water, supply of drinking water through the public water supply system, and disposal of wastewater through the public sewerage system) constitutes a significant proportion of the average monthly household income. This definition, however, lacks details that would allow us to unambiguously identify and quantify energy poverty. It does not define what is considered a significant proportion, nor it aligned with the Energy Efficiency Directive (EED).

The aforementioned Working Group on Definitions led by the Ministry of Economy suggested a definition of energy poverty. Based on their recommendations, the basic terms are defined as follows.

Energy expenditure: expenditure on 'energy products', which are fuels, heat, renewable energy, electricity or any other form of energy (according to Article 2(d) of the Energy Statistics Regulation, referred to in the EED Directive)

Disposable income is the sum of the income of natural persons of the household which is subject to income tax according to a special regulation (Act No 595/2003 Coll. on Income Tax, as amended), after deduction of compulsory health and social insurance premiums, social insurance benefits (from pension, sickness, guarantee, accident and unemployment insurance), benefits and allowances for material need and selected state social benefits (in particular, the compensation allowance for miners). Justification: only income from work and that which replaces income from work.

Vulnerable customer at risk of energy poverty (corresponds to the concept of 'vulnerable customer' in the EED Directive): is a vulnerable customer according to Art. 3a), points 10.1, 10.2, 10.7, 10.8 of Act No. 251/2012 on Energy, who lives in a household with a disposable income below the national median equivalent disposable income, the household's energy expenditure is 20% or more of the disposable income and the household lives in a dwelling with low energy efficiency, where income and energy expenditure are not examined, if the household is a

[16] Slovak Statistical Office. (2024). Private household in Household Budget Survey. https://slovak.statistics.sk/PACVPEM/vocabPagesDetails.html?id=41208&lang=en.

dependent customer according to Act 251/2012 § 3(3)(e)(1)(a). (b)(16) and (c)(16) (i.e. they are a person with a disability or their vital functions are dependent on the consumption of electricity.

The TSI team suggests adding those in hidden energy poverty and without access to electricity supply to the group of vulnerable households. While hidden energy poverty is defined as: 'household if its equivalent disposable income is ***p (70/100)*** percent or less of the national median equivalent disposable income, its verifiable energy expenditures are less than half the national median of the energy expenditures, and it lives in a dwelling with low energy efficiency'.

The Ministry is considering using the same definition in all official documentation produced to comply with the SCF Regulation, with the EED, and with the Energy Performance of Buildings Directive.

Furthermore, the national SCP definition of vulnerable households is identical to the EU definition suggested in the SCP Regulation: 'households in energy poverty or households, including low income and lower middle-income ones, that are significantly affected by the price impacts of the inclusion of greenhouse gas emissions from buildings within the scope of Directive 2003/87/EC and lack the means to renovate the building they occupy'.

For our analysis of energy poverty and vulnerability in the Slovak context, our assessment focuses on the two key dimensions: income and energy expenses, while data on energy efficiency of households is not available as part of the source used for the analysis (the HBS).

2.1.2. Transport poverty

According to the SCF Regulation, the group of **vulnerable transport users** consists of two (overlapping) subgroups (Art. 2(12) SCF Regulation):

- individuals in transport poverty;
- '*individuals and households, including low income and lower middle-income ones, that are significantly affected by the price impacts of [the ETS2] and lack the means to purchase zero- and low-emission vehicles or to switch to alternative sustainable modes of transport, including public transport.*'

Transport poverty is defined by the SCF as 'individuals' and households' inability or difficulty to meet the costs of private or public transport, or their lack of or limited access to transport needed for their access to essential socioeconomic services and activities, taking into account the national and spatial context' (Art. 2(2) SCF Regulation).

The definition aligns with the **availability**, **accessibility**, and **affordability** as core dimensions related to transport poverty:

- **Availability** is addressed by referencing the "lack of or limited access to adequate and equitable transport." This includes the physical presence, usability, and fair access to transport options, such as accessible public transport stops for people with disabilities or private vehicles, which are important for mobility in rural and peripheral urban areas.
- **Accessibility** is captured through the focus on enabling access to "essential socio-economic services and activities," ensuring that the system supports connectivity to employment, education, and healthcare.
- **Affordability** is emphasised by mentioning the "inability or difficulty to meet costs" as well as "enforced lack of car", addressing the financial burdens exacerbated by ETS2-induced fossil fuel price increases.

Member States have generally not yet fully developed the concept of transport poverty in national policy making. The SCP is an occasion to do so. The definition of 'transport users vulnerable to the introduction of the ETS2' (second bullet) applied in the context of the SCP should be used directly from the SCF Regulation and this group should be the focus of the analysis and the measures and investments in the SCP.

There is no official definition of transport poverty in Slovakia yet. Based on the discussions within the SCP working group, the Slovak SCP is expected to use the EU definition of transport poverty: 'individuals' and households' inability or difficulty to meet the costs of private or public transport, or their lack of or limited access to transport needed for their access to essential socioeconomic services and activities, considering the national and spatial context'.

The concept of transport poverty represents a complex problem. It can affect a whole region (village, municipality) if there is insufficient public transport, while even members of upper-income families can be affected by transport poverty. One approach to deal with this complexity is to divide transport poverty into three categories:

1. **regional transport poverty:** happens in a region (municipality) with insufficient public transport, and is linked to the frequency, commuting time to basic services, and accessibility of public transport;
2. **household transport poverty:** households with high share of transport-related expenditures related to transport that provides access to essential socioeconomic services and activities in their overall households' expenditures with income under poverty line. Hidden transport poverty is the other type of household transport poverty which cannot be determined on the basis of expenditures because these households are underspending their travelling costs as they cannot afford them financially; and
3. **individual transport poverty:** individuals who are unable to use public transport due to a disability, and at the same time their disposable income is lower than a set threshold (proposed to be national median). Such person can be permanently or temporally disabled, e.g. due to injury.

Not all the above-mentioned aspects of transport poverty can be measured. The most difficult measurement is the one related to hidden energy poverty as well as regional transport poverty. Slovakia does not define standards determining what frequency of public transport is suitable for a municipality. Such standards are planned to be prepared by the end of 2025 by the National Transport Authority NADA. Subsequently, these standards can be used to indicate the regions suffering with transport poverty and the proposed measures can be implemented there. To assess the household transport poverty, the 2M and 6% indicators, described in more detail in Table 2-2, can be used.

Meanwhile, the indicator based on the partial results of the work done by the Institute for Environmental Policy (IEP), an analytical institute of the Ministry of Environment of the Slovak Republic, could be used as proxy for indication of transport poor region. IEP has developed its own system for defining vulnerability of citizens in the transport sector based on the 3As framework (affordability, accessibility, and availability) combining with other socio economic indicators Vulnerability is measured by the composite index based on the wide range of selected Slovak-specific indicators (more details can be found in Annex F) what makes it difficult to use the index for targeted problem solving and addressing the measures . There are the other sources of data that can be used to identify the transport poor region based on public transport unavailability and inaccessibility prepared by the Institute of Geography of Slovak Academy of Sciences[17,18].

After the discussion within the SCP working group, the EU definition of transport vulnerability will be adopted for the purpose of the SCP, with two exceptions. In the Slovak definition of vulnerable transport users, the purchase of LEV or ZEV vehicles is omitted because Slovak households and individuals in transport poverty cannot buy or use even cheaper fossil fuels vehicles. It was also suggested to omit the part regarding the purchasing of vehicles as all effort should concentrate on the support of public transportation. However, an exception is made when addressing individual transport poverty, e.g. people with disabilities or persons in remote rural areas. This was considered to be the most appropriate solution for the problem of transport poverty in Slovakia as it covers all the potentially vulnerable transport users and can significantly decrease GHG emissions.

Therefore, the Slovak definition of vulnerable transport users will cover the individuals and households in transport poverty, but also individuals and households, including low and lower middle income households, who are significantly affected by the price impacts of the inclusion of greenhouse gas emissions from road transport under Directive 2003/87/EC and do not have the

[17] Székely, V. and Novotný, J. (2019). Spatial differences in public transport accessibility of district centres in the Prešov region, Slovakia. https://pdfs.semanticscholar.org/32c3/5ef1436c0ffcbe24bb722509f5a07a43f35a.pdf.
[18] Székely, V., Novotný, J. and Michniak, D. (2023). Without a car and overnight stay, can a visit to a regional centre be an unattainable goal in Slovakia? https://rcin.org.pl/Content/240415/WA51_276649_r2023-t44_EuropaXXI-Szekely.pdf.

means to switch to alternative sustainable modes of transport, including public transport.

As both the definitions lead to the same group of vulnerable households or individuals, we suggest using original EU definition.

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

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

This chapter gives an overview of the indicators that can be used to assess energy poverty and vulnerability to the introduction of the ETS2. The concept of energy poverty and the indicators used to measure energy poverty are independent of the SCP and should be applied in policy-making across the board, as well as in the national implementation of the EED and EPBD, for example. For indicators measuring vulnerability to the introduction of the ETS2, the relevant factors of the definition, i.e. households and individuals 'significantly affected by ETS2 costs, that are in the lower or lower-middle income group and lack the means to renovate the building they occupy' need to be taken into account.

Based on the suggestion of the Working Group on Definitions led by the Ministry of Economy and the TSI Country team, the proposed definition is transposed into the following indicators.

A household is in energy poverty if:

(a) its disposable income is ***p*** percent or less of the national median equivalent disposable income, its verifiable energy expenditures are ***n*** percent or more of disposable income, and it lives in a dwelling with low energy efficiency;

(b) its equivalent disposable income is ***p*** percent or less of the national median equivalent disposable income, its verifiable energy expenditures are less than half the national median of the energy expenditures, and it lives in a dwelling with low energy efficiency; and

(c) it lacks physical access to electricity supply (for instance because of the lack of a physical connection to the power grid, or because of the inability to connect due to its recurring non-payments).

The suggested values for the parameters are p=100% (70%), n=20% (15%), and the 'low energy efficiency criterion' representing a "dwelling that is not insulated". To identify vulnerable households, the above-mentioned indicators of energy poverty will be used. These indicators will be adjusted in line with the price increase of fossil fuels caused by ETS2. Table 2-1 provides an overview of the key indicators that will be used to assess energy poverty and vulnerability.

Table 2-1 Summary table of key indicators

Indicator Name	Definition/ Description	Data Source	Relevance/ Importance	Indicator for energy poverty	Indicator for energy vulnerability
Standard energy poverty	Disposable income is ***p*** percent or less of the national median equivalent disposable income, its verifiable energy expenditures are ***n*** percent or more of disposable income, and it lives in a dwelling with low energy efficiency	Slovak national HBS; HBS	High	Yes	Yes
Hidden energy poverty	Modified M/2. It measures the proportion of households that spent very low amount of money for ensuring energy (most probably caused by low income). Equivalent disposable income is ***p*** percent or less of the national median equivalent disposable income, its verifiable energy expenditures are less than half the national median of the energy expenditures, and it lives in a dwelling with low energy efficiency.	HBS	High	Yes	Yes
Without access to electricity	Household lacks physical access to electricity supply	Electricity distributors (DSOs)	Median	Yes	Yes

Other indicators that can also help to quantify the problem of energy poverty are estimated based on EU-level data (EU-SILC and HBS 2015) (see table below). Results for these indicators are displayed in Chapter 3.2.2. As stated in Chapter 1.2.1,

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.

However, in the Slovak context, they are not considered to be the most precise to describe the problem of energy poverty with all its nuances, and national stakeholders indicated a preference for the indicators presented above. Based on field research, the self-assessment indicators may not correctly indicate the problem of energy poverty. The answer of respondent has been often influenced by outdoor temperature, health status, state of mind or comparison by friends or neighbours.

Table 2-2 Other energy poverty indicators

Indicator Name	Definition/ Description	Data Source
M/2	The household population that spends less than half the national median on heating fuels and has total expenditure below the national median. Based on national discussions we prefer comparison to income.	EU HBS 2015
2M	Household population that spends more than twice the national median on heating fuels and has total expenditure below the national median. Based on the field research – people around the median expenditures can overconsume energy because of overheating their dwellings. And such people should not be considered as energy poor.	EU HBS 2015
Leak roof	Households living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor	EU SILC
Arrears	Households having arrears on utility bills	EU SILC
Keep warm	Households are unable to keep home adequately warm	EU SILC
EED default indicator	Arithmetic mean of three SILC indicators shown above and the AROP rate	EU-SILC 2019

In the context of this report, we also estimate a dedicated vulnerability indicator based on the EU HBS 2015 where we go through the steps detailed in Table 2-3. Results of this indicator are displayed in Chapter 3.2.1

Table 2-3 Vulnerability to energy poverty and to the introduction of the ETS2: Indicator based on an adaptation of the 2M indicator and on HBS 2015 data.

Indicator measuring vulnerability to energy poverty and to the introduction of the ETS2	Data
"Adapted 2M indicator" heating • Only households and individuals **with fossil fuel expenditure** (natural gas, heating oil, coal) are included. • To reflect the requirement that this should be limited to low and lower-middle incomes, we include households in the **bottom half of the expenditure distribution**[19]. • 2M threshold is estimated without CO_2 costs for all households and heating sources (using HBS 2015). This threshold is then fixed for all CO_2 price levels. • Vulnerable households are those that spend more than the 2M threshold based on their fossil-fuel heating costs including CO_2 costs. • The number of vulnerable households according to this indicator differs for each CO_2 price level.	EU HBS 2015

This adapted 2M indicator uses the same threshold value as the classic 2M indicator (albeit focussing only on heating costs). The median share of expenditure spent on heating is determined for all households based on the HBS 2015, including for households that heat with electricity, district heating and biomass. It is therefore based on expenditures before the introduction of the ETS2. The threshold value is fixed at twice this median expenditure. For Slovakia, the median value is equal to 7.6% and the 2M value equal to 15.2%.

For the different ETS2 price levels evaluated in this report (see Chapter 1.2.5), the adapted indicator then checks whether the heating fossil-fuel expenditure share in total expenditures is above the 2M value or not. The respective ETS2 prices are added to the 2015 expenditures. We are thus carrying out a comparative static analysis that takes the expenditures in the HBS 2015 as a basis and checks how vulnerability changes in case ETS2 prices are added on top of these expenditures. We apply the short-term price elasticities discussed in Chapter 3.1.1. As also explained in Chapter 3.1.1, using the HBS 2015 for this analysis of vulnerability may overestimate vulnerability at given ETS2 prices, as households have since reduced their fossil fuel use due to other policies and measures, as well as due to overall economic developments (see Chapter 3.5 where the impact of other policies and measures is taken into account).

[19] 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.

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

This chapter gives an overview of the indicators that can be used to assess transport poverty, as well as vulnerability to the introduction of the ETS2. For the vulnerability indicators, the relevant factors of the definition, 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- and low-emission vehicles or to switch to alternative sustainable modes of transport, including public transport'.

As already mentioned, the problem of transport poverty is a multilevel problem that cannot be solved by measures at a household level alone. In many cases, whole regions with insufficient public transportation are affected by transport poverty. Moreover, even member(s) of upper-income families can have a problem accessing the basic services, such as attending the school of their choice. To identify households in transport poverty (and to apply the proposed definition), we suggest using the indicators as described in the table below. The indicator corresponding to region in transport poverty is the one not available, as the national transport standards have not been defined yet. NADA should prepare them by the end of the year 2025. The indicators of transport poverty were used based on the report of European Commission[20].

Table 2-4 presents a summary of the proposed transport poverty indicators, based on European Commission recommendation on transport poverty definitions and indicators[21].

Table 2-4 Summary table of key transport poverty indicators

Indicator Name	Definition/ Description	Data Source	Applicability to SCF definition of vulnerability	Relevance/ Importance	Indicator for transport poverty	Indicator for transport vulnerability
Transport poor household	Share of the (household) population that spends more than	EU HBS	Yes	High	X	X

[20] European Commission. (2024) Transport poverty: definitions, indicators, determinants, and mitigation strategies - Final Report. https://employment-social-affairs.ec.europa.eu/transport-poverty-definitions-indicators-determinants-and-mitigation-strategies-final-report_en.

[21] European Commission. (2024) Transport poverty: definitions, indicators, determinants, and mitigation strategies - Final Report. https://employment-social-affairs.ec.europa.eu/transport-poverty-definitions-indicators-determinants-and-mitigation-strategies-final-report_en.

Indicator Name	Definition/ Description	Data Source	Applicability to SCF definition of vulnerability	Relevance/ Importance	Indicator for transport poverty	Indicator for transport vulnerability
	6% of total expenditures on transport (only including recurrent expenditures such as fuels, tickets) and household is in bottom half of expenditure distribution					
Transport poor household	Share of the (household) population for which the share of transport expenditures in total expenditures exceeds twice the national median and household is in bottom half of expenditure distribution	HBS	Yes	High	X	X
Transport poor region	Region (municipality) with insufficient public transport caused by frequency, commuting time to basic services or accessibility of bus stops	Not yet	Possible if reduction in the number of public transport connections can be estimated based on the increase in energy prices	High	X	X

We also estimate a dedicated vulnerability indicator based on the HBS 2015 where we go through the steps detailed in Table 2-5.

Table 2-5 Vulnerability to transport poverty and to the introduction of the ETS2: Indicator based on an adaptation of the 2M indicator and on HBS 2015 data

Indicator measuring vulnerability to transport poverty and to the introduction of the ETS2	Data
"Adapted 2M indicator" transport • Only households and individuals **with fossil fuel expenditure (petrol, diesel)** are included. • To reflect the requirement that this should be limited to low and lower-middle incomes, we include **households in the bottom half of the expenditure distribution**.[22] • The 2M threshold is estimated for all households and all mobility options without CO_2 costs (using HBS 2015). This threshold is fixed regardless of the CO_2 price level. • Vulnerable households are those that spend more than the 2M threshold based on their fossil-fuel transport costs including CO_2 costs. • The number of vulnerable households according to this indicator differs for each CO_2 price level.	HBS 2015

The median share of expenditure spent on mobility is determined for all households based on the HBS 2015, including for households that do not own a vehicle and do not use fossil fuels for mobility. It is therefore based on expenditures before the introduction of the ETS2. The threshold value is fixed at twice this median expenditure. For Slovakia, the median is equal to 3.7% with the 2M threshold value set at 7.3%.

For the different ETS2 price levels evaluated in this report (see Chapter 1.2.5), the adapted indicator then checks whether the mobility fossil-fuel expenditure share in total expenditures is above the 2M value or not. The respective ETS2 prices are added to the 2015 expenditures, which are inflated to EUR_{2023} using the Eurostat all-items HICP. We are thus carrying out a comparative static analysis that takes the expenditures in the HBS 2015 as a basis and checks how vulnerability changes in case ETS2 prices are added on top of these expenditures. We apply the short-term price elasticities discussed in Chapter 3.1.1. As also explained in Chapter 3.1.1, using the HBS 2015 for this analysis of vulnerability may overestimate vulnerability at given ETS2 prices, as households have since reduced their fossil fuel use due to other policies and measures (e.g. those aimed at increasing energy efficiency), as

[22] 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.

well as due to overall economic developments (see Chapter 3.5 where the impact of other policies and measures is taken into account).

Other indicators that can describe transport poverty are presented below in Table 2-6. They can offer a complementary picture but with many limitations as they can be distorted due to the subjectivity of the responses.

Table 2-6 Overview of other transport poverty indicators

Indicator Name	Definition/ Description	Data Source	Applicability to SCF definition of vulnerability	Relevance/ Importance	Indicator for transport poverty	Indicator for transport
Forced car ownership	Share of the population that is both materially and socially deprived (MSD) individuals and owns a car	EU SILC	it can be used for identification of vulnerability due to ETS2	Medium	X	X
Availability of public transport	Public transport stops too far	EU SILC	Yes	Medium	X	X
Access to public transport	Very difficult access to public transport	EU SILC	Yes	Medium	X	X
One-way commuting time > 30 minutes	Regions of one way commuting lasts longer than 30 minutes	EU SILC	Applicable	Low	X	X
Lack of car	Share of the population that faces enforced lack of a car	EU SILC	Applicable	Medium	X	X
Unaffordability	Unaffordability of public transport – individual or household level (based on too much money	EU SILC	Applicable	Medium	X	X

Indicator Name	Definition/ Description	Data Source	Applicability to SCF definition of vulnerability	Relevance/ Importance	Indicator for transport poverty	Indicator for transport
	spent on public transport)					

2.2.3. Vulnerability of micro-enterprises in the SCF context

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 most Member States, and national policies rarely refer to micro-enterprises specifically. Based on discussions held in the last months, it is proposed to operationalise the definition of vulnerable micro-enterprises by looking at micro-enterprises that:

a. use fossil fuels for their buildings or vehicles, and both are not new or refurbished, but also have inadequate funds to invest in renovation and purchase of vehicles, based on their profit account;

b. have a high energy expenditure to start with and are energy dependent, either for building or transport – which means having fuel use in the sectors significantly affected by ETS2.

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

Indicators for the vulnerability of micro-enterprises

The following chapter provides an explanation of the indicators used to determine the number of vulnerable micro-enterprises, according to the ETS2 definition and the criteria mentioned in Chapter 2.2.3. An assessment of micro-enterprises vulnerability according to these indicators is then presented for Slovakia in Chapter 3.

Core Indicator 1:

Micro-enterprises using fossil fuel and that 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.

This indicator estimates the number of micro-enterprises that are unable to invest in building renovations or sustainable vehicles. These are identified by the fact that their Profit/Loss account is lower than yearly depreciation of investment in the a)

building or b) building or vehicles. Only micro-enterprises that use fossil fuels for a) building or b) building and vehicles; and are affected by ETS2.

Core Indicator 2:
Micro-enterprises with significant energy expenditure:

This indicator estimates the number of micro-enterprises that operate in sectors with significant energy expenditure. If the national datasets are available, these sectors are identified on the basis of energy costs (sectors in which the average company spends more than 5% of its annual turnover in energy costs). If data concerning energy cost by sector is not available at national level, sectors with significant energy expenditure are assumed to be those with high energy consumption. These sectors are identified in Chapter 3.

The combination of the two indicators (Core Indicators 1 and 2) provides an estimate of the number of **companies with substantial energy costs, and that are unable to afford investments in buildings' energy efficiency and new vehicles that can allow them to offset the impacts of ETS2.** These two indicators describe vulnerable micro-enterprises by the definition from the SCF Regulation.

The two Core Indicators may be complemented by additional indicators, which would allow to further refine the number of vulnerable micro-enterprises or identify them with more precision. Additional indicators that can be considered are:

- **Limited access to capital:** considers companies' access to financial resources, and how this may impact their ability to invest in necessary improvements or expansions. For example, this may result in some micro-enterprises being excluded from the count of vulnerable micro-enterprises (as they are able to access investment capital at good term) or included in the count (they may make sufficient profits over the timeline considered, but they may not have access to finance to support them with the upfront investment costs).
- **Composition of the market and competitiveness**: Understanding the structure of the market and the level of competition that may affect the financial resilience of companies, which can make some companies more vulnerable than others.
- **Distribution of vulnerable companies per region:** Analysing how vulnerability is spread geographically and identifying regions with higher concentrations of at-risk companies.
- **Relevance of accessible public transport:** Assessing whether the availability and reliance on public transport affect companies' operational costs or limit their access to obtaining and selling goods and services.
- **Additional indicators:** This category covers other country-specific factors, such as number of companies located in distant or island locations, or sectors that are particularly vulnerable because affected by unique challenges or risks.

Table 2-7 Structural indicators for determining vulnerable micro-enterprises

Indicator	Explanation	Used (y/n)
1. CI1: Means to renovate building or buy sustainable vehicles	Micro-enterprises 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 (refers to the three obligatory indicators)	Yes, it is the Core Indicator
CI2: 2.1	Micro-enterprises with significant energy expenditure for on-site fossil fuels consumption, and which face significant cost increases after introduction of ETS2	Yes, it is the Core Indicator
CI2: 2.2	Micro-enterprises with significant expenditure for transport fuels, and which face significant cost increases after introduction of ETS2	Yes, it is the Core Indicator

3. Impacts of ETS2 and identification of vulnerable groups in Slovakia

3.1. Modelling approach

The impact of ETS2 on poverty and vulnerability has been estimated using different models. The primary estimation for households and transport users has been made using micro-economic modelling approaches. The impacts on micro-enterprise vulnerability have been estimated using statistical analysis. Looking forward to the need for measures and investments in the SCP, macro-economic modelling has been used to provide insights into the impacts of the ETS2 (and other Fit for 55 policies) on household and individual expenditures, investments and other behaviours. The following Chapter provides a summary of the methodological approach taken for each of these. More detailed descriptions and information can be found in the annexes to this deliverable.

3.1.1. Micro-modelling: Households and transport users

The micro modelling of households and transport users is based on Oeko-Institut's microsimulation model SEEK-EU (Figure 3-1) 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 (see Annexes

Annex A: Further details on the micro-modelling approach for more details on the data used in the model).[23] As stated in Chapter 1.2.1, 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.

Related to the EU HBS, the last available datasets are those from 2015 and 2020. In the context of this study, we use the 2015 data, as i) 2020 is a pandemic year which affects expenditure in the transport sector quite significantly and ii) several data issues have been identified with the 2020 dataset. Additionally, as stated in Chapter 1.2.5, for the purpose of the report, we assume 100% of costs are passed through onto the consumers.

On the one hand, using the 2015 data, we represent a pre-pandemic and pre-energy crisis year, thus giving a more likely impression of a 'regular year'. On the other hand, the ETS2 impact we estimate is likely to overstate the actual ETS2 impact as, between 2015 and 2027, the consumption of fossil fuels by households

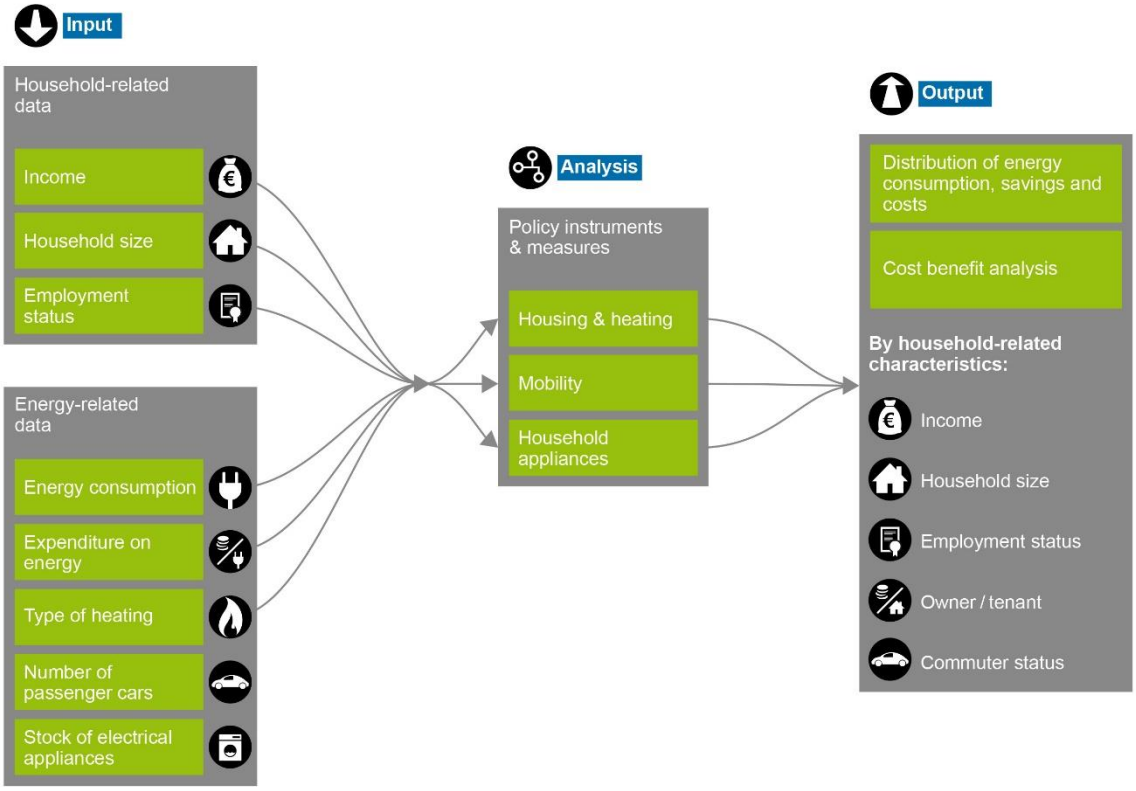
[23] See Annex A for more details on the data used in the model.

in the heating and transport is reduced due to other energy and climate policies and changes in the overall price levels of these fuels. Those changes in the demand for fossil fuels induced by other policies and developments are taken into account in the modelling presented in Chapter 3.5. We do expect, however, that in the case of vulnerable groups, these reductions are less pronounced and the 2015 data more likely a 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.

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.

The microsimulation model SEEK-EU has a modular structure. In the first module, the database is prepared, and, amongst other steps, missing values are filled in or, in some cases, extreme / extraordinary values are corrected. In the next step, the target groups relevant to the context of the ETS2 and the SCF are defined, these groups include income (expenditure) deciles, the degree of urbanisation, and the dwelling type. A further module calculates the energy and transport poverty indicators and the indicators showing vulnerability to energy and transport poverty and particularly vulnerability to the introduction of ETS2, as well as the expected impact of the ETS2 in terms of the additional expenditure spent on GHG emission costs.

Figure 3-1 Oeko-Institut SEEK-EU microsimulation model



In the context of this report, we estimate a main scenario, where behavioural changes of the households and transport users in response to ETS2 prices are accounted by using general short-term elasticities for heating and road transport[24]. As a sensitivity analysis, a scenario that does not account for behavioural changes at the level of households and transport users is estimated, in this scenario the amounts of fossil fuels consumed stay the same as in the baseline data of the HBS 2015.

The 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. These elasticities are broadly in line with those estimated in Temursho-, U. & Weitzel, M. (2024)[25] and Oeko-Institut (2020)[26]. Short-term elasticities cover changes in consumption that are achieved with little or no investments, such as heating less or using the car less often. The short-term price elasticities applied in the micro

[24] Elasticities are used to model how flexible consumers are in response to price changes. A low price elasticity means that if prices increase consumers are not readily able to reduce their consumption, for example a house should have a minimum level of heating. A high price elasticity means that consumption is much more easily reduced, i.e. household spending on entertainment or restaurants. Heating and transport fuels price elasticities are usually low, as houses need to be heated and people need to travel for work and other reasons, therefore price increases lead to higher costs much more than they lead to reduced consumption.

[25] Temursho, U. & Weitzel, M. (2024). Consumer demand in EU Member States. https://publications.jrc.ec.europa.eu/repository/handle/JRC136876..

[26] Oeko-Institut. (2020). Analysis of a new carbon market for road transport and buildings: Quantifying short-term response potentials to carbon price increases. Unpublished.

modelling are very different from a long-term elasticity that would also capture investment activity by households. The SCF was set up because it is likely that middle- and higher-income households can invest and shift away from fossil fuels more easily and thus have a higher long-run price elasticity. In Chapter 3.2**Chyba! Nenašiel sa žiaden zdroj odkazov.**, we cover changes in consumption that are long-term linked to both changes in behaviour and investment activity.

We choose the lower end of the short-term elasticity estimates to make sure that we account for the fact that vulnerable households may already be consuming at a level that only just fulfils their basic needs and may be falling below this level, if they reduce their consumption[27].

We apply the ETS2 price path and its translation to end consumer prices presented in Chapter 1.2.5, taking into account country-specific VAT rates. For Slovakia, we apply a VAT rate of 23%. We add the expected ETS2 costs based on this price path to the 2015 expenditures from the EU HBS 2015, which are inflated to EUR2023 using the Eurostat all-items HICP. We are thus carrying out a comparative static analysis that takes the expenditures in the HBS 2015 as a basis and checks how vulnerability and costs change in case ETS2 prices are added on top of these expenditures.

In many instances more recent or additional data at the micro level is available in-country. Where possible, this data was compared at the aggregate level to the EU-level data used in SEEK-EU. Furthermore, analysis based on this country-specific data is presented in Chapters 3.2.2, 3.2.4, and 3.3.2.

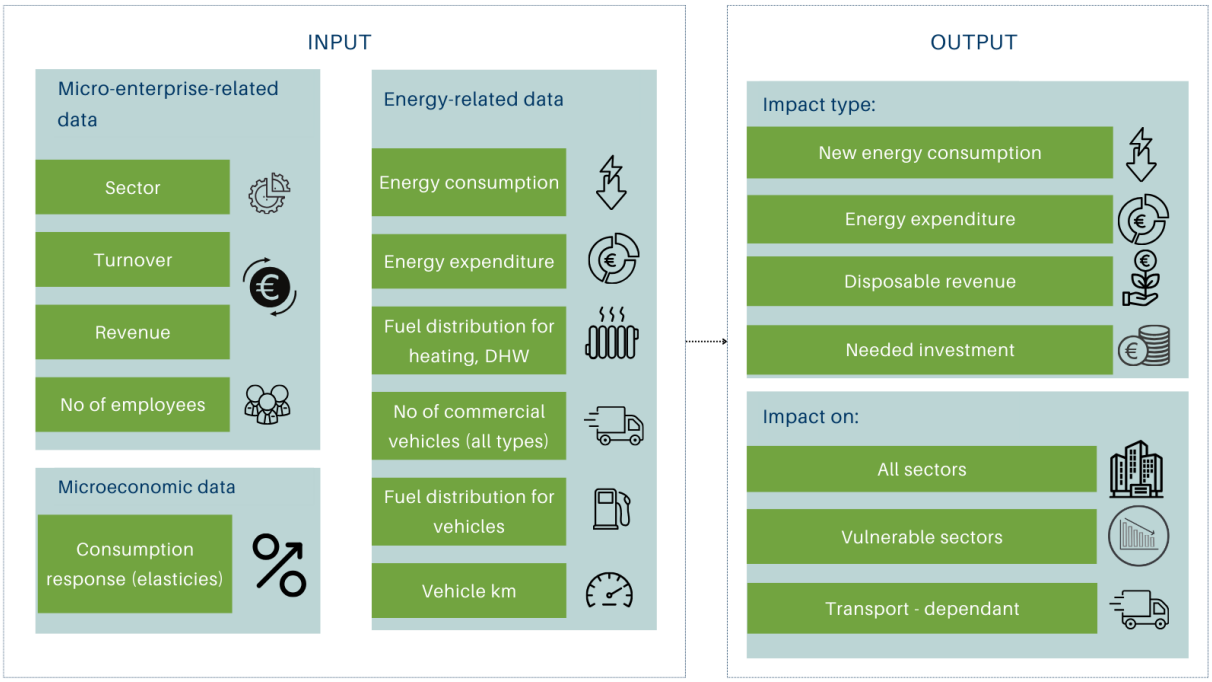
3.1.2. Micro-modelling: Micro-enterprises

In order to assess the impacts of ETS2 on micro-enterprises, we used IEECP's tool (see Figure 3-2), 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.

The tool assigns the investment, disposable revenue and defines the specific effect of the sectors with significant energy expenditure, based on the available data in existing datasets. The results help not only to quantify the total impact on micro-enterprises but also to identify the number of companies that are significantly affected by this impact.

[27] Note that indirect impacts on households deriving from an increase in the price of goods (because of increase in transport costs) are not considered in modelling.

Figure 3-2 Calculation process for micro-enterprises



The number of micro-enterprises is derived by preference from national data sources where available, due to its greater granularity. However, when necessary, national data are supplemented by the EUROSTAT SBS and ORBIS databases. Assessing the ETS2 impact on micro-enterprises is challenging due to limited data on energy use at this level of granularity, this is compounded by reliance on broader SME categories in existing datasets. Methodological approaches used to address this include (1) modelling energy consumption based on traits like employee numbers; (2) using shared databases; and (3) conducting surveys where possible.

Baseline energy consumption in buildings and transport is estimated through datasets like JRC-IDEES, adjusted for technology efficiency, and categorised by energy carrier and vehicle type, considering transport-dependent sectors separately. The ETS2 impact is calculated by analysing changes in energy expenditure and price elasticity for various consumption scenarios, alongside annualised investment costs for 2027–2032 to estimate the vulnerability of micro-enterprises.

More detailed information on the micro-modelling approach is provided in Annex A.

3.1.3. Macro modelling

The macro analysis is based on E3-Modelling's suite of models GEM-E3 (macro-economy), PRIMES (energy system) and MHM (Multiple household satellite module). The GEM-E3 model provides the scale and composition of economic growth for each country, PRIMES provides the energy system that is consistent

with the economic growth and the MHM module computes expenditures per household (decile) for different incomes and households. The macro-level data are largely derived from EUROSTAT, GTAP v11, IEA and ILO, whereas the household data are derived by EUROSTAT using the HBS[28] and the experimental ICW databases[29].

The reason for using this combination of models is to capture the dynamics of the energy and economic system but also the interplay between energy and climate policies. GEM-E3 captures how the income of households can change over time whereas the PRIMES model captures how not only ETS2 but also other energy efficiency and RES policies affect and interact with households' decisions and consumption patterns in the future. Expansion of the ETS through ETS2 will drive efficiency improvements through technology substitution, behavioural changes and renovation.

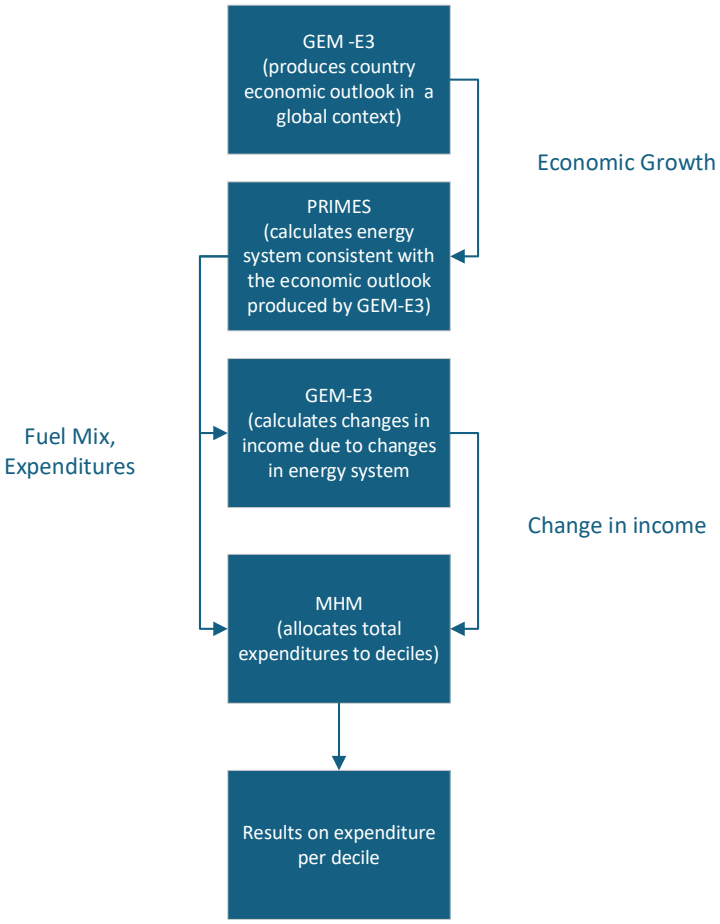
It is beneficial to the selection of measures and investments in the social climate plans to deepen the understanding of the changes in energy expenditures whilst also accounting for a number of changes including:

i) household income over time,
ii) fuel and technology adoption driven by energy policies
iii) technology cost dynamics, and
iv) behaviour changes.

To account for this the following modelling sequence and exchange of information among models is adopted (see Figure 3-3).

[28] Mainly the hbs_exp_t133: Mean consumption expenditure by income quintile, hbs_str_t223: Structure of consumption expenditure by income quintile and COICOP consumption purpose.
[29] Mainly the icw_aff_01: Disposable income of households (with expenditure greater than zero) spent on essential goods and services by income quantiles - experimental statistics.

Figure 3-3 Modelling sequence for the macro analysis



For this study two scenarios have been considered:

1. **A baseline scenario** consistent with the REF2020[30] producing the following indicators.
    - Power supply mix and investments;
    - Energy efficiency investments by HHs;
    - Fuel mix in industry;
    - Fuel mix in buildings (HHs, commercial sector);
    - Fuel mix in transport modes;
    - Expenditure for new vehicle stock;
    - Carbon prices;
    - Consistency check for fuel and electricity price changes.
2. **A Policy scenario (named MIX[31])** where a mix of climate and energy policies are implemented to reach EU carbon neutrality in 2050. This scenario includes a number of policies for the residential, commercial and transport sectors beyond the introduction of ETS2 carbon price.

[30] European Commission. (2021). EU Reference Scenario 2020. https://energy.ec.europa.eu/data-and-analysis/energy-modelling/eu-reference-scenario-2020_en.
[31] European Commission. (2021). Policy scenarios for delivering the European Green Deal. https://energy.ec.europa.eu/data-and-analysis/energy-modelling/policy-scenarios-delivering-european-green-deal_en.

3. **An intermediate scenario** that is consistent with the MIX scenario for ETS sectors and consistent with the REF2020 scenario for ETS2 sectors.

The policy implications are derived by comparing the policy MIX scenario with the intermediate reference scenario. A detailed description of the policies and developments considered in each scenario is presented in Table 3-1 below.

Table 3-1 Most relevant characteristics of scenarios (REF2020 and MIX)

	REF2020	**MIX:** Medium EE and RES policy + medium carbon price in non-ETS sectors
Brief description	Stylised focused on aggregate EU outcome of the NECPs 2019	Moderate bottom-up policies for: i) RES deployment, ii) energy efficiency, iii) extension of ETS scope to buildings, iv) road transport, v) keep them in Effort Sharing Regulation (ESR). Same ETS price for old and new ETS. The carbon prices shall be higher than those of REF so to further reduce GHG emissions to reach the GHG targets.
GHG emissions in 2030 compared to 1990	Bottom up from NECP 2019	-55%
Energy efficiency in Buildings	As legislated (2019)	MIX policies included: • double renovation rates increasing their depth (towards deep renovations); • achieving higher (than 3%) renovation in public buildings; • improving enforcement of Energy Performance of Buildings Directive (EPBD); • improving technical building systems, products and appliances performance; • further penetration of Building Automation and Control Systems (BACS); • increasing of district heating and cooling; • achieving efficiency standards for data centres; • achieving deeper renovation favoured by policy context and slightly lowering perceived risk factor for investment decisions; • implementation of energy taxation based on energy content and exemptions (Energy Taxation Directive review in addition to carbon pricing acts; • implementation of policies supporting bigger penetration of heat pumps.

	REF2020	MIX: Medium EE and RES policy + medium carbon price in non-ETS sectors
Energy efficiency in Transport	As legislated (2019)	Modal shift, intelligent transport systems, higher loads etc.; and energy taxation (ETD review)

RES in buildings	As legislated (2019)	• Medium penetration of RES in buildings, i.e.
		  ○ increase RES heating and cooling values and increasing binding targets as stipulated in the revised Renewable Energy Directive (RED II); this includes district heating and industry) – at least 1.5% per annum;
		  ○ higher uptake of not only heat pumps but also solar thermal, geothermal, bio-methane, direct electricity and RES in district heating as well as on-site RES (for own consumption);
		• Biomass consumption remains stable
		• Strong minimum RES energy for electricity and heat use that is locally produced

RES in transport and policies impacting transport fuel content	As legislated (2019)	• Renewable fuel supplier obligation on all transport modes including renewable fuels obligation on aviation and shipping, i.e.
		  ○ moderate uptake of advanced biofuels without double counting;
		  ○ minor uptake of renewable e-fuels by 2030 in transport.
		• Low ambition increase on fuel content

The macro-economic analysis in Chapter 3.5 provides outputs of absolute (in EUR) and relative (as % of total household or individual expenditure) for the following indicators:

- **Total Energy expenditures** for households
  - **Energy (fuel) expenditures**, representing all household expenditures on fossil fuels, renewables, electricity and district heating. In addition to the total figure, the outputs also include a figure for this category broken down by energy carrier, this breakdown does not include 'heat' and therefore in some cases there is a small variation of the totals in the breakdown figure compared to the total figure.
  - **Renovation expenditures,** represents additional costs for energy efficiency renovations. These are relevant as the MIX scenario design includes policies to increase the renovation rate (i.e. doubling renovation rates increasing their depth at the EU level relative to the reference scenario). The expenditure figures included in the report represent annualised costs (i.e. capital costs associated with

renovation expenditures on insulation and other measures improving the building envelope efficiency, capital costs for equipment and fuel purchasing costs, spread over the assumed lifetime of the renovation).

- **Equipment expenditures,** this represents either purchasing the same but more efficient technology or switching to a more advanced or lower emitting technology. The expenditure figures included in the report represent annualised costs (i.e. capital costs associated with investment expenditures for equipment and fuel purchasing costs, spread over the assumed lifetime of the equipment). These are relevant as besides renovation, the scenario includes measures towards the improvement of technical building systems, products and appliances performance, as well as policies supporting bigger penetration of heat pumps relative to the reference scenario. Renewables in buildings include incentives for the uptake of RES in heating and cooling - e.g. heat pumps- in line with a binding RES H&C target for 2030 (i.e. an increase of at least 1.5% per annum. in the period 2021 to 2030).

- **Transport expenditures** for individual transport users
  - **Operating expenditures**, representing fuel costs for private transport.
  - **Purchased transport expenditures**, representing spending on public transport services.

3.2. Impacts of ETS2 on energy poverty and vulnerability of households

3.2.1. Estimated ETS2 impact on the number of vulnerable households in Slovakia

Figure 3-4 shows the share of the Slovak population deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 according to the modified 2M indicator for heating that is based on the EU HBS 2015. The threshold value is fixed at twice this median expenditure. For Slovakia, the median value is equal to 7.6% and the 2M value equal to 15.2%. As described in Chapter 2.2.1, the vulnerability indictor is limited to low and lower-middle income households by considering only the bottom half of the expenditure distribution. The associated median value of the share of total expenditure spent (modified 2M threshold) on heating is 7.6%, the 2M threshold value is 15.2%.

We show:

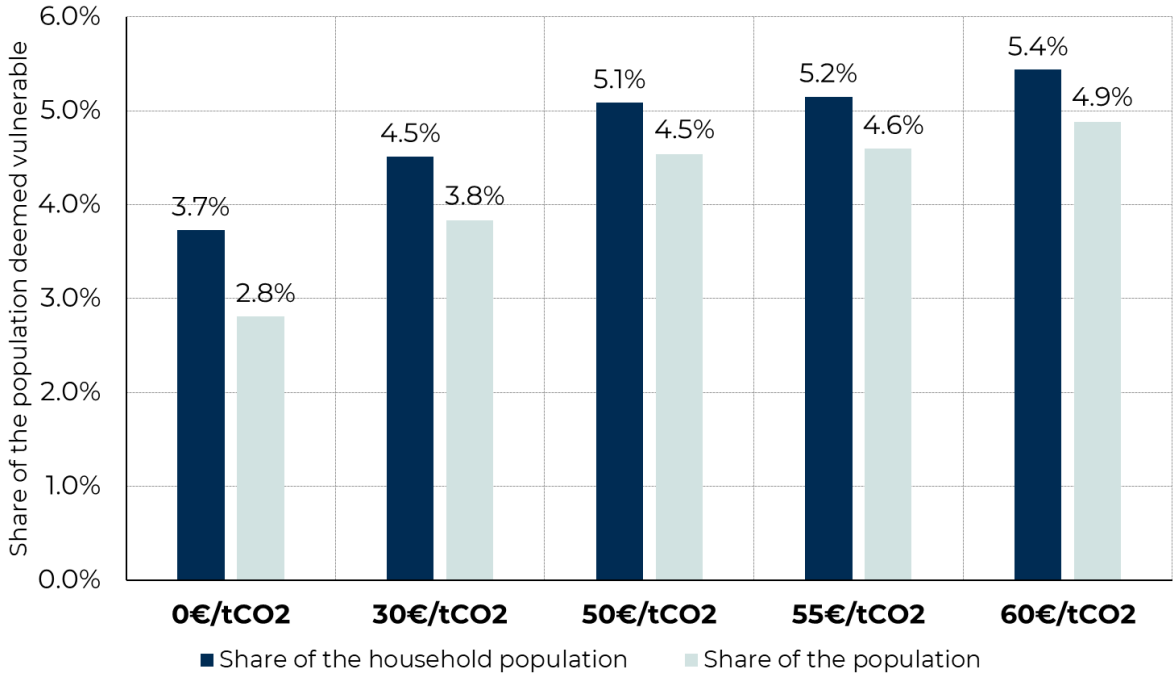
- the share of the household population (What percentage of all Slovak households is deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2?); and
- the share of the overall population (What share of the overall Slovak population do the persons living in these households represent?).

The share of the population deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 is shown before the introduction of the ETS2, here shown at a price of EUR 0/tCO_2, indicating the share of households deemed vulnerable based on their expenditures for fossil fuels according to the HBS 2015 (see Table 2-2). We also show the share of households and individuals vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 for ETS2 prices of 30 EUR/tCO_2, 50 EUR/tCO_2, 55 EUR/tCO_2 and 60 EUR/tCO_2. This analysis, and other modelling results presented in this Chapter, consider the impacts of ETS2 in terms of additional energy costs for different carbon prices.

3.7% of households are estimated as vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 before the introduction of the ETS2 (i.e. with an ETS2 price of 0 EUR/tCO_2) according to the 2M indicator. This share increases by around 1–2% with an introduction of the ETS2 depending on the ETS2 price. The share of vulnerable households in Slovakia rises moderately with rising CO_2 prices. Approximately 4.5% of households are deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 for an ETS2 price of 30 EUR/tCO_2 and to 5.4% at an ETS2 price of 60 EUR/tCO_2.

We see similar results when looking at the population, with the share of vulnerable individuals increasing from 2.8% to 4.9% share of the total population when the ETS price increases from 0 EUR/tCO_2 to 60 EUR/tCO_2. Most of the individuals and households deemed vulnerable were so before the introduction of the ETS2. The fact that the share in the household population is larger than the overall share of the population reflects that the households affected have fewer household members than the average.

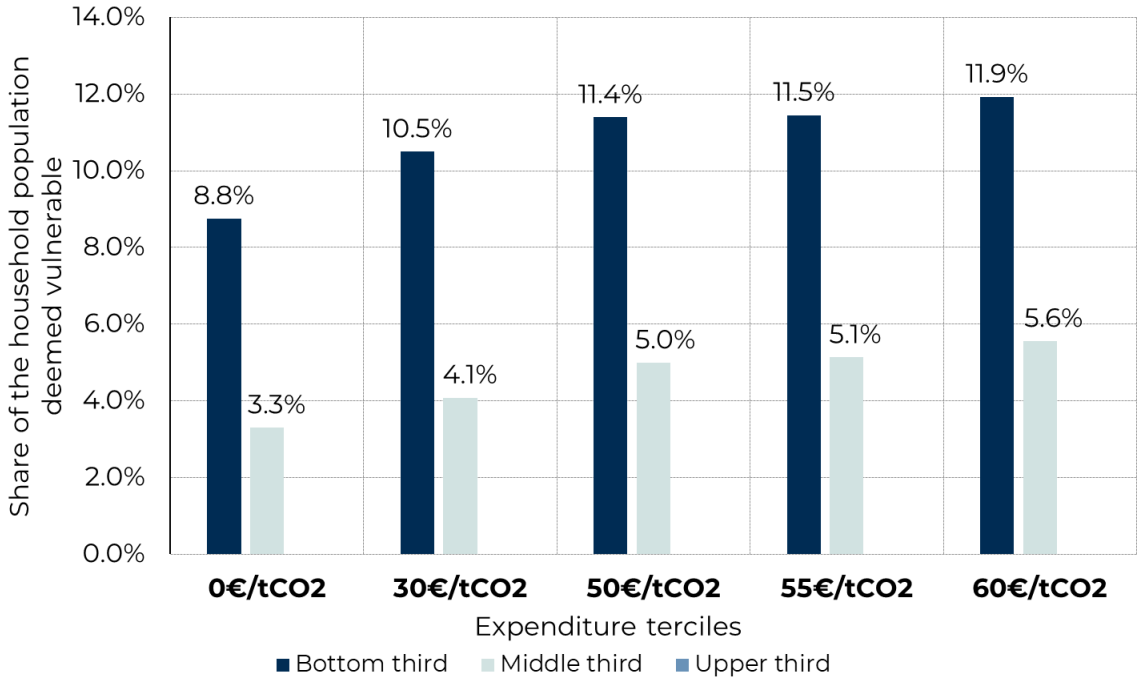
Figure 3-4 Share of the Slovak household population and share of the total Slovak population vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2



Source: Oeko-Institut SEEK-EU micro model

Figure 3-5 shows the share of the Slovak household population that is deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2. It shows the share along the expenditure distribution and for the bottom, middle and upper third of overall expenditures. As the modified 2M indicator is limited to the bottom half of the expenditure distribution (see Chapter 2.2.1), no households in the upper third are deemed vulnerable. The share of households vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 amongst the bottom third of the expenditure distribution is much higher at 9–12% than in the middle third of the distribution at 3–6%.

Figure 3-5 Share of the Slovak household population deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 by expenditure tercile



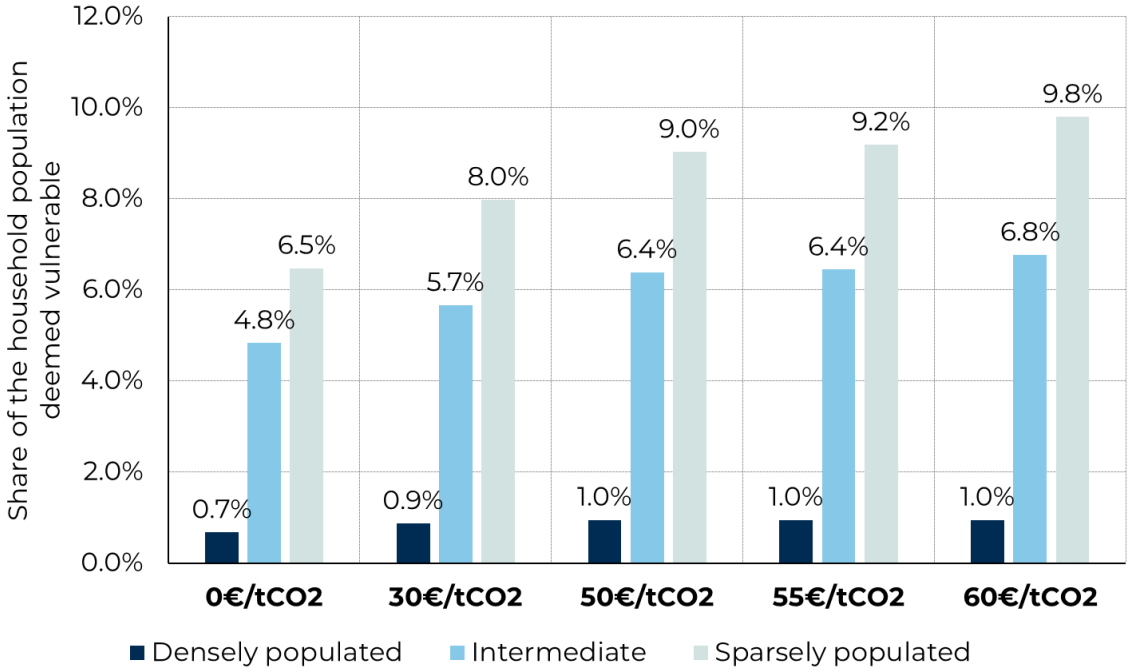
Source: Oeko-Institut SEEK-EU micro model

The distribution of vulnerability along the expenditure and income distribution depends on the amount of fossil fuels that are used by households in the expenditure brackets, as well as their total expenditures and incomes.

Figure 3-6 shows the share of the Slovak 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 6.5–10% of households are deemed vulnerable, depending on the level of the ETS2 price. The share is estimated at 5–7% for intermediate population density and 1% 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 expenditures and incomes. The difference between single-family houses and multi-apartment buildings is also relevant as their energy consumption per m^2 is almost half in comparison with apartment buildings, combined with the fact that heated floor area is smaller in flats.

Figure 3-6 Share of the Slovak household population deemed vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2 by degree of urbanisation

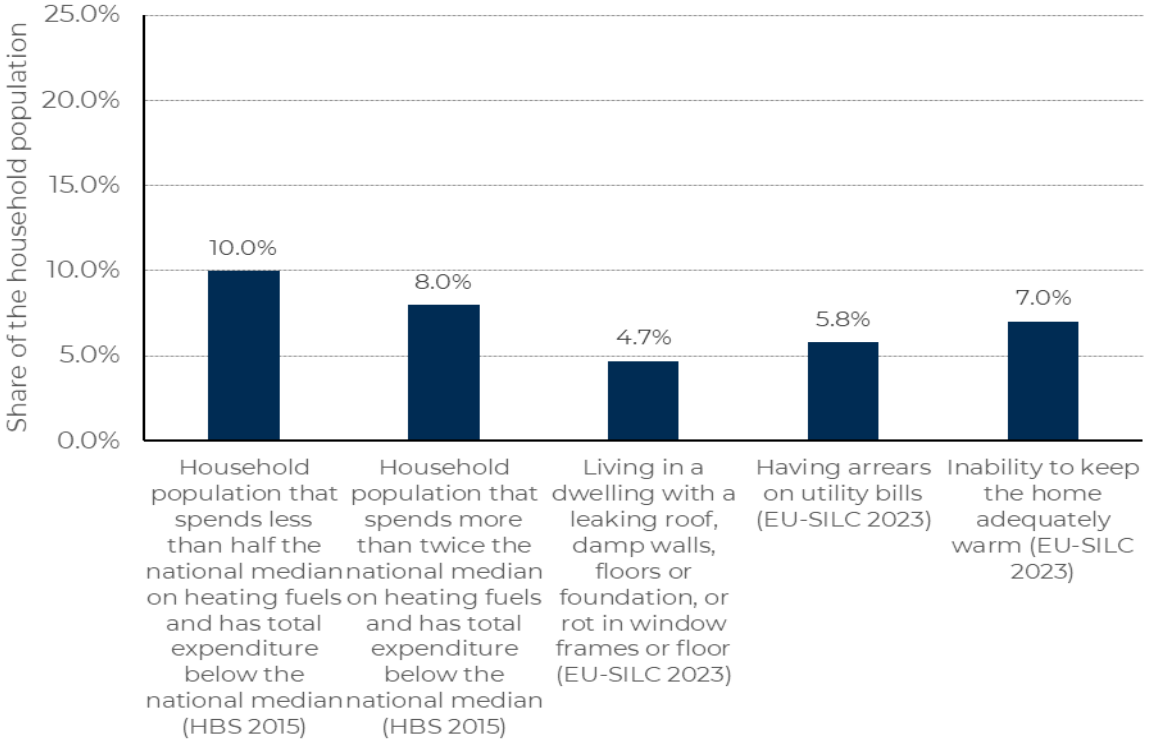


Source: Oeko-Institut SEEK-EU micro model
Note: Category 'Densely populated' should be flagged due to a low number of observations (20–49 observations).

3.2.2. Target group analysis of energy poverty indicators for Slovakia

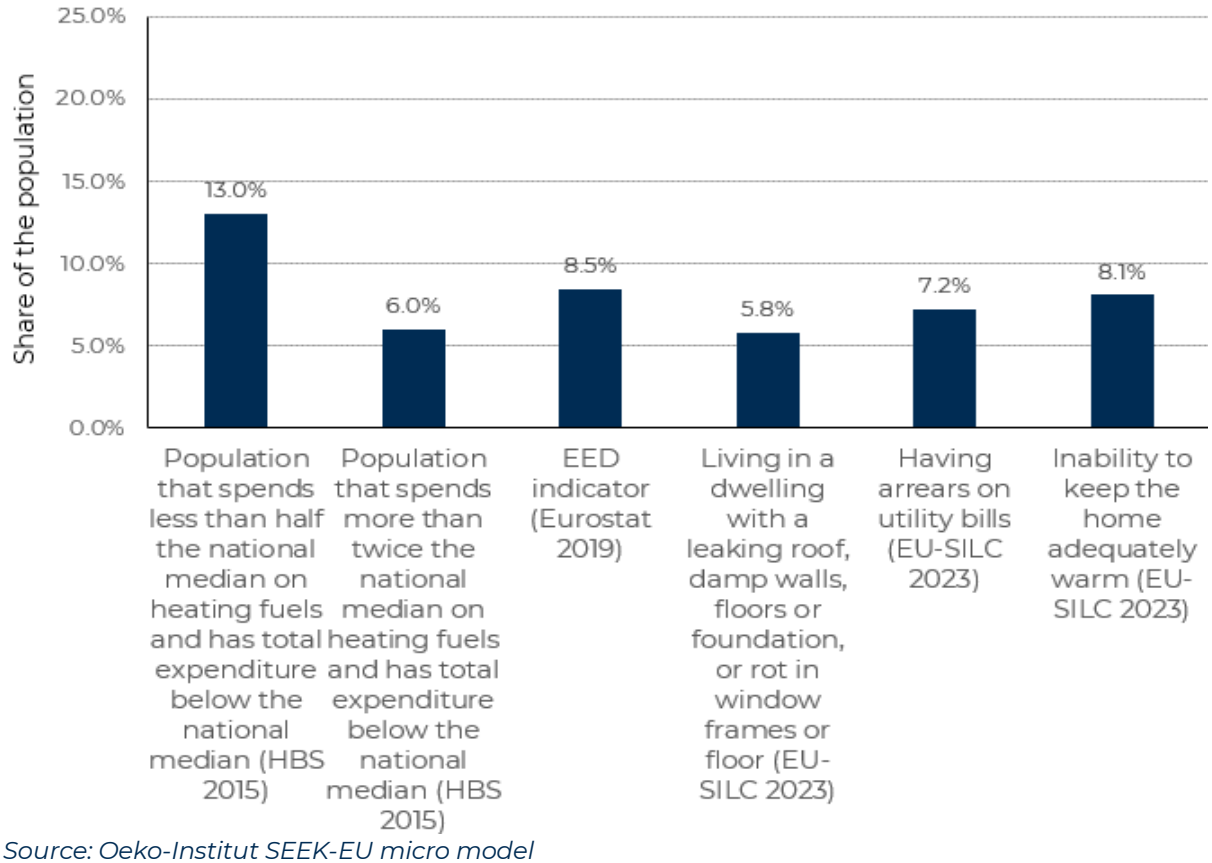
Figure 3-7 shows results on the share of energy poor households for a number of indicators for Slovakia based on the analysis of the EU-SILC and EU HBS 2015. The share ranges from 5% for the indicator 'leak, damp, rot' to 10% for the M/2 indicator showing 'hidden energy poverty'. Figure 3-8 shows the same indicators but displays results as a share of the total population. If results are higher for the total population than for the household population, this means that affected households likely have many household members. If the opposite is true, this means may one or two person households are affected. Based on the graphs below the problems are mainly linked to households with a higher number of members. Figure 3-8 also shows the EED default indicator estimated on the basis of EU-SILC 2019 figures published by Eurostat. As described in Table 2-1, the EED indicator relates to the arithmetic mean of the three EU-SILC indicators: inability to keep the home warm, arrears on utility bills, leak, damp or rot, and the AROP indicator.

Figure 3-7 Share of households identified as energy poor according to a number of indicators in Slovakia



Source: Oeko-Institut SEEK-EU micro model

Figure 3-8 Share of the total population identified as energy poor according to a number of indicators in Slovakia

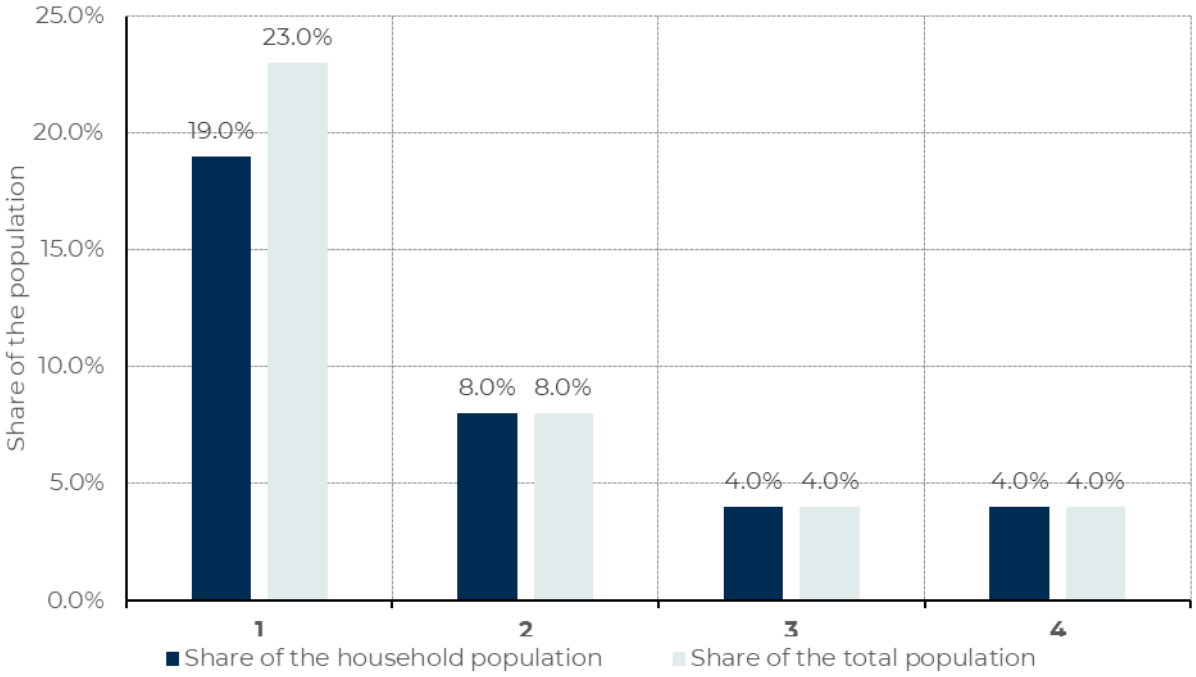


Source: Oeko-Institut SEEK-EU micro model

The following graphs explore the EU-SILC 2023 indicator with the highest values by income quintiles and degree of urbanisation. In the Slovak case, this is the 'inability to keep the home warm' indicator.

Figure 3-9 shows the indicator by income quintiles[32]. With 19% and 23% share, the bottom quintile is much more affected compared to the rest of the households. The fact that the share of total population is larger than the share of households indicates that a lot of households with many members (e.g. families) are affected. The fifth quintile cannot be displayed due to insufficient number of observations.

Figure 3-9 Inability to keep the home warm by income quintile in Slovakia

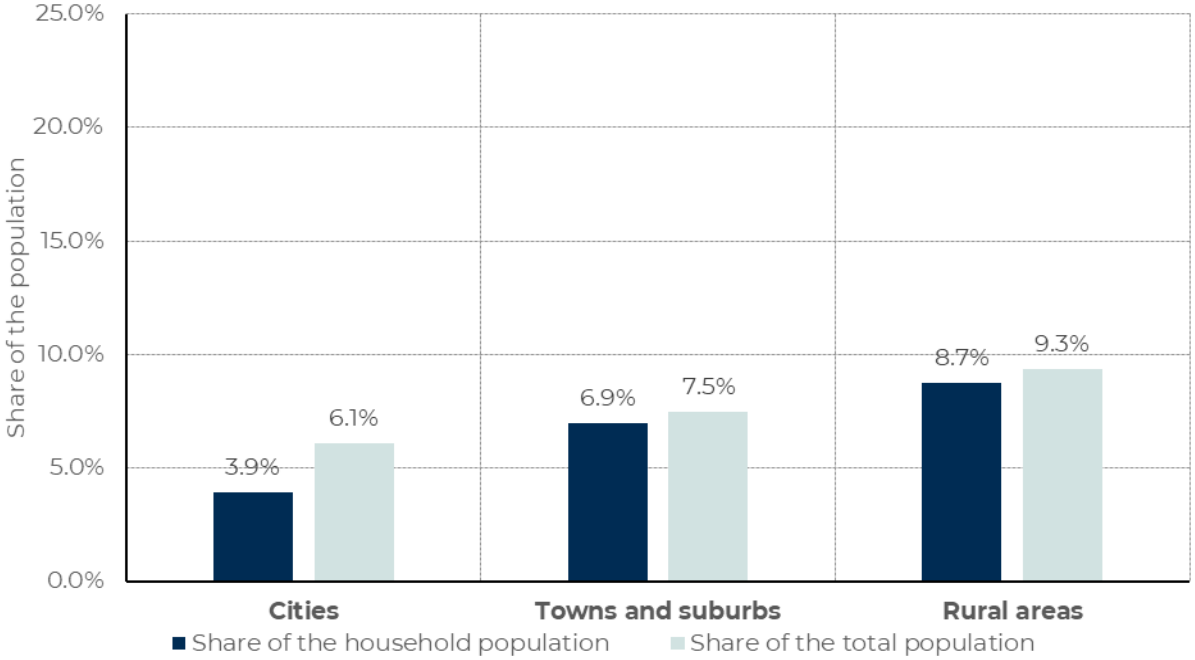


Source: Oeko-Institut SEEK-EU micro model, EU-SILC 2023 data
Note: Quintile 5 cannot be displayed due to a low number of observations (below 20 observations). Quintiles 3 and 4 should be flagged due to a low number of observations (20–49 observations).

Figure 3-10 shows results by degree of urbanisation. This indicator is the highest in sparsely populated areas what means that twice as many households in energy poverty can be found in rural areas compared to urban ones. However, in rural areas the energy poor households have on average less inhabitants what makes the difference between urban and rural areas less significant when comparing number of persons in energy poverty.

[32] Note that, throughout our analysis, we may show quintiles and terciles instead of deciles due to the limited number of observations for different grouping of the expenditure groups. This ensure that the results provided are sufficiently robust.

Figure 3-10 Inability to keep the home warm by degree of urbanisation in Slovakia



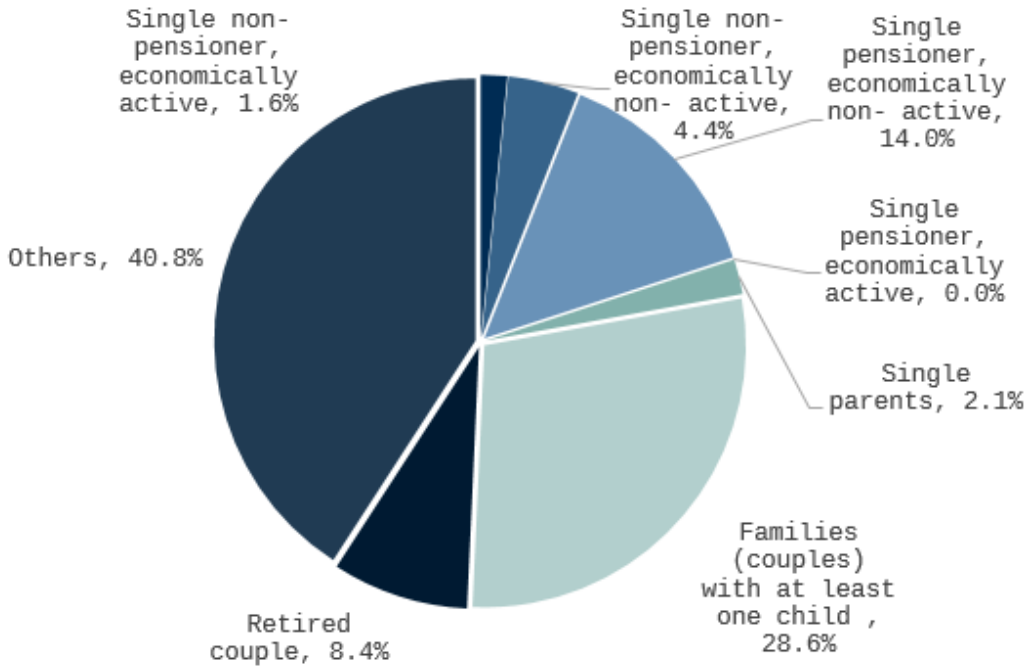
Source: Oeko-Institut SEEK-EU micro model, EU-SILC 2023 data

Based on a national study on energy poverty[33], **at least 16% of Slovak households** are affected by **energy poverty**. Hidden energy poverty (households spending small amounts of money compared to their income or to average(median) national expenditures on energy because they do not have enough financial resources to fully cover all their basic and energy needs[34]) is a problem for an additional 1.3% of Slovak households.

As shown in Figure 3-11, the largest proportion of the population in energy poverty is made up of complete families with at least one dependent child under the age of 25. This corresponds to 28.6% of households in energy poverty. The second largest group in energy poverty are, according to Slovak national HBS 2022, single pensioner households who live independently and are not economically active, which corresponds to 14% of households in energy poverty. The retired couple households make up 8% of the population in energy poverty.

[33] Dokupilová. (2024). Energetická chudoba 2024. https://www.prog.sav.sk/portfolio/energeticka-chudoba-2024/. (Available in Slovak).
34 Frida Betto, Patrizia Garengo, Arturo Lorenzoni. (2020). A new measure of Italian hidden energy poverty. Energy Policy Volume 138. https://doi.org/10.1016/j.enpol.2019.111237.

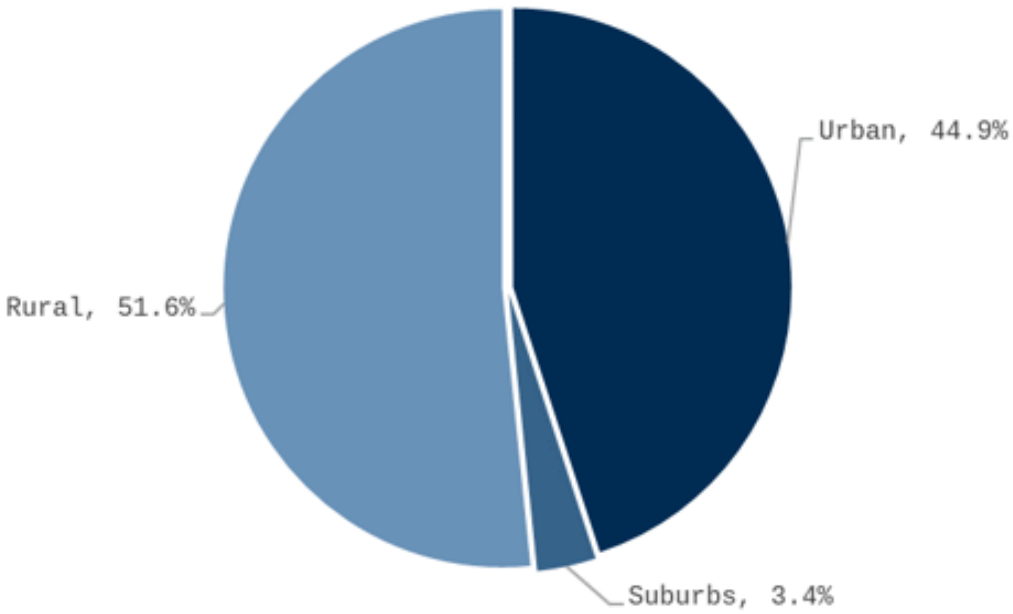
Figure 3-11 Share of households in energy poverty (National HBS, 2022)



Source: Dokupilová, Energy poverty 2024

Figure 3-12 shows that a larger proportion of households in energy poverty live in rural areas (52%). This fact is associated with lower renewal rates of family houses compared to apartment buildings, predominantly situated in urban areas, resulting in higher energy expenditures in rural areas.

Figure 3-12 Share of households in energy poverty (national HBS, 2022



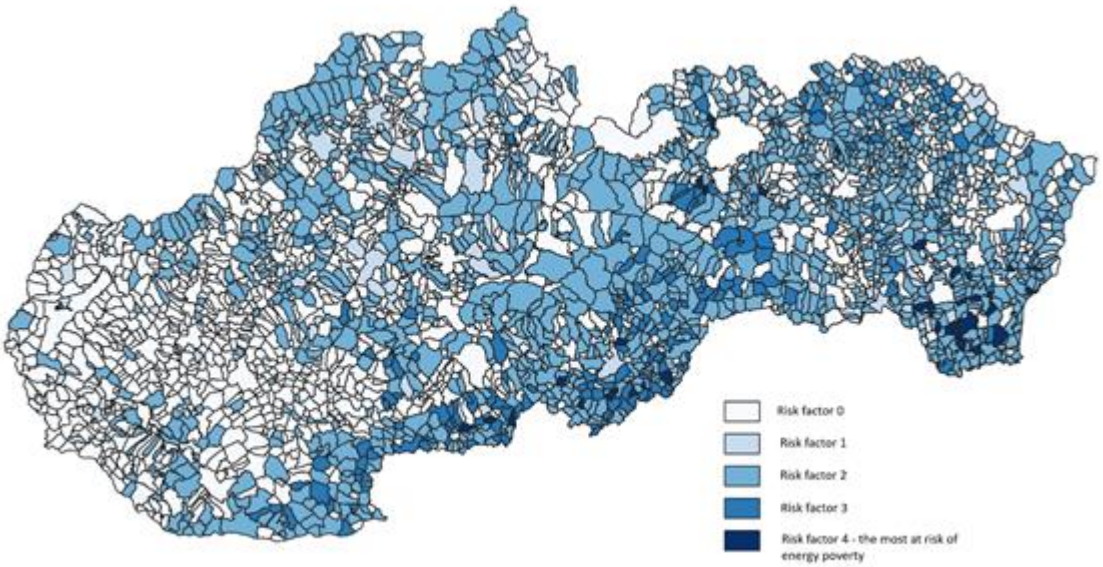
Source: Dokupilová, Energy poverty 2024

Energy poverty is unevenly distributed in Slovakia as can be seen in Figure 3-13. Based on the energy poverty vulnerability index (described below), households that are the most exposed to energy poverty are located mainly in the southern parts of Slovakia. The inhabitants of these municipalities have wages that belong to the lowest income decile (expressed in gross wages). At the same time, their dwellings are in poor condition – they are older, not renovated and their expenditure on energy is the highest in the Slovak Republic.

Combining the indicators of households that are most affected by energy poverty, the index of energy poverty was constructed[35]. It incorporates, based on availability, the data (indicators) on:

- **technical condition of dwellings** – the proportion of unrenovated dwellings and the proportion of dwellings over 40 years old;
- **income** – expressed as the average of the median gross wages of the inhabitants of the municipality;
- **energy expenditure** – based on the proportion of the municipality's population whose energy consumption is more than twice the national median energy consumption (one of the internationally accepted definitions of energy poverty); and
- **air pollution** – municipalities included in the list of municipalities at risk based on air quality (SHMÚ, Štefánik, 2021).

Figure 3-13 Regional distribution of energy poverty in Slovakia



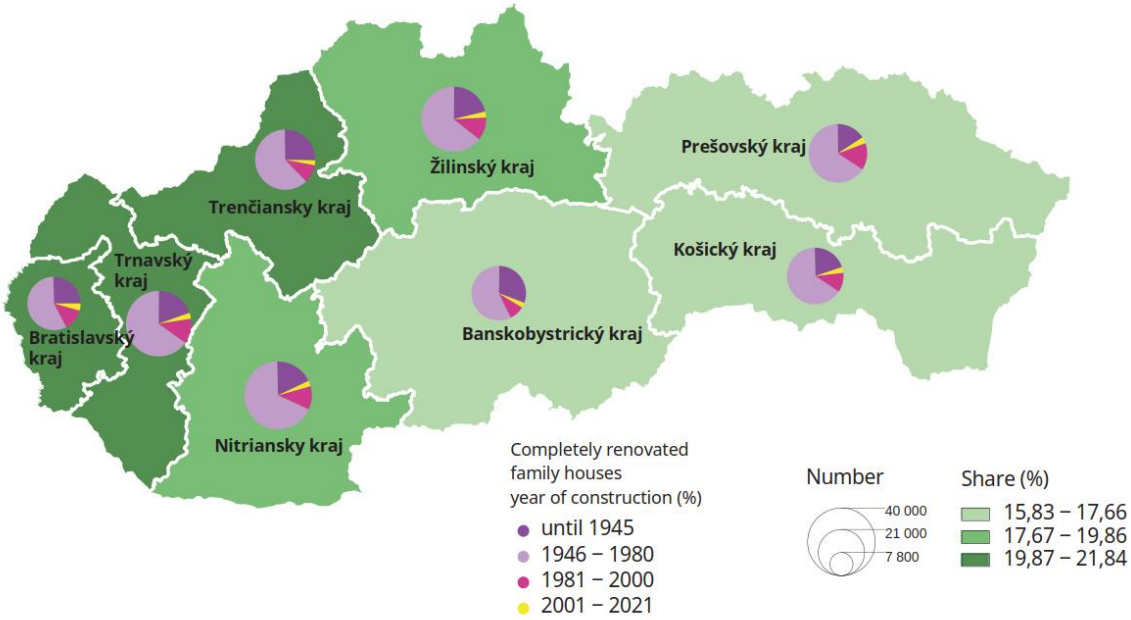
Source: Dokupilová (2023)

Family houses form approximately half of dwellings in Slovakia. As visible in Figure 3-14, the share of completely renovated houses is very low, as they make up less

[35] Dokupilová. (2023). Hĺbková štúdia energetickej chudoby. https://www.prog.sav.sk/portfolio/hlbkova-studia-energetickej-chudoby/. (available in Slovak).

than 18% in eastern parts of Slovakia. The majority of the area is classified as “less developed regions of Slovakia”. The situation is only slightly better in the western part of Slovakia, where the renovated rate increases up to 22%. The majority of renovated buildings were built 40 years ago.

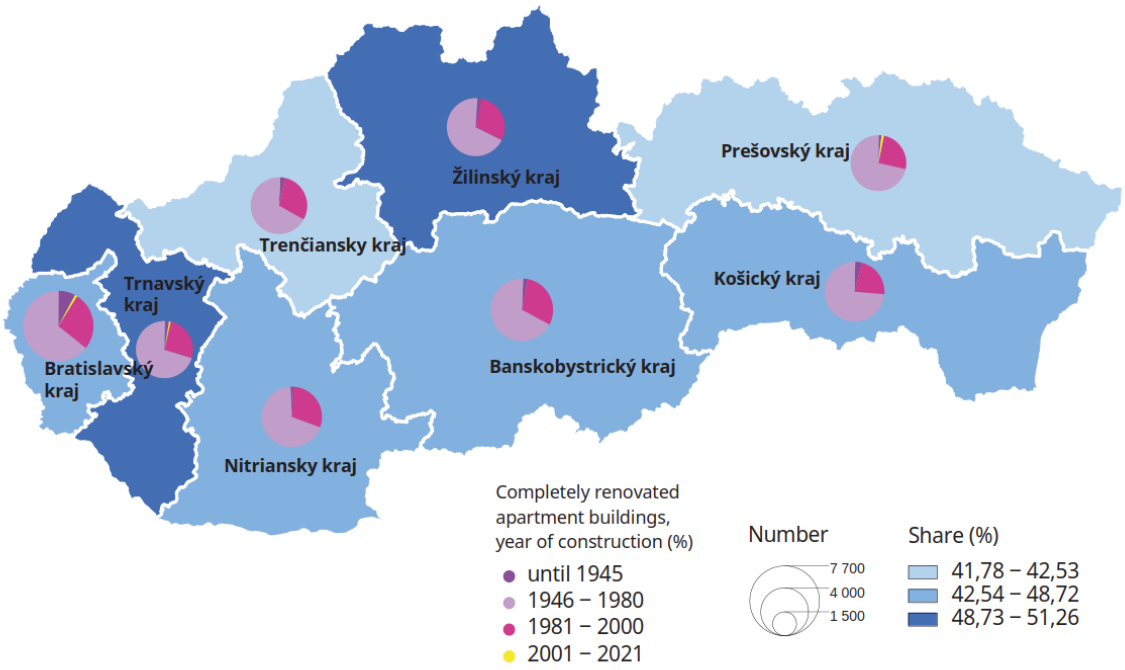
Figure 3-14 Completely renovated family houses



Source: Statistical Office of the Slovak Republic

As shown in Figure 3-15, the renovation of apartment buildings has seen a better uptake due to existing renovation support schemes. Up to 52% of apartment buildings are completely renovated in some regions. The majority of these were built between 80 and 45 years ago.

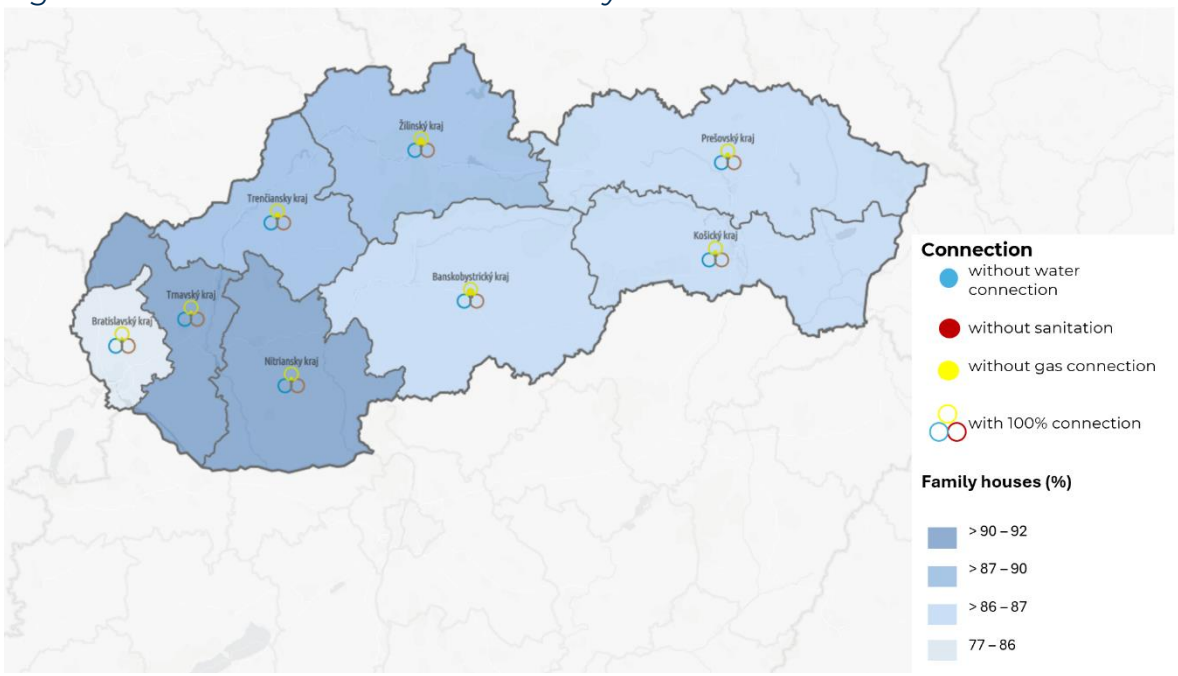
Figure 3-15 Completely renovated apartment buildings



Source: Statistical Office of the Slovak Republic

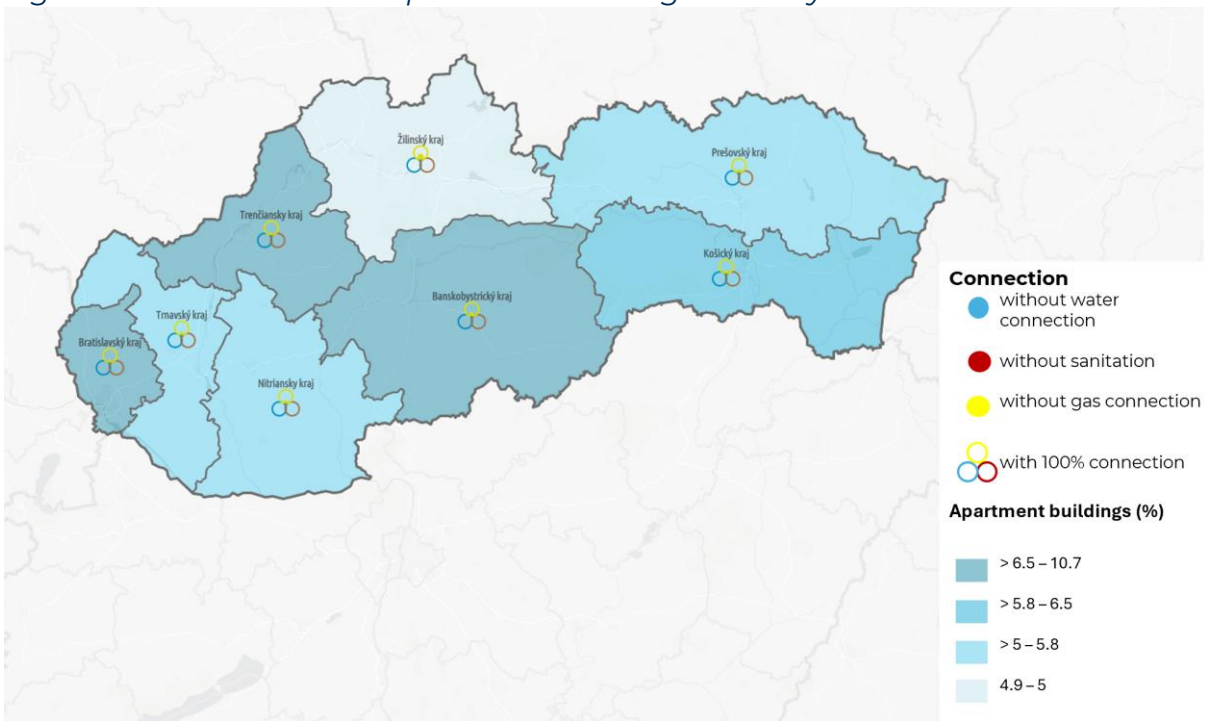
Even though Slovakia has the second most concentrated gas infrastructure in terms of gas pipelines developed in residential areas in the EU, Figure 3-16 depicts that only 66% of households use gas for heating and hot-water preparation, 21% of households use solid fuels and 5% uses electricity. Many houses in the regions of Žilina and Banská Bystrica are not connected to the gas network, and they normally use solid fuels for heating. As shown in Figure 3-17, most apartment buildings are connected to gas, with only the Žilina region lagging behind.

Figure 3-16 Connection of houses to utility networks



Source: Statistical Office of the Slovak Republic

Figure 3-17 Connection of apartment buildings to utility networks

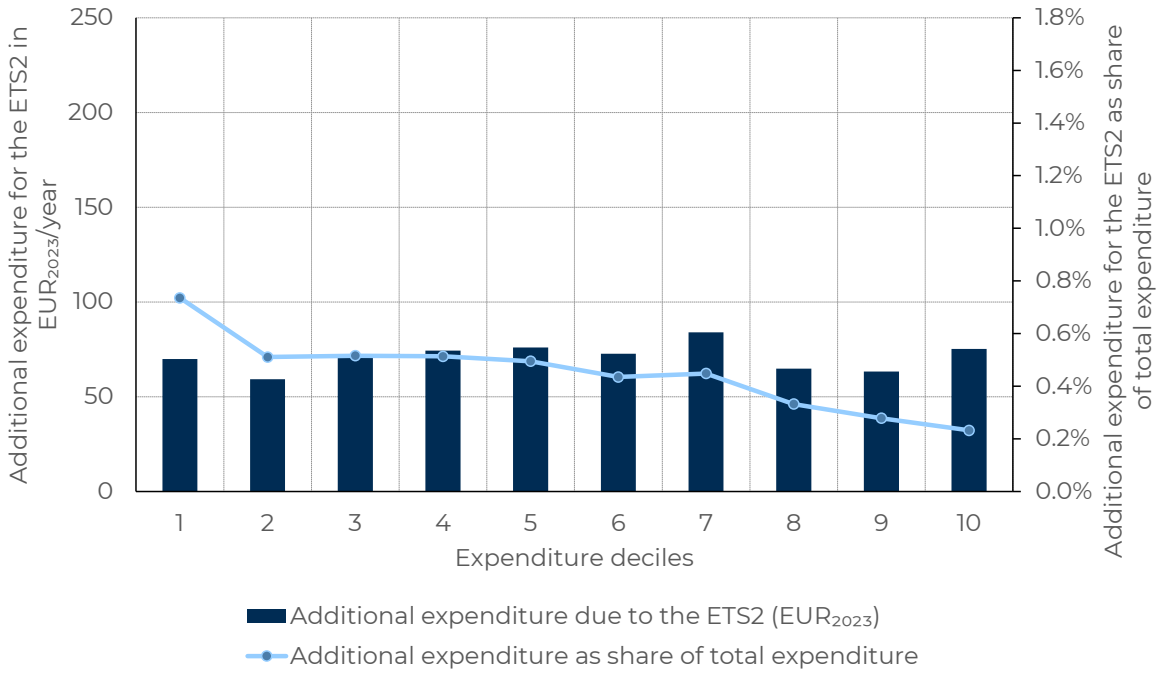


Source: *Statistical Office of the Slovak Republic*

3.2.3. Estimated ETS2 costs and cost burden in the heating sector by target group in Slovakia

Based on the analysis of EU HBS 2015 data with the SEEK-EU micromodel (see Chapter 3.1.1), Figure 3-18 shows the estimated ETS2 costs at a carbon price of 30 EUR/tCO_2 in the heating sector for Slovak households for our main scenario that includes an elasticity of -0.1 for heating. The figure shows the impact by expenditure decile only for those households using fossil fuels for heating.

Figure 3-18 ETS2 costs related to heating for Slovak households at a carbon price of 30 EUR/tCO₂ (only households using fossil fuels)



Source: Oeko-Institut SEEK-EU micro model

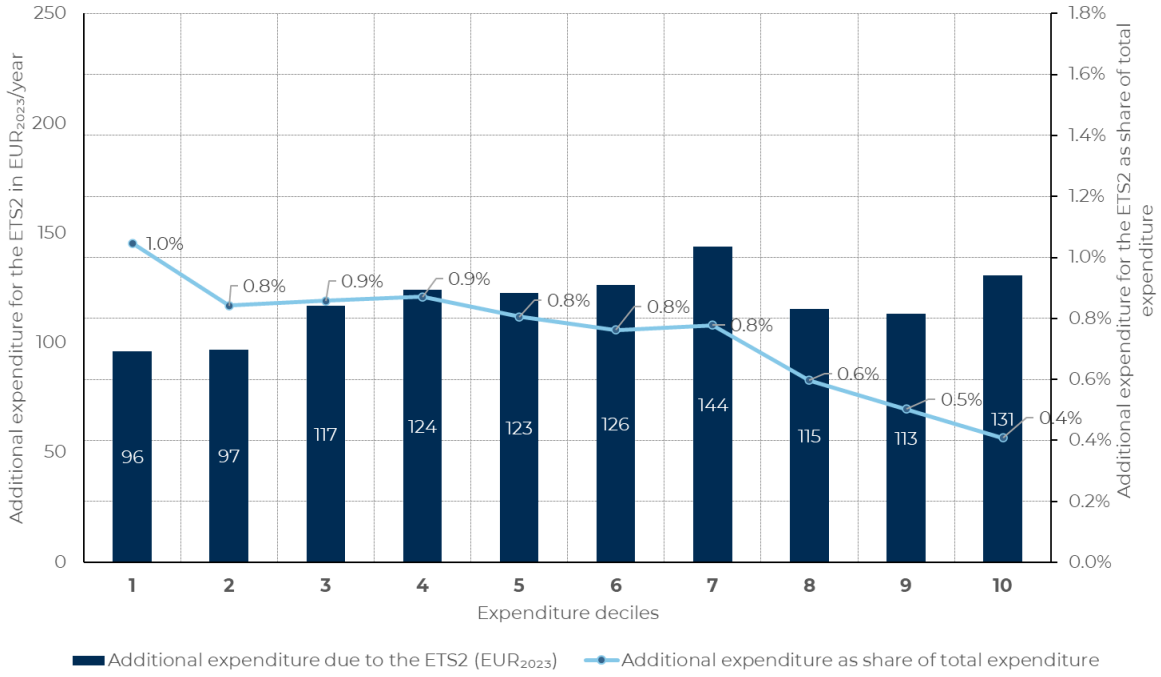
ETS2 costs at a price of 30 EUR/tCO₂ are estimated at an average 70 EUR/year for a Slovak household using fossil fuels. This compares to an average EUR$_{2023}$ 1 438 total annual heating costs without ETS2 for Slovak households using fossil fuels.

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 0.7% of household expenditure for a fossil-fuel using household 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.

At a carbon price of 60 EUR/tCO₂ (Figure 3-19), the estimated ETS2 costs rise to 140 EUR/year for an average Slovak household using fossil fuels. The share of total expenditure that needs to be spent on ETS2 costs, is equal to 1.5% in the first decile and then declines to 0.5% in the tenth decile.

Without taking the reaction of households into account, i.e. assuming an elasticity of 0 related to the carbon price, the impacts at 60 EUR/tCO₂ are higher by 2– 3 EUR/year.

Figure 3-19 ETS2 costs related to heating for Slovak households at a carbon price of 60 EUR/tCO$_2$ (only households using fossil fuels)

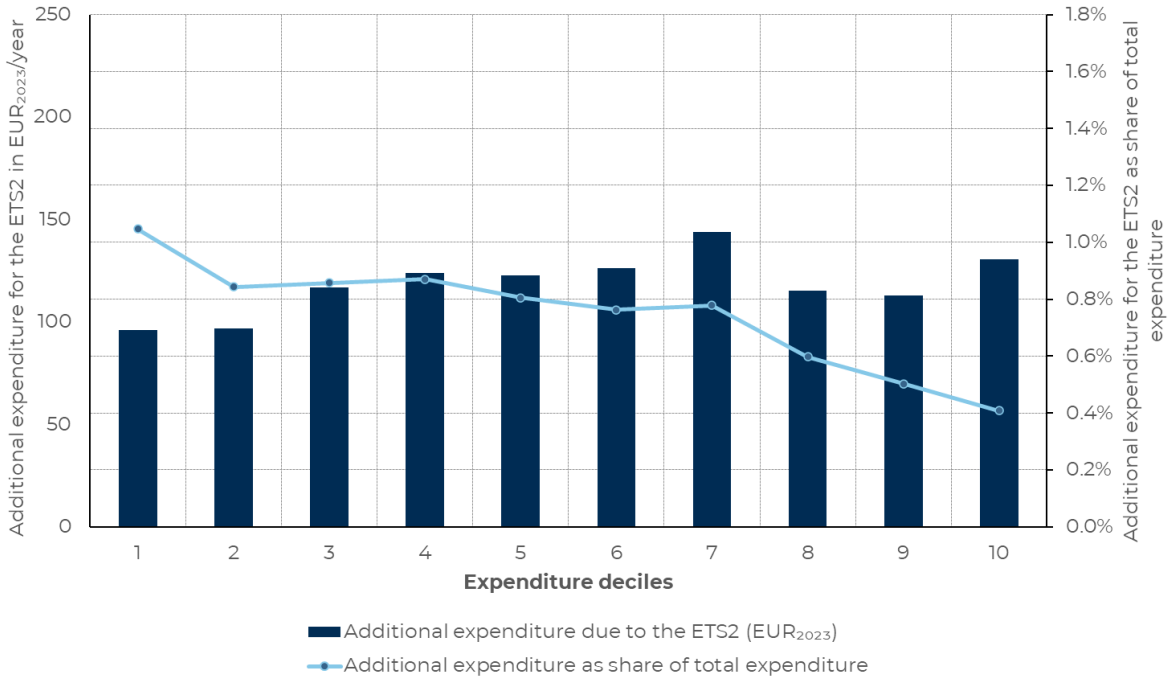


Source: Oeko-Institut SEEK-EU micro model
Note: The category 'Additional expenditure heating oil & coal' should be flagged due to a low number of observations (20–49 observations).

If all households are included in the analysis, i.e. also those that use heating fuels that will not be directly impacted by the ETS2, such as biomass or district heating (mostly covered by ETS), the average impact especially in the bottom deciles is smaller (Figure 3-20). The distribution of the impact in terms of the percentage of expenditure spent on ETS2 is similar to the analysis of only fossil-fuel using households.

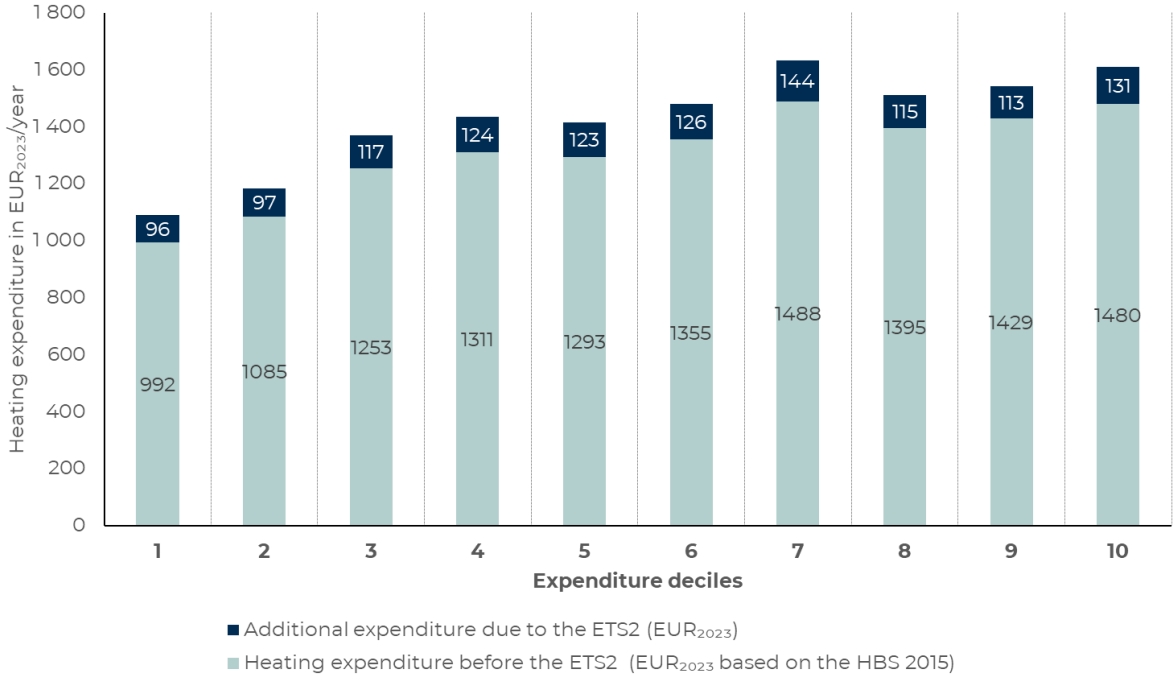
Figure 3-21 compares expected ETS2 costs at a carbon price of 60 EUR/tCO$_2$ to total heating expenditures based on the HBS 2015 (inflated to EUR$_{2023}$). In Figure 3-21, both households using fossil fuels (directly affected by the ETS2) and those using district heating, heat pumps, biomass and electric heating are included. Overall, the additional cost due to the ETS2 is expected to represent a small fraction of overall heating costs for households in Slovakia.

Figure 3-20 ETS2 costs related to heating for Slovak households at a carbon price of 60 EUR/tCO2 (all households)



Source: Oeko-Institut SEEK-EU micro model

Figure 3-21 ETS2 costs related to heating for Slovak households at a carbon price of 60 EUR/tCO2 compared to heating costs according to the HBS2015 (all households)

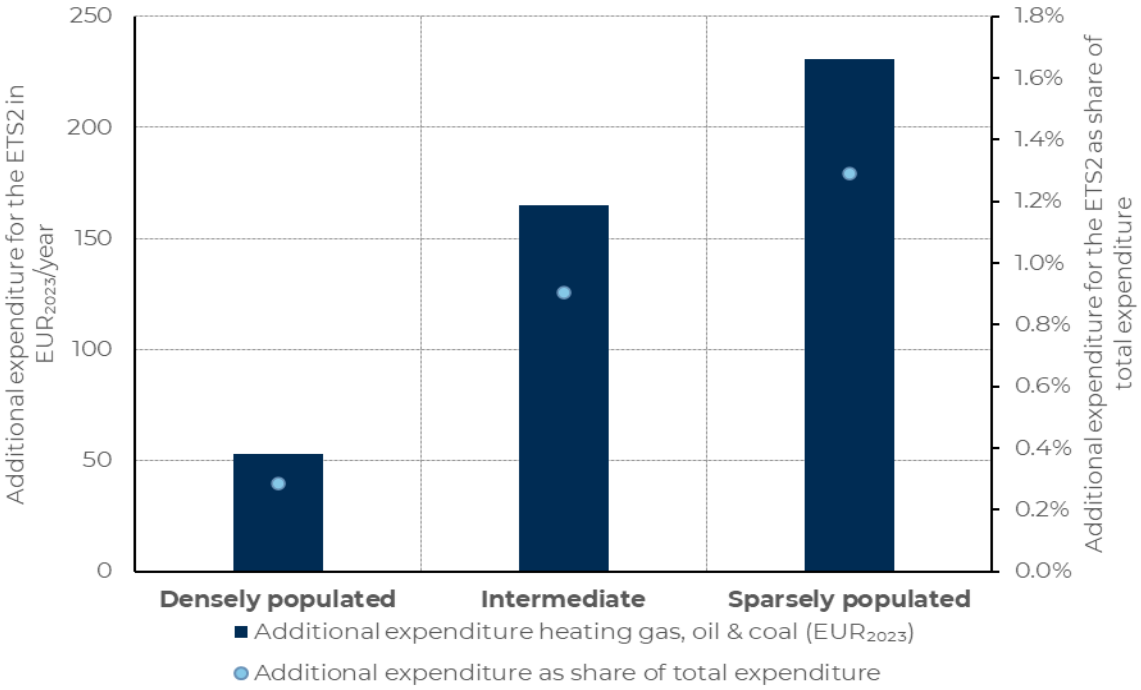


Source: Oeko-Institut SEEK-EU micro model
Note: A value of 1.3879 was applied to inflate expenditures to EUR2023, based on the Eurostat all items HICP [prc_hicp]

Figure 3-22 shows the estimated impact of the ETS2 by degree of urbanisation at a carbon price of 60 EUR/tCO$_2$ and only for those households using fossil fuels. The

estimated carbon costs are highest in sparsely populated areas at 230 EUR/year and smallest for the average household living in a densely populated area at 50 EUR/year. The share of expenditure that needs to be spent ranges from 1.3% in sparsely populated areas and smallest at 0.3% in densely populated areas. The distribution across the degrees of urbanisation reflects the fuel use in these areas (e.g. fossil fuels vs. biomass), as well as overall income and expenditure levels in those areas.

Figure 3-22 ETS2 costs related to heating for Slovak 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 fossil fuels coupled with low incomes, e.g. households in buildings with low efficiency and large floor space that have low incomes.

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

- For the average household in Slovakia, the ETS2 impact at prices of 30–60 EUR/tCO_2 lies at around 70–140 EUR/year for households using fossil fuels.
- The relative impact on overall expenditures is lower for higher-income households compared to low-income households. At an ETS2 price of 60 EUR/tCO_2, Slovak households in the lowest income decile are estimated to spend 1.5% of their total expenditures on ETS2 costs, while the tenth income decile is estimated to spend 0.5%. The distribution of impacts is

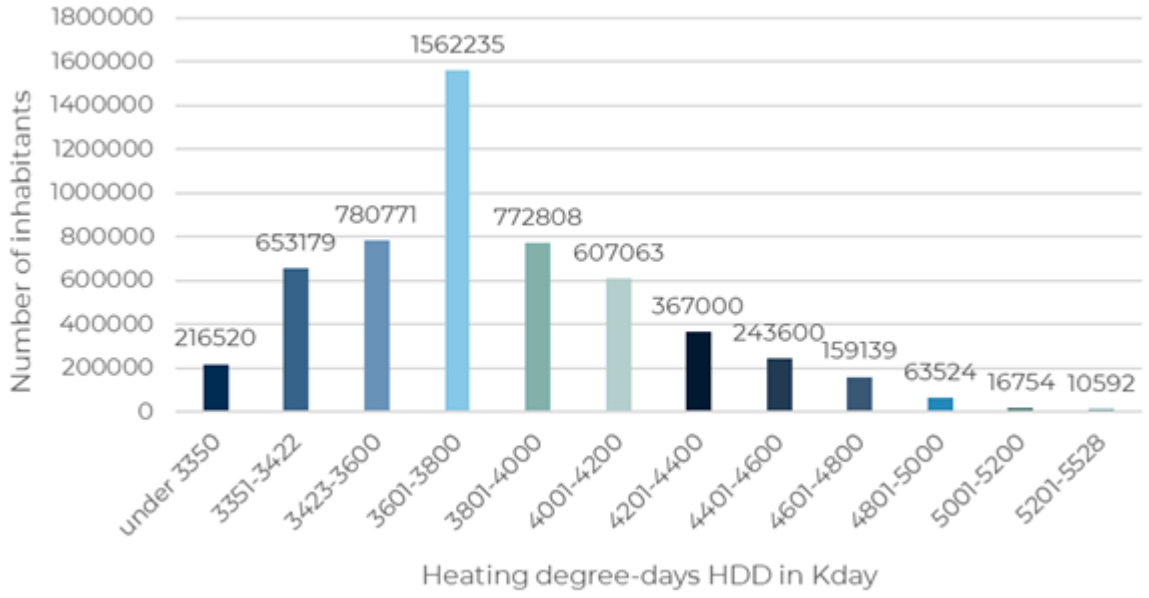
related to the use of fossil fuels vs. other fuels, as well as factors such as floor area and efficiency of the building, as well as income levels.

- The analysis by degree of urbanisation shows higher estimated impacts in sparsely populated areas and lowest impacts in densely populated areas.

3.2.4. Supplementary analysis of impacts

Slovakia has a relatively high diversity of climatic conditions which have an impact on energy use for heating and energy expenditure. The standardised heating degree-days (HDD) are available for all municipalities (more than 2 880) in the standard STN EN ISO 13790/NA. The number of inhabitants per heating degree-days interval is presented in Figure 3-23.

Figure 3-23 Number of inhabitants in climate localities identified by heating-degree-days (HDD)



Source: Bendžalová, J., SIEA: OP Kvalita životného prostredia, Národný projekt Odborne o energii 2022

Note: Heating degree-days HDD = 3 422 K.day is a standard climate for Slovakia for energy performance certificates.

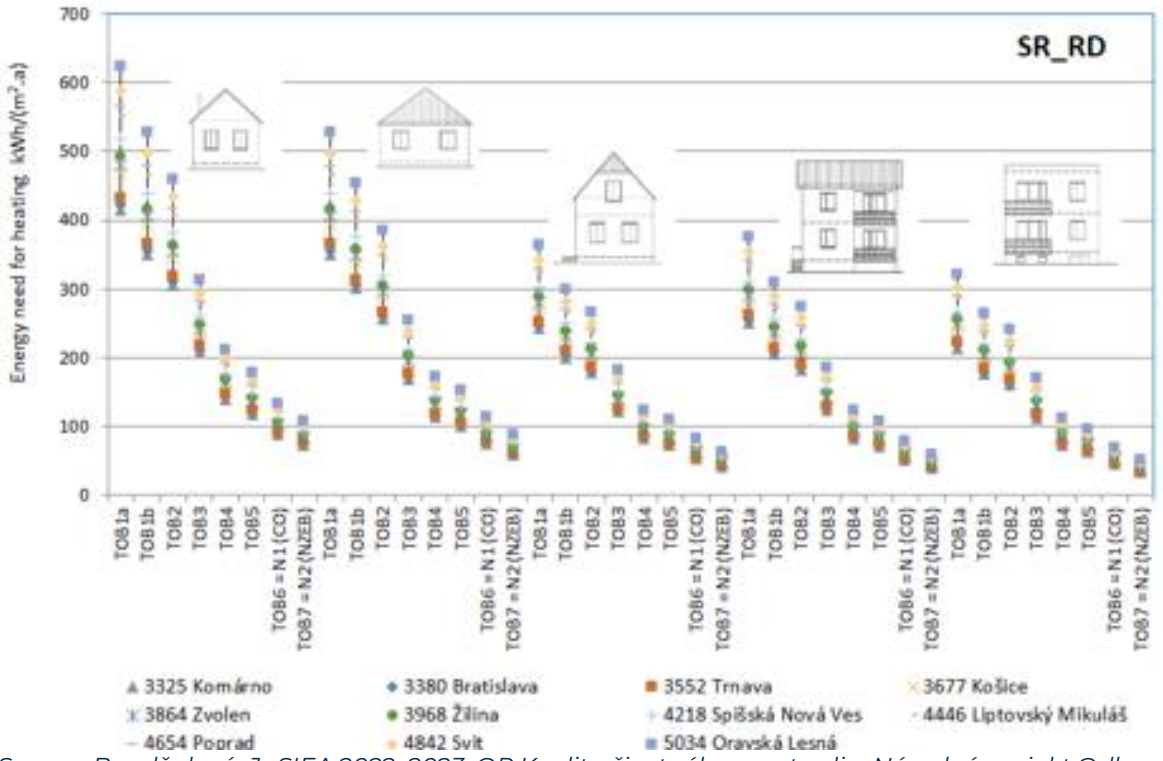
The data, similar to the TABULA approach[36], is available for all building categories on calculated energy needs for heating in kWh/(m^2), for reference buildings of different sizes, different envelope properties (from the worst envelope TOB1a to the

[36] Typology Approach for Building Stock Energy Assessment (TABULA/Episcope project) is based on National Building Typology, that is a set of model buildings with characteristic energy related properties. Each model building represents a certain construction period of the country and a specific building size. The key outcome of the project is an interactive webtool that allows using the Building Typology for different applications as e. g. energy advice, portfolio assessment, assessment of the building stock of a country and comparison of the building stocks between different countries can be found at: https://episcope.eu/fileadmin/tabula/public/docs/tabula-info.pdf.

best NZEB=TOB7) and located in 11 different climates represented by 11 reference cities (HDD from 3 325 K.day to 5 034 K.day according to STN EN ISO 13790/NA).

Figure 3-24 shows that, for example, the smallest family house with the worst building envelope quality level (TOB1a) and situated in the coldest climate (village Oravská Lesná with HDD 5 034 K.day) has calculated energy needs of more than 600 kWh/(m2.a) while the same house located in the warmest climate (town Komárno with HDD 3 325 K.day) would need approximately 400 kWh/(m2.a).

Figure 3-24 Calculated energy need for heating in kWh/(m2.a) based on building typology and climate – single family houses



Source: Bendžalová, J., SIEA 2022–2023, OP Kvalita životného prostredia, Národný projekt Odborne o energii 2022 Annex to Methodology for regional pasportisation of buildings, quantification of energy needs and the potential of energy savings in the building sector, Reference buildings, SIEA 2022–2023
Note: The envelope quality is presented on the x-axis for each reference building based on building age from the worst TOB1a to the best TOB7=N2(NZEB) at the level of NZEB

Figure 3-24 depicts potential additional expenditure for ETS2 in EUR/year calculated by the country team based on the energy need for heating for the above representative single-family houses. The same CO_2 emission factor is used as in the Oeko-Institut simulation (0.00018204 tCO_2/kWh).

Figure 3-25 confirms the values in Oeko-Institut SEEK-EU micro model for dwellings (Figure 3-21). Figure 3-24 shows that the additional expenditure for the ETS2 is 256 EUR/year for a single family house (usually situated in sparsely populated area) of an average size, with an average energy efficiency (envelope properties TOB3 means construction period 1993–1996) and in an average climate (town Zvolen) in case of natural gas used for heating and at a carbon price of

60 EUR/tCO$_2$. This value is in line with the value for sparsely populated area in Figure 3-20 that is about 230 EUR/year for all dwellings (flats and single-family houses).

Figure 3-25 also shows sensitivity of additional expenditure on climate and building size. For a large and worst-performing house in a coldest climate, the additional expenses could be more than EUR 1 000 per single-family house (household), which can be a problem if the size of the house is excessive for the number of inhabitants. This situation may occur due to the migration of people from rural communities to towns. As a result, large, originally planned multi-generational houses remain often in use by one or two, mostly elderly people. However, this is expected to be a quite marginal example affecting a small number of households.

Figure 3-25 Potential additional expenditure for ETS2 in case of natural gas used for heating and CO$_2$ price 60 EUR/tCO$_2$ – single family houses

Source: Bendžalová, J., Additional expenditure for the ETS2 - single family houses (gas, CO$_2$ price 60 EUR/t)

Data concerning building typology could be combined with statistical data on the number and floor area of buildings, their size and fuel used, and their distribution by age and climate locality (municipality). While statistical data is not presently publicly available in the necessary structure, they have been identified and discussions have begun with the Statistical Office of the Slovak Republic on the provision of this data for analysis, at least in an aggregated form. A similar analysis is also available for apartment buildings.

It should be noted that energy need in Figure 3-24 is not a real consumed energy, but calculated heat need (useful energy) using the same method as for energy performance certificate but for the actual climate of 11 towns defined in national annex STN EN ISO 13790/NA. The methodology[37] provides procedures how to consider the climate warming as the real degree-days are today lower.

The efficiency of heating systems is not considered in the above presented graphs but could be considered for a more detailed analysis.

3.2.5. Summary of impacts

Slovakia is the country with the highest median share of heating on total expenditures of the countries analysed in this TSI project, with a median value of 7.6% of total expenditures spent on heating. This indicates the high energy intensity of Slovak households, caused by low income relative to energy expenses, the climatic condition and the energy inefficiency of Slovak households, especially single family houses.

Based on national indicators, Slovakia has approximately 16% of households in energy poverty. The most exposed are the families with at least one child (29%), single pensioners (14%), and single parents (8%).

Based, on EU-SILC data, 5% of households are living in dwellings with a leaking roof and damp walls, 6% have arrears on utility bills, and 7% of households are unable to keep their home adequately warm. Slovakia also has 10% of population in hidden energy poverty, i.e. spending less than half the national median on heating fuels and having total expenditures below the national median. Finally, 8% of households spend more than twice the national median on heating fuels and their total expenditure is below the national median. These households have more household members than the average, so the number of affected persons is even higher.

Households in the lowest income quintile are in the worst situation. 23% of the population in the lowest income quintile is not able to keep their homes adequately warm. Significantly affected are also households in the second lowest income quintile (8%) and also in the two highest income quintiles (4%). Affected households are mostly located in rural areas, i.e. 9% of the rural population compared to 6% in the urban population.

Based on the modified 2M indicator estimated using EU HBS 2015 data, it is expected that 4.5–5.4% of Slovak households and 4–5% of Slovak population will be significantly affected by the increase in energy prices based on ETS2. This range depends on potential carbon price calculated at 30–60 EUR/tCO_2. Households in

[37] SEIA. (2022). Referenčné budovy pre regionálne energetické plánovanie. https://www.siea.sk/wp-content/uploads/odborne_o_energii/Dokumenty/Regionalne-energeticke-planovanie-ref-budovy-1.pdf. (available in Slovak).

the lowest expenditure tercile will be more exposed, as 10.5–12% of them will be significantly affected by the introduction of ETS2. These households are more likely to be located in sparsely inhabited areas. Moreover, at 60 EUR/tCO_2 carbon price there will be 1% of vulnerable household population in urban areas compared to 10% in rural areas. As noted above, the median value and the 2M threshold estimated at 15% is very high in the Slovak context compared to other countries. If this threshold was set at a lower level, additional households would qualify as vulnerable to energy poverty and particularly vulnerable to the introduction of ETS2.

As noted above, national analysis of the vulnerability indicator discussed in Chapter 2.2.1 will be added as data becomes available.

Based on the analysis using the SEEK-EU micromodel, households using fossil fuels will have to face the additional expenditures of EUR 100–150 per year, meaning 1.4– 0.4% of total expenditures in the lowest and the highest expenditure decile, respectively (at the price of 60 EUR/tCO_2). Households in rural areas using fossil fuels for heating will have to spend an additional EUR 230 per year, while households in urban areas will only spend EUR 50 more per year.

Moreover, energy vulnerability will be influenced by climate conditions, which can cause additional hundreds of euro expenditures. For example, considering theoretical consumption based on the EPC methodology and real climate, the average Slovak house (built in mild climate areas) is expected to incur in additional expenditures of EUR 260 per year, while larger worst-performing buildings in the coldest area may face up EUR 1 100 per year of increase in energy costs. However, this is expected to be a quite marginal example affecting a small number of households.

3.3. Impacts of ETS2 on transport poverty and vulnerability of transport users

3.3.1. Estimated ETS2 impact on the number of vulnerable transport users in Slovakia

The modified 2M indicator, for which results are shown in this Chapter 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 poverty[38]. We acknowledge this by showing a whole range of transport poverty indicators in this report[39].

Chyba! Nenašiel sa žiaden zdroj odkazov. shows the share of the Slovak population deemed vulnerable according to the modified 2M indicator that is

[38] 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.
[39] 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.

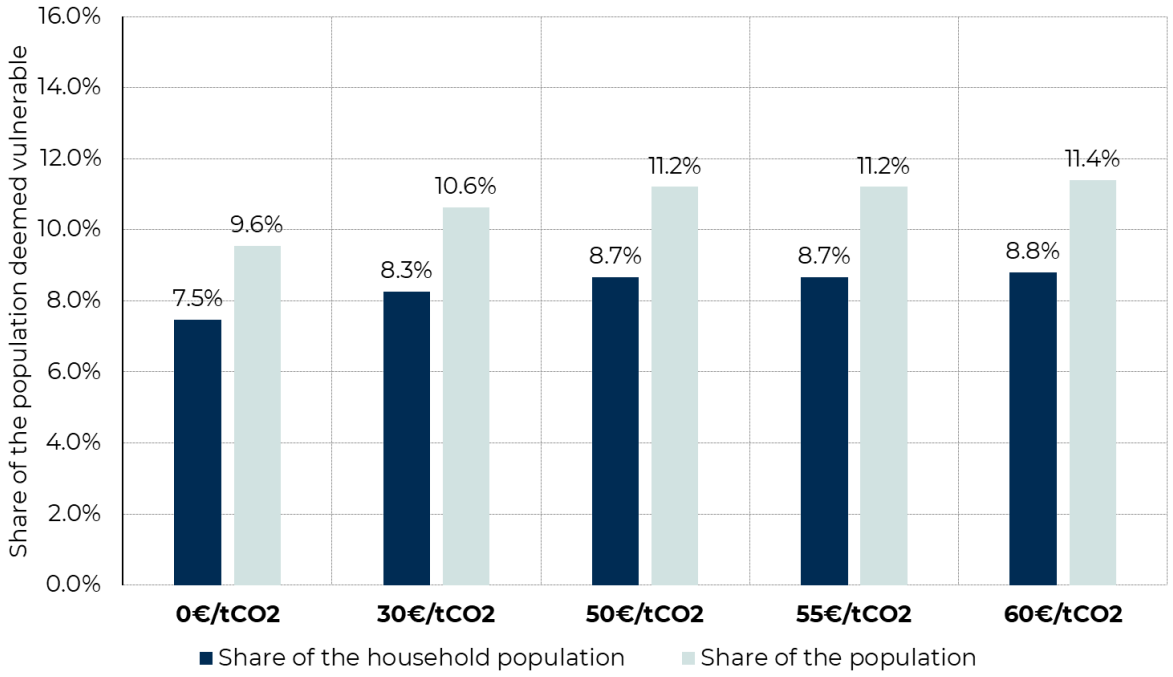
based on the EU HBS 2015 (see Chapter 2.2.2). The threshold value is fixed at twice this median expenditure. For Slovakia, the median related to costs for petrol, diesel and recurring expenditures for public transport is equal to 3.7% with the 2M threshold value set at 7.3%. We show both:

- the share of the household population (What percentage of all Slovak households is deemed vulnerable?); and
- the share of the overall population (What share of the overall Slovak population do the persons living in these households represent?).

The share of the population deemed vulnerable is shown before the introduction of the ETS2, here shown at a price of 0 EUR/tCO_2, indicating the share of households deemed vulnerable based on their expenditures for transport fuels in the HBS 2015 (see Table 2-5). We also show the share of vulnerable households and individuals for ETS2 prices of 30 EUR/tCO_2, 50 EUR/tCO_2, 55 EUR/tCO_2 and 60 EUR/tCO_2. The share of vulnerable households in Slovakia is estimated at 7–9%, the share of the total population is estimated at 10–11.5%. This analysis, and other modelling results presented in this Chapter, consider the impacts of ETS2 in terms of additional transport costs for different carbon prices. This analysis, and other modelling results presented in this Chapter, consider the impacts of ETS2 in terms of additional energy costs for different carbon prices. The impacts are estimated based on transport costs as presented in Chapter 1.2.5. Most of the households and individuals deemed vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2 are identified even at carbon prices of 0 EUR/tCO_2, indicating they are vulnerable based on their expenditures for petrol and diesel even before any carbon price is added.

The fact that a larger share of the total population is deemed vulnerable reflects the fact that more households with many household members are affected.

Figure 3-26 Share of the Slovak household population and share of the total population vulnerable to energy transport poverty and particularly vulnerable to the introduction of ETS2

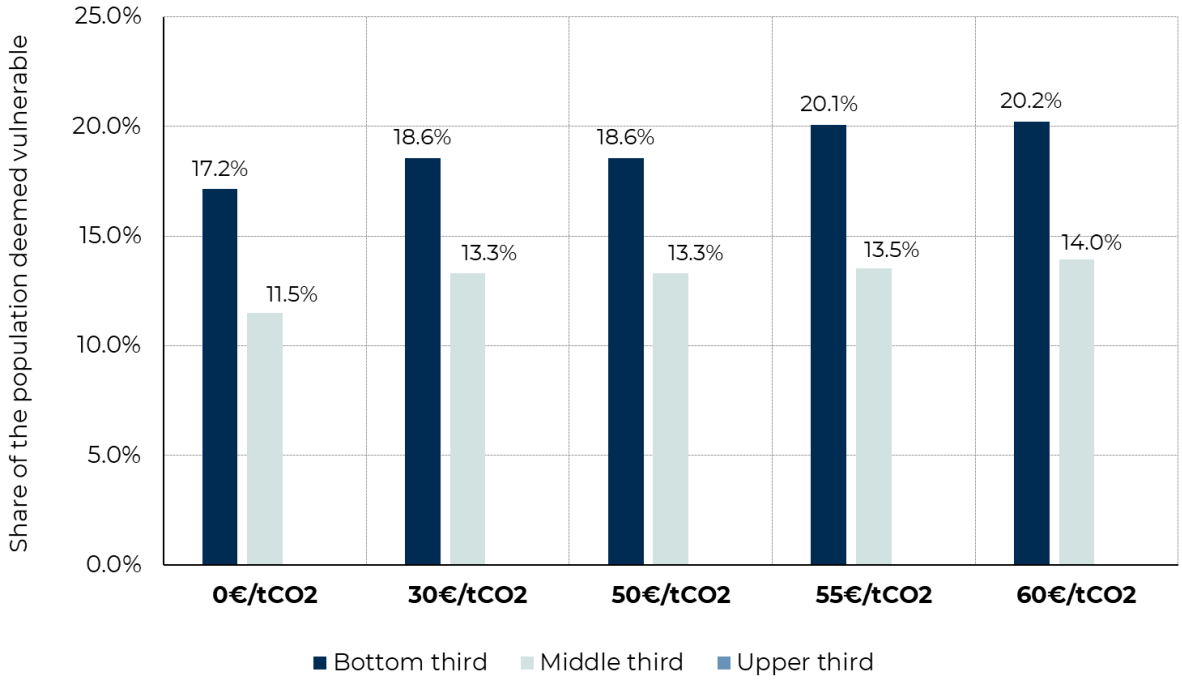


Source: Oeko-Institut SEEK-EU micro model

Chyba! Nenašiel sa žiaden zdroj odkazov. shows the share of the Slovak population that is deemed vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2. It shows the share along the expenditure distribution and for the bottom, middle and upper third of overall expenditures. As the modified 2M indicator is limited to the bottom half of the expenditure distribution (see Chapter 2.2.2), no one in the upper third is deemed vulnerable. With 17–20% the share amongst the bottom third is high and higher than in the middle third at 12–14%. Based on the definition of vulnerability, only the low-income and lower middle-income households are considered to be vulnerable.

The distribution of vulnerability along the expenditure and income distribution depends on the amount of fossil fuels that are used for transport in the expenditure brackets, which in turn reflects dependence on combustion vehicles and the availability of alternatives (public transport, active mobility). Vulnerability is also driven by overall expenditures and incomes. The lower the income, the harder to accommodate additional cost.

Figure 3-27 Share of the Slovak population deemed vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2 by expenditure tercile

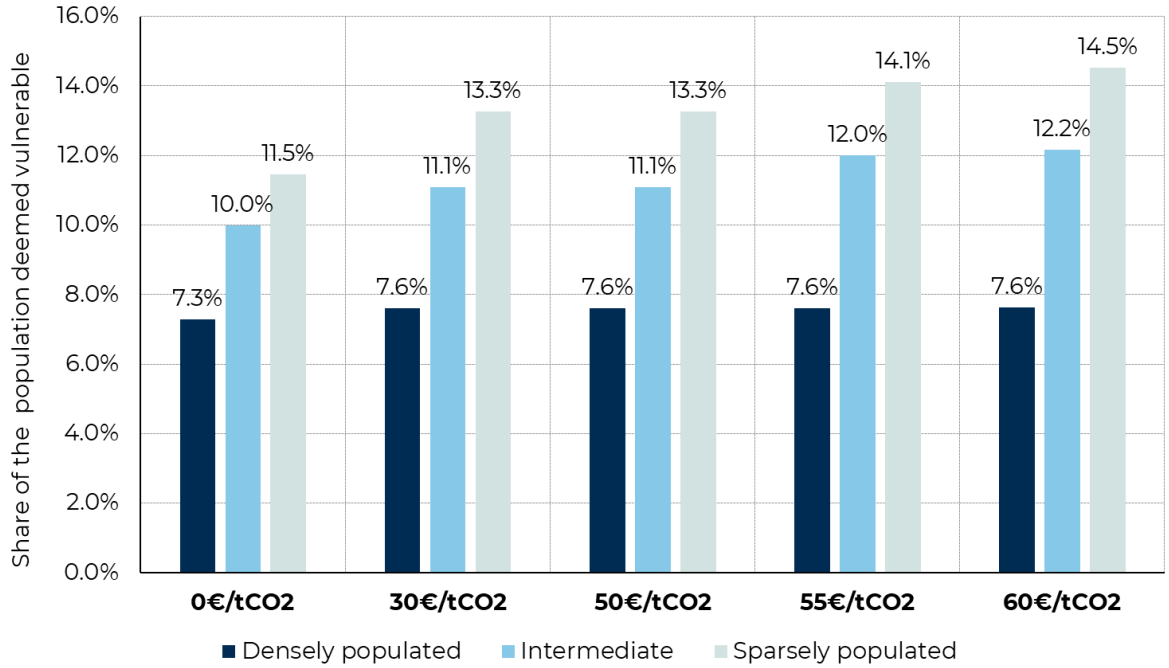


Source: Oeko-Institut SEEK-EU micro model

Chyba! Nenašiel sa žiaden zdroj odkazov. shows the share of the Slovak population deemed vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2 by degree of urbanisation. The highest vulnerability is calculated for sparsely populated areas, where 12–14.5% of the population is deemed vulnerable, depending on the level of the ETS2 price. The share is estimated at 10–12% for intermediate population density and 7–8% for densely populated areas.

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.

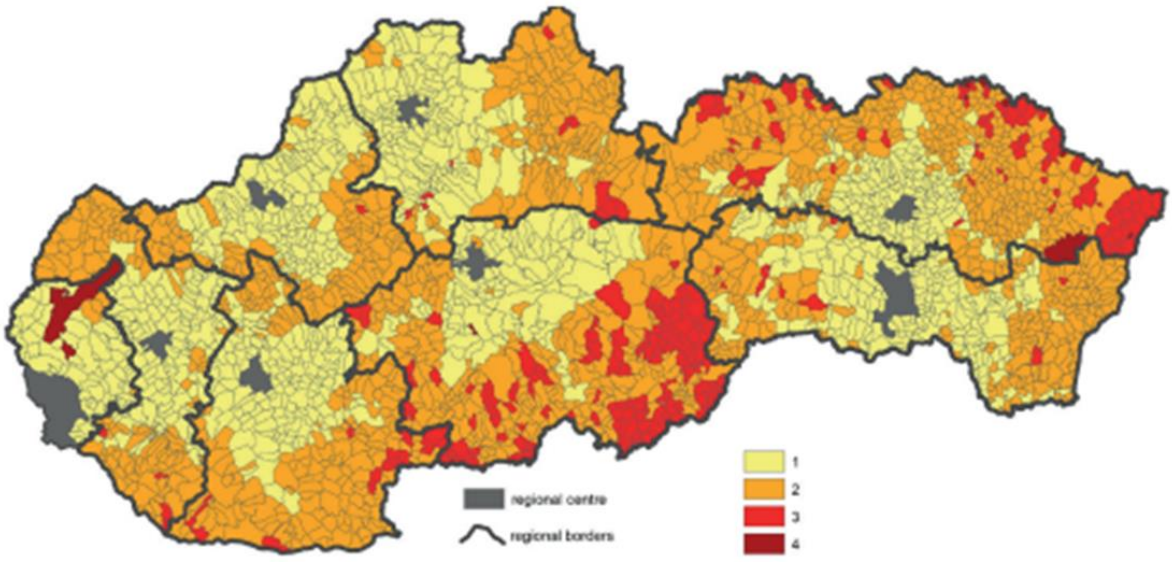
Figure 3-28 Share of the Slovak population deemed vulnerable to transport poverty and particularly vulnerable to the introduction of ETS2 by degree of urbanisation



Source: Oeko-Institut SEEK-EU micro model

Based on national analysis, we have regions seriously impacted by regional transport poverty. **Chyba! Nenašiel sa žiaden zdroj odkazov.** describes regions with long commuting time.

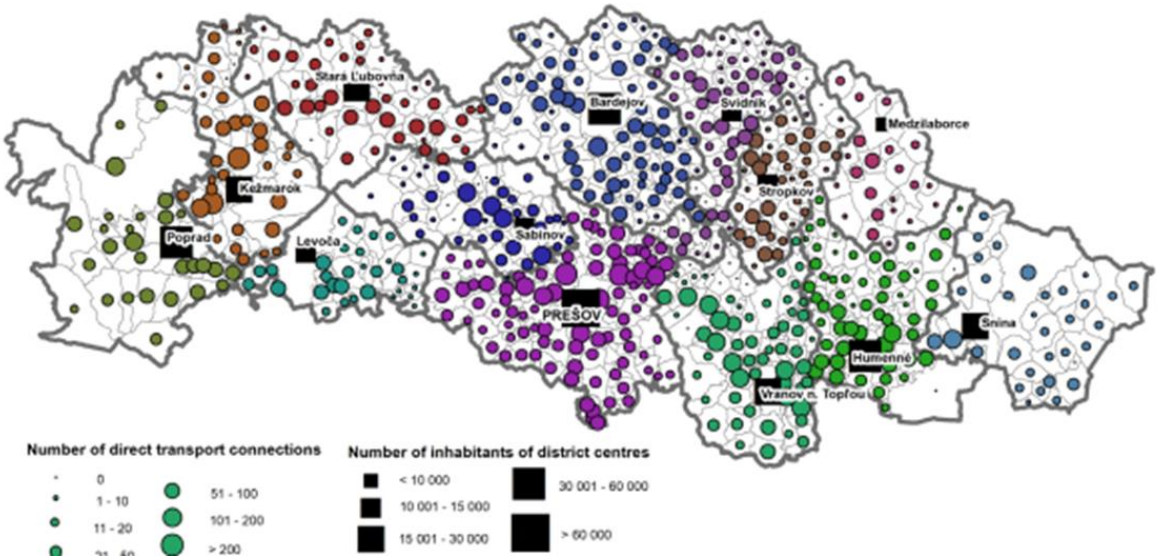
Figure 3-29 Transport disadvantage index – Wednesday



Source: Székely, V., Novotný, J. andMichniak, D. (2023).

In **Chyba! Nenašiel sa žiaden zdroj odkazov.**, we can track the regions with insufficient public transport connections in northeastern region of Slovakia.

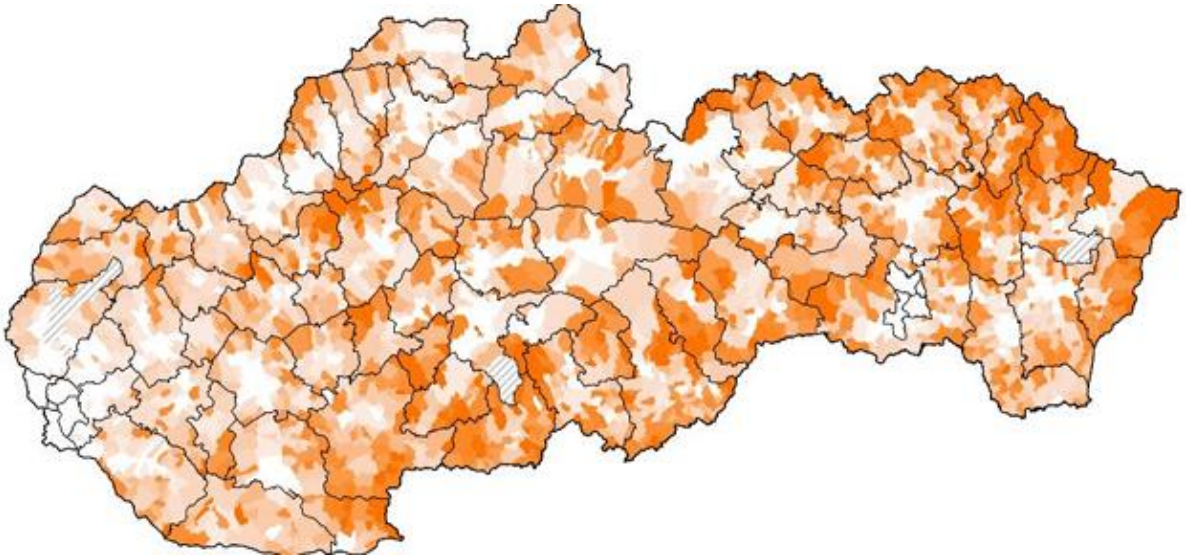
Figure 3-30 Prešov region: Number of direct transport connections between individual rural and urban municipalities and their district's centres



Source: Székely, V. and Novotný, J. (2019).

Complex index of regional transport poverty was prepared by Institute of Environmental Policy, Ministry of Environment of Slovak Republic (Table 3.31), taking into consideration wide range of indicators – transport, spatial and socioeconomic ones.

Figure 3-31 Complex index of transport poverty



Source: Institute of Environmental Policy (IEP), 2025.

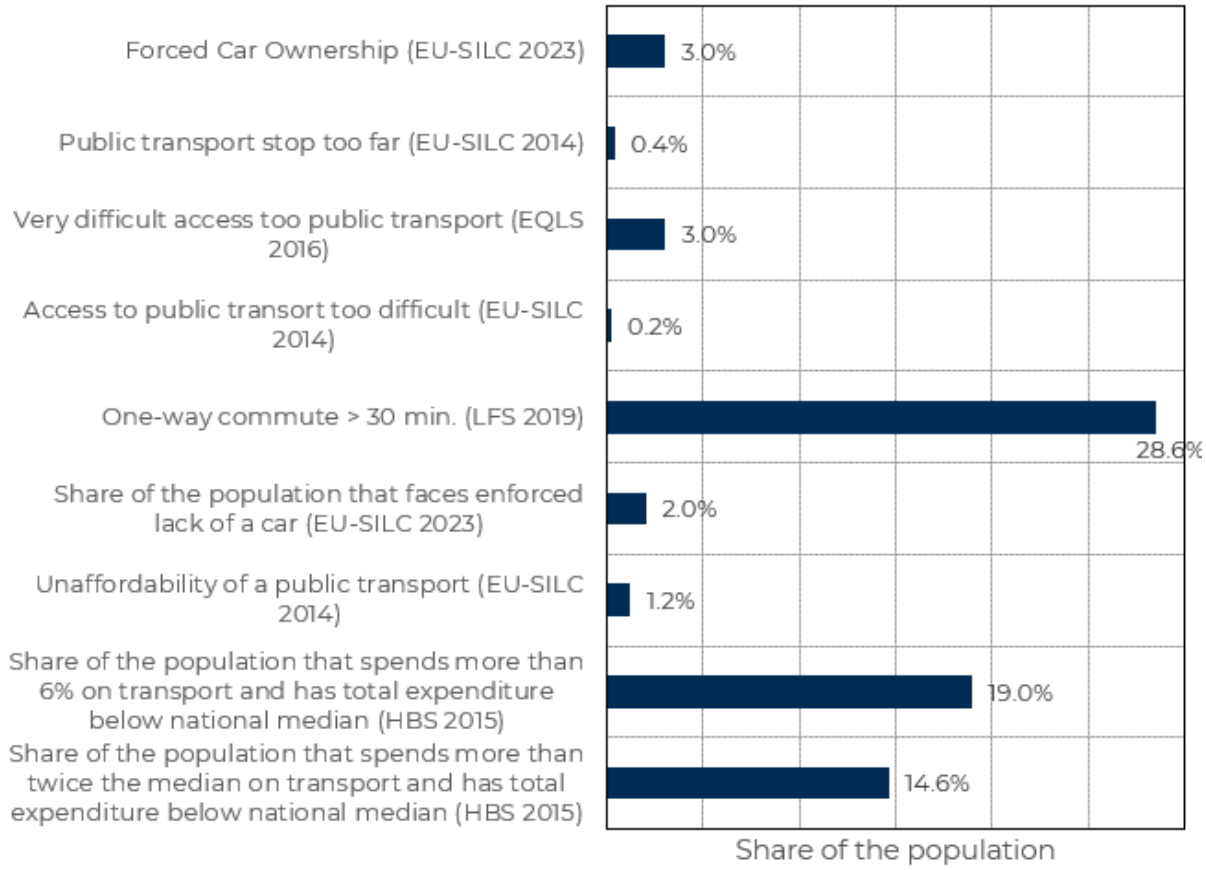
All these analyses point out to the regional problem of transport poverty and shows spatial differences among regions of Slovakia with the most vulnerable regions in southern and northeastern parts of Slovakia.

3.3.2. Target group analysis of transport poverty indicators for Slovakia

Figure 3-32 shows the share of the population identified by transport poverty indicators that reflect several different aspects of transport poverty for Slovakia. In

Slovakia, the indicators range from 1% for the share of the population stating that the stop being too far or the access too difficult is the main reason for not using it, to 29% of the Slovak population with a one-way commute to work of more than 30 minutes.

Figure 3-32 Share of the Slovak population identified by transport poverty indicators that reflect several different aspects of transport poverty



Source: Oeko-Institut SEEK-EU micro model

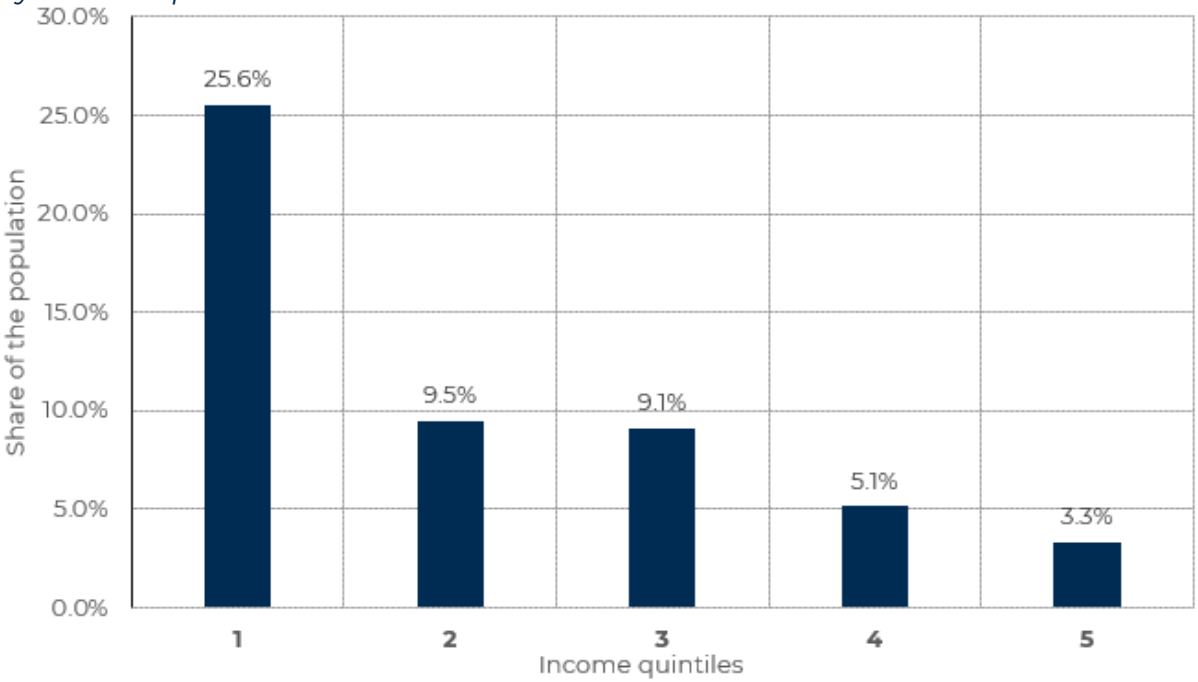
The following target group analysis focusses on two indicators that highlight the lack of a car and difficult access to public transport. We choose these indicators, as they focus on additional aspects relevant to transport poverty that may not be fully covered by the vulnerability indicator that focusses on fossil fuel use (see Chapter 2.2.2). The indicators may thus help identifying additional target groups that could benefit from the SCF due to being transport poor.

Figure 3-33 shows the share of the Slovak 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. Enforced lack of a car is a bigger issue for the bottom quintile of the income distribution, where 25% say that they cannot afford a car.

Figure 3-34 shows the same indicator by degree of urbanisation. The Slovak population living in towns and suburbs is more likely to say that they cannot afford

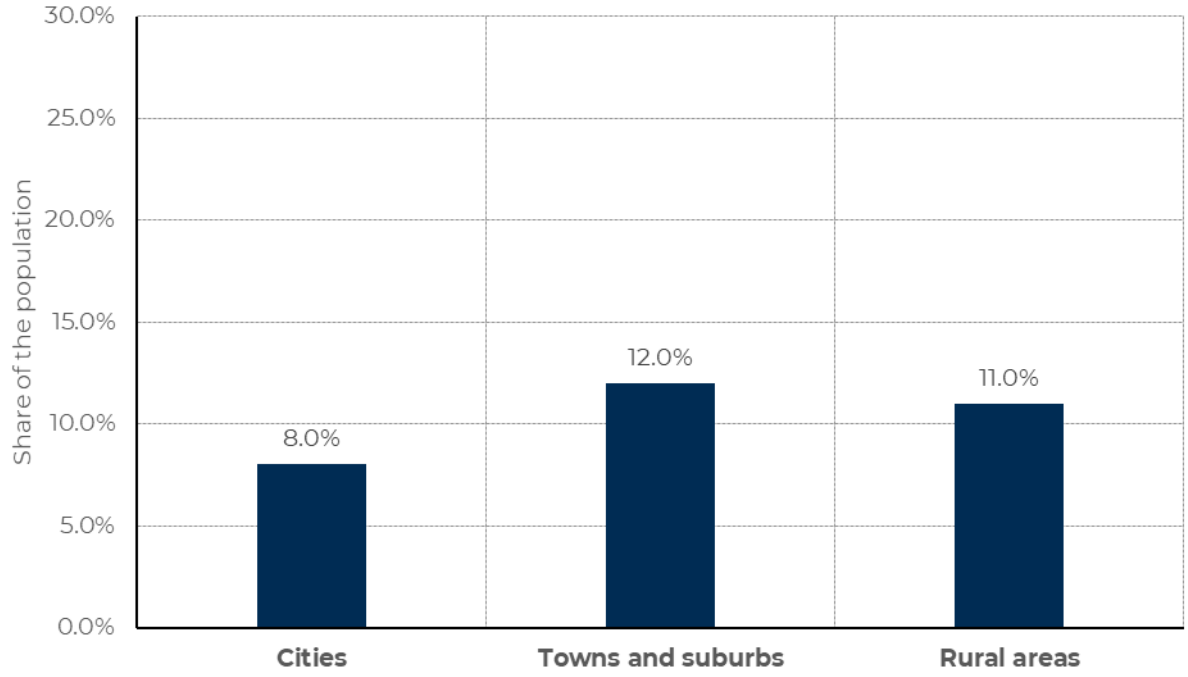
a car. The indicator usually shows higher shares in urban compared to rural areas, as a car may be a necessity in rural areas with households owning one, even if they cannot afford it or have to reduce other consumption.

Figure 3-33 Share of the population affected by enforced lack of a car in Slovakia by income quintile



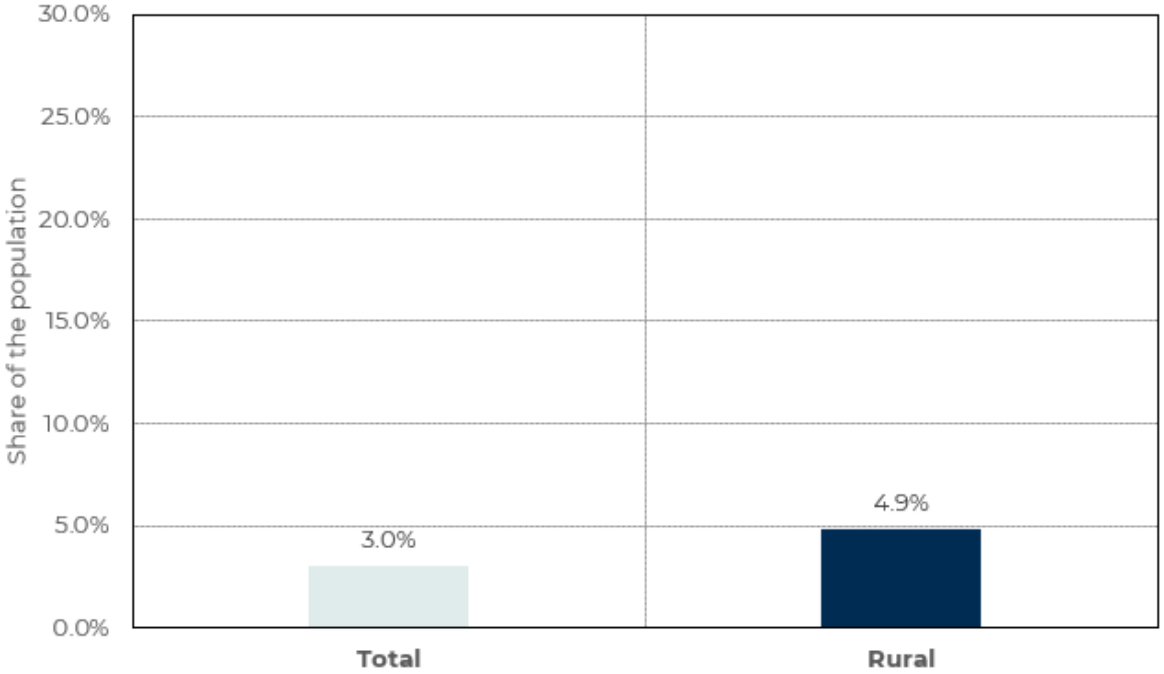
Source: Oeko-Institut SEEK-EU micro model based on EU-SILC 2023
Note: Quintile 5 should be flagged due to a low number of observations (20–49 observations).

Figure 3-34 Share of the population affected by enforced lack of a car in Slovakia by degree of urbanisation



Source: Oeko-Institut SEEK-EU micro model based on EU-SILC 2023.

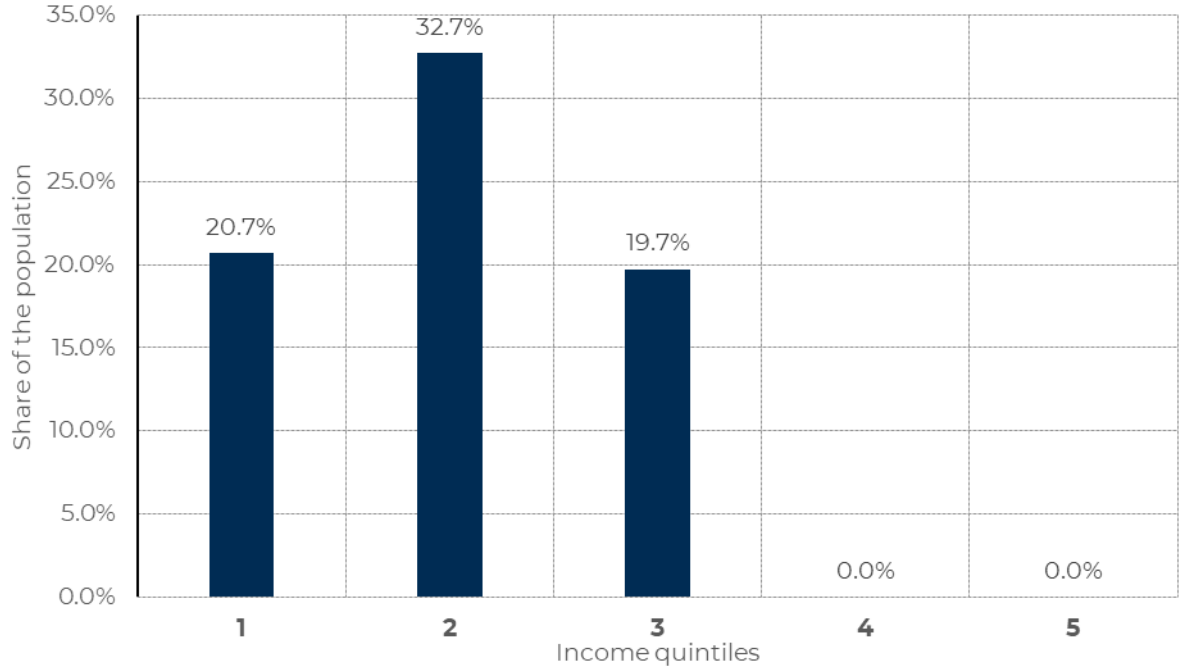
Figure 3-35 Share of the population affected by very difficult access to public transport in Slovakia: Total share and share in rural areas



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

Household transport poverty is highest in the second expenditure quintile. The comparatively lower share of transport poverty in the lowest expenditure quintile may be related to the fact that households in the first two deciles have a relatively low average share of transport expenditure in total expenditure. This is probably because they limit their mobility behaviour to some extent due to a lack of financial means. It is therefore possible that the proportion of transport poverty in low income groups is underestimated by expenditure-based indicators. That is why it is important to also look at other transport poverty indicators that focus on the availability and accessibility dimension of transport poverty.

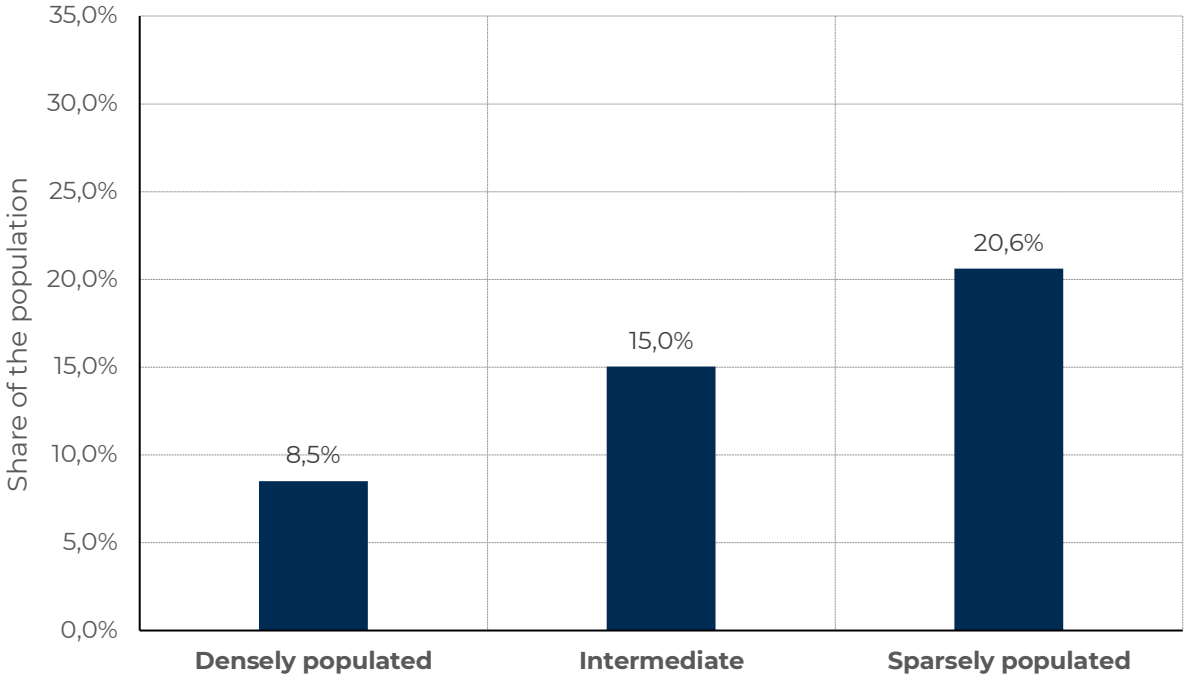
Figure 3-36 Share of the household/population that spends more than twice the median on transportation and has total expenditure below national median by expenditure quintiles (HBS 2015)



Source: Oeko-Institut SEEK-EU micro model based on HBS 2015

The problem of high expenditures on transportation is more serious in rural areas as depicted in Figure 3-37. Based on the data from HBS 2015, 17% of rural and 6% of urban households spend twice the median on transportation and belongs to the group with under medium expenditures. When comparing the number of persons affected, the shares increase – 21% of rural and 8% of urban population suffer from this kind of transport poverty.

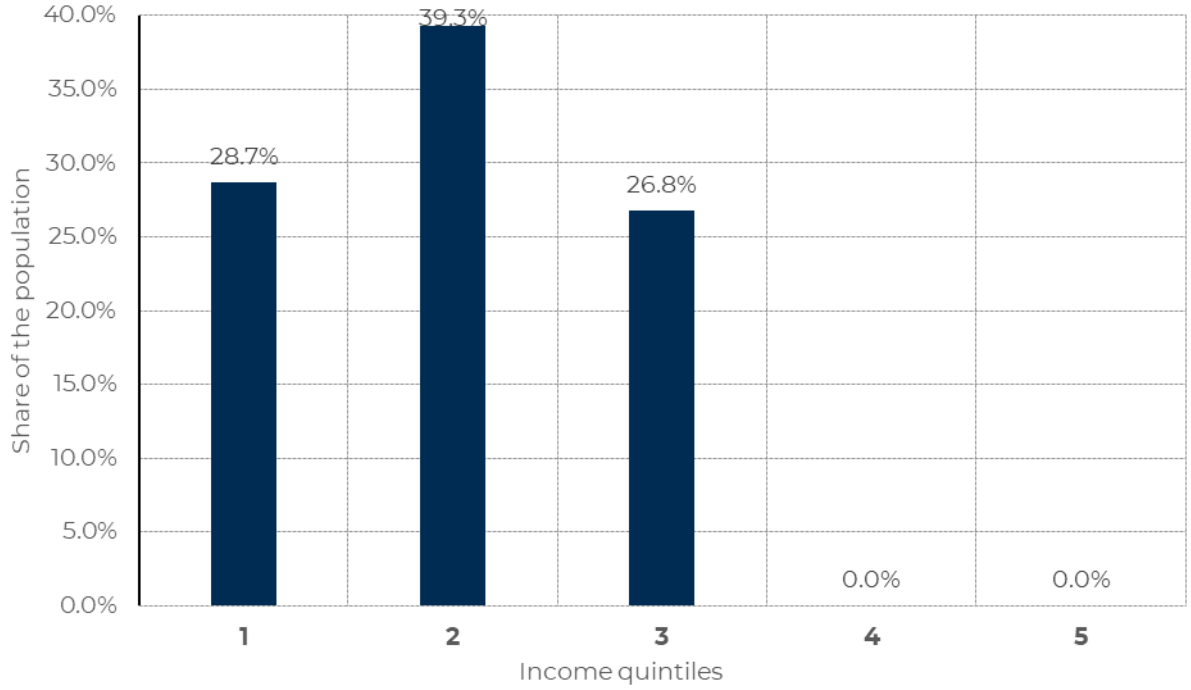
Figure 3-37 Share of the household/population that spends more than twice the median on transportation and has total expenditure below national median by degree of urbanisation (HBS 2015)



Source: Oeko-Institut SEEK-EU micro model based on HBS 2015

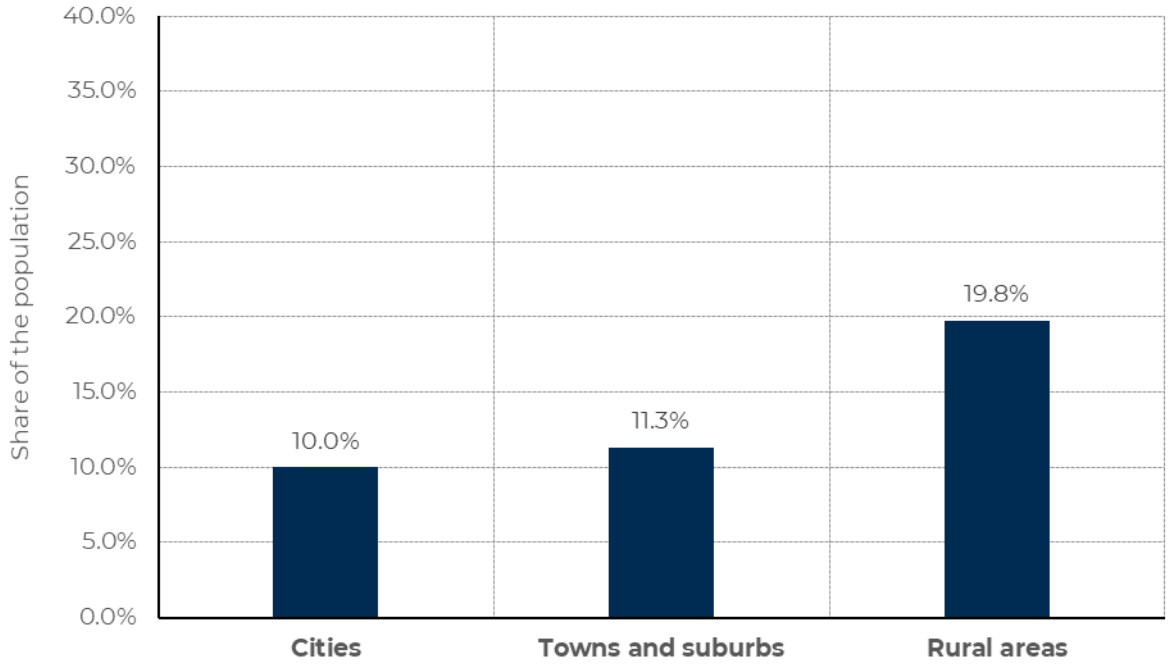
The other indicator of transport poverty is the share of the population that spends more than 6% on transportation and has total expenditure below the national median as shown in Figure 3-38 and Figure 3-39. Based on this, 40% of the population in the second lowest expenditure quintile spends more than 6% of their income on transportation which makes this group of the population the most exposed to transport poverty. In the lowest expenditure group, 29% of the population spends a significant part (6%) of its income on transport – also explained by the fact that the use of public transport is more common.

Figure 3-38 Share of the household/population that spends more than 6% on transportation and has total expenditure below national median by expenditure quintiles (HBS 2015)



Source: Oeko-Institut SEEK-EU micro model based on HBS 2015

Figure 3-39 Share of the household population that spends more than 6% on transport and has total expenditure below national median by degree of urbanisation (HBS 2015)

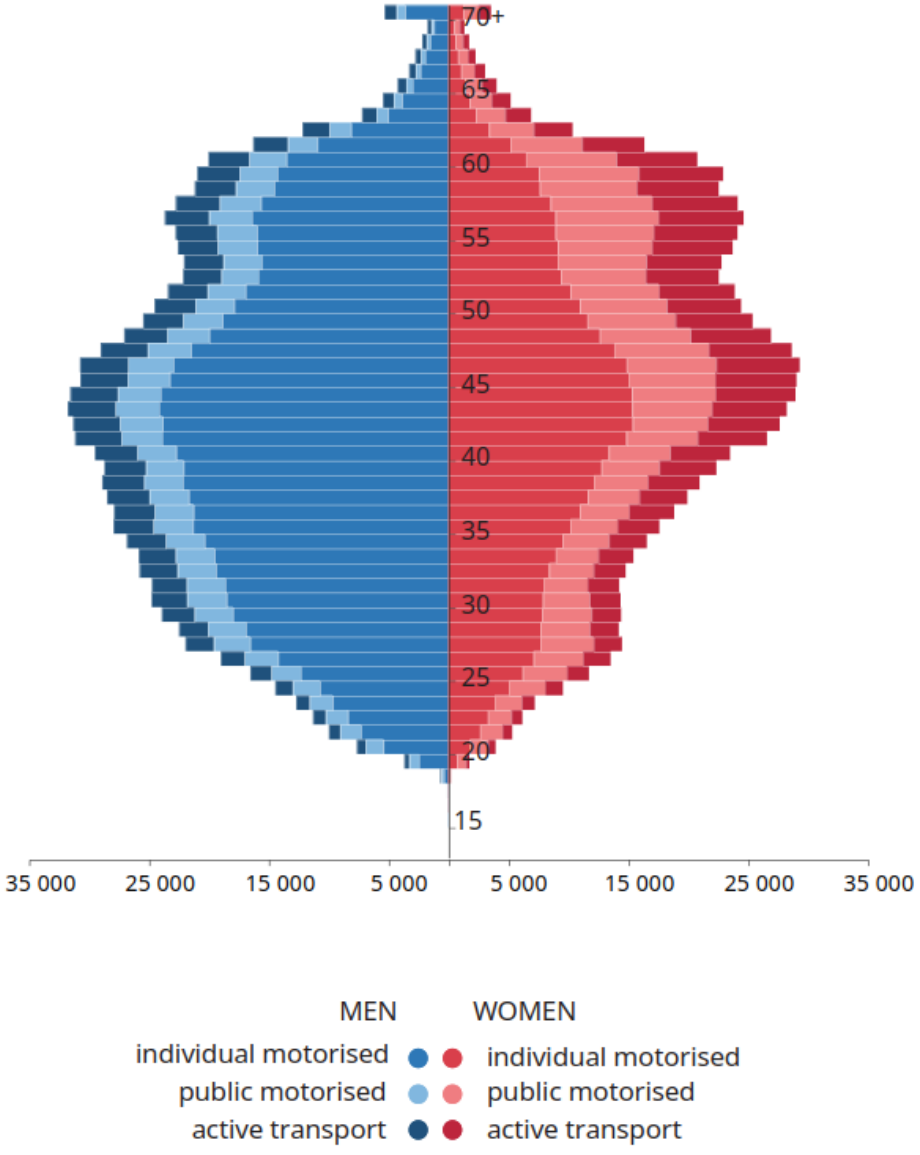


Source: Oeko-Institut SEEK-EU micro model based on HBS 2015

Both indices point out the vulnerability of households with lower expenditures living in rural areas.

Individual car transport (the most affected by ETS2) is predominantly used by men aged between 30 and 45 years. Women are more likely to use public or individual non-motorised transportation. Therefore, they could be less exposed to the impact of ETS2 on transport costs. This discrepancy is caused by customs and social norm of Slovak households – in households owning one car, men drive and use it for commuting.

Figure 3-40 Commuting to work by age and sex

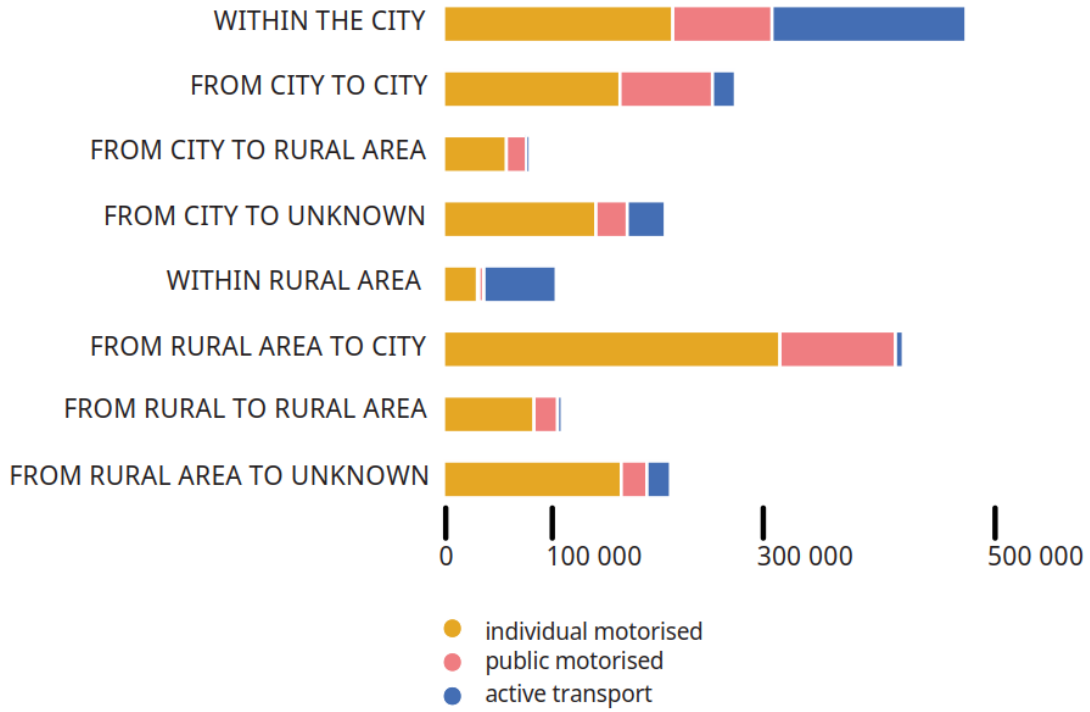


Source: Statistical Office of Slovak Republic

Note: Active transport is not motorised transportation such as walking, biking, etc.

Figure 3-41 shows that inhabitants are predominantly using individual motor/car transportation to get from rural to urban areas. This share of the population will be the most affected by the increase in ETS2.

Figure 3-41 Commuting to work by area and way of transport

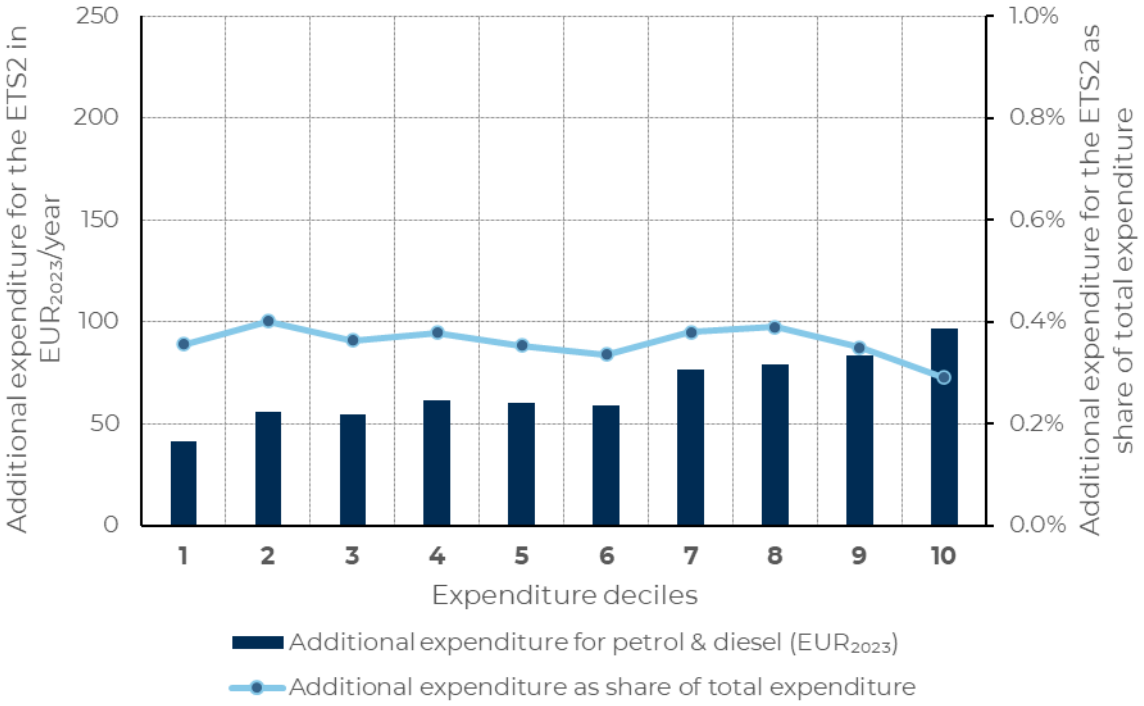


Source: Statistical Office of Slovak Republic

3.3.3. Estimated ETS2 impacts in the transport sector by target group in Slovakia

Based on the analysis with the SEEK-EU micromodel (Chapter 3.1.1), Figure 3-42 shows the estimated ETS2 costs at a carbon price of 30 EUR/tCO_2 in the transport sector for Slovak households for our main scenario that includes an elasticity of - 0.2 for transport (see Chapter 3.1.1). The figure shows the impact by expenditure deciles only for those households using petrol or diesel.

Figure 3-42 ETS2 costs related to transport for Slovak households at a carbon price of 30 EUR/tCO$_2$ (only households using fossil fuels)



Source: Oeko-Institut SEEK-EU micro model

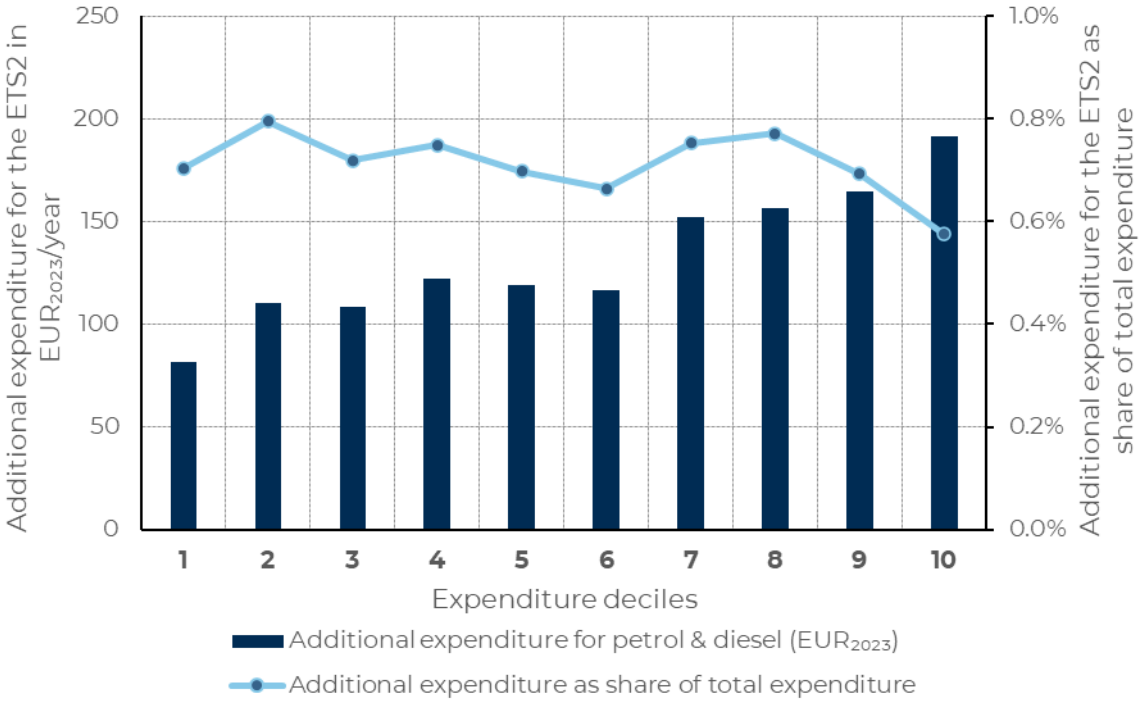
As households with higher overall expenditures use more petrol and diesel cars, the expected additional cost at 30 EUR/tCO$_2$ rises from 40 EUR/year in the first decile to 100 EUR/year in the tenth decile. This compares to EUR$_{2023}$ 1 438 total annual transport costs without ETS2 for Slovak households with expenditures for diesel or petrol according to the EU HBS 2015.

The share of total expenditure that needs to be spent on the ETS2 costs at a carbon price of 30 EUR/tCO$_2$ is relatively constant across deciles at 0.3–0.4%. This reflects the fact that higher income households have a better ability to absorb the additional cost.

At a carbon price of 60 EUR/tCO$_2$ (Figure 3-43), the estimated ETS2 costs rise to EUR 80/year in the first decile and 190 EUR/year in the tenth decile. The share of total expenditure that needs to be spent on ETS2 costs, is equal to between 0.6% and 0.8%, depending on the amount of fossil fuels used and the overall income and expenditure.

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/tCO$_2$ are slightly higher by 2 EUR/year in the first decile and EUR 4/year in the tenth.

Figure 3-43 ETS2 costs related to transport for Slovak households at a carbon price of 60 EUR/tCO$_2$ (only households using fossil fuels)

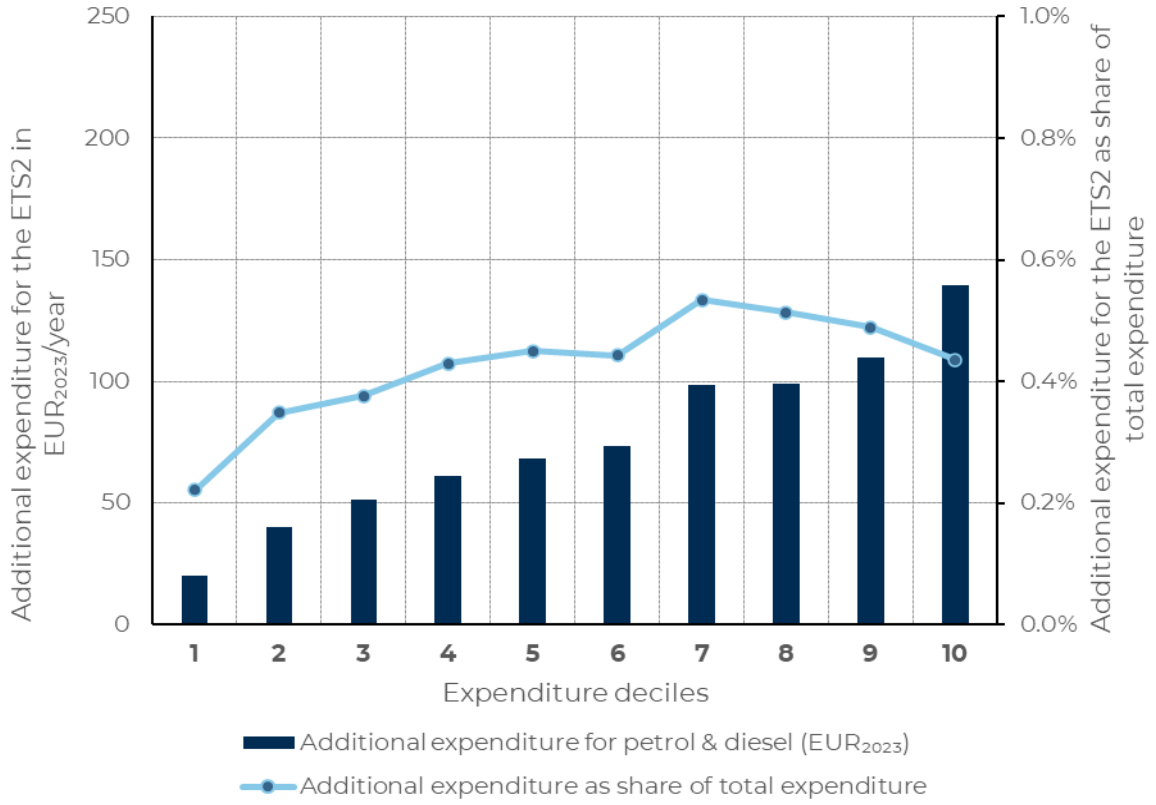


Source: Oeko-Institut SEEK-EU micro model

If all households are included in the analysis, i.e. also those that do not drive a vehicle and will therefore not be directly affected by the ETS2, the average impact is smaller (Figure 3-44). Especially in the first five deciles the average impact is much smaller, as much fewer households own a vehicle in these deciles.

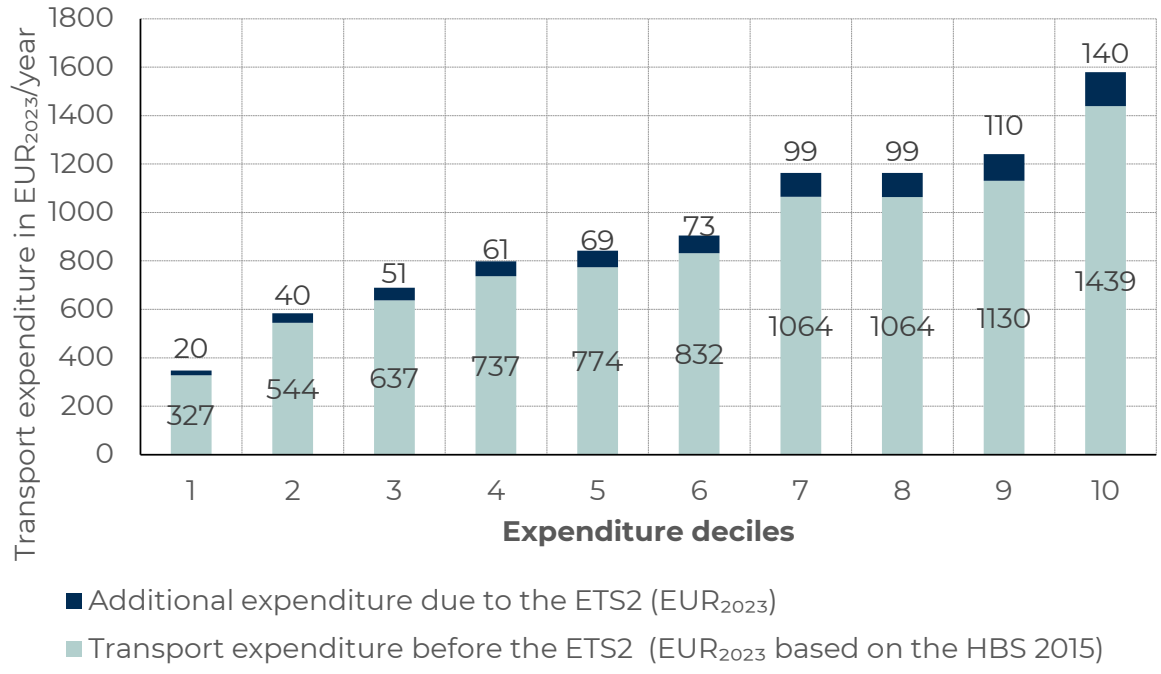
Figure 3-45 compares expected ETS2 costs at a carbon price of 60 EUR/tCO$_2$ to expenditures for transport based on the HBS 2015 (inflated to EUR$_{2023}$). In Figure 3-45, both households owning a car and those without are included. Overall, the additional cost due to the ETS2 is expected to represent a small fraction of overall transport costs for households in Slovakia.

Figure 3-44 ETS2 costs related to transport for Slovak households at a carbon price of 60 EUR/tCO₂ (all households)



Source: Oeko-Institut SEEK-EU micro model

Figure 3-45 ETS2 costs related to transport for Slovak households at a carbon price of 60 EUR/tCO₂ compared to transport costs according to the HBS2015 (all households)

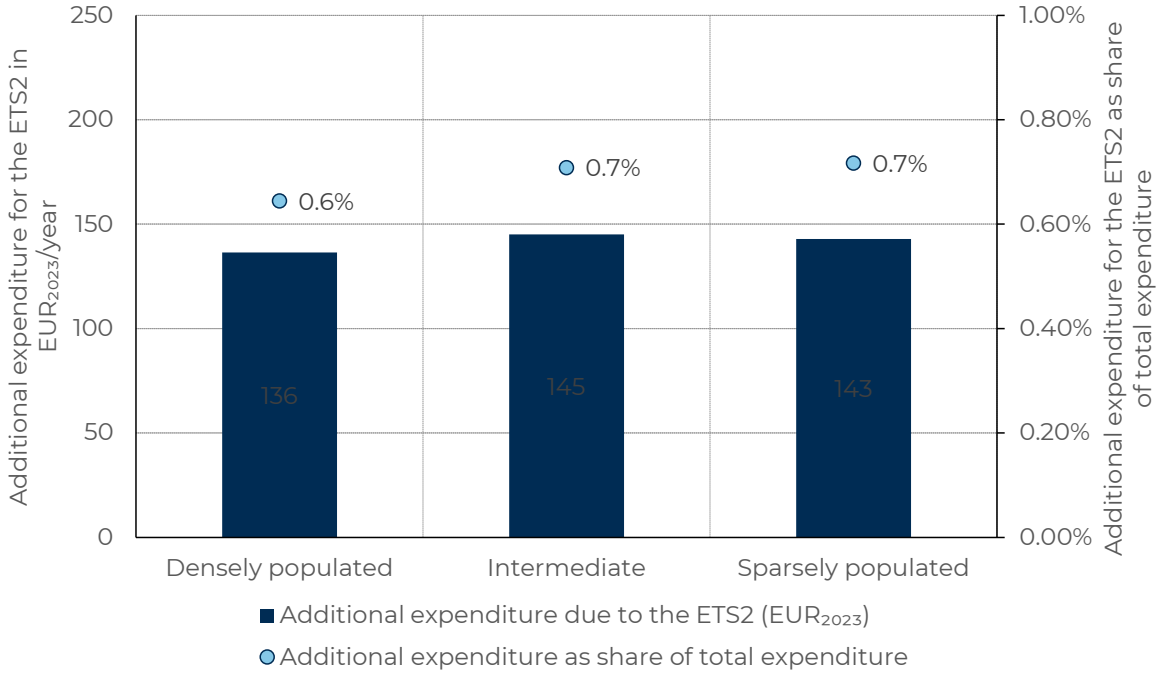


Source: Oeko-Institut SEEK-EU micro model

Note: A value of 1.3879 was applied to inflate expenditures to 2023 EUR, based on the Eurostat all items HICP [prc_hicp]

Figure 3-46 shows the estimated impact of the ETS2 by degree of urbanisation at a carbon price of 60 EUR/tCO_2 and only for those households using fossil fuels. The estimated carbon costs are distributed fairly evenly between degrees of urbanisation with an average cost of 90–100 EUR/year. It seems that the amount of petrol and diesel used by households owning a vehicle is similar in the different degrees of urbanisation. The impact of the additional expenditure spent on ETS2 costs lies between 0.6% and 0.7%.

Figure 3-46 ETS2 costs related to transport for Slovak households at a carbon price of 60 EUR/tCO_2 (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. This could be households that live far away from their workplace and have to commute by car, while also having low incomes.

3.3.4. Summary of impacts

Slovakia is a country with a quite high median share of transport in total expenditures – 3.7%. We analysed several indicators to fully understand transport poverty and vulnerability which are presented below.

- 29% of Slovak population based on LFS and 15% based on CENSUS 2021 has to commute for longer than 30 minutes (one way), 3% of population has very difficult access to public transport or is forced to own a car due to not having any other transport options. 19% of people spend a large share of their expenditures on transport. 15% of the population spends more than twice

the national median on transport and has total expenditure below the national median.

- Based on the modified 2M indicator and EU-level data, between 10% and 11% of the Slovak population is considered transport vulnerable after the introduction of ETS2 due to increased transport costs.
- For the average household in Slovakia, the ETS2 impact at prices of 30–60 EUR/tCO_2 lies at 70–130 EUR/year for households using diesel and petrol to fuel their vehicle.
- Households with higher incomes will be more affected in terms of the additional euros spent, as they are more likely to own a vehicle and drive over longer distances, thus using more petrol and diesel.
- However, due to the higher incomes the impact on overall expenditures for high income households is similar to the one for low-income households.
- The impact of ETS2 costs will have to be tackled especially for those using private cars to commute and do not have any alternative. Mostly men belong to this group of vulnerable transport users, as they use cars more frequently than women.
- The lowest expenditure deciles will be more exposed to transport vulnerability as a result of ETS2, as 20% of the population of the lowest expenditure tercile is expected to be vulnerable compared to 14% in the middle tercile at a carbon price of 60 EUR/tCO_2, up from 17% and 12% respectively in a situation without the ETS2.
- 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.
- The analysis by degree of urbanisation shows relatively equally distributed impacts.
- All the households (in rural and urban areas) are expected to face the same increase in expenditures at the level of around 0.6–0.7%.
- Individual motorised transport is used more frequently in rural areas to commute to the cities where basic services are provided such as schooling, health care and more employment opportunities. Here 14.5% of population can be considered vulnerable at the carbon price of 60 EUR/tCO_2, up from 11.5% in a situation without the ETS2.
- Households using fossil fuels will face the EUR 80 increase per year in the lowest decile and EUR 190 increase in the highest decile. This means 0.6-0.8% of total household expenditure increase in the lowest and highest deciles, respectively. The impact of the price increase will be evenly distributed as lower income households/individuals do not use individual transport as frequently and intensively.

3.4. Impacts of ETS2 on micro-enterprise vulnerability

3.4.1. Impacts of ETS2 based on micro-modelling analysis (using both indicators and target groups)

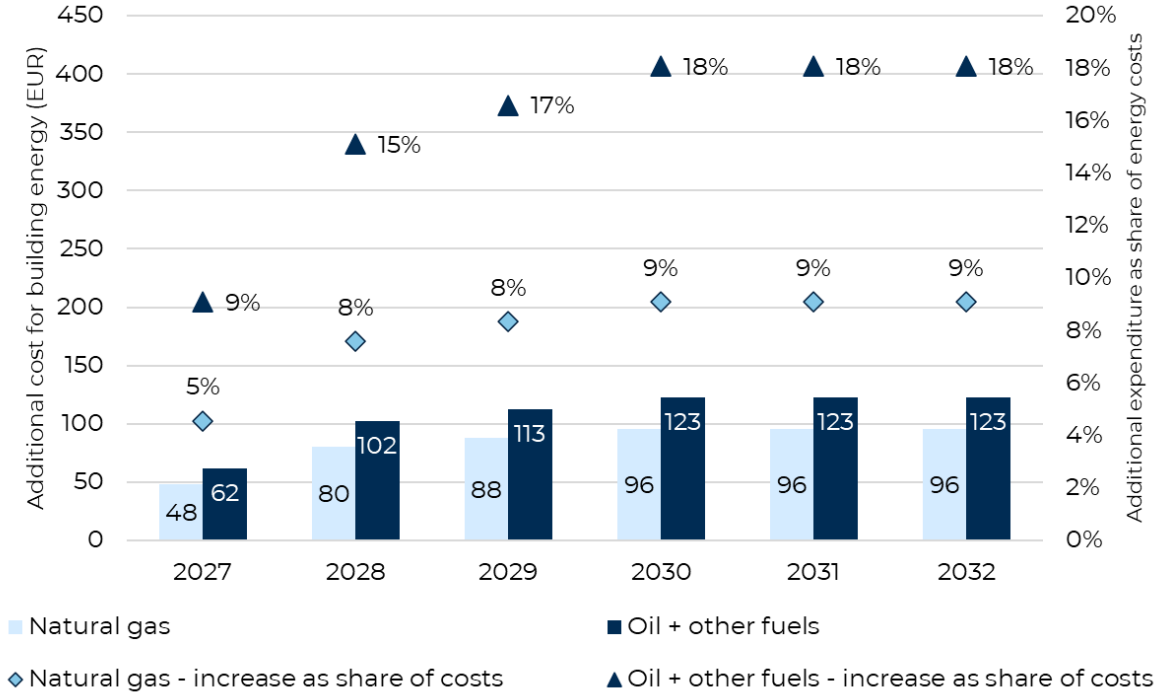
The analysis of the vulnerability of micro-enterprises in Slovakia focuses on two aspects: *buildings and transport*.

The impacts of ETS2 on buildings' and transport energy costs are evaluated on the basis of national fuel prices, CO_2 emission fuel factors, and expected change in the price of ETS2 (see Chapter 1.2.5). Our analysis also considers a reduction in the use of each fuel in response to the increase in price (elasticity).

Figure 3-47 shows the additional building-related costs for the average micro-enterprise using either natural gas and oil as main heating fuel up to 2032. Due to the higher carbon content of oil, increases in the running costs for oil boiler is higher both in absolute (EUR 123 from 2023 onwards) and relative terms (18% increase energy cost from 2023 onwards). The high increase in relative terms in the price of oil fuel is due to the low starting price considered (EUR 0.60 per litre), which results in the carbon price representing a higher share of total cost compared to natural gas. On the other hand, cost increases for natural gas users are limited to below EUR 100 per year. Data on total companies expenditure is not available, and therefore cannot be used to put cost increases under a broader perspective. However, we expect this increase to be limited in relative terms, similar to increases seen for households.

Across all affected microenterprises, the cost increases will amount to EUR 29.5 million per year from 2030 onwards.

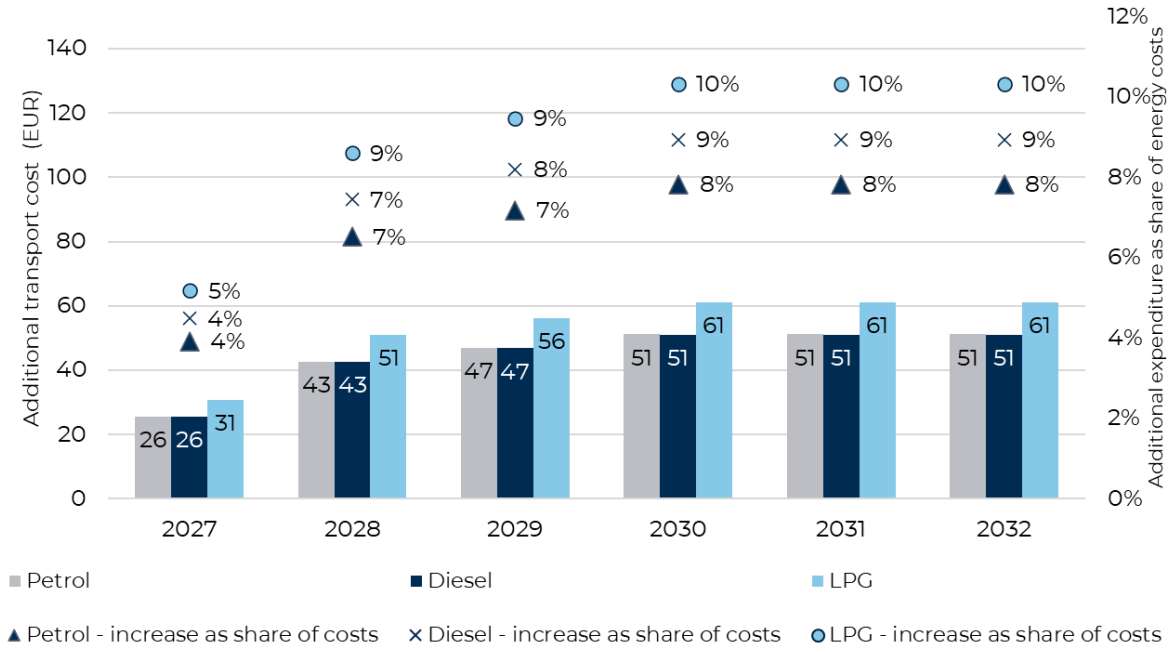
Figure 3-47 Additional costs for energy in buildings the average micro-enterprises that use fossil fuels



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

The impacts of ETS2 on transport costs are estimated in Figure 3-48, which shows that ETS2 may increase total transport fuel costs of the companies that own a fossil fuel vehicle for up to EUR 61 per year from 2030, an increase of 10% at most. Across all companies in Slovakia, this results in an overall increase of EUR 15.9 million per year from 2030 onwards.

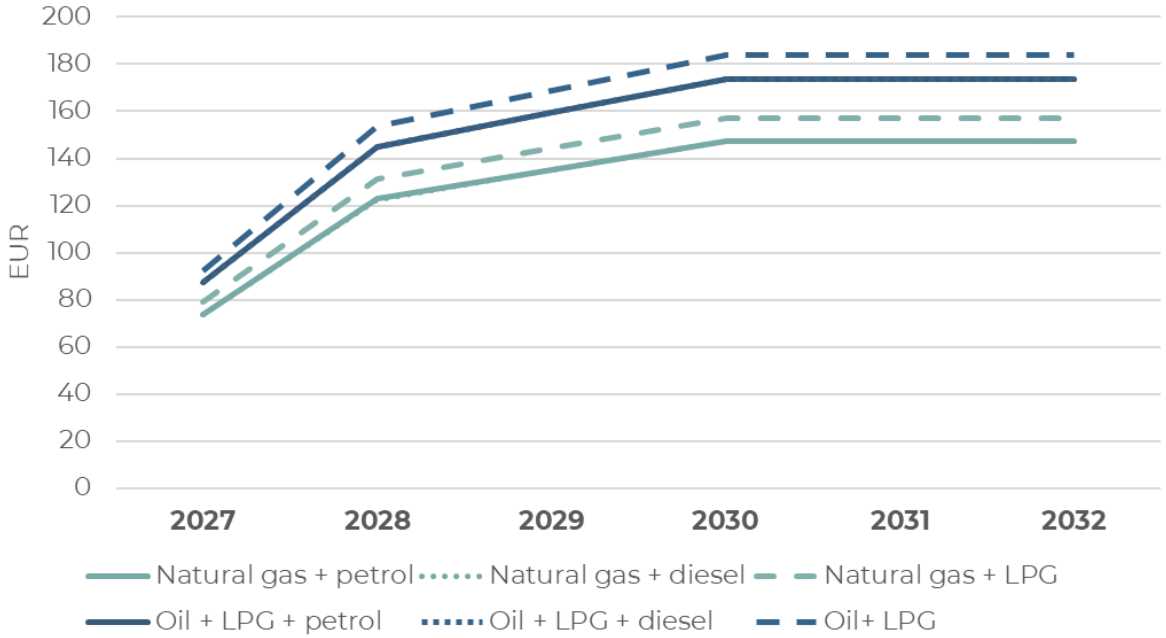
Figure 3-48 Additional transport costs for the average micro-enterprises (excluding transport and transport-intensive companies)



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

To assess the overall impact of ETS2 on the average micro-enterprise, we evaluated different combinations of building fuel and transport fuels. Figure 3-49Figure 3-49 shows the average annual cost increases of these combinations, highlighting that micro-enterprises that use a combination of oil for heating and DHW, and LPG for cooking and transportation are going to incur in the highest cost increase, with just over EUR 180 of additional costs from 2030 onwards (at most an increase of 16% compared to current costs for those companies using fuels with higher carbon intensity).

Figure 3-49 Average additional cost per micro-enterprise that own both buildings and vehicle (EUR)



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

As discussed in the introduction to this Chapter, we have analysed separately the effects of ETS2 on transport micro-enterprises and transport–intensive micro-enterprises. We consider transport-intensive those that fall within the NACE classes listed in Table 3-2. The numbers are approximated based on data from ORBIS and EUROSTAT SBS.

Table 3-2 Transport and transport–intensive sectors

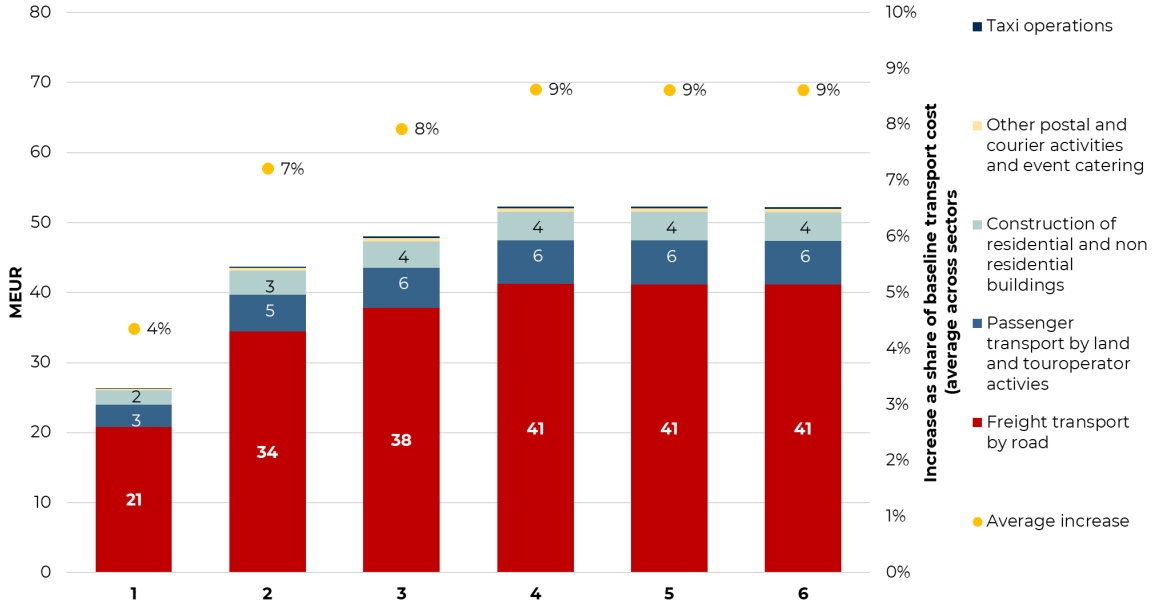
Sector	NACE class	No of companies*	Key assumptions per micro-enterprise**
Construction of residential and non-residential buildings (design excluded)	F4120	*25 300*	1 heavy-duty truck (D, P)
Urban and suburban passenger transport	H4931	*20*	2 buses (D)
Taxi operations	H4932	*590*	1 passenger car (P, D)
Other passenger transport by land	H4939	*1 120*	2 buses (D)
Freight transport by road	H4941	*19 840*	4 heavy-duty trucks (D, P)
Other postal and courier activities	H5320	*1 410*	2 LDVs(D, P)
Event catering activities	I5621	*530*	2 LDVs(D, P)
Tour operator activities	N7912	*1 130*	2 buses(D)

**rounded to the nearest 10*
**D: diesel; P: Petrol; L: LPG (most common fuels)*

In these companies, the effects on energy consumption and cost changes are much higher than for the average micro-enterprise. Figure 3-50 shows that the impact of ETS2 on these microenterprises is expected to reach nearly EUR 50 million per year from 2030 onwards, an increase of 8% form baseline energy

costs. Similarly to buildings and vehicles, these additional costs include a reduction in mileage following the increase in fuel prices (elasticity).

Figure 3-50 Additional cost for all micro-enterprise after ETS2 for transport intensive sectors (MEUR)



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

The majority of the additional costs are to be borne by companies operating in road freight transport (19 840 companies), followed by construction-sector companies. Figure 3-51 shows additional costs per micro-enterprise in these sectors in the year 2030. Passenger and freight transport by road are the most affected micro-enterprises, with additional costs expected to amount to EUR 2 000 and EUR 2 750 per year in 2030 (9% increase). Impacts in relative terms are similar across micro-enterprises, transport-intensive micro-enterprises use only diesel fuel, with the exclusion of taxis where other fuels play a significant role. The high impact on freight transport is a combination of highest number of vehicles per micro-enterprise, high number of km/year (around 15 500km) and high fuel consumption/100km (around 35 l/100 km).

Figure 3-51 Baseline and additional transport cost per micro-enterprise for transport dependent sectors in 2030

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

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

Based on the chosen indicators (detailed in previous Chapters, see 2.2.3.), a simulation and approximation of the number of vulnerable micro-enterprise is provided in Table 3-3.

Table 3-3 Approximation of vulnerable micro-enterprises based on the definition

Indicator number	Indicator name	Number of vulnerable micro-enterprises	Share of total micro-enterprises
Core Indicator 1	Micro-enterprises are those 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)	123 700	19%
Core Indicator 2	Micro-enterprises with significant energy expenditure	41 650	6%
Core Indicator 2.1	Significant energy expenditure for on-site fossil fuels consumption after introduction of the ETS2	13 350	2%

Indicator number	Indicator name	Number of vulnerable micro-enterprises	Share of total micro-enterprises
Core Indicator 2.2	Significant energy expenditure for transport after introduction of the ETS2	28 300	4%
Additional indicators			
5	Micro-enterprises operating from refurbished and new buildings		2%
	Vulnerable enterprises once micro-enterprises operating from refurbished and new buildings are excluded	40 830	6%

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

Vulnerable micro-enterprises are those captured by the two Core Indicators, in alignment with the definition of vulnerability in micro-enterprises. The Core Indicator 1 estimates the number of micro-enterprises that:

- Use fossil fuels; and
- Do not have enough profit to renovate the building or buy the adequate vehicle; are determined.

To determine the means of micro-enterprises to renovate buildings or to purchase zero- and low-emission vehicles (criterion b), the financial capability of affected micro-enterprises to invest needs to be assessed. This is done using following methodology:

- Renovation costs are calculated based on the information from the BPIE investment analysis, used for non-residential sector[40]. Since this data is from 2020, the investment adjusted using construction analytics index to the period from 2025–2032. The investment is divided in annual instalments during the ETS2 implementation SCP scope (2027–2032).
- Vehicle purchase costs are calculated based on average market prices for a 4-seater car, light duty vehicles (LDV), trucks and buses. Vehicle costs are also divided in six instalments.
- In order to estimate the number of enterprises that fall under the **Core Indicator 1**, we calculated the number of micro-enterprises that use fossil fuels only in buildings, only in vehicles, or both, and calculated whether their yearly profits are high enough to cover the additional expense for energy (due to ETS2) and for repaying the investment over the six years considered in this analysis. Based on our analysis, there are 123 700 micro-enterprises

[40] Buildings Performance Institute Europe. (2020). COVID-19 Recovery: Investment Opportunities in Deep Renovation in Europe.https://www.bpie.eu/wp-content/uploads/2020/05/Recovery-investments-in-deep-renovation_BPIE_2020.pdf.

that fulfil these criteria, equivalent to a share of approximately 19% of all micro-enterprises.

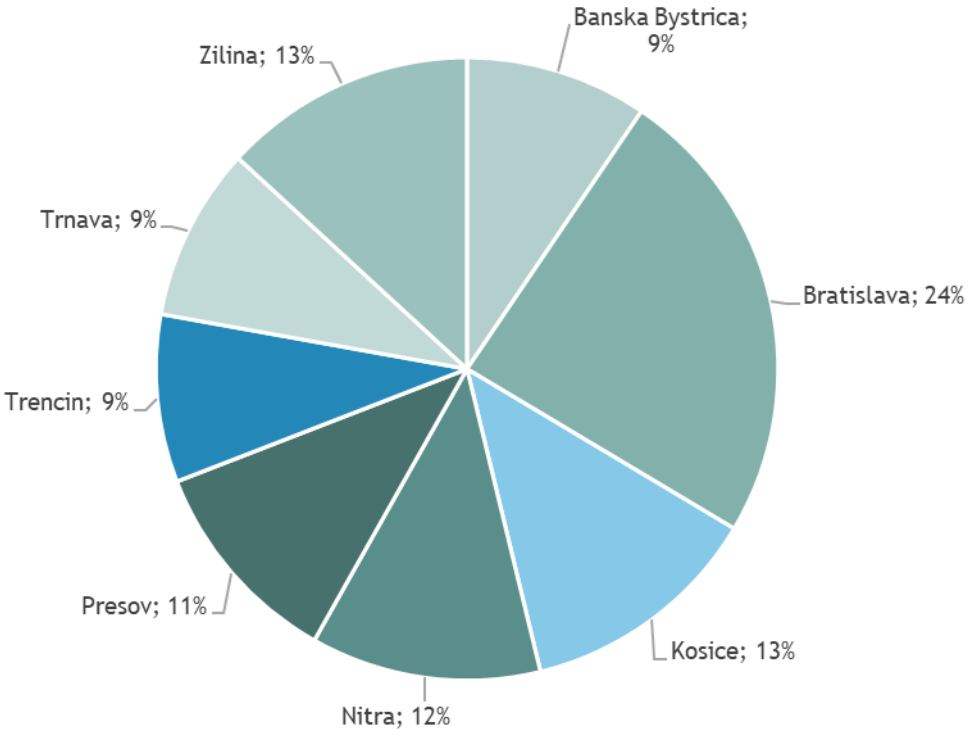
The second part of the definition refers to the significant energy expenditure in transport or buildings (Core Indicator 2). Based on the analysis presented in Chapter 3.4.3., combining Core Indicators 2.1 and 2.2, we estimate that the total number of vulnerable companies in Slovakia is around 41 650.

However, a portion of these micro-enterprises is based in a new or refurbished building. Based on JRC IDEES 2021 available dataset, around 2 % of all companies are located in new or refurbished buildings (789 out of 43 885 buildings in the service sector). If we assume the share is equally distributed between vulnerable and non-vulnerable companies, we can estimate that roughly 850 vulnerable micro-enterprises may be located in these buildings. This keeps the rounded number of vulnerable micro-enterprises at 40 830, which is around 6% of all micro-enterprises.

3.4.3. Target group analysis

Figure 3-52 shows the geographical distribution of affected microenterprises, showing that the majority of these are located in the Bratislava region (24%). The total number of micro-enterprises included in this analysis refers to 41 650 companies with high energy cost and limited capacity to invest.

Figure 3-52 Geographical distribution of affected micro-enterprises



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

3.4.4. Summary of impacts

A summary of the expected impacts is presented below.

- The total number of micro-enterprises in Slovakia is 664 680, and they employ 835 822 people. Due to the increase in energy prices caused by ETS2, those using fossil fuels are expected to incur in additional expenses to cover buildings and transportation costs.
- 48% of all micro-enterprise are using fossil fuels in their building, of which 98% are using gas for heating, hot water and cooking.
- It is expected that the building energy costs increase per micro-enterprise using fossil fuels would range between EUR 96 and EUR 123 per year from 2030 onwards.
- 48% of all micro-enterprises own a vehicle, the majority of which are petrol cars. ETS2 is expected to increase the fuel costs of the average non-transport intensive micro-enterprise by between EUR 51 and EUR 61 per year from 2030.
- The analysis of transport vulnerability considers delve into transport and transport-intensive micro-enterprises: 7.5% of micro-enterprise are transport intensive users, such as taxis and companies using or owning trucks, LDV or buses.
- Micro-enterprises operating in passenger transport by road are expected to be affected the most (around EUR 2 750 per year per company), followed by companies operating in road passenger transport (EUR 2 000/year).
- Based on the proposed definition and indicators: vulnerable micro-enterprises are those using fossil fuel and they 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. In Slovakia these are estimated to be 40 830 (6% or all micro-enterprises).

3.5. Impacts of the implementation of the EU energy and climate targets: expenditures and investments

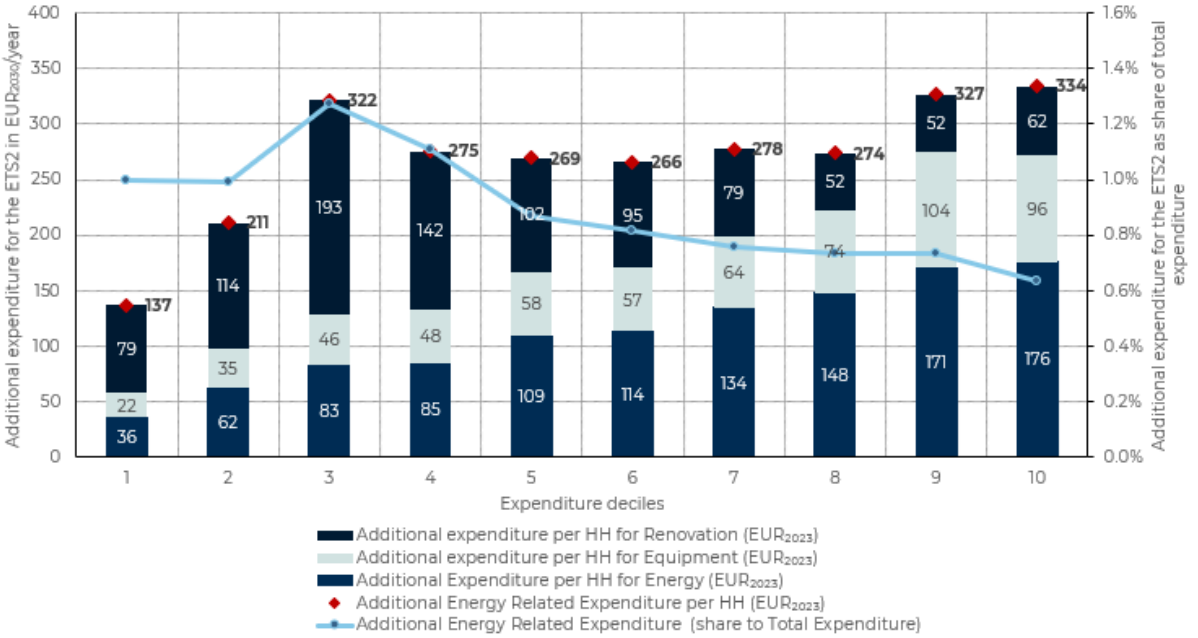
3.5.1. Households: total energy expenditures

The ETS2 and the implementation of the EU energy and climate targets for 2030 are expected to moderately increase the total energy expenditures of all households[41] as shown in Figure 3-53. This shows net increases in expenditure of between EUR 140–330 per year, the savings mostly increasing per decile, although there is an exceptional high impact for the third income decile. Proportionally the expenditure increase is highest for the lowest income deciles, representing a increase of around 1% or more in total household expenditures for households in the four lowest income deciles.

[41] See Chapter 1.1.1 of the report for expected change in per unit fuel costs resulting from ETS2.

Our analysis shows that the most significant driver of the decrease in expenditure is lower deciles, and especially decile 3, is increase expenditure on renovation[42]. However, it should be noted that it is expected that policy (including the SCP) provides support to lower income deciles to fund these investments, i.e. households would not need to meet all of the investment costs themselves. Renovation expenditures increase less for higher deciles. For higher deciles the impact of increased energy (fuel) expenditures and also equipment purchase are much more relevant.

Figure 3-53 Change in Total Energy Expenditures in 2030 – Policy Scenario changes from Reference Scenario



Source: GEM-E3, PRIMES, MHM

3.5.2. Households: expenditures split by energy carrier

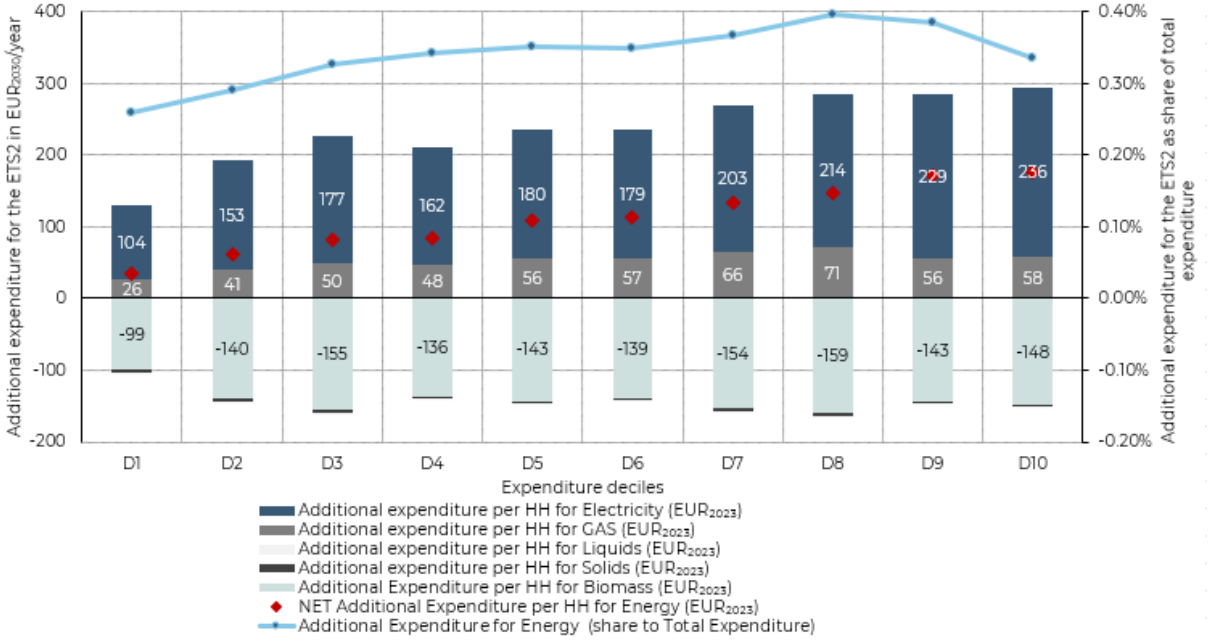
The impact on energy related expenditure can be broken down per fuel, as shown in Figure 3-54. The net increase in energy related expenditure is shown by the diamond marker. The lowest decile is assessed to have net expenditure increases of around EUR 36/year, increasing per decile up to around EUR 176/year for the highest decile. These increases, represent around a 0.3–0.4% increase in total expenditure for all households, with proportionally the highest impacts for the medium-high income deciles (7, 8, 9).

The three main components of the change in energy (fuel) expenditures are a decrease in biomass expenditures, and an increase in both gas and electricity expenditures. The largest share of energy consumption in households comes from gas, that is the preferred option for all income consumers. The increase in gas and electricity expenditures is what drives the increased spending on energy. Fuel

[42] Additional expenditure for renovation expressed in the following graphs and text refer to an average value across all households within an income category (i.e. including households that may not take up any investments), and is annualized over a period of 5 years.

shifts are expected, with the main switch being away from biomass to electricity or, to a lesser extent, natural gas. The results indicate the switch for households those undergone reconstruction to shift from biomass to other heating sources like electricity and using heat pumps, what is an effective choice. At the same time the heat pumps can also be used for other uses (like cooling).

Figure 3-54 Change in Electricity, Gas, Liquids, Solids and Biomass Expenditures in 2030 – Policy Scenario changes from Reference Scenario

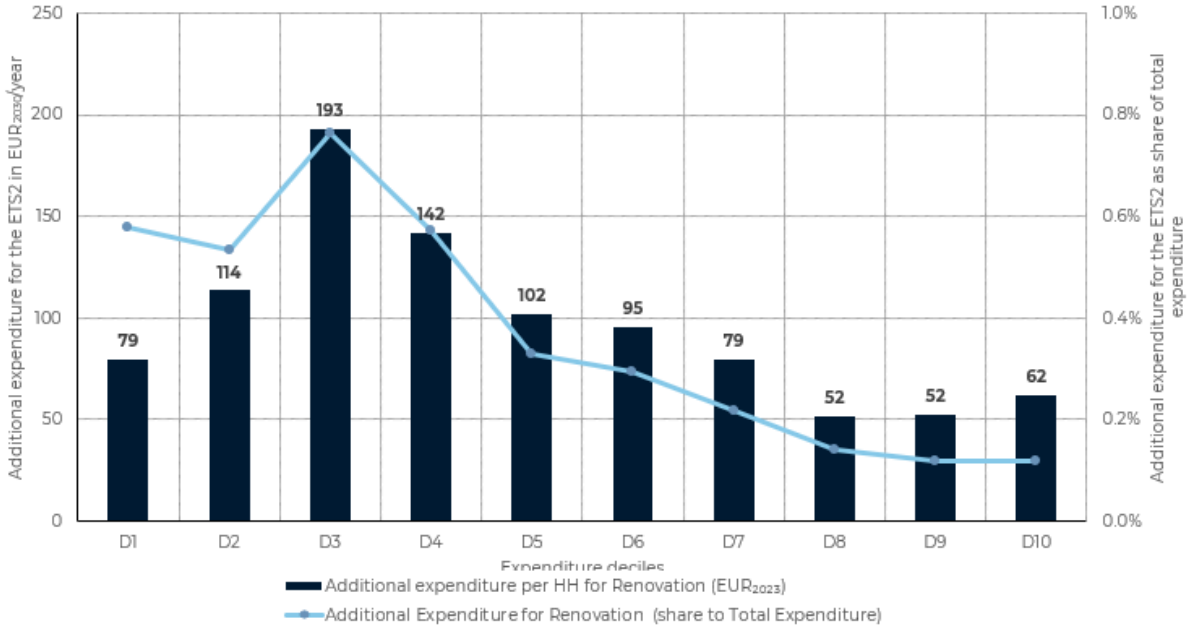


Source: GEM-E3, PRIMES, MHM

3.5.3. Households: investments in renovation

Renovation expenditures are largely driven by the need to meet the energy efficiency targets in 2030 and the policies associated with this. For the households in the four lowest income deciles this increases spending by an additional EUR 70– 200/year. This is also the highest increase as a share of total expenditures (0.5–0.8%). The absolute expenditures are also higher for the lowest deciles. It is understood that the main driver of this difference is that renovation needs and potential are higher in lower income households. As indicated also by the results on energy carriers the renovation expenditures are quite cost efficient.

Figure 3-55 Change in Renovation Expenditures in 2030 – Policy Scenario changes from Reference Scenario

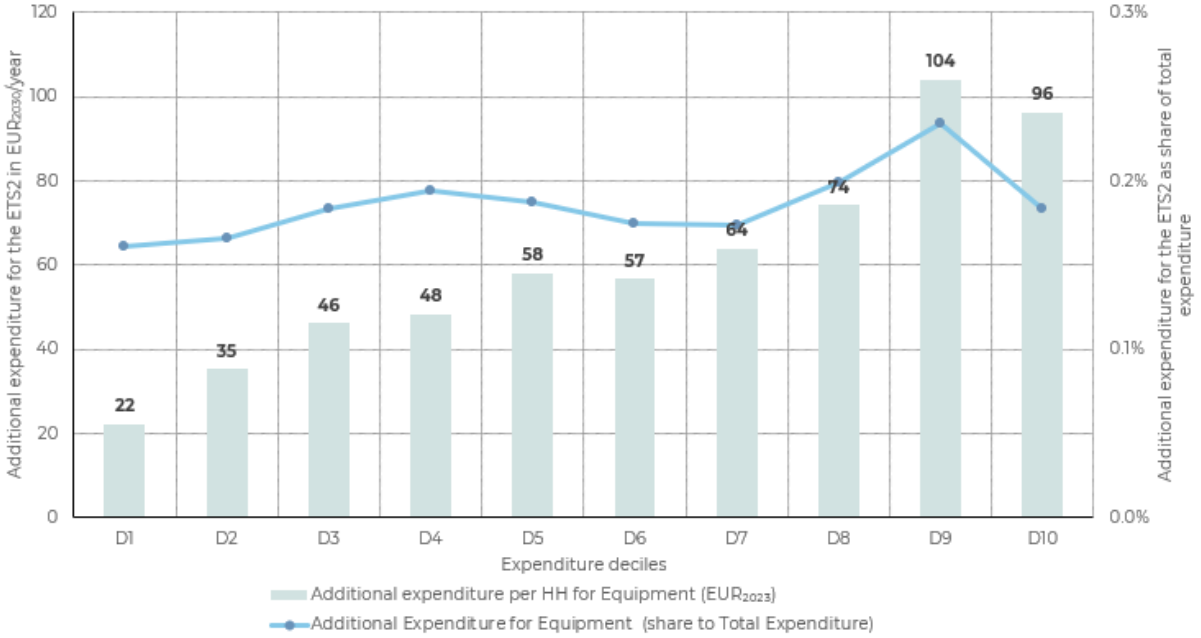


Source: GEM-E3, PRIMES, MHM

3.5.4. Households: investments in equipment

Additional investments in equipment involve mostly upgrades to more efficient technologies. Heating is based in district heating and boilers (gas) and heat pumps increase only marginally. Expenditures on equipment (space and water heating/air-cooling/cooking) devices range from between 20 EUR/year for households in the first income decile, and 100 EUR/year in the tenth income deciles. Proportionally the eighth and ninth income deciles face the high increase in costs, however costs for all deciles are around 0.2% of total households expenditures.

Figure 3-56 Change in Equipment Expenditures in 2030 – Policy Scenario changes from Reference Scenario

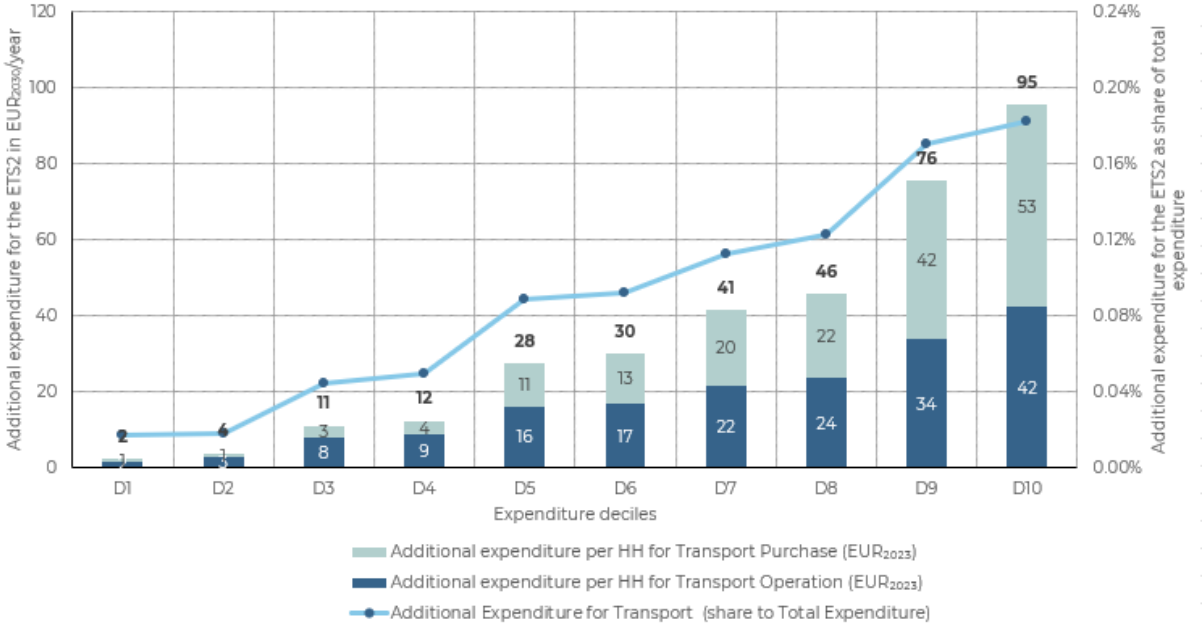


Source: GEM-E3, PRIMES, MHM

3.5.5. Transport: expenditures and investments

The ETS2 and the implementation of the EU energy and climate targets for 2030 are expected to have a limited net impact on transport costs, ranging from EUR 2/year for those in the first income decile to EUR 95/year for those in the tenth income decile. The split between impacts is relatively even between purchased (public) transport and operational costs (fuel cost of private transport). The increase in fossil fuel prices driven by ETS2 will in particular impact those individuals in higher income deciles that can afford personal vehicles. The impact is highest for the higher income deciles as these are the income deciles more likely to travel more (by public and private transport) and to own a car.

Figure 3-57 Change in Transport Expenditures in 2030 – Policy Scenario changes from Reference Scenario



Source: GEM-E3, PRIMES, MHM

3.5.6. Summary

We analysed the changes to households' energy expenditure (both recurrent expenditure and investments) and transport expenditure (fuel costs and public transport purchases) deriving from the introduction of the Green Deal and Fit for 55 package of measures, which include the ETS2. We conclude that:

- Overall, the effects are quite moderate. The impact of implementing ETS2 is for household energy expenditures to moderately increase for all households. This is because in Slovakia fossil fuels consumption is high (compared to other Member States) and, when the carbon price is applied, the savings from renovation are not enough to counterbalance the increases in households energy expenditure;
- Expenditures on renovation and equipment increase, renovation especially for lower income households, equipment for higher income households. These types of expenditures are not annual but mostly one time investments that will provide benefits to households and micro-enterprises, such as reductions in energy bills which payback the initial investment over time and increases in the value of buildings;
- Improving energy efficiency in buildings increases the resilience of households in fluctuations of fuel and electricity prices;
- Investment expenditures in renovation and equipment are expected to be amongst those supported by the SCP or other policy programmes, with the expectation that support is targeted towards lower income deciles;
- Expenditures on fuels see reductions in spending on biomass, but increased spending on gas and especially electricity, driven by fuel switching;

- Impacts on transport costs are low overall and relatively evenly split between public and private transport. Costs increase for transport users in higher income deciles as they travel more and are more likely to own their own vehicle.

3.6. Comparison of results

In this chapter we have used two different methodologies to assess the impacts of ETS2 on vulnerable households and transport users. Firstly, we used a static approach based on micro-data analysis that estimated the impact on the energy cost of households for heating (Chapter 3.2) and for individuals for transport (Chapter 3.3). This approach is considered static as it assumes that the ETS2 carbon price is introduced on the existing (2015) system with no flexibility for households to adapt their energy consumption behaviour apart from a reduction in consumption levels due to changes in prices (i.e. no fuel switch, model shift or renovation considerations).

Secondly, we provided a dynamic model-based analysis of the ETS2 implications, that incorporates the evolution of consumption patterns which respond to fuel price projections, changes in technological costs and technology adoption. The model also incorporates income and population changes towards 2030, as well as the implementation of the EU energy and climate targets in 2030 (including the Fit for 55 package), which can also drive households' investments in renovation and more efficient appliances and vehicles, impacting fuel consumption.

Both methodological approaches provide relevant insights into the impacts of ETS2 on energy expenditure of households. In the case of CO_2 prices of 60 EUR/tCO_2, our analysis shows that when households do not consider other technological options but mainly respond to price changes via a change in consumption levels (i.e. approach 1), energy costs for heating purposes increase more for low-income households, reaching 1% of total expenditure of goods and services for lowest incomes to 0.4% for high income households. When it comes to transport-related fuel purchases, expenditures increase by 0.2% to 0.5% of total expenditure of goods and services for transport purposes for low and high income households respectively.

Once additional technological options are considered (approach 2), and in combination with other measures and policies associated with the Fit for 55 package implementing the Green Deal, the heating-related fuel expenditure are expected to increase by 0.3% to 0.4% of total expenditure for goods and services for low and high-income households respectively. Higher expenditures mostly associated with additional expenditure on electricity and less so on gas, while expenditure on biomass drops. A fuel switch from gas and biomass towards electricity is observed, associated with investments in advanced heating equipment (e.g. heat pumps) that correspond to less than 0.2% of total expenditure for goods and services for both low- and high-income households. Higher

expenditures are registered despite the decline in total fuel consumption expenditures driven by expenditures in renovation, equal to 0.6% and 0.2% of total expenditure for goods and services for low- and high-income households respectively.

For transport, fuel expenditure is modelled to increase only marginally, due to modal shift to public transport and to some extent to more efficient vehicles for high-income households, and similar to the static analysis the highest impacts are experienced by the highest-income deciles (however, the values from the dynamic analysis are significantly lower, e.g. around 0.08% of total expenditure of goods and services for high-income groups).

Looking towards Deliverable 3 and the measures and investments to include in the social climate plan, we note that especially in the case of the most vulnerable households, the investments in renovation and more efficient equipment may not by funded via the households' disposable income but rather through policies (including SCP) providing dedicated financing sources (e.g. grants).

4. Preliminary long list of measures and investments considered

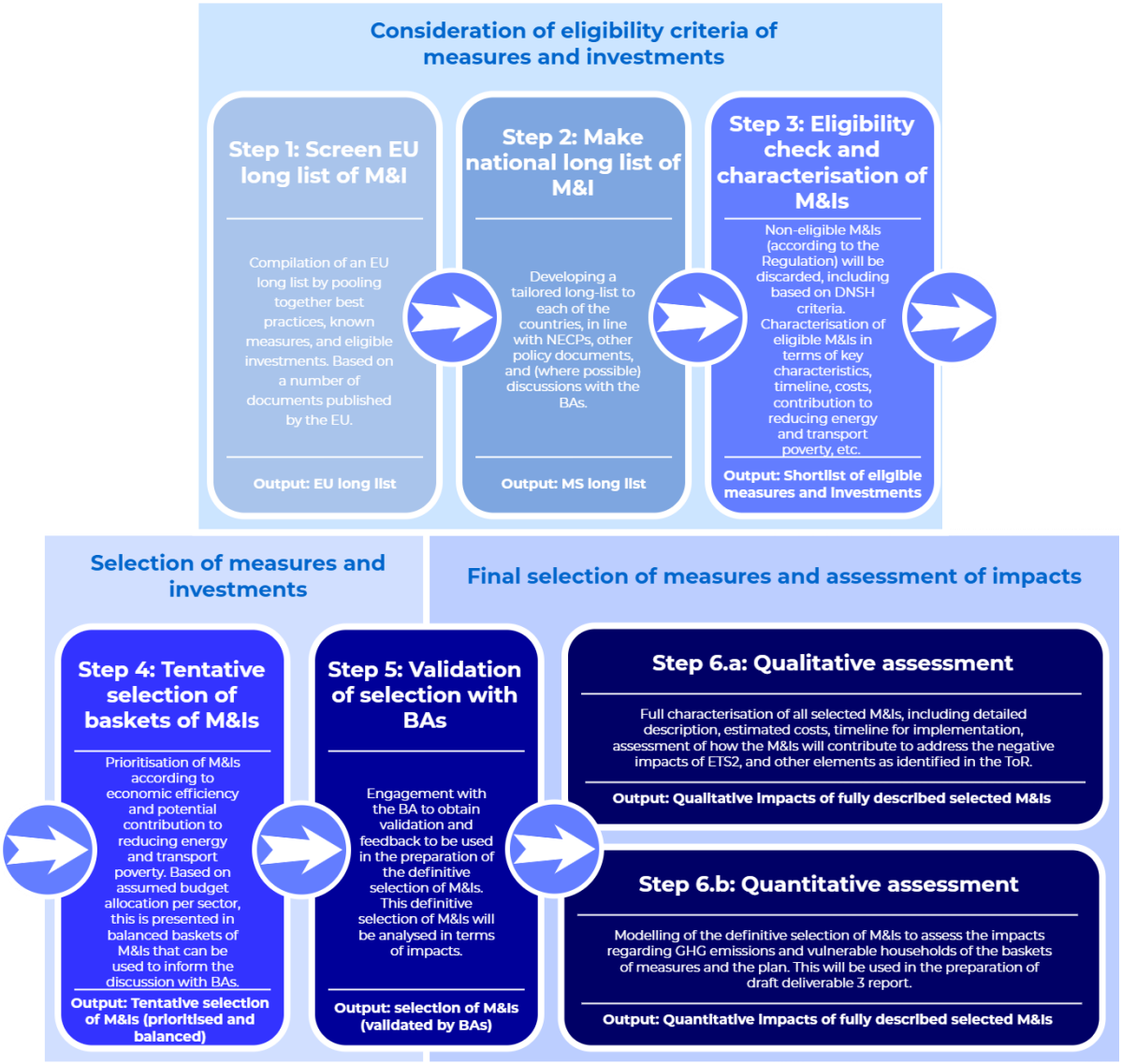
This chapter outlines the process of defining an initial long list of measures and investments for potential inclusion in the national Social Climate Plans, using the EU long list from the Inception Report (DLV 1) as a guiding reference[43].

4.1. The process towards defining M&I for the Social Climate Plans (SCP)

The process steps towards defining measures and investments (M&I) for the SCP is presented in Figure 4-1. The first step, i.e. the establishment of the EU long list of M&I has been completed, with results presented in the inception report. Chapter 4.2 deals with step 2, i.e. making a national long list of M&I. Next steps are presented in Chapter 4.3.

[43] This long list is informed by Regulation (EU) 2023/955 of the European Parliament and Council (10 May 2023), which established the Social Climate Fund (SCF) and amended Regulation (EU) 2021/1060, as well as the consultation on the application of the 'DNSH' principle under the SCF, both of which have already identified effective practices. Additionally, we have compared these practices with policies in the International Energy Agency (IEA) policies database and successful policy implementations highlighted in reports, such as the 2023 publication by the Global Covenant of Mayors. We also acknowledge the work produced by DG CLIMA, as requested by the Regulation, in the 'Support for the Implementation of the Social Climate Fund: Note on Good Practices for Cost-Effective Measures,' which provides examples of potential measures for the SSEE DG MOVE has contributed additional relevant work on public transport and shared mobility through the Expert Group for Urban Mobility (EGUM) and DG ENER has focused on energy poverty and related measures through the Energy Poverty and Vulnerable Consumers Coordination Group.

Figure 4-1 Process towards defining measures and investments for Social Climate Plans



4.2. Developing the national long list of M&I

4.2.1. 4.2.1 Elaboration of the national long list of M&I

The objective of this second process step is to tailor the EU long list to the Member State-specific context, taking into account current measures already in place at Member State-level and the specific priorities of the Beneficiary Authority, to provide a more comprehensive and targeted choice set.

In order to deliver this objective the following two sub-steps have been carried out:

1. interact with the beneficiary authority on M&I; and
2. screening of national-level M&I and inclusion in national long list.

Step 1 is focused on identifying priorities of the Beneficiary Authorities in relation to what M&I are already in place and which could be expanded and included in the

SCPs (see requirements on funding below). It also involved scanning for any M&I that could be currently under consideration by the Beneficiary Authority.

Step 2, i.e. the screening of national-level M&I, is designed to ensure that the M&I to be included in the national long list are eligible under the criteria set out in the Regulation, referring to the (i) target groups, (ii) the scope of action and (iii) avoiding double funding. Regarding the screening of national-level M&I on the first two eligibility criteria (target groups and scope of action), a screening table has been developed in which the target groups and scope of action are added to the EU long list, facilitating the screening of existing or intended M&I. Basically, if an existing or intended M&I fits the EU long list, the existing or intended M&I meets the first two criteria and only a check on double funding is needed (see description on double funding below).

If an existing or intended M&I is not included in the EU long list (or screening table), it can still be included in the national long list, if the M&I aligns with the three above-mentioned eligibility criteria (target group, scope of action, funding). These criteria must be assessed in order to be included. For scope of action, this means that the M&I needs to comply with the DNSH principle[44]. This compliance should be verified by assessing each measure against the six environmental objectives outlined in the DNSH Technical Guidance. To this end, we have prepared a screening questionnaire that can be used to test the existing or intended national M&I.

The third criterion relates to double funding: the funds to be potentially received under the SCP cannot replace existing national or EU funding, and the same cost cannot be funded twice. Therefore, an assessment is made whether M&I are already in place at the national level. If so, funds to be received from the SCF cannot substitute recurring national budgetary expenditure. Instead, funds to be provided for these existing programmes will need to be used only for their expansion or to be "scaled up".

4.2.2. Summary of national level M&I to be included in the long list

Following the steps described in Chapter 4.2.1, a preliminary national long list of M&I has been established. Annex D presents tables with an overview of the long list M&I, including the assessment against the stated eligibility criteria.

The following two tables summarise and describe in more detail the proposed national level of measures for the building and transport sectors. They will be developed in the discussion mainly within the SCP working group. Annex E presents the proposed each item on the national list of M&I in detail.

[44] In line with Article 17 of Regulation (EU) 2020/852 (Taxonomy Regulation).

Table 4-1 Overview of proposed national level M&I targeting energy poverty (buildings)

Possible measure or investment	Description
Direct income support	
Temporary direct income support is assumed as energy subsidies or vouchers for vulnerable groups. Such support should be used to address direct impacts of the inclusion of greenhouse gas emissions from buildings within the scope of ETS2. Recipients of direct income support should be targeted, as members of a general group of recipients, by measures and investments aimed at effectively lifting those recipients out of energy poverty. This target group can be estimated when short-list of measures is agreed.	
Building renovations	
Deep renovations: Conduct comprehensive renovations to significantly enhance the energy performance of buildings	• Family houses renovation (*Obnov dom* scheme) can be extended to more ambitious level ensuring significant energy costs decrease - deep renovation) • Apartment buildings renovation if targeting vulnerable groups is possible (area based, local, marginalised groups, etc.) • Renovation of buildings of micro-enterprises
Replacement of heating sources of vulnerable households	Replacement of fossil fuel boilers with heat pumps is recommended only in combination with deep renovation. Heat pump installation in worst-performing buildings is possible only after envelope improvement.
RES support for low-income households	Only in combination with deep renovation. Holistic approach is needed (envelope and technical systems used) to ensure energy costs decrease
Affordable housing	
Social housing renovation and construction with high energy efficiency standards, ensuring affordable energy costs for vulnerable households	• Renovation of social housing apartment buildings and renovation of social service facilities managed by municipalities and by non-public providers in case the support can be clearly directed only towards vulnerable households (social housing dedicated only to vulnerable households) and preferably specific types of social services for households, e.g. family-type facilities or shelters, emergency housing facilities, halfway houses. • Development of social housing – apartment buildings owned by local governments and by non-profit sector (construction and reconstruction)Self-help construction of family houses
Decarbonisation	
Decarbonising heating and cooling networks	• Support for connection to and development of decarbonised small heating networks/energy communities targeting vulnerable households or vulnerable micro-enterprises.

Possible measure or investment	Description
	• Support of renewable energy sharing and energy communities (PV)
Renewable energy integration on individual buildings	Solar energy installations on individual buildings - photovoltaic (PV) and solar thermal collectors on individual buildings (social housing, social services facilities), individual family houses or buildings used by vulnerable micro-enterprises
Information, education, awareness and advice	
Technical support	Advice, professional assistance combining one-stop-shops according to the EPBD and EED and community / field social work expert assistance under ed one-stop-shops according to EPBD and EED, extension of services of one-stop-shops to specific needs and closer to vulnerable groups. Provide tailored advice to vulnerable groups in the regions by field workers,Provide energy certificates and renovation passports free of charge or for affordable price to vulnerable groups (EPBD Art. 12 and 19)
Capacity building	• Education of local governments and other professionals, Training and capacity-building for stakeholders involved in the implementation of SCF: • Local governments and other professionals involved in advice and design of renovation and energy efficiency improvement •
Support public and private entities	
Provision of appropriate funding instruments and private sector involvement	Enabling funding and financial instruments that may include: • Renovation loans or guarantee funds • Pay-as-you-save financial schemes • Banks and other financial institutions and investors involvement in the financing of the improvement of energy efficiency • Financial support for compliance with stricter minimum energy performance requirements (e.g. EPBD Art. 9 for micro-enterprises) • Support for deployment of solar energy (EPBD Art. 10) for vulnerable groups (involvement of private sector - loans, microloans for PV as a short-payback investments, involvement of distribution companies in PV distribution and storage • Involvement of private sector in advice, technical assistance, one-stop-shops (independent advisors, designers, assessors)
Regulatory reforms	• Implement fiscal reforms to facilitate building renovations and the adoption of renewable energy solutions. These could include reduced tax rates on renovation works and materials, on-tax

Possible measure or investment	Description
	schemes, on-bill schemes, operation of energy communities (after discussing applicability with MF SR)

Table 4-2 Overview of proposed national level M&I targeting vulnerable transport users

Possible M&I at MS level	Description
Public transport	
National Transport Authority's continuation of the public transport reform	• The Ministry of Transport and Ministry of Finance started a reform of the public transport in recent years. As a result, a new plan for public transport availability was prepared by NADA (with the perspective of gradual change to the future) • All parts of the reform are aimed at the simplification of traveling by public transport, making it more comfortable, user friendly, modern and accessible. The long-term aim is to have affordable and effective public transport with optimised costs and zero or low emissions travel performance. It can be achieved by reforming timetable planning across different transport modes and cooperation on the different levels of government. • The reform also includes the definition of standards for the transport service of municipalities (and at the level of public transport stops)
Data collection on the public transport and data collection on the household's transport behaviour and costs	• The aim is to reduce emissions, increase the quality of public transport, and optimise public transport connections and frequency (in connection to the first measure – NADA's ongoing reform of public transport) • The measure is aimed at obtaining more detailed data beyond the scope of the reform of public transport and budgetary possibilities
Support schemes for buying new zero- or low-emission vehicles for public transport and fleet expansion with charging points	• Renewing and replacing old (less emission-effective) vehicles in public transport, including railroad vehicles, buses, microbuses and trolleys • Incentive schemes to support the purchase of low or zero emission vehicles for providers of the public transport • Schemes should be designed to prefer zero-emission vehicles and railroad • The scheme will provide grants for the purchase of vehicles as well as the development of related infrastructure, mainly charging points for vehicles in depots and at final stops/terminals
Maintaining reduced fare for selected groups like students, seniors (62 years old and above), disabled persons	• Reduced transport rates/discounts for train transport are the same across Slovakia. Discounts for bus transport vary by regions, as it is the competence of the self-governing regions to order transport bus service. The competence includes setting the fares, rates and discounts and setting who (students, pensioners) is eligible for reduced fare or what kind of ticket may be reduced in price, e.g. online ticket or one month valid • Zero fare is applied to students only for train transport

Possible M&I at MS level	Description
	• Possible extension for selected groups (pregnant women, person in material need, blood donor).
Cycling infrastructure	
Building bicycle infrastructure	• There are already existing schemes for building cycling infrastructure under the RRF and ESIF • This investment should continue with the aim of achieving a modal shift from motorised to non-motorised means of transport, mainly in city and near-city areas • The investment should also include charging infrastructure for e-bikes, mainly in urban and semi-urban areas and in hilly areas
Support scheme for e-bikes and cargo bikes	• The aim is to promote an active travelling and using non-motorised mode of transport • Support for cargo bikes should lead to replacement of cargo services by vans or light duty vehicles to zero emission mode in urban and semi-urban areas • Scheme may be designed as a grant scheme for direct support (rabats, tax relief, etc.) or grant scheme for social leasing
Individual mobility	
On demand transport for selected groups	• Scheme aimed at people in the transport poor region and vulnerable transport users, also citizens with health problems and disabled persons whose mobility is limited • May also be targeted at households with a very low income in rural areas with bad or insufficient (time or frequency) connections to economic centres or essential services (such as hospitals) • Should not be a replacement of regular transport and should be based on the ad-hoc needs of vulnerable groups

The promotion of a second-hand market with EV/BEV	• The offer of EV or BEV on the second-hand market is limited. This results from the fact that Slovak drivers are sceptical of electric cars
	• May consist of two "subprogrammes":
	  ○ one related to a support grant scheme to provide a subsidy for selected groups of transport vulnerable users and
	  ○ second, a scheme that will guarantee and certify the quality of used cars, including BEV

Multimodal mobility and support of non-motorised modes of transport	
Multimodal mobility points	• The Slovak Railroad Company (ŽSR) has been working on the preparation and building of integrated terminals • Aimed at the development of integrated terminals mainly in the city areas, especially for commuting purposes • Scheme will provide grants for development and preparation of project documentation (feasibility study, zoning and building permits).

Possible M&I at MS level	Description
Campaigns promoting the use of transport modes other than individual car mobility	• Should include various campaigns, information days, different ways of marketing and promoting different modes of zero-emissions transport or public transport

4.2.3. Summary of national level M&I discarded

No measure has been definitively discarded. However, we do not consider measures to directly support the purchase of electric/zero-emissions vehicles for individuals or households to be effective from the perspective of transport poverty alleviation, except e-bikes and cargo bikes.

4.3. Next steps towards selecting M&I for Social Climate Plans

In line with Figure 4-1, the next steps leading to the selecting of M&I for the SCPs are described in Table 4-3.

Table 4-3 Next steps towards selecting M&I for Social Climate Plans

Step	Objective
Step 3: Eligibility check and characterisation of M&Is	Perform a final check on M&Is and discard ineligible ones, including on DNSH criteria, as well as begin the characterisation of the measures on elements that are useful for further steps (e.g. costs and timelines).
Step 4: Tentative selection of baskets of M&Is	Obtain information and structure the M&Is in a way that is useful to inform discussions with the BAs on the final selection of measures. This involves a prioritisation of measures and presenting how the possible measures help fulfil the objectives of the plan.
Step 5: Validation of selection with BAs	Obtain the final selection of measures in discussion with the BAs, who ultimately have the decision power on which measures to present on the plan.
Step 6.a and 6.b: Qualitative and quantitative assessment.	Finalise the characterisation of the measures to include on the plan, as well as impacts in vulnerable groups, energy poverty, and transport poverty, so that BAs can use the information in the drafting process of the plans.

5. Recommendations for the collection and use of data, indicators and criteria to identify and estimate the size of the vulnerable groups

5.1. Estimating the size of vulnerable groups

5.1.1. Current gaps

Vulnerable households

Using national indicators, we can estimate the number of vulnerable households without the means to renovate their dwellings. These are considered as those who do not have sufficient amount of savings and not being able to put aside every month at least EUR 100 on a regular basis – for example to pay a mortgage or a loan).

However, it is currently impossible to link the income/expenditure side of a household and the technical condition of its building as data about buildings efficiency are missing. This poses a challenge of how to identify a vulnerable household with energy savings and emission reduction potential. Helping to reduce energy consumption would imply energy costs savings and a potential for lifting recipients out of energy poverty

Additionally, a definition of the worst performing residential buildings for EPBD implementation is currently missing, but it will have to be defined for NBRP. Several data on buildings are available from Census 2021 (e.g. location, age, fuel, type of heating, size of dwelling), but not in the structure that could be directly used for connection with building typology (SIEA). Similarly, there are missing data on households without access to electricity.

Vulnerable transport users

Currently, Slovakia does not have data that can exactly identify regions in transport poverty. The biggest challenge is represented by missing transport standards. Transport standard is defined nationally as an appropriate number of transport connections between municipalities (based on the size of the municipality) and what is an acceptable commuting time to basic services. NADA is currently preparing transport standards and should make them available by the end of 2025, which should be in time for monitoring of the SCP.

Additionally, there are missing transport data such as the frequency of connections; commuting time based on real data (peak hours travelling); the usual journeys of the inhabitants; and the time to bus stops based on the road/path

distance, etc. Data on mobility patterns and behaviour are also limited. These are the basic inputs needed for the analysis and identification of a transport poor region. Transport poor households can be estimated based on the national HBS data.

Vulnerable micro-enterprises

We cannot obtain any national data on micro-enterprises. Data on the characteristics of building stock like floor area, the source of heating, energy efficiency linked to micro-enterprises are missing. To analyse transport requirements of micro-enterprises, the composition of the fleet (for instance age, fuel, type of vehicles) is necessary as are the mobility patterns and behaviour. The income (revenue) and energy and total expenditures connected with the above-mentioned data are missing too.

5.1.2. Recommendations

Vulnerable households

We recommend the interconnection of databases on income, energy expenses of households and technological conditions of their buildings (using national HBS and Census 2021). This would help in coordinating with the worst-performing buildings identification in the EPBD implementation.

The Census 2021 data combined with national HBS can be used as proxies for indication of energy vulnerable households as they can capture both the socioeconomic status of the household and the technical characteristics of the dwelling. This interconnection can be done only by the Statistical Office.

Aggregated statistical data from Census 2021 on number and floor area of buildings in the required structure for connection with the reference buildings typology (SIEA data from project *OP Kvalita životného prostredia, Národný projekt Odborne o energii)* could allow to set SCP budget, milestones, targets quantification. The discussion with the Statistical Office has started.

To obtain data for the households without electricity connection, it is necessary to elaborate cooperation with the operators of distribution power grids.

Vulnerable transport users

We suggest collecting data on actual public transport frequencies, time travelled, the distance to the nearest bus stop and prepare analysis on public transport using the 3A framework (affordability, accessibility, and availability). It is necessary to elaborate an analysis based on the new standards prepared by NADA.

Vulnerable micro-enterprises

It is necessary to ensure data collection or make existing data available and accessible for analysis. Based on the data, analysis of micro-enterprises vulnerability should be prepared.

5.2. Recommendations on the administrative identification of vulnerable groups

5.2.1. Current gaps

Vulnerable households

As mentioned, currently, no dataset allows to correlate the income side of the households' budget and the expenses on energy (electricity, gas, central heating). This makes it impossible to identify with precision the vulnerability of the household.

Vulnerable transport users

The gaps for administrative identification of the transport poor region are the same as for the estimation the size: lack of data availability on the frequency of public transport, commuting time, distance to bus stops.

For the administrative identification of transport poor individual there is no existing database linking income and transport expenditures. The same situation is applicable to the identification of a transport poor individual – disabled persons are not automatically connected with their income.

Vulnerable micro-enterprises

There is missing or unavailable data for micro-enterprises overall. We do not know what kind of data is collected. It can also be the case that interconnection between income and expenditure data and technical data for buildings and vehicles is missing.

5.2.2. Recommendations

Vulnerable households

The data on energy expenditures and income can be used as proxies for indicating the influence of energy price increase due to ETS2 (energy expenditures) and lacking the means to renovate their households (income). The interconnection of both the variables is essential as each of the factors alone does not express the problem of vulnerability. A household which is not able to renovate the building that occupies (for example because of low income) may not be impacted by the introduction of ETS2 due to heating with wood, or even not having high energy expenses. On the other hand, rising prices of fossil fuel heating tend to increase biomass prices. And vice versa, a household with high energy expenses can be able to renovate the household that occupies from own resources. An introduction of a households' identification number (similar to EIC) can link all the energy expenditures of the household. Additionally, it can be linked to the income of the household on an institutional level by indicating the household members. This can result in automatic identification of vulnerable households. We would recommend implementing the described linkages for smoother identification of vulnerable groups. Based on the available information, Ministry of Economy is preparing implementation strategy, that can be used for SCP.

If the improved definition of energy poverty (based not only on income and expenditure characteristics of the households and counting on the efficiency of the building, number of members and climate conditions too) is planned to be used in the future, a database of Slovak households collecting data on number of members, disposable income, energy expenses, energy efficiency of household and the place where the building is located should be introduced.

Following the identification of households in energy poverty or households including low income and lower middle-income ones based on definition agreed by public authority, the next steps should be the identification of affected households based on the fuel used (affected by increase of energy prices by ETS2) and the relation to the energy consuming building (tenant/owner) who can renovate building if he has the means, i.e. the measures and investments in renovation can be implemented (ownership, social housing, worst-performing buildings defined according to EPBD Art. 3).

Administrative identification of eligibility for investment in building renovation or grids decarbonisation should include the thresholds on energy and costs savings. The cost optimality should be checked as not all investments in technologies that contribute to decarbonisation and primary energy savings will bring costs savings and contribute to lifting recipients out of energy poverty. Local climate should be taken into account for energy cost savings (focus should be on colder climate with higher cost-efficiency of investment in building energy performance improvement).

Worst-performing buildings identified for the national building renovation plans (referred to in EPBD Article 3) could be the eligibility criteria. Implementation is in responsibility of the Ministry of transport. Coordination of SCP preparation with National building renovation plans preparation is recommended.

Documents for eligibility: future revised Energy Performance Certificate (EPC) based on EPBD recast that introduces new indicator final energy and especially the Building Renovation Passport (BRP) which provides a step-by-step renovation roadmap to achieve deep renovation for a specific building, and it shows potential energy savings and the estimated savings on the energy bill, based on the common framework set out in EPBD Annex VIII.

Vulnerable transport users

The recommendation for a transport poor region is the same as for estimating the size – prepare analysis based on new standards of transport poor regions using the 3A framework (affordability, accessibility and availability). The output will be the list of transport poor regions.

When dealing with transport poor households – this will be quite a challenge and time demanding to address the support to transport poor – it will be administratively demanding as requiring the collection of the transport

expenditures on household level. Based on this fact we recommend reducing the measures supporting the poverty on household level and to support/solve regional poverty by improved public transportation. Based on the price of public transportation combined with the statistics on the expenses of the household on public transportation the support of regional poverty can solve the problem of transport poverty at the household level.

Vulnerable micro-enterprises

Firstly, we need to know what kind of data is available. Additionally, a linkage as proposed for household vulnerability connecting energy expenses, income (revenue) and the technical characteristics of the buildings should be introduced. The transport poverty can be resolved in the same manner – to connect data on energy expenses and income (revenue).

Table 5-1 Overview of gaps and recommendations for Slovakia

Current gaps and challenges	Vulnerable group			Recommendation	Possible implementing authority / agency	Priority (High, Medium, Low)	Implementation timeline* (Short, medium, long term)	Remarks
	Hhs	Tspt users	Micro-enterprise					
Lack of data on share of energy expenditure of micro-enterprises			X	Launch national survey; prepare analysis based on the data	Ministries of Finance and Economy	High	Short-term	
Lack of data on energy efficiency of households and micro-enterprises	X	X	X	Collect data and make them available for research proposes; prepare analyses; get existing public data from Statistical Office about buildings in needed structure for analysis of exiting building stock; cooperation between ministries and agencies on worst-performing buildings identification for EPBD	Ministry of Transport. Ministry of Economy, Statistical Office	High	Short term	

Current gaps and challenges	Vulnerable group			Recommendation	Possible implementing authority / agency	Priority (High, Medium, Low)	Implementation timeline* (Short, medium, long term)	Remarks
	Hhs	Tspt users	Micro-enterprise					
				implementation (MEPS, NBRP)				
Data for energy efficiency not publicly accessible	X	X	X	Improve cooperation between ministries and agencies (e.g. SAŽP, SIEA, …) to develop open, interoperable data formats; promote open data policies (while ensuring GDPR), and develop centralised data platforms at the national level	Ministries of Economy, Transport	High	Long term	
Missing interconnection between income, expenditures and energy efficiency of the households	x			Improve cooperation between ministries / agencies to develop open, interoperable data formats, promote open data policies (while ensuring GDPR),	Ministries of Economy, Finance, Social Affairs	High	Medium term	

Current gaps and challenges	Vulnerable group			Recommendation	Possible implementing authority / agency	Priority (High, Medium, Low)	Implementation timeline* (Short, medium, long term)	Remarks
	Hhs	Tspt users	Micro-enterprise					
				and develop centralised data platforms at the national level				
Missing transport data – frequency of connections, commuting time (transport standards), distance to bus stops and missing data on citizens mobility in general (patterns, behaviour, use and selection of transport mode)		x	(x)	Prepare study and standards	NADA	High	Short term	In preparation
Missing deep analysis of transport poverty of households and micro-enterprise		x	x	Promote cross-sector collaboration between government agencies, academic institutions, NGOs	Ministries of Transport and Economy	High	Medium	

Current gaps and challenges	Vulnerable group			Recommendation	Possible implementing authority / agency	Priority (High, Medium, Low)	Implementation timeline* (Short, medium, long term)	Remarks
	Hhs	Tspt users	Micro-enterprise					
Missing data on households without access to electricity	x			Collect from operators of distribution networks (electricity)	Ministry of Economy	High	Short	

6. Conclusions and next steps

6.1. Conclusions

This report has delivered critical insights into the impacts of the Emissions Trading System 2 (ETS2) on various vulnerable groups in Slovakia, including households, transport users, and micro-enterprises. By employing context-specific indicators, we have assessed the implications of ETS2, highlighting the groups most affected and the broader consequences across different sectors. The analysis has revealed how ETS2 will impact vulnerable populations, taking into account factors such as income levels, fuel usage, and regional disparities.

Throughout this assessment, we encountered several challenges that must be acknowledged when interpreting the findings. Despite utilising a comprehensive array of datasets at local, national, and EU levels, data gaps and limitations persist. Additionally, the recent energy crisis and the COVID-19 pandemic have significantly altered several trends, leaving the long-term effects of rising prices uncertain.

The introduction of new concepts within the Social Climate Fund Regulation, such as vulnerable transport users and micro-enterprises, has also posed challenges due to the absence of established assessment methodologies. Furthermore, the ETS2 operates within a complex policy framework, making it difficult to isolate its specific impacts and introducing a considerable margin of uncertainty into our results.

Engagement with stakeholders will be crucial in this process. Strengthening collaboration with key groups, including representatives from vulnerable communities, will help refine proposed measures and secure commitment for their implementation. The findings from this assessment should serve as a foundation for fostering dialogue and building consensus around priority actions.

In conclusion, the insights derived from this analysis will guide the development of targeted measures and investments aimed at enhancing both social and environmental outcomes in Slovakia.

Key takeaways

- **Impacts on households, individuals and transport users**: At an ETS2 price of 60 EUR/tCO_2, the expenditures of households using fossil fuels are expected to increase by an average 140 EUR/year in heating and 130 EUR/year for transportation. For households in the first income decile using fossil fuels, we expect additional expenditure equal to 1.5% of total expenditures for heating and 0.7% of total expenditures for transportation.

- **Identification of vulnerable groups**: Households in the lowest income and expenditure deciles and those living in sparsely populated areas are likely disproportionately affected by the increase in energy prices due to the ETS2. Extensive analysis has been provided in chapter 3 on regional and societal aspects of vulnerability.
- **Sectoral impacts**: Significant impacts were observed in transport intensive micro-enterprises. Micro-enterprises operating in freight transport by road are expected to be affected the most (around EUR 2 000 per year per company), followed by companies operating in road passenger transport (EUR 1 400/year). Shown graph includes assumptions of micro-enterprises owning following number of vehicles:
    - Construction of residential and non-residential buildings (1 truck);
    - Taxi operations (1 taxi car);
    - Passenger transport by land and tourism (2 buses);
    - Freight transport by road (4 trucks);
    - Other postal and courier activities (2 LDV).
- *Although number of vehicles might differ, percentage change remains the same.*

- **Identification of vulnerable micro-enterprises:**

    - Our analysis of non-transport intensive enterprises estimates that 6% are considered vulnerable (40 830 micro-enterprises) as they have significant energy expenditure and are unable to afford building renovations and/or the purchase of a low-emissions vehicle.

    - Based on the sectorial impacts and supplementary analysis, micro-enterprises operating in passenger and freight transport by road are expected to incur in the higher cost increases, due to their high fuel expenditure.

These findings provide a critical foundation for refining strategies and prioritising actions to enhance both social and environmental outcomes.

6.2. Next steps

The next phase involves translating the insights from this report into actionable steps to ensure that the proposed measures and investments achieve their intended objectives, as well as any actions agreed with the national BAs. This includes:

- **Refinement of measures and investments**
    - Collaborate with stakeholders to (i) address any gaps identified in this assessment, such as lack of data and (ii) focus on administrative identification of vulnerable households and suitability of measures.

- Ensure measures are tailored to meet the specific needs of energy and transport poor and vulnerable including those living in remote areas without access to public transport. The special groups of the vulnerable are single parents, multi member families, and Roma communities.

- **Engagement with Stakeholders**
  - Strengthen collaboration with key stakeholders being members of the SCP working group led by NIKA and other stakeholders, such as NGOs from various sectors and NGOs active in areas related to the proposed national measures in order to refine the proposed national measures and secure their commitment to implementation. Additionally, the meetings with regional municipalities and regional transport providers could be organised by NIKA as they are securing regional transportation in the most vulnerable regions.
  - Use the assessment findings to foster dialogue and build consensus around priority actions.

- **Finalisation of Deliverable 2**
  - The TSI Country Team will update the impact analysis in line with the national data (HBS and EU SILC 2023) under the condition that they will be provided by the BA in due time.
  - The TSI Country Team will approach the SCP working group members and other stakeholders, via NIKA, with the national long list of measures.
  - Slovakia has very few rental and social housings in comparison with other countries. Most of dwellings are private. Focus on vulnerable groups in apartment buildings seems difficult and 75% of apartment buildings have been already renovated. The vulnerable households who could be potential target of measures and investments will be mostly owners of single-family houses, however, locally targeted investments (marginalised groups and less developed districts/priority districts) may be possible..

7. Annexes

Annex A: Further details on the micro-modelling approach

- **Main data sources of the SEEK-EU microsimulation model**

The **Household Budget Survey (HBS)**[45] is a national survey carried out by the Member States. It contains information on households' expenditure on goods and services, as well as other important household characteristics, such as income group and household type. Eurostat collects and compiles the national datasets and publishes them every five years. The last available publications are those from 2015 and 2020. In the context of this study, we use the **2015** data, as i) 2020 is a pandemic year which affects expenditure in the transport sector quite heavily and ii) several data issues have been identified with the 2020 publication.

The **EU Statistics on Income and Living Conditions (EU-SILC)**[46] are a dataset that is collected based on a household survey by all EU Member States in each year. They contains information on household income, living conditions, poverty and social exclusion indicators. The national datasets are compiled by Eurostat and published on a yearly basis. In the context of this study, we use survey data from the year **2023**.

For a number of transport poverty indicators, we also use the EU Labour Force Survey (LFS)[47]: and the Eurofound European Quality of Life Survey (EQLS)[48].

- **Micro-enterprises micro-modelling approach**

The Chapter below provides a comprehensive description of the modelling approach to assess the impacts of ETS2 on micro-enterprises, in addition to what has been described in Chapter 3.1.2.

[45] Eurostat. (n.d.). Household Budget Surveys – Overview. https://ec.europa.eu/eurostat/web/household-budget-surveys.
[46] Eurostat. (n.d.). Microdata – EU statistics on income and living conditions. https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions.
[47] Eurostat. (n.d.). Microdata – EU labour force survey. https://ec.europa.eu/eurostat/web/microdata/european-union-labour-force-survey.
[48] Eurofound. (n.d.). European Quality of Life Surveys (EQLS). https://www.eurofound.europa.eu/en/surveys/european-quality-life-surveys-eqls.

Limitations and caveats

There are some significant limitations to determine the impact of ETS2 on micro-enterprises and the final number of vulnerable micro-enterprises. These are listed below.

- Many of the EU level and national datasets differentiate enterprises only down to SMEs (small and medium enterprises), with insufficient elements to further identify micro-enterprises. Micro-enterprises operate in a wide range of industries with varying scales, energy use, and operational modes, making it challenging to generalise or standardise data.
- The definition of vulnerability of micro-enterprises related to energy does not exist in any of the countries.
- The level disaggregation of companies in the databases we used is level 2 "NACE division" (for example H49: Land transport and transport via pipelines), while for the purpose of this analysis it would be more useful to differentiate companies at level 4 "NACE class" (for example H49.32 Taxi operation or 49.41 Freight transport by road). This is because companies in different level 4 NACE classes have significantly different energy consumption and patterns, although they belong to the same NACE division.
- Comprehensive information on the energy consumption or energy expenditure of micro-enterprises is largely unavailable. Two Member States of the nine included in this project — Croatia and Czechia — collect data on companies' average energy expenditure (in monetary terms) at the NACE division level. While this provides insights into sectors potentially affected by ETS2, it lacks precision, as it encompasses all company sizes and energy carriers (electricity, district heating, biomass included).
- Additional data, such as information on buildings' age, energy systems or ownership, as well as the energy performance of buildings occupied by micro-enterprises, is rarely available. When available, it usually pertains to the entire service sector, covering both public and private entities (with the exception of Croatia, where data from the National Energy Management Information System[49] allows a more precise estimate of energy use in micro-enterprises). A similar lack of data availability applies to vehicles ownership and usage, and use of other modes of transport. Several countries, however, collect information that allows to differentiate privately-owned and company vehicles.
- A significant challenge for the analysis of micro-enterprises is discerning between the company use of private dwellings and vehicles for commercial purposes (and

[49] ISGE, Croatia's National Energy Management Information System, is a web-based platform used to monitor, analyse, and optimize energy and water consumption in public sector buildings, aiding in energy efficiency and sustainability goals.

vice-versa). However, there is currently no reliable and statistically significant data on this matter.

Number of micro-enterprises (micro-enterprises)

The number of micro-enterprises in a country is available from national sources (generally the National Statistical Office) for the majority of the nine Member States included in this analysis. When this was not the case, we used by data provided by EUROSTAT SBS[50], and calibrated with the ORBIS database[51]. EUROSTAT SBS categorises companies based on the number of employees and turnover, although we identified inconsistencies with other sources. Therefore, where available, we used one or more national datasets to estimate the number of micro-enterprises, and their characteristics.

Assumptions

To estimate the number of enterprises affected by ETS2, and the extent of this impact, it is necessary to estimate several key determinants:

- The size, type and energy performance of the dwellings the micro-enterprises use, including also whether they use premises owned or rented by the micro-enterprises, or private dwellings;
- The type of energy carriers used for different final purposes;
- Vehicle number, type and fuel consumption.

As none of the nine Member States carry out a systematic census of micro-enterprises, or surveys reaching a statistically significant sample-size, it is necessary to estimate these determinants by other means. In this analysis, we use a combination of sources and methodological approaches.

- Available data in the joint public databases for all countries is used(JRC IDEES, EUROSTAT SBS, IEA, ORBIS, DG MOVE statistical pocketbook etc.).
- Available data in national statistics is used to understand sectoral composition, sectoral energy use, and various trends, such as energy expenditure;
- Average energy use is estimated based on a common trait (the number of employees NACE sector);
- Primary data is collected where possible (surveys of micro-enterprises or focus groups with targeted associations of companies in most important NACE codes).

Determination of the energy consumption baseline

[50] Eurostat. (2024). Enterprise statistics by size class and NACE Rev.2 activity (from 2021 onwards). https://ec.europa.eu/eurostat/databrowser/product/view/sbs_sc_ovw?category=bsd.sbs.sbs_ovw.

[51] Orbis is a comprehensive global database of company information, owned and maintained by Bureau van Dijk, a Moody's Analytics company. It provides detailed information on companies worldwide, including financial statements, ownership structures, industry classification, and much more: Orbis.

The estimation of the energy consumption baseline in micro-enterprises requires an analysis of two complementary aspects: fossil fuel consumption in buildings (for space heating, cooking and domestic hot water), and fossil fuel consumption in transport.

- Calculation of the baseline energy consumption in buildings:

The baseline energy consumption is calculated by analysing the energy consumption of an average tertiary-sector company for various end uses—space heating, domestic hot water (DHW), and cooking, based on data from the Integrated Database of the European Energy System (IDEES) (2021). The IDEES database provides energy consumption data for service sector buildings per Member State, but does not account for company size. To estimate the energy consumption in buildings of micro-enterprises, we first compute the average useful energy consumption per employee and per building (described below), and we then estimate the average consumption of micro-enterprises in each NACE sector based on the average number of employees.

We use the IDEES dataset also to calculate the energy requirement for thermal services. This enables us to quantify how much energy is converted into useful energy for thermal services.

$$UEC_E = \frac{UEC_B}{SIZE}$$

- *UEC_B= Useful energy consumption/building for different purposes* – ***available data***
- *UEC_E = Useful energy consumption/employee*
- *SIZE= Representative building cell size (employees/representative building cell)* – ***available data***

In the second step, the calculated unitary final energy consumption for each end use is refined by incorporating the efficiency performance of specific technologies.

$$FEC_{E(HNG)} = FEC_{E(HNG)} \times Eff$$

- *FEC_E = Final energy consumption/employee****- calculated***
- *FEC_E = Useful energy consumption/employee****- calculated***
- *Eff = Efficiency of certain energy transformations (useful to final energy)* – ***known data***
- *NG= natural gas (used as example)*
- *H= heating (used as example)*

Table 0-1 Natural gas use

Natural gas use for space heating, DHW & catering	
Energy consumption by end-uses (kWh per employee)	**(kWh per employee)**
Space heating	3 746
Cooling	N/A
Hot water	753
Cooking	767

This adjustment allows to estimate the final energy consumption of an average micro-enterprise relying primarily on gas, oil or LPG for thermal purposes, where applicable (e.g., heating, DHW, and cooking). Additionally, the IDEES database provides information on the share of buildings using various energy carriers for different end uses, enabling a more detailed analysis.

$$FEC_{ME(HNG)} = FEC_{E(HNG)} \times \left[{no\ of\ employees} \Big/ {(ME)} \right]$$

- *FEC_{ME} = Final energy consumption/ME* ***- calculated***
- *NG= natural gas (used as example)*
- *H= heating (used as example)*

We then estimate the fuel use in buildings by considering different the possible combination of fuels. This includes:

1. only natural gas for all end uses;
2. oil for heating and DHW, and LPG for cooking;
3. only oil for heating, with other fuels such as electricity for cooking;
4. LPG for cooking and other fuels such as electricity for heating and DHW[52]. The fuel mix depends on the country.
   - *F_P = Percentage of buildings using certain energy carrier for different energy us - available data (F_{PHeat}, F_{PDHW}, F_{PCook})* ***- available data***

The estimate of energy expenditure includes all micro-enterprises, including companies operating from residential premises. Due to the lack of data that allow us to distinguish between commercial and private premises, we assume all micro-enterprises occupy commercial buildings, while in practice it is known that a significant part operate from private premises.

- Calculation of the baseline energy (fuel) consumption in transport

The calculation of the baseline energy consumption for transport is more complicated than the one in buildings. Our methodology considers two separate cases:

- *Average micro-enterprises which owns a vehicle;*
- *Transport – intensive micro-enterprises, which are likely to own several vehicles.*

As a first step, the data on vehicle distribution has been categorised based on fuel type and ownership status (using national datasets, JRC IDEES, and a number of assumptions). We also segmented the vehicle fleet into groups according to the type of fuel they use (gasoline, diesel, LPG, other) and distinguishing between private ownership and corporate or public fleet usage. This initial classification provides a foundational structure for further analysis, enabling targeted insights into energy consumption patterns and emissions based on ownership and fuel characteristics.

[52] Note: some of the fuels used in buildings are ineligible for the purposes of the SCF Regulation.

- **Group 1: Average micro-enterprises**

Based on the total fleet of commercially owned cars, we estimate the proportion of vehicle owned by micro-enterprises by analysing ownership patterns and distribution trends within the commercial fleet. We allocate passenger cars to micro-enterprises based on the number of employees (total number of passenger cars owned by micro-enterprises divided by the average number of employees). We use turnover to allocate a share of other vehicle ownership on micro-enterprises.

Fuel consumption data per car is averaged based on data available in literature, while vehicle-kilometer statistics are derived from the JRC IDEES database, supplemented with national resources for greater accuracy and timeliness.

$$FEC_{car} = \frac{D_{car}(km)}{100} * C_{fg}\left(\frac{l}{100km}\right) * F_{fg}$$

- *FEC_{car}= Final energy consumption/car* ***- calculated***
- *D_{car}= Average distance/car in a year* ***– available data***
- *C_{fg} = Fuel consumption per car* ***- available data***
- *F_{fg} = Fuel factor (kWh/l)* ***- available data***
- *G= gasoline (used as example)*

- **Group 2: Transport-intensive micro-enterprises**

We define as transport-intensive micro-enterprises those operating in sector or economic activities that rely heavily on transportation for the movement of goods, services, or personnel. Examples include logistics, delivery services, passenger transport services (e.g., taxis, ride), and certain companies where material inputs and distribution require substantial transport infrastructure.

Table 0-2 NACE codes for transport-intensive industries

Sector	NACE
Construction of residential and non-residential buildings	F4120
Urban and suburban passenger transport	H4931
Taxi operations	H4932
Other passenger transport by land	H4939
Freight transport by road	H4941
Other postal and courier activities	H5320
Event catering activities	I5621
Tour operator activities	N7912

Transport-intensive sectors are assigned an average number of vehicles based on a combination of national data, informed assumptions, and survey results, where such data is available. This approach ensures a reasonable estimation tailored to the specific characteristics and operational needs of these sectors.

The problem with transport is the same as for buildings, consistent data on the exact number of vehicles owned by micro-enterprises is lacking, particularly given that many micro-enterprises use privately owned vehicles for business purposes. Consequently, our estimates account for both the per-company use and the total use.

Calculation of the ETS2 impacts

As part of our analysis, we also estimate the impact of price changes resulting from the implementation of ETS2. This step enables an evaluation of how the updated carbon pricing mechanism influences overall energy expenditure across different consumption patterns.

Table 0-3 Prices and factors used for ETS2 impact evaluation

Data sources and additional information	
UNFCCC	Greenhouse Gas Emissions Calculator | 2021 Emission Factors | UNFCCC
2024 Eurostat- Gas prices for non-household consumers CBI	https://ec.europa.eu/eurostat/databrowser/product/view/nrg_pc_203
National prices for all fuels in consumption	Example: average price of oil distributed to non-household consumers
Country level information	*Example: VAT in Croatia on natural gas is currently 5%, and from 2025 it will be back to 13%*

This analysis estimates each year of the period from 2027 to 2032 with a linear increase, considering various building scenarios and different types of vehicles, without taking into consideration other policy influences. Each case accounts for the respective energy consumption patterns, with adjustments based on the price changes introduced by ETS2. This analysis includes companies that use only buildings, as well as those that utilise both vehicles and buildings, accounting for energy consumption and price changes under ETS2 for each scenario. Since transport dependant companies have significantly different baseline energy consumption we consider them separately.

Example: micro-enterprises with cars using diesel

1. The first step is to calculate energy price increase:

$$\delta P_{EDn} = EF_D X \delta P_{ETS2(n,n-1)}$$

- δP_{ED} = *(Diesel) energy price increase*
- *EFD= Diesel emission factor (kg CO_2/kWh)* ***- available data***
- δP_{ETS2} = *ETS2 price increase (euros/tn)* ***– calculated***
- *n= year*

2. Using baseline energy consumption and price elasticities, final energy consumption for every year is calculated as:

$$FEC_{D,n} = FEC_{D,n-1} - (1 + \delta P_{ED} \times \frac{PED}{P_{ED,n-1}})$$

- *$FEC_{D,n}$ = Final energy consumption of diesel fuel for year n* ***– calculated***
- *$FEC_{D,n}$ = Final energy consumption of diesel fuel for year n-1* ***– calculated***
- *δP_{ED} = (Diesel) energy price increase* ***– calculated***
- *P_{ED} = (Diesel) energy price* ***– calculated***
- *PED = price elasticity of demand* ***- available data***
  /in case of country different elasticities from documented sources or national plans (such as NECPs), the new elasticities can be used/

Table 0-4 Price elasticities used in the ETS2 impact scenario[53]

Commercial sector	**Price elasticity**
Natural gas (and LPG)	-0.299
Heating oil	-0.188
Gasoline	-0.194
Diesel	-0.157
LPG (car fuels)	-0.18

We estimate the energy consumption of diesel/car after the introduction of the ETS2, for every year of the period 2027–2032, as well as the new energy expenditure based on the energy price which includes ETS2 costs ($Additional\ expenditure = FEC_{D,n} \times P_{ED,n}$) We expect that micro-enterprises will reduce their energy consumption in response to the increase of the fuel price (at a rate determined by the elasticity of each fuel).

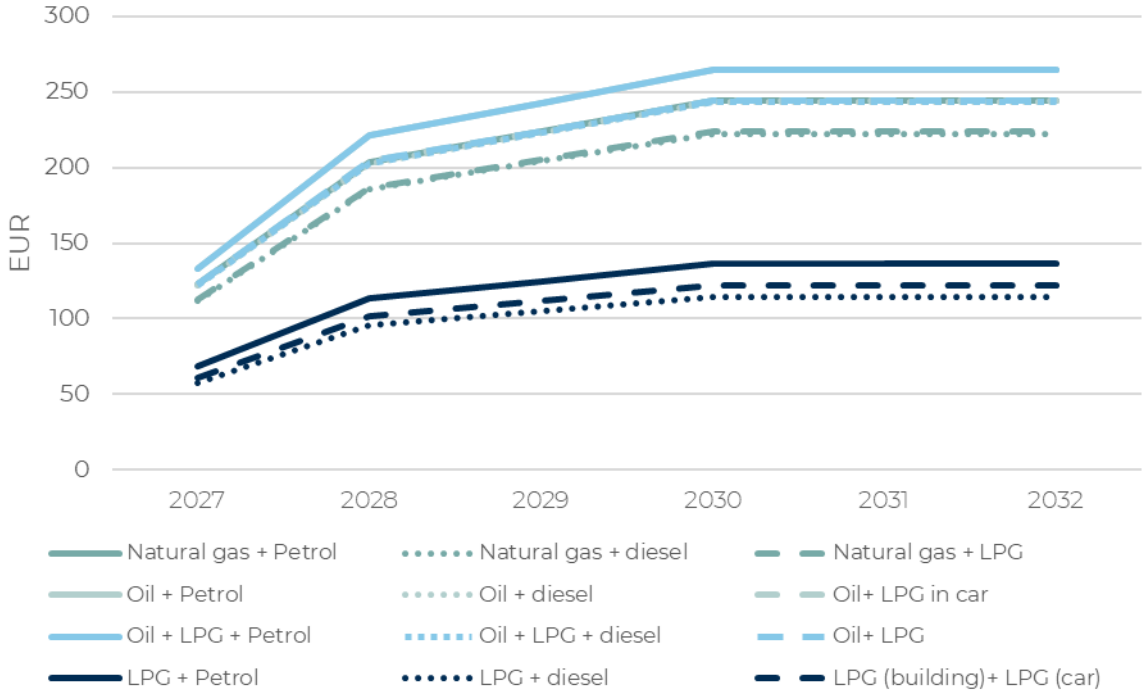
[53] Sources of price elasticities used are based on Labandeira, X., Labeaga, J. M., & López-Otero, X. (2017). A meta-analysis on the price elasticity of energy demand. Energy policy, 102, 549-568. https://cadmus.eui.eu/bitstream/handle/1814/40870/RSCAS_2016_25.pdf?sequence=3.

Table 0-5 Example of additional costs per micro-enterprise for diesel fuel

Diesel emission factor (kg CO_2/kWh)	0.265						
Diesel price before ETS2 (€/kWh)	0.162						
Elasticity	-0.157						
	Baseline	2027	2028	2029	2030	2031	2032
ETS2 price (€/tn)		30	50	55	60	60	60
Diesel price increase (€/kWh)		0.008	0.005	0.001	0.001	0.000	0.000
Diesel price after ETS2 (€/kWh)		**0.170**	**0.175**	**0.177**	**0.178**	**0.178**	**0.178**
Cars average company							
FEC per vehicle ETS2 (kWh)	6 290						
Cost per vehicle before ETS2 (€)	1 019						
FEC per vehicle after ETS2 (kWh)		6 242	6 211	6 204	6 196	6 196	6 196
Cost per vehicle after ETS2 (€)		1 061	1 088	1 095	1 102	1 102	1 102
FEC per vehicle savings after ETS2 (%)		0.8%	1.3%	1.4%	1.5%	1.5%	1.5%
FEC per vehicle savings after ETS2 (kWh)		48	79	86	94	94	94
Additional cost per vehicle after ETS2 (%)		4.1%	6.8%	7.5%	8.2%	8.2%	8.2%
Additional cost per micro - enterprise after ETS2 (€) - owns a diesel car		42	69	76	83	83	83
Additional cost for all micro -all companies using diesel for cars (M€)		0.24	0.40	0.44	0.48	0.48	0.48

The same methodology is used to determine the additional costs for the energy carriers used in buildings. The results are shown as a combination of energy carriers for building use and for vehicles.

Figure 0-1 Example of average additional costs per micro-enterprise



To determine the impact on the total number of micro-enterprises, we use the share of buildings using certain energy carrier for different energy use.

- *F_P = Percentage of buildings using certain energy carrier for different energy use - (F_{PHeat}, F_{PDHW}, F_{PCook})* ***- available data***

Determination of the vulnerable group in micro-enterprises

As part of our analysis, we also estimate the number of vulnerable micro-enterprises.

These are identified by the two Core Indicators, in alignment with the definition of vulnerability in micro-enterprises. The Core Indicator 1 estimates the number of micro-enterprises that:

a) Use fossil fuels; and

b) Do not have enough profit to renovate the building they operate in, or substitute their vehicle with a zero- or low-emission vehicle;

Analytically, a) is a starting point and includes all the companies using fossil fuels, explained in the previous chapter.

To determine the means of micro-enterprises to renovate buildings or to purchase zero- and low-emission vehicles, the financial capability of affected micro-enterprises to invest needs to be assessed. This is done using following methodology.

- Renovation costs are calculated based on data on renovation costs for non-residential buildings as provided by the Croatian Long Term Renovation Strategy (LTRS). Since this data is from 2020, the investment costs provided in the LTRS is then adjusted using a construction analytics index to adjust

the costs for the period considered in this analysis (2025-2032). The total investment cost is then divided in annual instalments for the ETS2 implementation SCP in scope (2027-2032).

- Vehicle purchase costs are calculated based on average market prices for a 4-seater car, light duty vehicles (LDV), trucks and buses. Vehicle costs are also divided in six instalments.

Companies that cannot invest are those whose annual profits are lower than the additional energy expenditure and investment together.

Annual instalment + energy expenditure> Profit/Loss account (net)

The second part of the definition refers to the significant energy expenditure in transport or buildings (Core Indicator 2). Based on research data or national information, companies that have relatively high energy expenditure in total expenditure are considered significantly affected. These are usually companies in transport intensive sectors, or those that use significant amount of building energy.

Sectors estimated to have significant energy expenditure, based on the available national datasets, are shown below:

Table 0-6 Sectors estimated to have significant energy expenditure

Sectors with higher building energy consumption	NACE class
Hotels and similar accommodation	I5510
Holiday and other short-stay accommodation	I5520
Other accommodation	I5590
Restaurants and mobile food service activities	I5610
Renting and operating of own or leased real estate	L6820
Education	*P85*
Human health activities	*Q86*
Residential care activities	*R87*
Operation of sport facilities	R9311
Fitness activities	R9313
Washing and (dry-)cleaning of textile and fur products	S9601
Hairdressing and other beauty treatment	S9602
Physical well-being activities	S9604
Sectors with higher transport energy consumption	NACE class
Construction of residential and non-residential buildings (design excluded)	F4120
Urban and suburban passenger transport	H4931
Taxi operations	H4932
Other passenger transport by land	H4939
Freight transport by road	H4941
Other postal and courier activities	H5320
Event catering activities	I5621
Tour operator activities	N7912

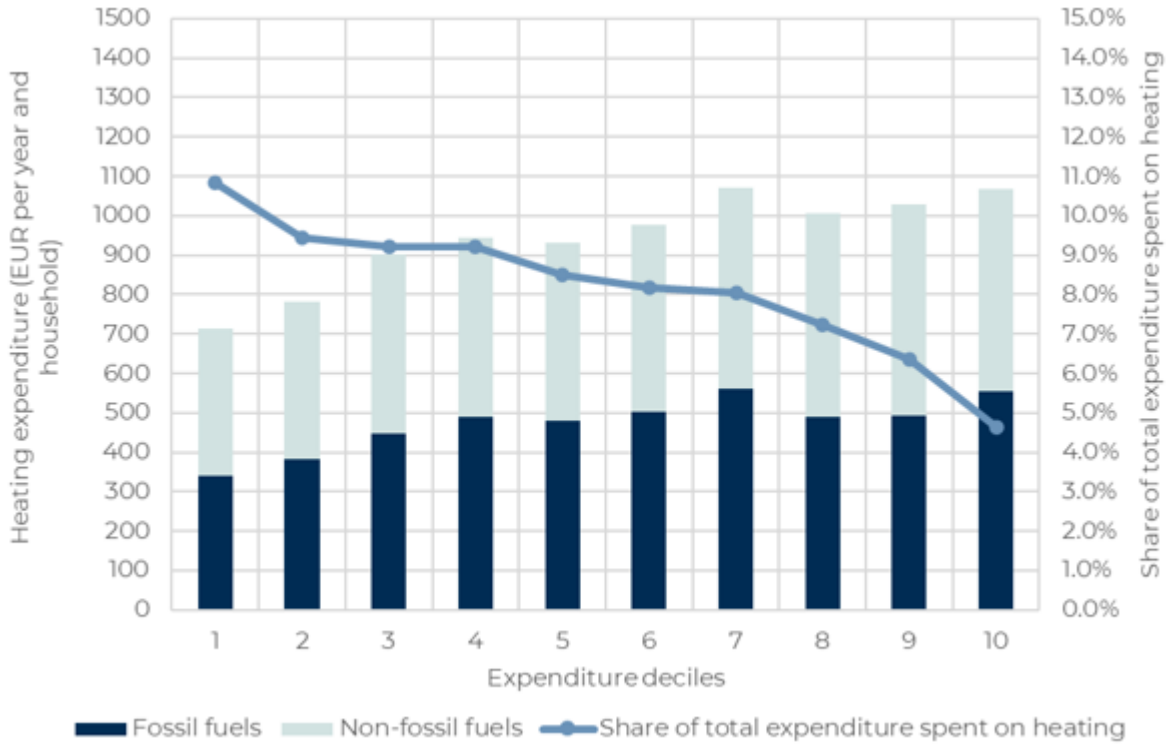
- Composition of the two indicators:

[*Annual instalment* $_n$> *Profit/Loss account (net)*$_n$] ∧ [*company belongs to a sector with significant baseline energy expenditure*]

Additional indicators are used differently country by country.

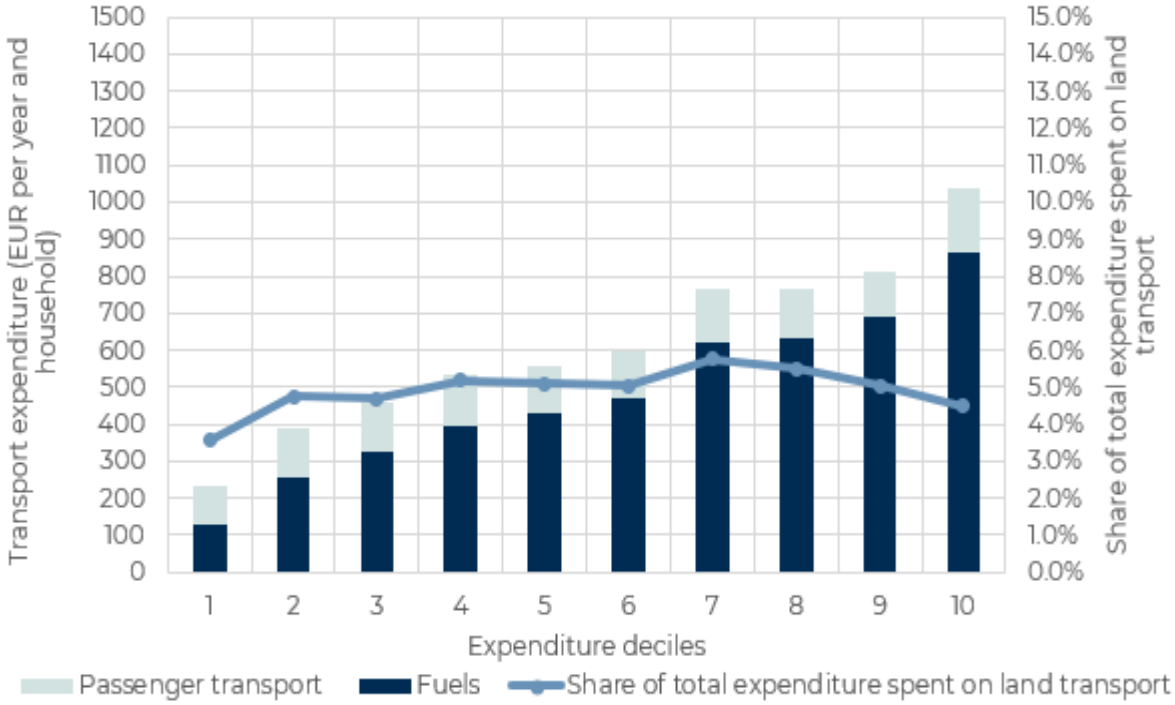
Annex B: HBS 2015: Descriptive statistics on heating and transport expenditure for Slovakia

Figure 0-1 Heating expenditure by Slovak households by expenditure deciles in 2015



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

Figure 0-2 Transport expenditure by Slovak households by expenditure deciles in 2015



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

Annex C: HBS 2015: Zeros in heating and transport expenditure

Table 0-1 shows the share of households that, according to the HBS 2015, do not have any heating expenditure (first column), as well as the share of households that do not have any transport expenditure according to the HBS 2015 (second column).

Table 0-1 Share of households with zero heating or zero transport expenditure according to the HBS 2015

MS	Share of households in the HBS 2015 with zero heating expenditure	Share of households in the HBS 2015 with zero transport expenditure
BE	12%	19%
CZ	11%	5%
DK	4%	43%
FI	52%	32%
HR	9%	18%
LT	6%	49%
LV	12%	44%
RO	17%	49%
SK	5%	16%

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

The HBS 2015 can display **zeros in the data for heating expenditure** due to several reasons:

- households do not heat their home;
- households do not have any heating expenditure, because someone else is paying directly for their heating costs;
- households use heating fuels that they do not need to pay for, e.g. wood;
- households use electricity for heating, which is not included in our calculations. In the HBS 2015, the category "electricity" contains all electricity use by households, including for lightning, appliances, heating and e-mobility.

The HBS 2015 can display **zeros in the data for transport expenditure** due to several reasons:

- households are not mobile;
- households do not have any transport expenditure, because someone else is paying directly for their transport costs;

- households use transport fuels that they do not need to pay for, e.g. walking or cycling;
- households use electricity for transport, which is not included in our calculations. In the HBS 2015, the category "electricity" contains all electricity use by households, including for lightning, appliances, heating and e-mobility;
- there are issues with the data.

Table 0-2 shows the share of households with zero expenditure in the different transport categories according to the HBS 2015. In Table 0-1, only households that have zero expenditures across all categories are displayed in the second column.

Table 0-2 Share of households with zero transport expenditure by transport category according to the HBS 2015

MS	Diesel	Petrol	Passenger transport by train	Passenger transport by underground and tram	Passenger transport by bus and coach	Passenger transport by taxi and hired car with driver
BE	51%	60%	86%	93%	91%	97%
CZ	72%	32%	54%	100%	34%	92%
DK	84%	48%	100%	100%	100%	94%
FI	83%	55%	90%	100%	81%	93%
HR	80%	51%	94%	92%	76%	98%
LT	84%	76%	99%	100%	75%	99%
LV	88%	74%	95%	97%	78%	98%
RO	94%	83%	99%	93%	80%	97%
SK	89%	60%	82%	100%	48%	92%

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

Table 0-3 shows the share of households with zero expenditure in the different heat energy categories according to the HBS 2015. In Table 0-1, only households that have zero expenditures across all categories are displayed in the second column.

Table 0-3 Share of households with zero heating expenditure by fuel according to the HBS 2015

MS	Natural gas	Liquid fuels	Coal	Other solid fuels	District heating
BE	47%	67%	98%	88%	100%
CZ	32%	97%	93%	78%	61%
DK	75%	94%	100%	76%	34%

MS	Natural gas	Liquid fuels	Coal	Other solid fuels	District heating
FI	98%	93%	100%	49%	92%
HR	33%	98%	99%	48%	92%
LT	34%	100%	94%	64%	50%
LV	22%	100%	100%	100%	48%
RO	22%	100%	100%	91%	92%
SK	19%	99%	95%	83%	54%

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

Annex D: National long list of M&I

Table 0-1 Building sector long list of measures and investments

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Building renovations										
Insulation and windows: Improve insulation of walls, roofs, and floors, and replace windows to enhance energy efficiency		Vulnerable households	✓		✓					
	Included in deep renovation Measures 1.1, 1.2, 1.3, 2.1	Vulnerable households and vulnerable micro-enterprises	✓		✓					
		Vulnerable households	✓		✓					
		Vulnerable households	✓		✓					

[54] a) Support building renovations in worst performing buildings (b) Support access to affordable energy-efficient housing (c) Contribute to energy savings in buildings or reduce energy poverty (d) Provide targeted, accessible, and affordable information (e) Support entities developing and providing affordable energy efficiency solutions (f) Provide access to zero- and low-emissions vehicles and bicycles (g) Incentivise the use of affordable and accessible transport alternatives

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Technical building systems: Upgrade heating, cooling, ventilation, and domestic hot water systems, including the installation of heat pumps (and possibly hybrid heating systems with significant RES share)		Vulnerable micro-enterprises	✓		✓					
	Included in deep renovation Measures 1.1, 1.2, 1.3, 2.1	Vulnerable households, vulnerable micro-enterprises	✓		✓					
Renewable energy integration: Install solar panels, wind turbines, and other renewable energy systems on buildings	Included in deep renovation measures 1.1, 1.2, 1.3, 2.1 and in new buildings construction measure 2.2 and in Chapter 3 Decarbonising heating and cooling. Measure 3.3 Solar energy installations on individual buildings. Solar energy installations - investment in rooftop photovoltaic (PV) and solar thermal collectors or photovoltaic thermal panels (PVT) on individual public	Vulnerable households and vulnerable micro-enterprises	✓		✓					Y M&I used for expansion or for "scaling up"

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
	buildings - social housing facilities or individual family houses or buildings used by vulnerable micro-enterprises.									
Deep renovations: Conduct comprehensive renovations to significantly enhance the energy performance of buildings	1.1 Family houses renovation. A holistic approach, deep renovation is needed to renovate the worst performing buildings. Stage renovation should be based on renovation passport. It is necessary to follow the principle of "energy efficiency first". Change of technical systems is possible after firstly the thermal envelope improvement.	Vulnerable households	✓		✓					Y M&I used for expansion or for "scaling up" (Obnov dom) Modernisation Fund
	1.2 Apartment buildings renovation. Targeting only vulnerable groups is difficult, therefore the relevant target groups could be apartment buildings operated by social housing providers (see Chapter 2 Affordable housing) and area based vulnerable groups (marginalised groups, less developed districts).	Vulnerable households	✓		✓					Y M&I used for expansion or for "scaling up" (ŠFRB)

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
	ZEB should be the target of renovation; in case of staged renovation, the investment should be confirmed by a renovation passport.									
	1.3 Buildings of micro-enterprises renovation Deep renovation of buildings of micro-enterprises.	vulnerable micro-enterprises	✓		✓					Y M&I used for expansion or for "scaling up" (ŠFRB)
Financial instruments: Utilise on-bill financing, energy performance contracts, and energy company obligations to support building renovations	Included in Measures 5	Vulnerable households	✓		✓		✓			
		Vulnerable households and vulnerable micro-enterprises	✓		✓		✓			
Energy efficiency improvements										

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Energy audits: Provide energy audits and advisory programmes for tenants and landlords to identify and implement energy-saving measures	Energy performance certificates and renovation passports for free are included in measure 4.1	Vulnerable households and vulnerable micro-enterprises				✓				
		Vulnerable households				✓				
Smart metering: Install smart meters to monitor and optimise energy use	Included in deep renovation Measures 1.1, 1.2, 1.3, 2.1 and in new construction measures 2.2., 2.3 It is not suitable as a stand-alone measure for the worst performing buildings without prior envelope improvement. Installation of pre-paid system for electricity and water (successfully tested for electricity by VSD in multiple localities, including Luník IX. Košice) - for both educational and energy saving measure to be considered.	Vulnerable households			✓					

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Building automation: Implement advanced building automation and control systems to enhance energy management	Included in deep renovation Measures 1.1, 1.2, 1.3, 2.1 and in new construction measure 2.2. It is not suitable as a stand-alone measure for the worst performing buildings without prior envelope improvement.	Vulnerable micro-enterprises			✓					
Community Energy Savings Programmes: Implement area-based energy efficiency advisory schemes targeting low-income areas	Included in one-stop-shops, Measure 4.1	Vulnerable households, vulnerable micro-enterprises				✓				
Capacity building: Offer training and capacity-building programmes for stakeholders involved in the	Measure 4.2 Education of local governments and other professionals; Training and capacity-building programs for stakeholders involved in the implementation of SCF measures. Education of local governments and other professionals with	Vulnerable households, vulnerable micro-enterprises					✓			N

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
implementation of SCF measures	focus on SCF measures and investments and vulnerable groups including micro-enterprise, specifically on how to use the SCF and also other schemes such as Obnov dom mini and Green Solidarity									
Support services: Provide technical support for the implementation and management of the measures to ensure efficiency and effectiveness	Measure 4.1 Advice, professional assistance, combining one-stop-shops according to EPBD and EED and community / field social work. . One-stop-shops shall provide independent advice, streamlined information on technical and financial possibilities and solutions to households, microenterprises, A particular focus on households and micro-enterprises affected by energy poverty and on worst-performing buildings and provide support covering the different stages of renovation requires community / social field work to effectively complement one-stop shops.	Vulnerable households, vulnerable micro-enterprises			✓	✓				N

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
		Vulnerable households			✓	✓				
Energy efficiency programmes: Implement targeted programmes to reduce energy consumption in low-income households		Vulnerable households			✓					
Affordable housing										
Social housing: Develop and renovate social housing with high energy efficiency standards, ensuring affordable energy costs for vulnerable households	2.1 Renovation of social housing in apartment buildings and renovation of social service facilities managed by municipalities and including non-public providers.	Vulnerable households	✓	✓	✓					Y M&I used for expansion or for "scaling up" (ŠFRB, ESIF, PO4) N Y M&I used for expansion or for "scaling up"

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
										(Environmental Fund)
Affordable rental solutions: Provide financial support or tax incentives for energy-efficient rental housing to benefit low-income tenants	2.2 Development of social housing – apartment buildings owned by municipalities and by non-profit sector (construction and reconstruction) 2.3 Self-help construction of family houses	Vulnerable households		✓	✓					Y M&I used for expansion or for "scaling up" (ESIF, PO4)
Climate bonus: Provide additional rent allowances for energy-efficient dwellings to low-income households	It is not very relevant because there are few rental houses in Slovakia	Vulnerable households, vulnerable transport users	✓		✓					
Decarbonising heating and cooling										

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Heat pumps: Promote the installation of electric heat pumps for heating and cooling according to dwelling type	Installation of heat pumps for heating is included in Chapter 1 Building renovation (1.1, 1.2) and Chapter 2 Affordable housing (2.1, 2.2, 2.3) because the installation of heat pumps is only possible after reducing the energy needs by envelope improvement. It cannot be promoted separately.	Vulnerable households	✓		✓					
District heating: promote connections to district heating networks using renewable energy sources	3.1 Support for connection to and development of decarbonised small heating networks at the community level. Targeting only vulnerable groups is difficult, therefore the focus should be on local heating communities or networks, area based (marginalised groups, less developed / priority districts).	Vulnerable households, vulnerable micro-enterprises			✓					
Renewable energy communities: Support community-based renewable energy projects and energy-sharing schemes	3.2 Support of renewable energy sharing and energy communities. Renewable energy communities; support creation of renewable energy communities for solar energy, promote the uptake of the self-consumption of renewable energy with focus on investment in rooftop photovoltaic (PV) and solar thermal collectors or photovoltaic	Vulnerable households, vulnerable micro-enterprises			✓	✓				N

Categories from EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action[54]							(iii) Funding
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
	thermal panels (PVT) that is shared with more buildings or households									
		Vulnerable households, vulnerable micro-enterprises			✓	✓	✓			
Clean Heating for all: Provide grants for replacing fossil fuel heating systems with climate-friendly alternatives for low-income households	Change of heating systems is included in Chapter 1 Building renovation (1.1, 1.2) and Chapter 2 Affordable housing (2.1, 2.2, 2.3,) as installation of climate-friendly alternatives is often only possible after firstly reducing the energy needs by envelope improvement	Vulnerable households	✓		✓					

Table 0-2 Transport sector long list of measures and investments

Categories from the EU long list	**Selected M&I at MS level** (please write down the name/description of the M&I)	**(i) Target**	**(ii) Scope of action**							**(iii) Funding**
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Zero- and Low-emissions vehicles										
Purchase incentives: Offer financial incentives for the purchase of electric and hybrid vehicles and bicycles, including subsidies and tax rebates		Vulnerable micro-enterprises and vulnerable transport users						✓		
		Vulnerable transport users						✓		
		Vulnerable micro-enterprises and vulnerable transport users						✓		

Categories from the EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Charging infrastructure: Develop public and private charging infrastructure for electric vehicles to ensure widespread availability		Vulnerable micro-enterprises and vulnerable transport users						✓		
Second-hand market: Promote the development of a second-hand market for zero-emission vehicles and bicycles to make them more accessible	Promotion of a second-hand market with EV (BEV) vehicles. This measure may consist of two "subprogrammes" – one related to a support grant scheme to provide a subsidy for selected groups of transport vulnerable citizens and second, a scheme that will guarantee and certify the quality of used cars, including BEV.	Vulnerable micro-enterprises, vulnerable transport users						✓		n
Integration of unconventional vehicles:		Vulnerable transport users						✓		

Categories from the EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Adapt city planning to accommodate the uptake of space-saving, low-polluting, cost-efficient, and safer electric vehicles such as micro cars and electric wheelchairs		Vulnerable transport users						✓		
		Vulnerable transport users						✓		
Public transport enhancements (including urban rail)										
Fleet expansion: Expand and modernise public transport fleets with low-emission vehicles such as electric buses	Support schemes for buying new zero- or low- emission vehicles for public transport and fleet expansion with charging points	Vulnerable transport users							✓	y/y
		Vulnerable transport users							✓	

Categories from the EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Infrastructure development: Invest in the development of public transport infrastructure, including new routes	Multimodal mobility - the development of integrated terminals mainly in the city areas, especially for commuting (preparation of project documentation)	Vulnerable transport users							✓	y/y
Multimodal mobility: Support multimodal transport options that integrate public transport with cycling, walking, and shared and on-demand mobility services	Multimodal mobility - the development of integrated terminals mainly in the city areas, especially for commuting (preparation of project documentation)	Vulnerable transport users						✓	✓	y/y
Public transport dedicated trajectories: Separating public transport from private traffic to improve service	National Transport Authority's continuation of the public transport reform and data collection on the public transport and data collection on	Vulnerable transport users							✓	y/y

Categories from the EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
reliability (ensure travel times and prevent delays)	the household's transport behaviour and costs									
Active mobility										
Bicycle infrastructure: Develop safe and attractive cycling infrastructure, including bike paths separated from motor traffic, and on-street bike lanes in lower-traffic streets	Building bicycle infrastructure including charging infrastructure for e-bikes	Vulnerable transport users						✓	✓	y/y
Pedestrian infrastructure: Develop safe and attractive walking infrastructure, including		Vulnerable transport users							✓	

Categories from the EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
expansion of pavements, pedestrian zones, and shared spaces		Vulnerable transport users				✓			✓	
Secure bicycle parking in strategic locations: Develop secure bike parking facilities to facilitate seamless commuter travel and reduce theft	Building bicycle infrastructure including charging infrastructure for e-bikes	Vulnerable transport users						✓	✓	y/y
Bicycle programmes: Subsidise the purchase of bicycles and reward zero-emission commuter travel	Support scheme for ebikes and cargo bikes	Vulnerable transport users						✓		n
		Vulnerable transport users						✓		
		Vulnerable transport users						✓		

Categories from the EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Integrate bicycle variants: Design bike paths and bike parking facilities to welcome bicycle variants such as cargo bikes and e-bikes	Building bicycle infrastructure including charging infrastructure for e-bikes	Vulnerable transport users						✓		y/y
Multimodal and shared mobility										
Shared mobility services: Promote bike-sharing, car-sharing, and ride-sharing services to reduce reliance on private vehicles		Vulnerable transport users							✓	
Mobility on demand: Develop sustainable mobility-on-demand services, such as app-	On demand transport for selected groups	Vulnerable transport users							✓	n

Categories from the EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
based ride-hailing and shuttle services										
Cargo bike services : Offer cargo bike mobility options in strategic city areas (e.g. commercial areas) to promote less polluting heavier load transportation (furniture, groceries, tools, children)	Building bicycle infrastructure including charging infrastructure for e-bikes Support scheme for ebikes and cargo bikes	Vulnerable micro-enterprises and vulnerable transport users						✓	✓	y/y n
P&R facilities: Install Park & Ride facilities at city limits to facilitate transportation switching and promote more sustainable and cost-		Vulnerable transport users							✓	

Categories from the EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
effective routes and transport modes										
MaaS (Mobility as a Service): Mobile apps offering the most convenient trajectory from A to B by integrating all mobility services	National Transport Authority's continuation of the public transport reform and data collection on the public transport and data collection on the household's transport behavior and costs	Vulnerable transport users							✓	y/y
Support for vulnerable transport users										
Offset increased transport costs for vulnerable users		Vulnerable transport users							✓	
Affordable transport solutions: Offer subsidies for public transport	Maintaining reduced fare for selected groups (students, seniors (62 years old and above, disabled persons)	Vulnerable transport users							✓	y/n

Categories from the EU long list	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
passes and other affordable mobility options to ensure accessibility for all		Vulnerable transport users							✓	

Table 0-3 Cross-sectoral long list of measures and investments

Cross-sectoral measure and/or investment	**Selected M&I at MS level** (please write down the name/description of the M&I)	**(i) Target**	**(ii) Scope of action**							**(iii) Funding**
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Information, education, and awareness										
Campaigns: Conduct information campaigns on energy efficiency and sustainable mobility to raise awareness	Campaigns promoting the use of other transport modes than individual car mobility	Vulnerable households and vulnerable transport users				✓				y/n
	Conduct information campaigns on energy efficiency focused on specific stakeholders involved in SCF Regulation implementation (owners, workforce implementing measures and investments, financial institutions, municipalities ,…)	Vulnerable households			✓	✓	✓			

Cross-sectoral measure and/or investment	**Selected M&I at MS level** (please write down the name/description of the M&I)	**(i) Target**	**(ii) Scope of action**							**(iii) Funding**
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Advisory services: Provide accessible advisory services on energy savings and sustainable transport options	Included in Measure 4.1	Vulnerable households, vulnerable micro-enterprises, social housing				✓				
Community programmes: Support community-scale initiatives and educational programmes to promote sustainable practices		Vulnerable households				✓				
Policy and regulatory measures										

Cross-sectoral measure and/or investment	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Incentive programmes: Develop national and regional programmes that incentivise energy efficiency and sustainable transport investments (measure)		Vulnerable micro-enterprises	✓		✓					
		Vulnerable transport users								
Regulatory reforms: Implement reforms to facilitate building renovations and the adoption of renewable energy solutions	I 5.4 Fiscal incentives These M&I could include reduced tax rates on renovation works and materials, on-tax schemes, on-bill schemes,	Vulnerable households and vulnerable micro-enterprises			✓		✓			
		Vulnerable households and			✓					

Cross-sectoral measure and/or investment	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
		vulnerable micro-enterprises								
Innovation and technology development										
Pilot projects: Support pilot projects to test and demonstrate innovative solutions for energy efficiency and low-emission transport		Vulnerable households and vulnerable micro-enterprises			✓					
		Vulnerable households			✓					

Cross-sectoral measure and/or investment	**Selected M&I at MS level** (please write down the name/description of the M&I)	**(i) Target**	**(ii) Scope of action**							**(iii) Funding**
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
		Vulnerable transport users							✓	
Public-Private Partnerships										
Cooperatives and social enterprises: Encourage the development of cooperatives and social enterprises (energy communities and micro-enterprises) in the energy and transport sectors to		Vulnerable households and vulnerable micro-enterprises			✓					

Cross-sectoral measure and/or investment	**Selected M&I at MS level** (please write down the name/description of the M&I)	**(i) Target**	**(ii) Scope of action**							**(iii) Funding**
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
foster community-driven solutions										
Private sector engagement: Foster partnerships with private sector entities to leverage investment in sustainable projects	Measure 5.1 Public-private partnerships (EPBD Art. 17); MSs may promote and simplify the use of public-private partnerships. The enabling funding and financial tools may include renovation loans or guarantee funds, including in combination with relevant Union programs, where applicable or energy performance contracting and pay-as-you-save financial schemes.	Vulnerable households and vulnerable micro-enterprises	✓		✓	✓				

Cross-sectoral measure and/or investment	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
	MSs shall ensure that banks and other financial institutions and investors receive information on opportunities to participate in the financing of the improvement of the energy performance of buildings Measure 5.2 Financial support for compliance with minimum energy performance standards (EPBD Art. 9); Private sector engagement in support for compliance with minimum energy performance standards (MEPS) by providing appropriate financial measures, particularly those targeting vulnerable groups, designing									

Cross-sectoral measure and/or investment	Selected M&I at MS level (please write down the name/description of the M&I)	(i) Target	(ii) Scope of action							(iii) Funding
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
	integrated financing schemes which provide incentives for deep renovations and staged deep renovations Measure 5.3 Support for deployment of solar energy (EPBD Art. 10); financial measures to support the deployment of solar energy in buildings, including in combination with technical building systems in form of loans, microloans, credits in cooperation with private sector (distribution companies, banks)									

Cross-sectoral measure and/or investment	**Selected M&I at MS level** (please write down the name/description of the M&I)	**(i) Target**	**(ii) Scope of action**							**(iii) Funding**
			(a) Support building renovations in worst performing buildings	(b) Support access to affordable energy-efficient housing	(c) Contribute to energy savings in buildings or reduce energy poverty	(d) Provide targeted, accessible, and affordable information	(e) Support entities developing and providing affordable energy efficiency solutions	(f) Provide access to zero- and low-emissions vehicles and bicycles	(g) Incentivise the use of affordable and accessible transport alternatives	M M&I already included in existing national or EU funding (y/n). If yes, is M&I used for expansion or for "scaling up" (y/n).
Financial support										
Temporary and targeted direct income support: Provide targeted temporary direct income support to vulnerable households and transport users to mitigate immediate financial impacts	• Funds to help vulnerable households and vulnerable transport users pay for the price impact of ETS2	Vulnerable households, vulnerable micro-enterprises, and vulnerable transport users								

Table 0-4 M&I not included in the EU long list

Selected M&I at MS level	(i) Target	(ii) Scope of action	(iii) Funding M&I already included in existing national or EU funding (y/n)

Table 0-5 Summary of national M&I

Selected M&I	Sub-category
Building sector - national long list of measures and investments	
Building renovations	1.1 Family houses renovation
	1.2 Apartment buildings renovation
	1.3 Renovation of buildings of micro-enterprises
Affordable housing	2.1 Renovation of social housing in apartment buildings and renovation of social service facilities managed by municipalities and including non-public providers.
	2.2 Development of social housing – apartment buildings owned by municipalities as well as owned by non-profit sector (construction and reconstruction)
	2.3 Self-help construction of family houses
Decarbonising heating and cooling	3.1 Support for connection to and development of decarbonised small heating networks at the community level
	3.2 Support of renewable energy sharing and energy communities
	3.3 Solar energy installations on individual buildings
Information, education, and awareness	
Information, education, awareness and advice	4.1 Advice combining one-stop-shops according to the EPBD and EED and community / field social work.

Selected M&I	Sub-category
	4.2 Education of local governments and other professionals, Training and capacity-building programs for stakeholders involved in the implementation of SCF
Public-private partnerships	
Support public and private entities	5.1 Public-private partnerships ; renovation loans, guarantee funds, energy performance contracting, pay-as-you-save financial schemes with financial institutions and investors
	5.2 Private sector engagement in financial support for renovation of the worst-performing buildings (EPBD Art. 9);
	5.3 Private sector engagement in support for deployment of solar energy
	5.4 Fiscal / Regulatory reforms, incentives, reduced tax rates on renovation works and materials, on-tax schemes, on-bill schemes regulatory reforms to facilitate building renovations
Support for vulnerable transport users	
Public transport	1.1 Increase of the quality of public transport, optimisation of public transport connections and frequency (National Transport Authority (NADA)'s continuation of the public transport reform)
	1.2 Support schemes for buying new zero- or low-emission vehicles for public transport and fleet expansion with charging points
	1.3 Maintaining reduced fare for selected groups like students, seniors (62 years old and above), disabled persons
Cycling infrastructure	2.1 Building bicycle infrastructure
	2.2 Support scheme for e-bikes and cargo bikes
Individual mobility	3.1 On demand transport for selected groups
	3.2 The promotion of a second-hand market with EV/BEV
	4.1 Multimodal mobility points (integrated terminals)

Selected M&I	Sub-category
Multimodal mobility and support of non-motorised modes of transport	4.2 Campaigns promoting the use of transport modes other than individual car mobility
Financial support	
Direct income Art. 8, par. 2	37,5 % of the estimated total costs of the Plan can be used for direct income. The details to be completed when measures are selected. ***I***mpact is an immediate relief from the cost burden, with a short-term effect that does not address the root cause of vulnerability or energy or transport poverty and does not have a positive impact on emissions.

Annex E: M&I in the Buildings and Transport Sectors

M&I in the Buildings Sector

Based on discussions of the first proposal for M&I to be included in the Slovak SCP and first comments by the SCP working group, the following preliminary long list of measures and investments is proposed for the buildings sector.

The proposed measures and investments with lasting impacts are grouped in 5 Chapters according to Art. 8 par. 1 of SCF Regulation – Eligible measures and investments to be included in the Social Climate Plans:

- **Building renovation** (building renovation and energy efficiency improvements)
- **Affordable housing** (access to affordable energy-efficient housing, including social housing)
- **Decarbonisation** (by providing access to affordable and energy-efficient systems, and by integrating renewable energy generation and storage, renewable energy communities, promoting self-consumption, energy sharing and peer-to-peer trading of renewable energy, connection to smart grids and to district heating that contributes to achieving energy savings or to reducing energy poverty)
- **Information, education, awareness and advice** (support for building renovations and energy efficiency improvement awareness and implementation)
- **Support public and private entities** (, in particular public-private cooperatives providing affordable energy efficiency solutions and appropriate funding instruments.

Art.8 (3) of SCF Regulation also supposes Technical assistance to cover expenses related to training, programming, monitoring, control, audit and evaluation activities which are required for the management of the SCF and the achievement of its objectives, for example studies, information technology (IT) expenses, public consultation of stakeholders, information and communication actions. The costs of such technical assistance shall be up to 2% of the estimated total costs of the Plan. At this stage, all measures and investments in the EU long list are kept. The recommended M&I for the national long list are grouped according to Art.8 (1) SCF Regulation.

In order to avoid an overlap, the short-listed measures and investments have to be consistent and compliant with the implementation of other Directives in the specific context of Slovakia and aligned with reporting and implementation obligations at the EU level that are expected in the coming years. The harmonisation with these obligations is out of the competences of this project as

they are mostly up to Slovak authorities. However, they will be addressed and stressed during consultations.

Under the SCF Regulation, the SCPs are required to be consistent with the following instruments:

- European Pillar of Social Rights Action Plan;
- The Cohesion policy programmes.

Beyond these two requirements, the main strategic and policy documents to be taken into account for the **national short-list** of measures and investment in **building sector** are:

- Energy Performance of Buildings Directive (EPBD recast)[55] adopted in May 2024 which requires implementation of several articles taking into account the vulnerable groups;
- Energy Efficiency Directive (EED) recast[56]; and
- National Energy and Climate Plan (NECP).

The national long-list of possible measures and investments with a short description targeting energy poverty and vulnerable households, and potentially micro-enterprises, is provided below.

Building renovation

Description: This investment should target building renovation and energy efficiency improvements by insulation of walls, roofs, and floors, and replacement of windows, installation of energy efficient building technical systems, renewable energy integration, potentially also other measures (building automation, smart metering, respond to grid).

It is necessary to follow the principle of "energy efficiency first" and a holistic approach to the renovation of buildings. Separate investments in components (e.g. only windows) or only the technical systems change are not suitable for worse performing buildings. The design of technical systems requires a holistic assessment of buildings, as the installation of some systems is only possible after reducing the energy needs (RES, heat pumps). The goal of renovation should be deep renovation, NZEB/ZEB (if reasonable also in step-by-step approach, but the risk of hygienic defects must be checked and avoided, and steps must be proofed by building renovation passport).

Municipalities have an overview of energy poor and vulnerable residents in their jurisdiction, and actively help them in their difficult situation — either directly through direct aid or by subsidizing NGOs that then provide the aid.

[55] EurLex. (2024). Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings (recast). https://eur-lex.europa.eu/eli/dir/2024/1275/oj.
[56] EurLex. (2023). Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955 (recast). https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023L1791.

Energy poor residents can be found in any part of Slovakia, and therefore assisting energy poor and vulnerable residents or households, regardless of location and region's economic development level should be ensured if the cost efficiency and energy cost savings for household can be achieved.

- **Family houses renovation**

This investment should target the improvement of energy performance of single-family houses. It is recommended to extend the ongoing support for renovation of family houses "Obnov dom" after its expiry and provide grants for additional thermal insulation, window replacement and systems renovation, RES integration, and the installation of devices for control systems as part of installed technologies, smart metering connected with electricity pre-payment with holistic approach to minimise the energy costs.

The scope of the action and target groups: The aim is the increase of energy efficiency with emphasis on cost optimality of investments and the decrease of household's annual energy costs (Note: not all investments in CO_2 emission savings will bring decrease of energy costs, e.g. change to wooden pellets can increase the costs). The focus should be on deep renovation of worst performing buildings with the highest potential for energy savings owned by vulnerable households also step-by-step based on the measures indicated in building renovation passport (BRP). **Additionality:** The "*Obnov dom*" (Renovate your house) scheme *and "Obnov dom mini*" are financed by REPowerEU. Support for "Obnov dom mini" is focused on poor households, and it is for the **partial renovation** of 3 600–4 500 family houses from the funds of the Recovery and Resilience Plan (POO, chapter REPoweEU) in the time horizon until the end of 2025. Currently, eligible applicants are households whose net income per member for 2023 did not exceed 8 165.30 Euros in the BBSK, KSK, ŽSK and PSK regions (**not entire SR is included**). The allocation for the scheme is EUR 40 million + VAT and since it is a partial renovation, the **maximum contribution is EUR 10 000** per application.

After the end of the POO scheme, the **partial renovation** of houses will continue from the Modernization Fund (MOF) up to the amount of EUR 186 340 000 euros, while at least 16 940 applications should be supported. The time frame for implementing the MOF scheme is planned from 2026 (or after the allocation from the POO is exhausted) until the available allocation from the MOF is exhausted. The conditions have not yet been finally determined, but it is being considered to increase the maximum amount of support to 11 000 euros and the other conditions should be similar to the POO scheme.

Additionality of SCF is ensured by the extension of the ambition level to deep renovation, NEZB (until 2030) and ZEB from 2030. Further financing would extend the target group to vulnerable households, p the worst performing residential buildings (EPBD Art. 3 and 9) in cold climates and the time extension of the scheme (the "*Obnov dom*" scheme will conclude in 2026). The time frame for implementing

the financing from Modernisation Fund (MOF) is planned from 2026 (or after the allocation from the POO is exhausted) until the available allocation from MOF is exhausted.

Implementation: the administrative implementation would build up on the existing administrative system in place. The savings should be proofed by energy performance certificates before and after renovation and for step-by-step renovation the renovation passport should be required and should be an eligible cost from the SSEE This scheme would be linked to the EPBD recast articles implementation: Renovation passports (Art. 12), EPCs (Art. 19). New indicators in energy performance certificates, such as final energy, should be used to prove potential household annual energy costs decrease after renovation.

The impact: The impact of this M&I will result in a decrease of energy costs and reduction of greenhouse gas emissions. Other impacts are thermal comfort improvement, reduction of health risks due to indoor humidity, avoiding mould growth, reduction of noise by window replacement, and the improvement of security by window and door replacement (burglary). The worst buildings renovation will contribute to the objectives established in the EPBD.

This investment will contribute to the following indicators: reduction of number of households in energy poverty, increase the number of buildings/floor area of buildings having undergone deep renovation or other energy renovation, reduction in greenhouse gas emissions in the buildings sector, savings in annual primary and final energy consumption. Relevant indicators for indicative milestones and targets for this M&I are the savings in annual primary and final energy consumption.

- **Apartment buildings renovation**

This investment should target improvement of energy performance of multi apartment buildings by additional thermal insulation, window replacement and systems renovation, RES integration, and the installation of devices for control systems as part of installed technologies, smart metering connected with electricity pre-payment with holistic approach to minimize the energy costs.. The existing subsidy scheme ŠFRB could be extended.

The scope of the action and target groups: It is difficult to primarily target vulnerable households or micro-enterprises by this investment due to small segregation of vulnerable groups in specific apartment buildings due to the private ownership of flats. In addition, an existing subsidy scheme ŠFRB is currently working well and only a small part of apartment buildings is not renovated (approximately 25%). Future investigation is recommended on the territorial distribution of non-renovated apartment buildings and their age (renovation is not possible for historical buildings or buildings with poor statics). The potential target group could be apartment buildings occupied fully by vulnerable groups or the ratio of vulnerable households in apartment building has to be defined for

Investment can be locally, geographically targeted . The goal of renovation should be deep renovation (NZEB/ZEB) or steps in line with the building renovation passport in case of step-by-step renovation.

Additionality: The "ŠFRB" scheme could be extended by providing grants instead of loans, combination of loan and progressive subsidy (e.g. progressively set subsidies with regard to the size of the share of vulnerable households in the apartment building and the level of achieved depth of renovation) the extension of ambition level to deep renovation, and the target group extension to vulnerable groups, marginalised groups, less developed districts/priority districts, and worst performing buildings in cold climates.

The "ŠFRB" scheme already provides subsidies in the form of a partial remission of the principal of the loan after meeting the requirements for energy savings and the application of renewable energy sources.

The grant and loan support would be ideal. The sustainability of using the building for the given purpose has to be ensured.

Implementation: the administrative implementation would utilise the existing structure as the scheme "ŠFRB" is in place. For step-by-step renovation, the renovation passport should be required and should be an eligible cost. This M&I is linked to the EPBD recast articles implementation: Renovation passports (Art. 12), EPCs (Art. 19).

The impact: The impact of this M&I is focused on the decrease of energy costs and reduction of greenhouse gas emissions. Other impacts are thermal comfort improvement, reduction of health risks due to indoor humidity, avoiding mould growth, reduction of noise by window replacement. The worst buildings renovation will contribute to the objectives established in the EPBD and could avoid future fines or disadvantages for owners.

This investment will contribute to the following indicators: reduction of number of households in energy poverty, increase the number of buildings/floor area of buildings having undergone deep renovation or other energy renovation, reduction in greenhouse gas emissions in the buildings sector, savings in annual primary energy consumption and annual final energy consumption.

Relevant indicators for indicative milestones and targets for this M&I are savings in annual primary and final energy consumption.

Affordable housing

This group of M&I was established in cooperation with a non-profit organisations Friends of the Earth - CEPA and Roma Environmental Sustainability & Development Initiative (RESDI).

Description: The aim of this M&I is to provide access to affordable energy-efficient housing, including social housing and to provide municipalities *and non-public*

providers with tools and conditions for new construction and renovation of social housing, as well as rental housing and social service facilities. Measure is similar to previous measure "Apartment buildings renovation", but the target group is social housing in apartment buildings and renovation of social service facilities managed by municipalities and non-public, non-profit sector in case the support can be clearly directed only towards vulnerable households (social housing dedicated only to vulnerable households). The focus should be on specific types of social services for households, e.g. family-type facilities or shelters, emergency housing facilities, halfway houses.

The investment should target the construction of new buildings or the renovation of existing buildings and energy efficiency improvements by insulation of walls, roofs, and floors, and replacement of windows, installation of energy efficient building technical systems, renewable energy integration, potentially also other measures (building automation, smart metering connected with electricity pre-payment, respond to grid).

The same principles have to be applied ("energy efficiency first" and holistic approach to building renovation) as defined in the *Building renovation M&I*. Separate investment in components (e.g. only windows) or only the technical systems change is not suitable for worse performing buildings. The design of technical systems requires a holistic assessment of buildings, as the installation of some systems is only possible after reducing the energy needs (RES, heat pumps).

The goal of renovation should be the deep renovation, or step renovation in line with the measures in building renovation passport in case of step-by-step renovation. The renovation and construction of new buildings has to fulfil minimum requirements on energy performance of new and renovated buildings according to Act 555/2005 Coll., as amended, and implementing Decree 364/2012 Coll.

Renovation should include all necessary investments, including basic infrastructure with some degree of flexibility for unexpected investments, which is likely to vary in the social housing residential blocks (they often include holes in the building structure, lack wires and windows, etc.) It is also recommended an inclusion of the pre-paid system for electricity.

It is essential that the support entail financing or co-financing of project development support, which is currently very costly for the municipalities to cover from own resources.

Better integration and cooperation between support programmes and institutions with bigger focus on energy poverty could be also part of the solution to better target the energy poverty in Slovakia. There are currently three institutions a three programmes which are dealing with renovation of buildings and RES for lower income households. ŠFRB provides loans for obtaining flat or house for socially

disadvantaged people, SIEA provides grants for low-income people to install some RES on their households and SAŽP provides grants to low-income people to renovate their houses. Every institution has its own marketing and information strategy and each of the programmes is separated from the other programs. We could perhaps achieve bigger progress in alleviating energy poverty in Slovakia if they improve coordination of their efforts, pool the resources, expertise, adjust their programs to supplement each other, focus more on energy poverty and communicate and approach jointly towards population under energy poverty,.

The options for long-list of specific measures in this Chapter are:

- **Renovation of social housing in apartment buildings and renovation of social service facilities managed by municipalities and including non-public providers**

These are managed by local governments, non-public, non-profit sector, ideally in the form of a combination of subsidy and loan in proportion depending on the financial capabilities of municipalities. Implementation support through a technical assistance scheme (Chapter 3) will be appropriate.

Although non-public providers provide 34% of social service capacity in Slovakia, they are often not eligible applicants for public building renovation schemes from the Slovakia Programme (ESIF), the Renovation Plan or the Environmental Fund.However, the ŠFRB has been providing them with financing for more than 10 years.

The value for money in the renovation of these facilities can be significantly higher than in the renovation of individual family houses. In the case of social housing providers, it is important to consider ownership and how will it be guaranteed that the investment in social housing is not reflected in the rental price.

The scope of the action and target groups: The aim is the increase of energy efficiency and decrease of annual energy costs. The target group are households in energy poverty targeted via municipalities and non-profit sector who manage existing social housing and social services buildings with high potential for energy savings.

Additionality: It is suggested that the Social Climate Fund would build on established experience of the MD SR. From 1999 MD SR directly supports municipalities in financing rental housing development through the Programme of Housing Development. In this scheme it is possible for municipalities to combine state subsidy with the long-term low interest loan from the State Housing Development Fund (SHDF). The subsidies are provided by the Ministry of Transport the Slovak Republic according to the Act No. 443/2010 Coll. on Subsidies for Housing Development and on Social Housing as amended.

Implementation:

The implementation will be based on existing long-term national program governed by Ministry of Transport SR in line with the approved National Housing Policy.

For social service facilities the M&I would require utilization of the existing structure of the ŠFRB. For more than 10 years, the ŠFRB has been providing preferential loans for the renovation of social service facilities to all types of applicants, including non-public providers.

Social service facilities: the situation of non-public providers requires suitable combination of grants and loans.

The only effective and sustainable long-term solution for building owners is a renovation measure carried out to the level of the applicable EHB requirements. This will ensure not only an extension of the building's lifespan, energy savings but also many other benefits such as thermal comfort of residents / users / etc. but especially it is a long-term solution for reducing energy needs and an effective measure with regard to the introduction of the new ETS2 scheme.

Part of the savings achieved on energy bills will help repay the loan in combination with a certain progressive rate of any subsidy

The impact: The impact of this M&I is focused on the decrease of energy costs for households in energy poverty and reduction of greenhouse gas emissions as well as the thermal comfort improvement, reduction of health risks due to indoor humidity, avoiding the mould growth, reduction of noise by window replacement and air quality improvements due to switching from coal or other fossil fuels used in the social service facilities...

This investment will contribute to the following indicators: reduction of number of households in energy poverty, increase the number of buildings/floor area of buildings having undergone deep renovation or other energy renovation, reduction in greenhouse gas emissions in the buildings sector, savings in annual primary energy consumption and annual final energy consumption.

Relevant indicators for indicative milestones and targets for this M&I are the savings in annual primary energy consumption.

- **Development of social housing – apartment buildings owned by local governments as well as owned by non-profit sector**

The aim of this investment is the construction of new social housing. It may also include a more cost-efficient conversion of existing non-residential buildings into residential buildings or the conversion of a family house into social housing or a social services facility. Some organisations operating in the social field often convert family houses into social services facilities. For example, the Slovak Catholic Charity has a lot of facilities that are former family houses. *The focus should be on*

specific types of social services for households, e.g. family-type facilities or shelters, emergency housing facilities, halfway houses

New constructions must be energy-efficient as the NZEB (energy class A0) is a minimum requirement for all new buildings.

It is essential that the support would entail financing or co-financing of project development support, which is currently very costly for the municipalities to cover from own resources.

The new buildings should be equipped in such a way that the measures and investments synergistically contribute to the SCP objectives in the area of transport poverty, as well as to the overall objectives of the Slovak Republic in the area of transport, which are aimed at supporting sustainable modes of transport (bicycle parking, connection to cycle paths, if possible).

Measures aimed at barrier-free adaptation of buildings and technical solutions to support independent living for people with disabilities should be also included.

The measures should be supplemented with soft educational, support and awareness-raising activities. This could include as eligible optional interventions 2 components:

1. pre-paid system for electricity and water (successfully tested for electricity by VSD in multiple localities, including Luník IX. Košice) - it serves as both educational and energy saving measure
2. modular forms of constructions which are energy and time-efficient

The solution should not secondarily contribute to the creation of transport poverty (construction in more remote locations with an absence of economic and social environment). To achieve the best impact of the measure, it is recommended to focus on moving households from less efficient buildings to more efficient buildings.

The scope of the action and target groups: The scope of the action is construction of new buildings for households in energy poverty, or the conversion of non-residential premises into residential buildings for households in energy poverty, for low income households, potentially also households in transport poverty living outside the village, or the conversion of a family house into social housing or a social services facility. The focus should be on specific types of social services for households, e.g. family-type facilities or shelters, emergency housing facilities, halfway houses. It is possible to later set up a specific solution for specific groups, as part of the implementation tool.

Additionality:

It is suggested that the Social Climate Fund would build on established experience of the MD SR. From 1999 MD SR directly supports municipalities in financing rental

housing development through the Programme of Housing Development. In this scheme it is possible for municipalities to combine state subsidy with the long-term low interest loan from the State Housing Development Fund (SHDF). The subsidies are provided by the Ministry of Transport the Slovak Republic according to the Act No. 443/2010 Coll. on Subsidies for Housing Development and on Social Housing as amended.

Most of the social housing is financed by loans from ŠFRB and built by municipalities. Most of the time, the only criterion is the price of the apartment house. However, in many regions of Austria, the projects for social housing are looking at the final price of a rent which includes payments for utilities/energy. This indicator will make sure that tenants will not fall under energy poverty with increases of energy prices in the future and at the same time allows to build affordable housing only in the highest energy standards. This criteria as a condition for granting a better loaning could guarantee better energy poverty proofing of future tenants and could be finance by the SCF.

Implementation: The implementation will be based on existing long-term national programme governed by Ministry of Transport SR in line with the approved National Housing Policy.

In the case of social housing providers, it is important to take into account the ownership and how will it be guaranteed that the investment in social housing is not reflected in the rental price.

The impact: The impact of this M&I focuses on the increased access and availability of affordable housing and social housing for a larger group of the population.

This investment will contribute to the following indicators: reduction of number of households in energy poverty, as a result of measures and investments . Potential impact is also on decrease of number of households in transport poverty.

A relevant indicator for indicative milestones and targets for this M&I is reduction of number of households in energy poverty as a result of M&I.

In addition, an interesting option, which is used in the Western Europe, is institute of a municipal/social rental agencies. These agencies acts as intermediary between homeowners and households in need of standard housing and guarantees the lease agreement, gives landlords assurance of a securely rented home and assumes the risks associated with the lease for people in need, very often falling under energy poverty category. Advantage of this principle is that instead of building a new housing stock, it uses more efficiently current housing stock, which could be in oversupply. It is usually more convenient to use such institute in the underdeveloped regions where the supply of apartments/houses for renting is higher than demand and thus it is less expensive to rent apartments for people in need than building new apartment building from scratch. Bratislava, under pilot a scheme has already started to use such institute. This concept could be improved

with the additional program, particularly that agency which is renting/guarantee renting of apartment for low income tenants would provide convenient loans/grants to land lord for renovating the rented apartments. The benefit would be two fold- it would increase the value of the property for landowner and decrease the rent for tenants due to lower energy costs. Similar program already exists in France (but not in connection with municipal rental agencies).

- **Self-help construction of family houses**

This M&I is the continuation of funds from the currently implemented Programme Slovakia by several organisations operating in the social field, e.g. ETP Slovakia, Dedo Foundation, Domov, n.o.,

It is appropriate to combine this M&I with the existing Green Solidarity programme.

The scope of the action and target groups: The scope of the action is the construction of new family houses for households in energy poverty, potentially also households in transport poverty living in unsuitable conditions outside towns and villages and in marginalised Roma settlements.

Funding : There are broadly defined similar measures, mostly for self-help construction of individual houses in rural areas by marginalised Roma communities with only roughly EUR 40 million allocation in the Priority Objective 4 (PO4). A specific measure RSO4.3: '*Promoting the socio-economic inclusion of marginalised communities, low-income households and disadvantaged groups, including persons with special needs, through integrated actions including housing and social services*' has EUR 99 million total allocation for 2021–2027.

Implementation: The implementation would be based on PO4 – Programme Slovakia.

The impact: The impact of this M&I is on availability for a larger group of affordable housing and social housing.

This investment will contribute to the following indicators: reduction of number of households in energy poverty, as a result of measures and investments financed under the Fund. Potential impact is also on decrease of number of households in transport poverty.

Relevant indicator for indicative milestones and targets for this M&I is reduction of number of households in energy poverty as a result of M&I.

Decarbonisation

The aim of these M&I is to contribute to decarbonisation of heating and cooling in buildings by providing access to affordable and decarbonised energy efficient systems, e.g. through electrification, integrating renewable energy generation and storage, including through renewable energy communities, citizen energy communities and other active customers to promote the uptake of the self-

consumption of renewable energy, such as energy sharing and peer-to-peer trading of renewable energy, connection to smart grids and to district heating networks, that contributes to achieving energy savings or to reducing energy poverty.

The design of technical systems requires a holistic approach, as the installation of some systems is only possible after reducing the energy needs (RES, heat pumps). Therefore, decarbonisation by installation heat pumps in individual buildings (family houses and apartment buildings including social housing) is included in Chapter 1 Building renovation (1.1, 1.2) and in Chapter 2 Affordable housing (2.1, 2.2, 2.3, 2.4, 2.5)

- **Replacement of community-scale fossil-fuel based heating systems**

The scope of the action and target groups: The scope of the action is investment in decarbonisation of community scale heating by support for connection to existing or development of decarbonised small community level heating networks. new heat generation installation, or replacement of existing fossil fuel heating installation with a renewable based appliance and/or a highly efficient installation for example heat pumps. The investment in district heating could be in the form of small energy community delivering heat for several multiapartment buildings . Focus is on a specific vulnerable household or vulnerable micro-enterprises fulfilling eligibility criteria and investment that reduces energy costs (price of district heat) after M&I implementation should be ensured. Therefore, the tailored solutions for heat delivery will be necessary for specific areas or groups (e.g. investment in new small community systems for local population groups, marginalised groups, less developed/priority districts, social housing, social services). The price of delivered heat should be regulated after investment (price of heat should decrease at least for vulnerable groups). The M&I could be implemented in the form of a combination of subsidies and loans.

Additionality: New scheme or existing that is tailored for the specific vulnerable groups or localities. Currently in Slovakia, Modernisation Fund is intended to support only refurbishment of large district heating systems.

Implementation: New

The impact: The impact of this M&I lies in energy and CO_2 emissions savings and less on reducing energy poverty.

This investment will contribute to the following indicators: reduction in greenhouse gas emissions in the buildings sector.

Relevant indicators for indicative milestones and targets for this M&I could be the number of replacements of fossil fuel heating installation with a renewable based appliance and/or a highly efficient installation and additional operational capacity installed for renewable energy (e.g. the number and capacity of heat pumps;

number and capacity of other renewable space heating and cooling technologies including renewable based boilers).

- **Support of renewable energy sharing and energy communities**

This M&I should support the establishment of renewable energy communities, citizen energy communities and other active customers to promote the uptake of the self-consumption of renewable energy, such as energy sharing and peer-to-peer trading of renewable energy.

The scope of the action and target groups: The relevant scope of the action is investment in rooftop photovoltaic (PV) and solar thermal collectors or photovoltaic thermal panels (PVT) that is shared with more buildings or households (energy sharing). The sharing of renewable energy production in energy communities will ensure a higher ratio of self-consumption of produced photovoltaic electricity and higher costs savings in comparison with export of a big part of production into electricity grid. Tailored solutions for specific areas or groups of buildings (social housing, marginalised groups or less developed districts/priority districts) will be necessary to ensure targeting vulnerable households fulfilling eligibility criteria. PV installation brings direct costs savings, therefore, the support could be in form of combination of subsidies and loans.

Funding : New scheme

Implementation: New.

The impact: This M&I has an impact on CO_2 emissions reduction and direct impact on energy costs savings and reducing energy poverty.

This investment will contribute to the following indicators: reduction of number of vulnerable households, reduction in greenhouse gas emissions in the buildings sector, savings in annual final energy consumption.

Relevant indicators for indicative milestones and targets for this M&I are additional operational capacity installed for renewable energy (number and capacity of rooftop photovoltaic and solar thermal collectors) and savings in annual final energy consumption.

This M&I is focused on community level. It will be necessary to avoid a double counting from the measures listed in Building renovation that includes the RES integration in deep renovation.

- **Solar energy installations**

The scope of the action and target groups: The relevant M&I is investment in rooftop photovoltaic (PV) and solar thermal collectors or photovoltaic thermal panels (PVT) on – social housing and social services facilities or individual family houses or buildings used by vulnerable micro-enterprises including necessary structural construction measures on the building.

Additionality: There are existing schemes focused on PV installations that can be extended to social housing and social services facilities (and all types of solar installations

Implementation: Existing schemes implementation can be extended.

The impact: This M&I has an impact on CO_2 emissions reduction and a direct impact on energy costs savings and reducing energy poverty. The solar installations on public buildings (social housing facilities) will contribute to the obligation established in EPBD recast Art. 10 Solar energy in buildings that requires Member States to ensure the deployment of suitable solar energy installations, if technically suitable and economically and functionally feasible on all existing public buildings with useful floor area larger than 2000 m^2, by 31 December 2027; larger than 750 m^2, by 31 December 2028 and larger than 250m2, by 31 December 2030.

This investment will contribute to the following indicators: reduction of number of vulnerable households, reduction in greenhouse gas emissions in the buildings sector, savings in annual final energy consumption.

Relevant indicators for indicative milestones and targets for this M&I are additional operational capacity installed for renewable energy (number and capacity of rooftop photovoltaic and solar thermal collectors) and savings in annual final energy consumption.

Information, education, awareness and advice

This type of measure provides targeted, accessible and affordable information, education, awareness and advice on cost-effective measures and investments, available support for building renovations and energy efficiency, as well as sustainable and affordable mobility and transport alternatives.

This type of M&I may include:

Technical assistance including one-stop-shops for the energy performance of buildings with a particular focus on vulnerable households and people living in social housing is the measure that MSs have to establish according to EPBD Art. 18.

Education of local governments and other professionals so that they would gain knowledge and skills in the field of energy poverty and its solutions, and specifically to advise their clients on how to use the Social and Climate Fund and other subsidies schemes.

- Advice, professional assistance combining one-stop-shops according to the EPBD and EED and community / field social work

According to EPBD recast Art. 18, Member States shall, in cooperation with competent authorities, and, where appropriate, private stakeholders, ensure the establishment and the operation of technical assistance facilities, including

through inclusive one-stop shops for the energy performance of buildings, targeting all actors involved in building renovations, including homeowners and microenterprises.

According to EED the Member States shall ensure that technical assistance facilities are available across their territory by establishing at least one one-stop shop per 80 000 inhabitants; per region; in areas where the average age of the building stock is above the national average; in areas where Member States intend to implement integrated district renovation programs; or in a location that can be reached within less than 90 minutes of average travel time, on the basis of the means of transport that is locally available.

For the purpose of providing information and consultation to households in energy poverty and vulnerable households it may not be sufficient to have the technical assistance facilities in big cities within a recommended distance. Fieldwork that can help with filling out individual applications and also help with technical implementation of measures should be closer to small regions with higher occurrence of households *and micro-enterprises* in energy poverty.

This measure will include complement to one-stop-shops created under EED and EPBD implementation by strengthening two types of advice: first contact advice - by existing social field workers, and specialised advice - detailed technical advice in one-stop-shops (OSS). Field workers will identify eligible recipients and direct them to OSS.

This measure should also create more advice centres in smaller regions, as close as possible to target groups (densification of OSS).

Within the OSS (EED, EPBD), that is in principle for all population, this measure should provide beyond this basic function a targeted advice to vulnerable groups including free certificates and renovation passports (EPBD Art. 12 and 19) if preliminary eligibility is identified.

The scope of the action and target groups: The one-stop-shops established according to EPBD Art. 18 shall provide streamlined information on technical and financial possibilities and solutions to households, microenterprises, and public bodies ; provide holistic support to all households, with a particular focus on households affected by energy poverty and on worst-performing buildings, as well as to accredited companies and installers providing retrofit services, adapted to different housing typologies and geographical scope, and provide support covering the different stages of the retrofit project. One-stop shops shall provide independent advice on the energy performance of buildings and may accompany integrated district renovation programmes.

In the scope of SCF could be helping to implement EPBD and extension of assistance adapted and closer to specifics of SCF and closer geographically to identified vulnerable groups (vulnerable households and micro-enterprises)..

Under technical assistance MSs may offer dedicated services for vulnerable households, people affected by energy poverty by provision of energy certificates and renovation passports free of charge or for affordable price (EPBD Art. 12 and 19).

Information and awareness campaigns and the provision of individualised information required by EPBD Article 29 may also be included.

Additionality: One-stop-shops have to be implemented according to EPBD Art. 18, 12, 19, 29 and Article 22(6) of EED.

Additionality is in a tailored focus on households in energy poverty and vulnerable households and in specific areas, closer to vulnerable groups (e.g. marginalised groups or specific localities such as less developed regions).

Implementation: A new implementation system will be introduced based on EPBD Art. 18 and EED Art. 22(6).. The private sector actors involved in building renovations will also need to be involved (designers, consultants, energy performance assessors). An example of a similar system is currently in place in the Czech Republic.

*T*here are more options for administrative implementation. It may be efficient to use the existing established Single Points of Contact (SAŽP, SIEA) instead of creation of new support network with costly administrative and operational support in the current lack of professional capacities. The subsequent sustainability of such new centres is also a challenge. Existing SIEA advisory centres will be used and advisory centres for "Obnov dome" scheme.

An implementation should be in line with the implementation of the EPBD Art. 18 and EED Art. 22(6). The private sector actors will also have to be involved (designers, consultants, energy performance assessors).

One-stop shops are more relevant for majority population. Assistance to vulnerable and marginalised groups is better suited and more accessible via existing support professions, TSP, Community Centres, Healthy Regions, as the first contacts, who will navigate people to more detailed technical advice if relevant.

Regional centres of sustainable energy management (SIEA) would be the best implementation institution, if created. Their activities should be extended towards vulnerable groups.

The target groups identification should be in line with the target group for specific measure. Free energy certificates and energy passports should be provided under specific conditions specified in implementation phase. The regions with more contact points and field workers needed should be estimated in cooperation with MPSVR SR.

The impact: This M&I has an impact on renovation rates and quality of renovation and support for SCF investments implementation, CO2 emissions reduction and on reducing energy poverty through proper renovation that ensures that real energy cost savings are achieved.

This investment will contribute to the following indicators: reduction in the number of vulnerable households, reduction in greenhouse gas emissions in the buildings sector, annual final energy consumption savings.

Relevant indicator for indicative milestones and targets for this M&I is the number of buildings and the corresponding floor area being renovated fully or partially after the support by technical assistance.

- **Education of local governments and other professionals**

The scope of the action and target groups: Training and capacity-building programmes for stakeholders involved in the implementation of SCF measures. The education of local governments and other professionals including the field social workers with a focus on SCF measures and investments and households in energy poverty and vulnerable households and micro-enterprises, specifically on how to use the Social and Climate Fund and other schemes such as "*Obnov dom mini*" and "Green Solidarity" should be provided.

The previous measure, advice, professional assistance is focused on direct help to vulnerable households, the operation of one-stop-shops, terrain workers who help vulnerable households, issue free EPC and renovation passport, etc. The aim of this measure is to provide a training of people, who help vulnerable groups. The focus would not just be on individuals, but also regional energy centres as a whole.

Additionality: The capacities of the existing and well-functioning programmes such as Healthy Regions programmes and field social workers (TSP) could be utilised so that they would gain knowledge and skills in the field of energy poverty and its solutions to advise their clients. Comprehensive training, renumeration, and expansion of the remit of the existing support professions, TSP, Community Centres, and Healthy Regions, is essential in this regard. Training on inclusive design and the needs of people with disabilities could be included.

Complementarity to existing schemes - Advisory capabilities for all schemes should be extended to include targeted assistance for vulnerable groups and SCF. Extend SIEA information centres over time and expand their content.

Implementation: Existing capacities of the existing and well-functioning programs could be utilised.

The professional's identification for capacity building should be linked to capacities increase of the existing and well-functioning training programs.

It is recommended to coordinate these efforts and trainings also with MIRRI regional centres, the Development Teams of the Plenipotentiary for Roma Communities, SIEA's and Slovak Environmental Agency regional offices, and other relevant bodies.

The impact: This M&I has an impact on renovation rates, quality of renovation and SCF investments rate, CO_2 emissions reduction and on reducing energy poverty.

This investment will contribute to the following indicators: reduction in the number of vulnerable households, reduction in greenhouse gas emissions in the buildings sector, annual final energy consumption savings.

Relevant indicator for indicative milestones and targets for this M&I is the number of buildings and the corresponding floor area being renovated fully or partially with the support of measures and investments under the Fund after technical assistance and the number of vulnerable households, that were consulted by the professionals (e.g. number of contacts).

Support public and private entities

The aim of this type of measure is to support public and private entities, including non-profit organisations, social housing providers, in particular public-private cooperatives, in developing and providing affordable energy efficiency solutions and appropriate funding instruments in line with the social goals of the Fund.

MSs should encourage financial institutions to promote targeted financial products, grants and subsidies to improve the energy performance of buildings housing vulnerable households (EPBD Art. 17).

Under this type of measures could be considered implementing financing solutions that do not require any upfront payment from the final beneficiaries, e.g. energy performance contracts.

By frontloading renovation costs against monthly repayments (receivables), third-party financing not only lifts the budgetary burden of the renovation but also facilitates the transfer of receivables in case of change of occupants in a given dwelling. This is particularly true for innovative schemes such as on-bill and on-tax financing, where reimbursements are due to either energy providers or fiscal authorities (Guidelines).

The scope of the action and target groups: The main target groups are households in energy poverty and vulnerable households. Specific measures can target social housing providers, specific territory or marginalised groups and micro-enterprises.

To support the mobilisation of investments, Member States shall promote the effective development and use of enabling funding and financial tools, such as:

- energy efficiency loans and mortgages for building renovation;
- energy performance contracting;
- pay-as-you-save financial schemes;
- fiscal incentives, for example reduced tax rates on renovation works and materials, on-tax schemes, on-bill schemes;
- guarantee funds, funds targeting deep renovations, funds targeting renovations with a significant minimum threshold of targeted energy savings; and
- mortgage portfolio standards.

- **Public-private partnerships (EPBD Art. 17)**

Member States may promote and simplify the use of public-private partnerships. The enabling funding and financial tools may include renovation loans or guarantee funds for energy performance renovations, including in combination with relevant Union programmes, where applicable.

By 29 May 2025, the European Commission shall adopt a delegated act establishing a comprehensive portfolio framework for voluntary use by financial institutions in order to effectively encourage financial institutions to increase lending volumes provided for energy performance renovations. The actions shall include suggested safeguards to protect vulnerable households through blended funding solutions.

Member States shall adopt measures that promote energy efficiency lending products for building renovations, such as green mortgages and green loans, secured and unsecured, and ensure that they are offered widely and in a non-discriminatory manner by financial institutions and, are visible and accessible to consumers. Member States shall ensure that banks and other financial institutions and investors receive information on opportunities to participate in the financing of the improvement of the energy performance of buildings.

- **Financial support for compliance with minimum energy performance requirements (EPBD Art. 9)**

Private sector engagement in support for compliance with minimum energy performance standards (micro-enterprises) and the trajectory for worst-performing residential buildings renovation in National Building Renovation Plan (EPBD Art. 3) by providing appropriate financial measures, particularly those targeting vulnerable households, people affected by energy poverty or, where applicable, living in social housing, and designing integrated financing schemes which provide incentives for deep renovations and staged deep renovations should be encouraged.

This measure could support the measures 1 and 2 for buildings renovation by reduction of loan-interest for appropriate groups (e.g. middle-income vulnerable households).

- **Support for deployment of solar energy (EPBD Art. 10)**

This could be in the form of financial measures to support the deployment of solar energy in buildings, in the form of loans, microloans or credits for vulnerable groups, especially the micro-enterprises, in cooperation with private sector (distribution companies, banks). Measure could be in the form of PV installation and grid as virtual battery provided by distribution companies (ZSE, VSE)

The correct design and sizing of the measure will be key to success.

Possible overlap with the Program Slovakia. Duplicity with measures focused on deep renovation should be avoided.

- **Fiscal incentives**

These M&I could include reduced tax rates on renovation works and materials, on-tax schemes, on-bill schemes. The targeting of this type of measures can be problem (see note by IFP).

Note (IFP):

Although tax breaks can be implemented relatively quickly and do not require a large-scale administration apparatus, we emphasise that expenditure policies are generally more effective in targeting assistance to vulnerable groups compared to tax policies. Direct financial transfers, housing subsidies or energy subsidies can be precisely targeted at the most vulnerable groups of the population, thereby minimizing the waste of public resources. Conversely, adopted tax support schemes may not reach the targeted groups through tax incidence. Last but not least, tax breaks in the aforementioned areas (renovation and construction) may not be effective, as the sector is known for a significant tax gap and low tax collection efficiency.

Additionality: Some of existing financial instruments can be extended (e.g. support for PV installation), some new should be introduced.

Some examples of successful schemes:

Microloans have been successfully tested in the self-help construction of family houses in rural areas. They also make sense in the self-help renovation of apartment buildings in cities under professional supervision (More information can be provided by Priatelia Zeme-CEPA).

Credit system combined with photovoltaics – an innovation of the project of the Eastern Slovak Distribution Company, which was successfully implemented as a tool for better accessibility to electricity and energy efficiency in Luník IX as well as in other locations, by installation of renewable energy sources. (More information can be provided by Priatelia Zeme-CEPA: Analysis of the proposal for pilot solutions to energy poverty of Roma communities in the Luník IX municipal district based on an energy audit of an apartment building).

Implementation: The implementation of this M&I could be conducted through public authorities (taxes) or private banking sector (loans) in line with the implementation of the EPBD, in particular Articles 17, 9, 10.

The impact: These M&Is will contribute to the implementation of the EPBD and EED by increasing the renovation rate and will support implementation of SCF in practice.

This investment will contribute to the indicators: reduction in the number of vulnerable households, reduction in greenhouse gas emissions in the buildings sector, annual primary energy and final energy consumption savings.

Relevant indicator for indicative milestones and targets for the financial measures is the number of buildings and the corresponding floor area that will be fully or partially renovated or the annual primary energy and final energy consumption savings achieved using financial measure from the above list.

- **M&I in the Transport Sector**

Based on the Inception report, provided data and macro modelling we consider the investment and measures for public transportation and its quality as the most suitable and efficient tool to mitigate the vulnerability of transport users and to lower the number of citizens in transport poverty. Strengthening public transport performance is a response to the fact that, according to modelling results, rural areas and people with the lowest incomes are most at risk of transport poverty. It is also an opportunity to reduce the risk for citizens who are forced to own a car as they can change the mode of transport.

Grant measures should therefore be focused on public transport as a more environmentally friendly form of transportation, and measures related to individual transport or vehicle ownership should be very specific and narrowly defined.

Incentives for the purchase of EV BEV, hybrid or hydrogen vehicles would not have significant impact on the transport poverty reduction, with the exception of the promotion of the second-hand market for EV/BEV.

Support of non-motorised transport modes may play significant role in urban and semi-urban areas, for example when commuting to work or school.

Here we provide list of possible measures and investments with a short description.

National Transport Authority's continuation of the public transport reform

Description: The Ministry of Transport and Ministry of Finance started a reform of the public transport in recent years. As result, a new plan for public transport availability was prepared (with the perspective of gradual change to the future), a new law on the public transport was adopted by the Parliament and applied, and NADA was established. We consider this effort should continue and aim to fulfil the set reform commitments, for example, the project on the "one ticket only"/unified

transport ticket or providing mobility as a service (MaaS). All parts of the reform are aimed at the simplification of traveling by public transport, making it more comfortable, user friendly, and modern. The reform also includes the definition of standards for the transport service of municipalities (and stops). The project is related to the point 2 below.

The long-term aim is to have affordable and effective public transport with optimised costs and zero or low emissions travel performance. It can be achieved by reforming timetable planning across different transport modes and cooperation on the different levels of government.

Possible indicators: (a) implementation of the reform (on time), (b) % of completion of the project and included sub-projects

Funding : Supporting aid for existing scope of reform. The National Transport Authority is a budgetary organisation of the Ministry of Transport, reform is financed by government budget. Additional financing may be used for expansion of the scope of reform and services (MaaS, single travel ticket, etc.).

Implementation: The administrative implementation would build up on the existing administrative system in place. Implementation agency is NADA and the Ministry of Transport.

Data collection on the public transport and data collection on the household's transport behaviour and costs

Description: The collection of data will serve a three-fold purpose: specific knowledge of transport vulnerable groups, such as of patterns of travel, reason for travelling (work, school, leisure, etc.), choice of transport mode, application of discount in public transport, and the reasons for transport vulnerability. The reasons can be, but are not limited to, income, access to public transport, quality of public transport, the availability of services, etc., and enhanced policymaking processes. The quality of data is essential for the development of more targeted policies and measures for vulnerable transport users. The NADA plans to obtain and analyse data from mobile operators in 2025.

Possible indicators: (a) existing database, (b) model for citizens transportation patterns

Funding : Supporting aid for existing scope of reform. NADA is a budgetary organisation of the Ministry of Transport; reform is financed by government budget. Additional financing may be used for providing more datasets or more detailed data.

Implementation: The administrative implementation would build up on the existing administrative system in place. Implementation agency is NADA and the Ministry of Transport.

Maintaining reduced fare for selected groups like students, seniors (62 years old and above), disabled persons

Description: Currently, a system of reduced fare for selected groups already exists in Slovakia. The reduced fare applies to students, people over the age of 62 and above (retired citizens, pensioners), and disabled persons.

Reduced transport rates/discounts for train transport are the same across Slovakia. Discounts for bus transport vary by regions, as it is the competence of the self-governing regions to order transport bus service. The competence includes setting the fares, rates and discounts and setting who (students, pensioners) is eligible for reduced fare or what kind of ticket could be reduced in price, e.g. electronic bought online, one month valid is cheaper, etc.). Zero fare is applied for students only for train transport. It includes any journey made by a student by train (it does not apply for commercial trains or a seat reservation ticket). Zero fare is not tied to a specific route.

We consider the instrument as needed; however, it should be reformed on the basis of further exploration and estimation of the public transport and the introduction of an income test of the beneficiaries of reduced or zero fare should be examined.

Possible indicators: (a) share of the passengers using reduced or zero fare by transport mode and by travel distance of the journey and in the city transport, (b) compensations of public budgets for reduced or zero fare total

Funding : Supporting existing system with applying results of the reform and new data findings. Payments for reduced and zero fares are financed through public budgets (central government, self-governing regions and municipalities).

Implementation: The administrative implementation would build up on the existing system of public transport ordering and bodies. Subjects for implementation are the Ministry of Transport, self-governing regions and municipalities.

Building bicycle infrastructure

Description: There are already existing schemes for building cycling infrastructure under the RRF and ESIF. We think that this investment should continue with the aim of achieving a modal shift from motorised to non-motorised means of transport mainly in city and near-city areas. The investment should also include charging infrastructure for e-bikes, mainly in urban and semi-urban areas and in hilly areas.

Possible indicators: (a) kilometres of new bike paths/roads built (urban, rural), (b) number of charging points built (also by capacity in kW), (c) share of using a bicycle as a mode of transport of the total transportation of citizens

Funding : Additional schemes following the Resilience and Recovery Plan schemes and ad-hoc schemes of the Ministry of Transport

Implementation: The administrative implementation would build up on the existing administrative system in place. Main implementation body is the Ministry of Transport.

Support scheme for e-bikes and cargo bikes

Description: The aim is promote an active travelling and using non-motorised mode of transport. Support for cargo bikes should lead to replacement of cargo services by vans or light duty vehicles to zero emission mode in urban and semiurban areas. Scheme may be designed as a grant scheme for direct support (rabats, tax relief, etc.) or grant scheme for social leasing. This measure may have an impact on the SMEs business and emission performance.

Possible indicators: (a) number of supported sales, (b) share of cargo transport by mode (rural and urban areas)

Funding : New scheme

Implementation: The administrative implementation would build up on the existing administrative system in place. Main implementation body is the Ministry of Transport.

Support schemes for buying new zero- or low-emission vehicles for public transport and fleet expansion with charging points

Description: These schemes should be provided with the goal of renewing and replacing old (less emission-effective) vehicles in public transport, including railroad vehicles, buses, microbuses and trolleys. Schemes should be designed to prefer zero-emission vehicles and railroad as a mode of the transport where possible. The aim is to lower emissions, increase the quality of public transport, and optimise public transport connections and frequency (in connection to the first measure – NADA's ongoing reform of public transport). Part of the support should be allocated to building charging points for vehicles in depots and at final stops/terminals. Based on the modelling results, the criterions for prioritization should be based on the availability of the service (defined by standards and transport poverty region) and emission reduction of the new (fleet compared to the old one) or by TCO change.

Possible indicators: (a) share of public transport in total passenger mobility, (b) number of replaced vehicles (by category of vehicle and by powertrain of vehicle)

Funding : Additional scheme following the Resilience and Recovery Plan scheme and scheme of the Operational Programme Slovakia

Implementation: The administrative implementation would build up on the existing administrative system in place. Main implementation body is the Ministry of Transport.

On demand transport for selected groups

Description: This measure is aimed at people with health problems and disabled persons whose mobility is limited. The measure may also be targeted at households with a very low income in rural areas with bad or insufficient (time or frequency) connections to the economic centre or hospital, etc. This measure should not be a replacement of regular transport and should be based on the ad-hoc needs of vulnerable groups.

Possible indicators: (a) number of on demand transport vehicles, (b) number of on demand transport users

Funding : New scheme

Implementation: Implementation should be designed on the principle of subsidiarity, it should be carried out by municipalities or self-governing regions, as close as possible to citizens.

Multimodal mobility points

Description: The Slovak Railroad Company (ŽSR) has been working on the preparation and building of integrated terminals (*terminál integrovanej osobnej prepravy* – TIOP in Slovak). At least one TIOP has already been built in Trebišov. Other projects are in the phase of preparing documentation (e.g. spatial and building permits). This instrument is aimed at the development of integrated terminals and preparing project documentation, mainly in the city areas, especially for commuting purposes.

Possible indicators: (a) number of TIOPs built, (b) share of population in the region using TIOP on the total public transport

Funding : New scheme, as addition to state (ŽSR) budget

Implementation: Implementation body is ŽSR

Campaigns promoting the use of other transport modes than individual car mobility

Description: This measure should include various campaigns, information days, and different ways of marketing and promoting different modes of zero-emissions transport or public transport. For example, a campaign promoting commuting to work by bicycle (*"Do práce na bicykli"* – "To work by bicycle") has been running since 2017.

Possible indicators: (a) number of implemented (and finished) campaigns, (b) money spent on the campaigns, promotions and other activities

Funding : New scheme following financing of the Ministry of Transportation.

Implementation: The administrative implementation would build up on the existing administrative system in place. Main implementation body is the Ministry of Transport.

The promotion of a second-hand market with EV/BEV

Description: The offer of EV or BEV on the second-hand market is limited. This results from the fact that Slovak drivers are sceptical of electric cars, for example due to battery lifespan and the price being higher compared to the same vehicle with a conventional drivetrain. This measure may consist of two "subprogrammes" – one related to a support grant scheme to provide a subsidy for selected groups of transport vulnerable users and second, a scheme that will guarantee and certify the quality of used cars, including BEV. The goal is to promote the accessibility of zero or low-emission vehicles for those who are forced to have a car. An income test should be applied when introducing support grant schemes.

Possible indicators: (a) share of sold EV (BEV) of total sells of second-hand market, (b) number of issued certifications, (c) number of subsidies provided and amount of money spent on subsidies

Funding : New scheme

Implementation: We suggest the Ministry of Transport (primarily responsible for technical regulations for vehicles) and the Ministry of Economy (primarily responsible for regulation of automotive industry policy and strategy regarding promotion of electric vehicles) as implementation bodies.

Annex F: Indicators

- **Indicators of transport poverty**

Slovakia is a country with low share of transport expenditures on total expenditures. This can be caused by the system of price reductions for the most vulnerable groups of people like pensioners, disabled, children and students. But the big problem is based on access to public transport – people without a car are suffering in many socio-economic activities. **This problem is the regional one**. Many municipalities do not have a sufficient number of transport connections to get to basic activities. The important problem is to define what is sufficient. As already mentioned in Chapter 2, Slovakia has not defined the national standards for transportation (the frequency of connections, time travelled, etc.) yet. This work should be done during the next year by NADA (NTA). Subsequently, its results can be used for the implementation of SCP. Based on the standards for transportation we can determine the transport poor regions and prepare the measures to solve the problem.

The Institute for Environmental Policy ("IEP"), an analytical institute of The Ministry of Environment of the Slovak Republic, has developed its own system for defining vulnerability of citizens in transport sector. There is no direct definition, however, the way of defining vulnerable groups is based on the 3As framework (affordability, accessibility and availability). The vulnerability is measured by the composite index based on the selected Slovakia's specific indicators listed below.

1. Travelled time – morning and evening - calculated as a weighted average of the time spent commuting to work or school by public transport or by private car transport to each municipality, using the number of residents travelling by each mode as weights.
2. Share of time distance travelled by public transport and individual car transport (effectivity of public transport in comparison with individual).
3. Frequency of connections.
4. Share of people living within 500 m from bus stop
5. Share of population 65+
6. Share of children and students
7. Share of Romas
8. Share of disabled
9. Tome distance to the hospital
10. Median wage
11. Rate of unemployment
12. Age of private cars
13. Number of cars per inhabitant

We consider this indicator to be very broad and it is difficult to use the index and address the problem of availability and accessibility on regional level. It can be downscaled or the analysis of Slovak Academy of Sciences can be used to address the regional distribution of poverty. Additionally, Slovakia does not have defined

the transport standards as the required frequency of public transportation considering regionality or the time travelled to the nearest centre. We suggest to use IEP's sub-index (frequency, time travelled and the distance to the bus stop) or above mentioned data of Slovak Academy of Sciences[57] as the preliminary indicator of transport poverty regions. After the approval of the already mentioned transport standards the indexes need to be updated.

[57] Székely, V. and Novotný, J. (2019). Spatial differences in public transport accessibility of district centres in the Prešov region, Slovakia. https://pdfs.semanticscholar.org/32c3/5ef1436c0ffcbe24bb722509f5a07a43f35a.pdf and Székely, V., Novotný, J. and Michniak, D. (2023). Without a car and overnight stay, can a visit to a regional centre be an unattainable goal in Slovakia? https://rcin.org.pl/Content/240415/WA51_276649_r2023-t44_EuropaXXI-Szekely.pdf.

Annex G: Additional comments received by stakeholders via e-mail communication

Dalšie pripomienky:

CEPA:

Ďalšie pripomienky a odporúčania

- Túto správu považujeme za kľúčový dokument, ktorý umožní na Slovensku využiť SKF na cielenú podporu cieľových skupín. Odhadovaný dopad ETS2 na zraniteľné skupiny napriek priznaným metodickým a dátovým komplikáciám indikuje, ktoré cieľové (pod)skupiny by mali mať prioritný prístup k financovaniu zo SKF. Pre zabezpečenie ďalších skúseností z regionálnej praxe odporúčame zapojiť expertov/-ky v sociálnej oblasti, napríklad cez Sociofórum, ktoré združuje 141 organizácií pôsobiacich v sociálnej oblasti (https://socioforum.sk/).
- V aktuálnej verzii správy považujeme za zásadné najmä **nedostatky v dostupnosti dát**, pre ktoré nie je možné adresne identifikovať a administratívne overiť cieľové skupiny. Aktuálne externý spracovateľ dokázal len odhadnúť počty jednotlivých cieľových skupín. V prípade obnovy budov nie je napr. možné prepojiť údaje o stave konkrétnej budovy s údajmi o sociálnej/príjmovej situácii danej domácnosti (relevantné najmä pri worst performing residential buildings - EPBD). Pri zraniteľných užívateľoch dopravy a mikropodnikoch spracovateľ konštatuje extrémny nedostatok dát, pričom pri užívateľoch dopravy by niektoré medzery by mali byť vyplnené až koncom tohto roku. Tieto skutočnosti považujeme za významné ohrozenie prípravy kvalitného Národného Sociálno klimatického plánu (NSKP). **Nesúhlasíme s dopracovaním týchto zásadných údajov až po schválení NSKP**, pretože majú zásadný dopad na stratégiu podpory tzn. identifikáciu cieľových skupín a výber opatrení na financovanie. Precizovanie stratégie podpory v neskoršej fáze sa na Slovensku často využívalo pri eurofondoch a spravidla výrazne oddialilo realizáciu investícií, prípadne viedlo k podpore, ktorá nebola smerovaná len na cieľové skupiny. Jasná ex ante identifikácia cieľových skupín v NSKP je kľúčovým predpokladom efektívnej implementácie, ktorá si v prípade SKF okrem jednoznačných administratívnych procesov na strane poskytovateľa vyžiada aj komplexnú podporu a sprevádzanie cieľových skupín celým procesom. **Prosíme NIKA o konkrétne vyjadrenie ako a kedy sa vysporiada s odporúčaniami spracovateľa uvedenými v kapitole 5 správy**, napr. čo sa týka odporúčaného zapojenia Štatistického úradu SR a energetických

distribučných spoločností, vyžadovania EPC (Energy Performance Certificate), BRP (Building Renovation Passport) od domácností.

- V kontexte riešenia dostupnosti dát pre NSKP odporúčame NIKA čo najskôr zintenzívniť spoluprácu s relevantnými aktérmi v území (samosprávy, regionálni dopravcovia atď.), ako aj zohľadniť existujúci národný projekt **Kapacity pre regióny**, ktorý mala začať Slovenská inovačná a energetická agentúra (SIEA) v spolupráci so samosprávnymi krajmi implementovať z prostriedkov Programu Slovensko (https://www.siea.sk/podporne-programy/podpora-rozvoja-regionalnej-a-lokalnej-energetiky/). Návrh správy veľmi správne odporúča **začať spolupracovať so zraniteľnými komunitami už vo fáze identifikácie cieľových skupín**. V tomto procese vedia NIKA efektívne asistovať aj neziskové organizácie, ktoré majú vytvorené siete v území. Odporúčame najmä zapojiť Sociofórum, ktoré združuje 141 organizácií pôsobiacich v sociálnej oblasti (https://socioforum.sk/).

4.1 Technická pomoc, len z hľadiska implementácie smerníc o energetickej hospodárnosti budov a energetickej efektívnosti (EPBD a EED) môže byť v podmienkach SR pre cieľové skupiny NSKP nepostačujúca. Zraniteľné skupiny nemajú čas ani peniaze cestovať do krajského mesta (EPBD: ..zriadením aspoň jedného kontaktného miesta: na 80 000 obyvateľov; ...). **Je nevyhnutné toto opatrenie kombinovať s terénnou sociálnou prácou, teda už rozbehnutými projektami ako Spolu pre komunity, Zdravé regióny, projekt na ochranu ovzdušia Populair, aktivity SAŽP, Rozvojové tímy a pod.** Ideálne by bolo, aby tieto regionálne kapacity dlhodobo a neprerušovane pokrýval (aj) Envirofond, pretože pri ňom nedochádza k niekoľkomesačným až niekoľkoročným prestávkam v čerpaní, na rozdiel od EŠIF, NPOO. Mohli by sa tak dlhodobo rozvíjať technické / poradenské kapacity a minimalizovať prerušenia vo financovaní miezd, ktoré môžu viesť k fluktuácii / strate odborných kapacít a pod.

Opatrenia 5.1 až 5.4 je vhodné realizovať v naviazaní na implementáciu národného projektu **Kapacity pre regióny**, ktorý mala začať Slovenská inovačná a energetická agentúra (SIEA) v spolupráci so samosprávnymi krajmi implementovať z prostriedkov Programu Slovensko (https://www.siea.sk/podporne-programy/podpora-rozvoja-regionalnej-a-lokalnej-energetiky/). Skúsenosti s niektorými súkromno-verejnými službami popísal napríklad Najvyšší kontrolný úrad: Na nevyvážené partnerstvo medzi samosprávou kraja a súkromnou firmou doplácajú školy. Dostupné na internete: https://www.nku.gov.sk/aktuality/-/asset_publisher/OkVQsC5cs53F/content/na-nevyvazene-partnerstvo-medzi-samospravou-kraja-a-sukromnou-firmou-doplacaju-skoly-duplikat-3

IDP:

Všeobecné pripomienky k DLV 2 -časť cestná doprava

1. Rozsah DLV 2 181 strán je nadmerný, čo je z hľadiska doručenia podstatných informácií beneficientom vecnou a zrozumiteľnou formou kontraproduktívne.

2. Dopad ETS2

- dopady zavedenia ETS2 sú v DLV 2 podľa nášho názoru významne podhodnotené. DLV 2 úplne abstrahuje od prenosu rastu cien zemného plynu a PHM do všetkých ostatných spotrebných a produkčných cien, hoci tieto efekty tiež predstavujú nezanedbateľný vplyv zavedenia ETS2.
- DLV 2 uvádza, že priemerný dopad zavedenia ETS2 na slovenskú domácnosť pri cene povolenky 60 eur bude predstavovať 130 eur, t.j. 11 eur mesačne. Ak by bol dopad zavedenia ETS2 na takejto nízkej úrovni, určite by nevyžadoval kompenzáciu zo strany SKF, ale bol by domácnosťami absorbovateľný, alebo pokrytý existujúcimi schémami sociálnej pomoci.
- aj dopad ETS2 na mikropodniky sa zdá významne podhodnotený. Podľa DLV 2 iba 6% mikropodnikov bude ovplyvnených ETS2. Tí najviac postihnutí budú v nákladnej doprave – 2200 eur ročne a v osobnej doprave 1800 ročne. Podľa nášho názoru, všetky mikropodniky budú ovplyvnené zvýšením cien PHM a zemného plynu na vykurovanie a chladenie.
- dopady ETS2 kvantifikované v DLV 2 sú tak nízke, že opodstatnenie vzniku SKP, ako zdroja na zmiernenie jeho socioekonomických dopadov by sa mohlo zdať diskutabilné.

3. Identifikácia zraniteľných skupín

- - je pre oblasť dopravy prakticky absentujúca
- - v neprehľadnom návrhu sa uvádzajú dva indikátory s rovnakým názvom „Transport poor household“ a jeden indikátor „Transport poor region“. Ani jeden z ukazovateľov nie je zaužívaný, opodstatnenie jeho stanovenia sa neuvádza (napr. prečo benchmark 6 % výdavkov?) a nie je preukázané, či na základe takto definovaných indikátorov je možné adresovať cielenú podporu.
- - pre mikropodniky ukazovateľ zraniteľnej skupiny úplne absentuje.

4. Návrh opatrení

- - návrh opatrení nie je zrozumiteľne cielený na identifikované zraniteľné skupiny,
- - mnohé z navrhovaných opatrení sú už realizované s podporou z iných fondov, najmä POO – nie sú stanovené jednoznačné deliace línie, aby sa zamedzilo presahom. Vzhľadom na pravidlá čerpania pomoci EÚ je nutné pre ich realizovateľnosť zaručiť ich komplementárnosť a dodatkovosť.
- - ergo nie je možné posúdiť (garantovať) komplementárnosť, doplnkovosť a realizovateľnosť opatrení a ich financovania
- realizovateľnosť opatrení tak nie je garantovaná
- dlhodobá udržateľnosť opatrení nie je spomenutá

- ponechanie súčasného systému zliav na cestovnom nie je možné považovať za návrh opatrenia
- opatrenia nie sú zaradené do existujúceho rámca národných stratégií (regionálny rozvoj, plány udržateľnej mobility a povinností vyplývajúcich z európskeho rámca (PUM) – a nie sú tak zasadené/ adaptované na aktuálny národný kontext
- - absentujú opatrenia na dočasnú priamu podporu príjmu.
- - absentujú míľniky a kvantitatívne ukazovatele (ciele)
- -niektoré opatrenia (napr. podpora sekundárneho trhu s ojazdenými elektromobilmi) sú v rozpore s cieľmi SKP

MD SR v krátkej dobe predloží NIKA vlastný návrh opatrení pre oblasť cestnej dopravy.

ISP:

Odbor sociálnych služieb má k predloženému dokumentu nasledujúce pripomienky:

- V prvom rade máme dojem, že v reporte nie sú zapracované naše pripomienky a otázky, ktoré sme zaslali v decembri k tzv. Long Listu a preto sa aj tie súčasné zameriavajú najmä na časť 4.2.2. a prílohu E
- Nie je zrejmé, či autori rozumejú rozdielu medzi social housing a social services facility – kde je oprávnení verejní/neverejní (public/non-profit/private) a prečo sú pre niektorých isté opatrenia dostupné a pre iných nie.
- Zároveň by sme opätovne chceli upozorniť, že investície do social services facilities (zariadení sociálnych služieb), ktoré sú určené pre osoby s odkázanosťou na pomoc inej osoby (zariadenia pre seniorov, osoby so zdravotným postihnutím) nemôžu byť poskytované v rozpore s legislatívou týkajúcou sa sociálnych služieb a strategickými dokumentami v tejto oblasti, ktoré zohľadňujú práva osôb so zdravotným postihnutím – v krátkosti, žiadame minimálne doplniť, že investície nasmerované do týchto zariadení budú zohľadňovať relevantné národné stratégie v tejto oblasti, ale ani na európskej - napr. European Pillar of Social Rights, kde sa v rámci Social Protection je zahrnutých viacero inicitáv, ktoré súvisia s dostupným bývaním alebo aj prístupom k energiám https://employment-social-affairs.ec.europa.eu/policies-and-activities/european-pillar-social-rights-building-fairer-and-more-inclusive-european-union_en

Viac pripomienok a komentárov odboru sociálnych služieb je v priloženom dokumente.

Okrem toho máme za Inštitút sociálnej politiky tradičnú pripomienku k identifikácii zraniteľných domácností pre účely distribúcie pomoci.

Dokument v časti "5.2. Recommendations on the administrative identification of vulnerable groups" správne poznamenáva, že údaje na úrovni domácností nie sú dostupné, ale prichádza s riešeniami, ktoré nie sú jednoducho implementovateľné.

Napríklad, na str. 98 dokument uvádza: "An introduction of a households' identification number (similar to EIC) can link all the energy expenditures of the household. Additionally, it can be linked to the income of the household on an institutional level by indicating the household members."

Ako sme už opakovane upozorňovali, na Slovensku neexistujú administratívne údaje o príjmoch domácností, s výnimkou domácností, ktorým je poskytovaná pomoc v hmotnej núdzi. A keďže nevieme, kto s kým tvorí spoločnú domácnosť a nevieme posúdiť jej príjem, nevieme ani distribuovať pomoc.

Navrhovaná registrácia domácností by tento problém vyriešila, ale treba si uvedomiť, že povinná registrácia domácností by bola náročná z viacerých dôvodov. Po prvé, vyžadovala by politickú podporu. Po druhé, vyžadovala by zmenu legislatívy. Po tretie, vyžadovala by alokáciu finančných prostriedkov na tvorbu nového alebo úpravu existujúceho informačného systému, ako aj budovanie kapacít. Dokument však nijako nekomentuje časový harmonogram, ani financie potrebné na zavedenie ID domácností.

Náročnosť tejto zmeny je zároveň aj dôvod, prečo stále tlačíme na to, aby nám bola poskytnutá aj alternatíva, ktorá sa dá implementovať na základe existujúcich údajov a pri existujúcich kapacitách. Ani tie najlepšie opatrenia totiž nebudú mať želané výsledky, ak ich nebudeme vedieť implementovať. xxStr. 93. "Data collection on the public transport and data collection on the household's transport behaviour and costs – The measure is aimed at obtaining more detailed data beyond the scope of the reform of public transport and budgetary possibilities"xAk ide o údaje z rodinných účtov, tak to sú údaje z prieskumu (pár tisíc ľudí), a navyše anonymné, a teda nevhodné na cielenie pomoci.xStr. 97: "We recommend the interconnection of databases on income, energy expenses of households and technological conditions of their buildings (using national HBS and Census 2021). This would help in coordinating with the worst-performing buildings identification in the EPBD implementation."

Údaje zo sčítania sú anonymné, historické (t.j. dnes môže byť situácia iná) a ich prepojenie s rodinnými účtami (survey data) by aj tak neumožnilo cielenie pomoci.

Str. "Transport poor households can be estimated based on the national HBS data."

Ako už bolo povedané, rodinné účty pokrývajú len mizivú časť popolácie a sú anonymné.

V prípade otázok sme k dispozícii.

S pozdravom

Marcela Veselková, PhD.

vedúca | Odd. pokročilých analýz, stratégií a koncepcií v oblasti sociálnych vecí a rodiny

Inštitút sociálnej politiky

Ministersto práce, sociálnych vecí a rodiny SR

Špitálska 4, 6, 8 | 816 43 Bratislava | Slovenská republika

+421 2 2046 1511 | https://institutsocialnejpolitiky.gov.sk

KK:

1. Dôležitosť presnej identifikácie cieľových skupín pred definovaním opatrení

Súhlasím s pripomienkami *Priatelia Zeme CEPA*, že pracovať na zozname opatrení bez presnej a kvalitnej špecifikácie cieľových skupín je kontraproduktívne. Ak majú byť opatrenia účinné a adresné, je nevyhnutné najskôr zozbierať relevantné údaje o zraniteľných a potenciálne zraniteľných skupinách, prípadne identifikovať dostupné zdroje dát, ktoré umožnia ich presnú identifikáciu.

Bez dôkladnej analýzy týchto skupín a ich špecifických potrieb nie je možné efektívne nastaviť opatrenia tak, aby dosiahli požadovaný sociálny a klimatický dopad. Opačný postup je chybný, ako už upozornili *Priatelia Zeme CEPA*, a môže viesť k neefektívnemu rozdeľovaniu prostriedkov a slabému dosahu na cieľové skupiny.

2. Zabezpečenie účinnej participácie cieľových skupín pri príprave a implementácii SKP

V súlade s odporúčaniami uvedenými v dokumente *EU Social Climate Fund briefing (September 2024)* - v prílohe, je nevyhnutné, aby príprava národných sociálno-klimatických plánov (SKP) zahŕňala široké, transparentné a inkluzívne procesy verejnej konzultácie už v počiatočných fázach (s. 4–5)

Je kontraproduktívne určovať zoznam opatrení bez jasne vyšpecifikovaných cieľových skupín. Preto je potrebné zabezpečiť nielen zber a analýzu dát o zraniteľných a potenciálne zraniteľných skupinách, ale aj ich aktívne zapojenie do konzultácií s verejnosťou. Osobitný dôraz by mal byť kladený na zapojenie nízkopríjmových domácností, osôb žijúcich v energetickej chudobe, ako aj ďalších marginalizovaných skupín (s. 2)

Odporúčané kroky zahŕňajú:

1. **Skoré a efektívne konzultácie** – Národné sociálno-klimatické plány by mali byť vypracované s aktívnym zapojením občianskej spoločnosti, odborov, akademického sektora, energetických komunít a zástupcov marginalizovaných komunít. Zohľadnenie ich perspektív môže pomôcť nastaviť cielené opatrenia a zamedziť ich neúčinnosti.

2. **Viacero foriem participácie** – Okrem online konzultácií je potrebné organizovať fyzické verejné diskusie a workshopy, aby sa zabezpečila dostupnosť aj pre skupiny s nižšou digitálnou gramotnosťou. Príkladom dobrej praxe je Španielsko, ktoré už v roku 2022 realizovalo širokú verejnú konzultáciu pri revízii svojho NECPu (s. 5)
3. **Zohľadnenie pripomienok** – Pripomienky získané z verejných konzultácií by mali byť transparentne vyhodnotené a ich zapracovanie do SKP by malo byť riadne odôvodnené.

Doterajšie skúsenosti z iných politických procesov ukazujú, že nedostatočná participácia verejnosti vedie k slabšiemu prijatiu opatrení a nižšej efektivite ich implementácie (s. 6–7) Slovensko by sa preto malo vyvarovať chýb minulosti (aj s prípravy NECP-u) a zabezpečiť, aby SKP bol vytvorený a realizovaný v spolupráci s tými, ktorých sa najviac dotknú.

3. Alokácia finančných prostriedkov na hodnotenie existujúcich schém podpory

Pre zabezpečenie efektivity implementovaných opatrení je nevyhnutné vyčleniť primerané finančné zdroje na hodnotenie existujúcich podporných schém, ako sú *Obnov dom*, *Zelená solidarita*, *Zelená domácnostiam*, *Obnov dom mini* a ďalšie. Toto hodnotenie by malo byť realizované pred zavedením nových programov určených pre nízkopríjmové domácnosti v oblasti renovácie rodinných domov a bytov.

Hodnotenie by malo byť kontinuálne a nemalo by sa sústrediť len na ekonomickú efektívnosť a návratnosť investícií, ale aj na adresnosť opatrení a vnímanie pomoci cieľovými skupinami. Osobitný dôraz by mal byť kladený na zabezpečenie nízkoprahovej dostupnosti pomoci, aby bola prístupná aj domácnostiam a jednotlivcom so zníženou digitálnou a finančnou gramotnosťou. Programy musia byť nastavené tak, aby skutočne zasiahli najzraniteľnejšie skupiny a umožnili im plnohodnotne čerpať podporu.

V minulosti sa ukázalo, že nízke čerpanie podporných schém, ktoré sa následne odôvodňovalo „nízkou absorpčnou kapacitou cieľovej skupiny“, bolo v skutočnosti dôsledkom nesprávneho nastavenia kritérií spolufinancovania zo strany cieľových skupín, ako aj nedostatočnej informačnej a konzultačnej podpory pre tých, ktorí by mohli túto pomoc čerpať. Preto je nevyhnutné zohľadniť tieto faktory pri nastavovaní nových schém podpory tak, aby pokrývali tých, ktorí sa nekvalifikujú na komerčné úvery či iné finančné produkty, a tiež zabezpečiť dostatočné zdroje na poradenské služby a administratívnu asistenciu pre žiadateľov.

4. Budovanie kapacít a rozšírenie poradenských služieb

Pre zabezpečenie efektívneho poskytovania pomoci je potrebné vyčleniť dostatočné zdroje na vzdelávanie a tréning konzultantov a sociálnych pracovníkov, ktorí už v súčasnosti pôsobia v teréne v rámci rôznych štátnych programov. Ide

napríklad o terénnych pracovníkov Úradu splnomocnenca vlády pre rómske komunity či rozvojových pracovníkov projektu *Populair*.

Je nevyhnutné posilniť dva typy poradenstva:

1. **Poradenstvo prvého kontaktu** – poskytované existujúcimi sociálnymi pracovníkmi, ktorí poznajú lokálne podmienky a potrebujú zvýšiť kvalifikáciu, aby dokázali efektívne nasmerovať klientov k relevantným formám pomoci.
2. **Špecializované poradenstvo** – zamerané na detailnú administratívnu podporu v procese žiadania o pomoc, oprávnenosť žiadateľov a vyplnenie potrebnej dokumentácie.

Koncept *one-stop-shop* síce môže byť užitočný, no je nedostatočný v počte fyzických lokalít. Pre reálnu dostupnosť služieb pre ľudí ohrozených chudobou je potrebné zriadiť viac poradenských centier nielen v krajských mestách, ale aj v menších regiónoch, aby boli čo najbližšie k cieľovým skupinám.

5. Prepojenie schém pomoci so sociálnymi politikami

Pre úspešnú implementáciu podporných opatrení je dôležité, aby cieľové skupiny rozumeli nielen samotnému účelu pomoci, ale aj konkrétnym nástrojom, prostredníctvom ktorých sa poskytuje. Ak má byť pomoc efektívna a dlhodobo udržateľná, cieľové skupiny sa s ňou musia stotožniť a vnímať ju ako svoju príležitosť na zlepšenie životných podmienok.

Z tohto dôvodu by mali byť pripravované podporné schémy zosúladené s novým systémom financovania sociálnych služieb, ktorý vypracováva Ministerstvo práce, sociálnych vecí a rodiny SR, ako aj s ďalšími sociálnymi politikami. Tento súlad zabezpečí lepšiu koordináciu a synergické efekty, čo povedie k vyššej adresnosti a efektívnosti vynaložených prostriedkov.eeZuzana Fialová, 8.2.2025eeMD SR

Všeobecne k analytickej časti máme nasledovné pripomienky:

- Dáta, ktoré sú použité ako báza pre stanovenie dopadov schémy ETS2 na domácnosti do roku 2030 by mali byť, ak je to možné, čo najaktuálnejšie. Dáta (HBS 2015) považujeme za zastarané.
- Zavedenie schéme ETS2 bude mať na domácnosti významnejší dopad ako len zvýšenie výdavkov na energie (na vykurovanie) u domácnosti závislých na fosílnych palivách vo vykurovaní. Obchodovanie uhlíka v doprave zásadne a negatívne ovplyvní cenu všetkých tovarov a služieb (rast cien tovarov a služieb v spotrebnom koši domácností), vrátane nárastu cien produktov a služieb v obnove (renovation cost a cost of technologies). Analýza dopadov schémy ETS2 na domácnosti by preto mala byť komplexná, a teda obsahovať aj tieto širšie dopady, ktoré budú významné.
- Predložená analýza by mala súhrnne posúdiť komplexný dopad zavedenia schémy ETS2 na jednu domácnosť (v deciloch). Komplexný dopad = nárast výdavkov na vykurovanie + nárast dopravných nákladov + nárast nákladov

na tovary a služby v ekonomike. Tieto dopady budú rôzne pre A) domácnosti s fosílnymi palivami vo vykurovaní a B) rôzne pre domácnosti na ostatných palivách. Upozorňujeme, že spájať tieto odlišné dopady a prezentovať ich v kontexte celého obyvateľstva je rizikové, nakoľko dôjde k tzv. rozriedeniu dopadov a prekrytiu kritickej masy, ktorá bude schémou najviac postihnutá a má byť podporená z SKP.

- Podľa nášho názoru je veľmi dôležité **prognózovanie výšky a širšieho rozptylu predpokladanej ceny za plyn v eur/tCO2 do roku 2030 (emisná povolenka)** v predloženej analýze. Analýza musí pokryť kritickú možnú hornú hranicu ceny plynu v eur/tCO_2, ktorá bude pravdepodobne vyššie ako na prognózovanej úrovni 60 eur/tCO_2 uvedenej v analýze, napríklad na úrovni dvojnásobku. Tento aspekt považujeme za zásadný pre vyčíslenie dopadov zavedenia schémy ETS2 na obyvateľstvo v SR. (Forecast EU-ETS carbon prices 2024-2035 | Statista, https://www.statista.com/statistics/1401657/forecast-average-carbon-price-eu-emissions-trading-system/)

Ospravedlňujeme sa za neskoršie zaslanie.

S pozdravom

Denisa Andrejcová

hlavný štátny radca | odbor stavebníctva

sekcia bytovej politiky, stavebníctva a mestského rozvoja

MINISTERSTVO DOPRAVY SLOVENSKEJ REPUBLIKY

Námestie slobody 6 | 810 05 Bratislava | Slovenská republika

Tel: +421 2 594 94 461

denisa.andrejcova@mindop.sk| www.mindop.sk

IHA

Podnety k draftu DLV 2

Pri príprave Sociálno-klimatického plánu (SKP) navrhujeme uplatniť túto definíciu „domácností v energetickej chudobe“ (po konzultáciách s členmi pracovnej skupiny pre definície pri MH SR):

Domácnosť je v energetickej chudobe vtedy, ak jej disponibilný príjem je najviac *p* percent národného mediánu ekvivalentného disponibilného príjmu, preukázateľné výdavky na energie tvoria *n* a viac percent z disponibilného príjmu a býva v obydlí s nízkou energetickou efektívnosťou, pričom:

- *podiel „p“, podiel „n“ a „kritérium nízkej energetickej efektívnosti“* (návrh: „obydlie nemá zateplený obvodový plášť“) sa určí opatrením,
- národný medián každoročne vyčísli Štatistický úrad SR.
- pre výpočet ekvivalentnej veľkosti domácnosti sa použije škála, na základe ktorej je každému prvému dospelému členovi domácnosti priradený koeficient 1, každému ďalšiemu členovi vo veku 14 rokov a viac je priradený koeficient 0,5 a každej osobe mladšej ako 14 rokov koeficient 0,3 (modifikovaná OECD škála).

Zdôvodnenie: definícia obsahuje náležitosti čl.2, bod 52. Smernice EED, medzi ktoré má patriť aspoň nedostatočný disponibilný príjem, vysoké výdavky na energie, nízka energetická efektívnosť obydlí a finančná nedostupnosť (tu chápané ako zostatok po odpočítaní vysokých výdavkov na energie z nízkeho príjmu).

Domácnosť je osoba žijúca sama alebo skupina osôb žijúcich spolu, ktoré si zabezpečujú základné životné potreby. *Zdôvodnenie*: posudzujú sa osoby, ktoré spoločne užívajú energie, neposudzujú sa na základe vyživovacej povinnosti ani príbuzenských väzieb.

Podnety k DLV 2 draftu:

Uplatniť definíciu „domácností v energetickej chudobe“ na individuálnych dátach štatistiky rodinných účtov 2023 (nepoužívať štatistiku rodinných účtov 2015) v 2 variantoch:

- disponibilný príjem pod mediánom (t. j. 100 % národného mediánu ekvivalentného disponibilného príjmu) a zároveň výdavky na energie viac ako 20 %,
- disponibilný príjem pod 70 % mediánom a zároveň výdavky na energie viac ako 15 %.
- Na základe tejto definície prepočítať dopad na „zraniteľné domácnosti“ po zavedení ETS2 („zraniteľné domácnosti“ v zmysle Nariadenia o SKF, teda ohrozené ETS2 a nemajú prostriedky na obnovu).
- Dáta o vlastníctve áut na účely pomoci mikropodnikom možno čerpať z databázy Ministerstva vnútra SR a prepojiť ich s dátami o dani z motorových vozidiel od Finančného riaditeľstva SR

a. Len informatívne (nie je potrebné zapracovať do prípravy SKP):

Smernica 2023/1791 o energetickej efektívnosti EED (prepracované znenie) ukladá povinnosť prijať opatrenia s prioritným zameraním na tieto zraniteľné skupiny:

- domácnosti v energetickej chudobe (definícia uvedená v časti A.),
- zraniteľní odberatelia vrátane konečných spotrebiteľov (tento pojem je potrebné odlíšiť od „zraniteľných domácností“ v zmysle čl.2, bod 10. Nariadenia o SKF)
- nízkopríjmové domácnosti

- a prípadne aj ľudia žijúci v sociálnom bývaní.

Výdavky na energie: výdavky na „energetické produkty“, ktorými sú palivá, teplo, obnoviteľná energia, elektrina alebo iná forma energie (podľa čl.2 písm. d) Nariadenia o energetickej štatistike, na ktoré odkazuje Smernica EED)

Disponibilný príjem je súčet príjmov fyzických osôb domácnosti, ktoré sú predmetom dane z príjmu podľa osobitného predpisu (Zákon č. 595/2003 Z. z. o dani z príjmov v znení neskorších predpisov) po odpočítaní poistného na povinné zdravotné a sociálne poistenie, ďalej dávok sociálneho poistenia (z dôchodkového, nemocenského, garančného, úrazového poistenia a poistenia v nezamestnanosti), dávok a príspevkov v hmotnej núdzi a vybraných štátnych sociálnych dávok (najmä kompenzačný príspevok baníkom). *Zdôvodnenie*: iba príjmy z práce a tie príjmy, ktoré nahrádzajú príjem z práce.

Zraniteľný odberateľ ohrozený energetickou chudobou (to zodpovedá pojmu „zraniteľný odberateľ“ zo smernice EED): je zraniteľným odberateľom podľa § 3a), bod 10.1, 10.2, 10.7, 10.8 zákona č. 251/2012 o energetike, ktorý žije v domácnosti s disponibilným príjmom, ktorý je nižší ako národný medián ekvivalentného disponibilného príjmu, výdavky domácnosti na energie sú 20 % a viac z disponibilného príjmu a domácnosť býva v obydlí s nízkou energetickou efektívnosťou, pričom príjem a výdavky na energie sa neskúmajú, ak ide o závislého odberateľa podľa zákona 251/2012 § 3 písm. b), bod 16 a písm. c) bod 16 (t. j. je osobou s ŤZP resp. jeho životné funkcie sú závislé od odberu elektriny). 2*Zdôvodnenie*: 2podmnožina „zraniteľných odberateľov“ zo zákona o energetike a zákona o regulácii sieťových odvetví + obmedzený príjem + vysoké výdavky na energie + nízka energetická efektívnosť obydlia a 2podmnožina „závislých odberateľov“ zo zákona o regulácii sieťových odvetví + nízka energetická efektívnosť obydlia. 2**Nízkopríjmová domácnosť**: je domácnosť, ktorej disponibilný príjem neprevyšuje 70 % národného mediánu ekvivalentného disponibilného príjmu. Ekvivalentný disponibilný príjem je disponibilný príjem domácnosti vydelený ekvivalentnou veľkosťou domácnosti.

Pozn.: Pojem „**zraniteľné domácnosti“** v zmysle „zasiahnuté ETS2“ nie je potrebné pri transpozícii smernice EED definovať, tento pojem je platný v zmysle čl.2, bod 10. Nariadenia SKF: „zraniteľné domácnosti“ sú domácnosti v energetickej chudobe alebo domácnosti vrátane domácností s nízkymi a nižšími strednými príjmami, ktoré sú významne zasiahnuté cenovými vplyvmi začlenenia emisií skleníkových plynov z odvetvia budov do rozsahu pôsobnosti smernice 2003/87/ES a ktoré nemajú prostriedky na obnovu budov, ktoré obývajú (t.j. zasiahnuté ETS2 + nemajú prostriedky na obnovu).

IHA English version shorter than SK version

Draft recommendations

We propose to apply the following definition of "households in energy poverty" (following consultations with members of the Working Group on Definitions at the MoE SR) in the preparation of the SCP:

Household is in energy poverty if its disposable income is *p* percent or less of the national median equivalent disposable income, its verifiable energy expenditures are *n* percent or more of disposable income, and it lives in a dwelling with low energy efficiency, where:

- the 'p' share, the 'n' share and the 'low energy efficiency criterion' (suggestion: „the dwelling is not insulated“) shall be determined by the measure,
- the national median shall be calculated annually by the Statistical Office of the Slovak Republic.
- to calculate equivalised income using the modified OECD equivalence scale, each member of the household is first given an equivalence value: 1.0 to the first adult; 0.5 to the second and each subsequent person aged 14 and over; 0.3 to each child aged under 14
- Reason: the definition contains the requirements of Article 2, point 52. of the EED, which should include at least insufficient disposable income, high energy expenditure, low energy efficiency of dwellings and financial unaffordability (here understood as the balance after deduction of high energy expenditure from low income).

Household: a person living alone or a group of people living together who provide the basic necessities of life.

Reason: persons sharing energy are considered, they are not considered on the basis of dependency or kinship.

Recommendations on DLV 2:

1. Apply the definition of "households in energy poverty" to the individual data of the 2023 Household Budget Survey (do not use the 2015 HBS) in 2 variants:
   - A. disposable income below the median (i.e. 100% of the national median equivalent disposable income) and also energy expenditure above 20%,
   - B. disposable income below 70% of the median and also energy expenditure above 15%.

2. Based on this definition, recalculate the impact on "vulnerable households" after the introduction of ETS2 ("vulnerable households" as defined in the SCF Regulation, i.e. at risk of ETS2 and without resouces for renovation).

3. Car ownership data for microenterprise can be obtained from the Ministry of interior of the SR database and linked to motor vehicle tax data from the Financial Administration SR.

UMS:

Mnohé členské mestá UMS majú prehľad o energeticky chudobných a zraniteľných obyvateľoch vo svojom katastri a viaceré im aktívne pomáhajú v ich neľahkej situácii, či už priamo pomocou v hmotnej núdzi alebo dotáciami občianskym združeniam, ktoré túto pomoc následne poskytujú. UMS má za to, že energeticky chudobní obyvatelia sa môžu nachádzať v ktorejkoľvek časti Slovenska a preto navrhujeme, aby bol zachovaný zámer pomoci konkrétnym energeticky chudobným a zraniteľným obyvateľom alebo domácnostiam, bez ohľadu na lokalitu a jej ekonomickú vyspelosť. Zároveň v tejto súvislosti navrhujeme minimalizovať použitie pomerových indikátorov a ukazovateľov (najmä k absolútnemu počtu obyvateľov v danej oblasti).

V rámci služieb svojim obyvateľom poskytujú samosprávy sociálne bývanie a prevádzkujú zariadenia sociálnych služieb, a to najmä pobytové zariadenia pre seniorov. V týchto budovách sú ubytované kategórie obyvateľov, ktorí splnia podmienku energetickej zraniteľnosti. Preto vítame navrhnuté opatrenia ohľadom rekonštrukcie, znižovania energetickej náročnosti a výstavby nového sociálneho bývania a zariadení sociálnych služieb. Považujeme ich za veľmi významné, samosprávy plánujú podobné projekty, a navrhujeme tieto opatrenia zachovať vo finálnom návrhu Sociálno-klimatického plánu. Za dôležité opatrenia považujeme aj obnovu rodinných a bytových domov, a dekarbonizáciu vykurovania. Samosprávy majú záujem aj o vzdelávanie svojich zamestnancov v tejto oblasti i edukáciu obyvateľov.

UMS EN:

Many member municipalities of UMS have an overview of energy poor and vulnerable residents in their jurisdiction, and actively help them in their difficult situation — either directly through direct aid or by subsidizing NGOs that then provide the aid. UMS believes that energy poor residents can be found in any part of Slovakia, and therefore we propose to maintain the intention of assisting energy poor and vulnerable residents or households, regardless of location and region's economic development level. At the same time, in this context, we propose minimizing the use of ratio indicators and metrics (especially in the proportion to all inhabitants of the area).

Municipalities, as part of the services to their citizens, provide to their residents, offer social housing and operate social service facilities, particularly residential facilities for seniors. In these buildings, categories of residents who meet the criteria for energy vulnerability are accommodated. Therefore, we welcome the proposed measures regarding reconstruction, increasing energy efficiency and the construction of new social housing and social service facilities. We consider these measures to be significant (local governments are planning similar projects) and we propose that these measures be retained in the final proposal of the Social-Climate Plan. We also consider the renewal of family and apartment houses and the decarbonisation of heating to be important measures. Local governments are

interested also in educating their employees in this area and in raising awareness among residents.

UHP:

- Prvý odsek, strana 11. Rovnaký argument o zmene metodiky v odhade spotreby biomasy sa dá aplikovať na graf 1-2. Odporúčam aj v tomto grafe odstrániť dáta za 2017-2018.
- Prvý odsek, strana 14. Odporúčam už v texte reflektovať, že 29.4 % zo spomínaných 32% je HEV (a nie PHEV) a tak určite využívajú fosílne palivá (iba v menšej výške).
- Posledný odsek, strana 18 a popis pod grafom 1-12 tvrdí, že zemný plyn nie je zahrnutý kvôli nízkej spotrebe. Predpokladám, že ide o chybu.
- Tretí odsek zdola, strana 22. Odporúčam doplniť výsledok pracovnej skupiny MH SR (výsledky ktorej by mali byť podľa textu známe v januári 2025).

Trinomics B.V.
Mauritsweg 44
3012 JV Rotterdam
The Netherlands

T +31 (0) 10 3414 592
www.trinomics.eu

KvK n°: 56028016
VAT n°: NL8519.48.662.B01