Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

Facilitating Socially Just Carbon Pricing in the EU

Identification of vulnerable groups, impacts of carbon pricing and compensation. Insights from the microsimulation model SEEK-EU.

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Mannheim, 17-03-2023

Research Projects

- *Facilitating Just Carbon Pricing in Central and Eastern Europe* on behalf of the **European Climate Initiative of the German Federal Ministry for Economic Affairs and Climate Action (BMWK)**

- *Evaluation and further development of the EU ETS in the context of the amendment of the ETS Directive and the European Green Deal with an economic focus* on behalf of the **German Emissions Trading Authority (DEHSt)**

Agenda

1 Motivation & Research Questions

2 Method & Data

3 Preliminary Findings

4 Outlook

ETS for buildings and road transport and the Social Climate Fund

- **Agreement** between the European Parliament and the Council of the EU in **December 2022**
- Set up of **ETS-2 covering CO2 emissions from buildings and road transport** not covered by the EU ETS and **starting 2027**
- If the **price** of an allowance in ETS-2 rises **above 45 EUR** the **market stability reserve** will be triggered until 2030
- Set up of the **Social Climate Fund (SCF) to protect the vulnerable** from excessive costs
- SCF can provide **direct income support** covering up to **37.5% of the total estimated cost of each national plan**→ min. **62.5%** of financial support will be dedicated to **investements**

→ With the Fit-for-55 package and the SCF there is now a **policy requirement to define who is vulnerable, measure how many vulnerable households there are and identify them for policy implementation**

Research Questions

1. **Who is affected and at what rate** by the introduction of a **carbon price** in the buildings and road transport sectors?

2. **Who** should be **compensated** because they are **most vulnerable**?

3. **How** can the most vulnerable be **adequately compensated**?

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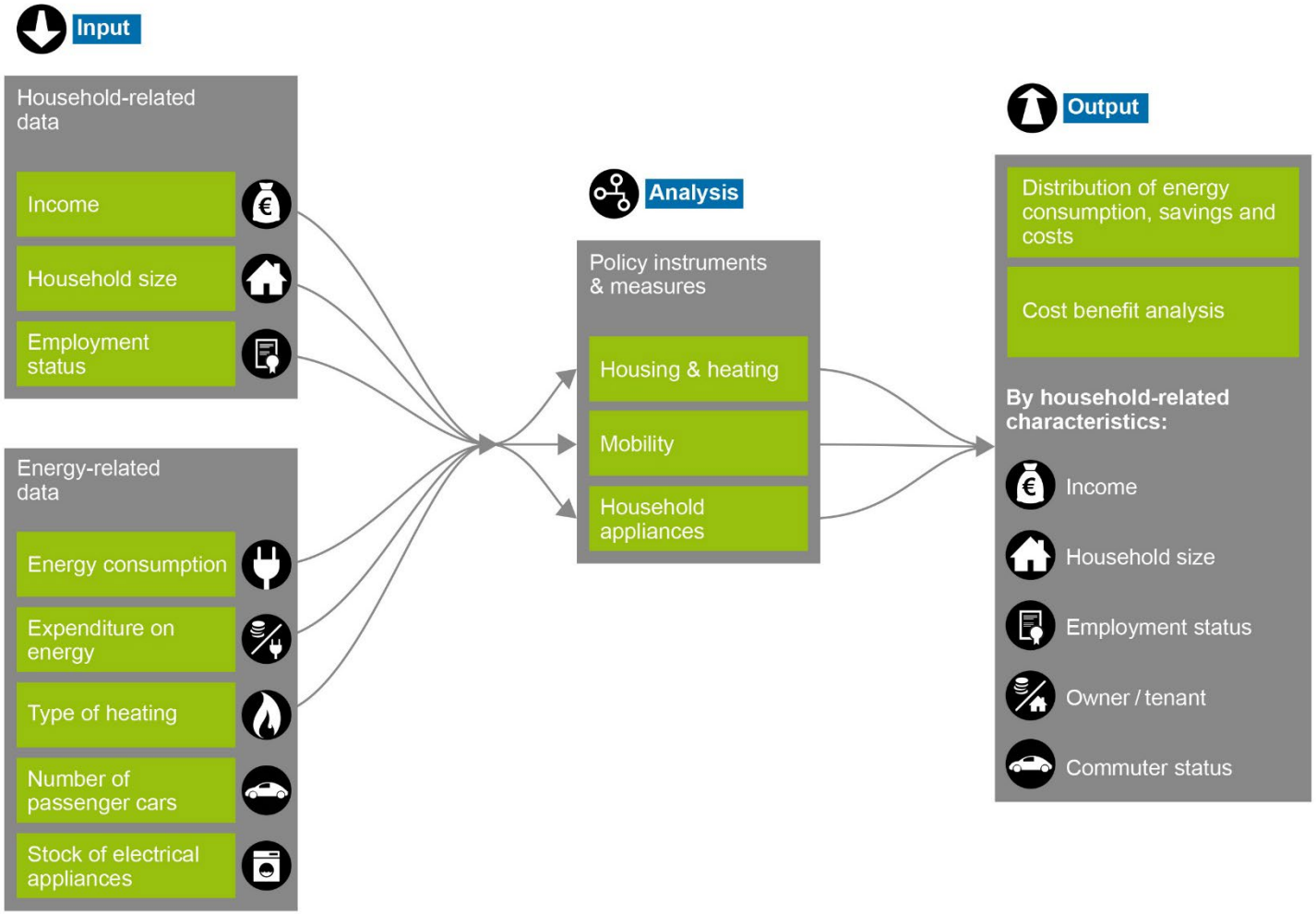
Model SEEK-EU



Selection of vulnerability indicators used in the analysis

Type of Indicator	Indicator	Sector
Individual indicator	2M - Household energy expenditure is higher than double the national median	Buildings, road transport
	Low income – high costs (LIHC) - Household falls under the poverty threshold after paying energy bills and share of energy expenses are higher that national median	Buildings, road transport
	Inability to keep home warm	Buildings
	Arrears on utility bills	Buildings
Compound indicator	Ability to keep home adequately warm x income	Buildings
	Acessability x (urbanisation) x income	Road Transport
	Regular use of public transport x income	Road Transport
Policy indicator	Income of traget groups e.g. below poverty line	Buildings, road transport

Data Quality HBS & EU-SILC

Examples of problems and open questions:

- Missings versus zeroes
- Negative values for expenditure
- Aggregate expenditure category > sum of expenditure subcategories
- Expenditure as a proxy for quantities, e.g. transport fuels
- Data quality of income variables: HBS versus EU-SILC
- HBS 2015 versus HBS 2020 (Issues due to Covid)

Happy to discuss about these issues!

Example Data Quality 1: Expenditure based indicators (HBS 2015)

COUNTRY	% zeroes for transport fuels	% zeroes for electricity	% zeroes for net income	COUNTRY	% zeroes for transport fuels	% zeroes for electricity	% zeroes for net income
BE	23.4	0.0	0.1	IE	26.8	6.8	0.0
BG	50.1	0.2	0.0	IT	26	2.0	100.0
CY	16.3	1.7	0.0	LT	56.5	0.6	0.0
CZ	20.3	3.1	0.0	LU	35.3	0	0.0
DE	17.4	100.0	0.0	LV	62.8	0.6	0.0
DK	39.8	1	0.0	MT (2010)		0.2	0.0
EE	59.9	5.1	0.0	NL	11.5	0	0.1
EL	35.7	0.1	0.0	PL	41	23.5	0.4
ES	37	1.6	0.3	PT (2010)	33.3	1.4	0.0
FI	43	0.1	0.0	RO	77.7	6.3	0.0
FR	56.6	3.7	0.5	SE	22.3	13.6	0.3
HR	34.2	1.1	0.0	SI (2010)	42.1	0.2	0.0
HU	52.6	0.3	0.1	SK	51.2	3.3	0.0

Example Data Quality 2: Expenditure based indicators (HBS 2015)

COUNTRY	Obs. with negative values for transport costs	Weighted HH with negative values for transport costs	COUNTRY	Obs. with negative values for transport costs	Weighted HH with negative values for transport costs
BE	0	0	IE	0	0
BG	0	0	IT	0	0
CY	0	0	LT	2	668
CZ	0	0	LU	0	0
DE	0	0	LV	6	1136
DK	20	27542	MT (2010)	0	0
EE	44	7604	NL	138	80280
EL	0	0	PL	0	0
ES	0	0	PT (2010)	0	0
FI	0	0	RO	0	0
FR	1	1775	SE	32	37433
HR	0	0	SI (2010)	0	0
HU	0	0	SK	0	0

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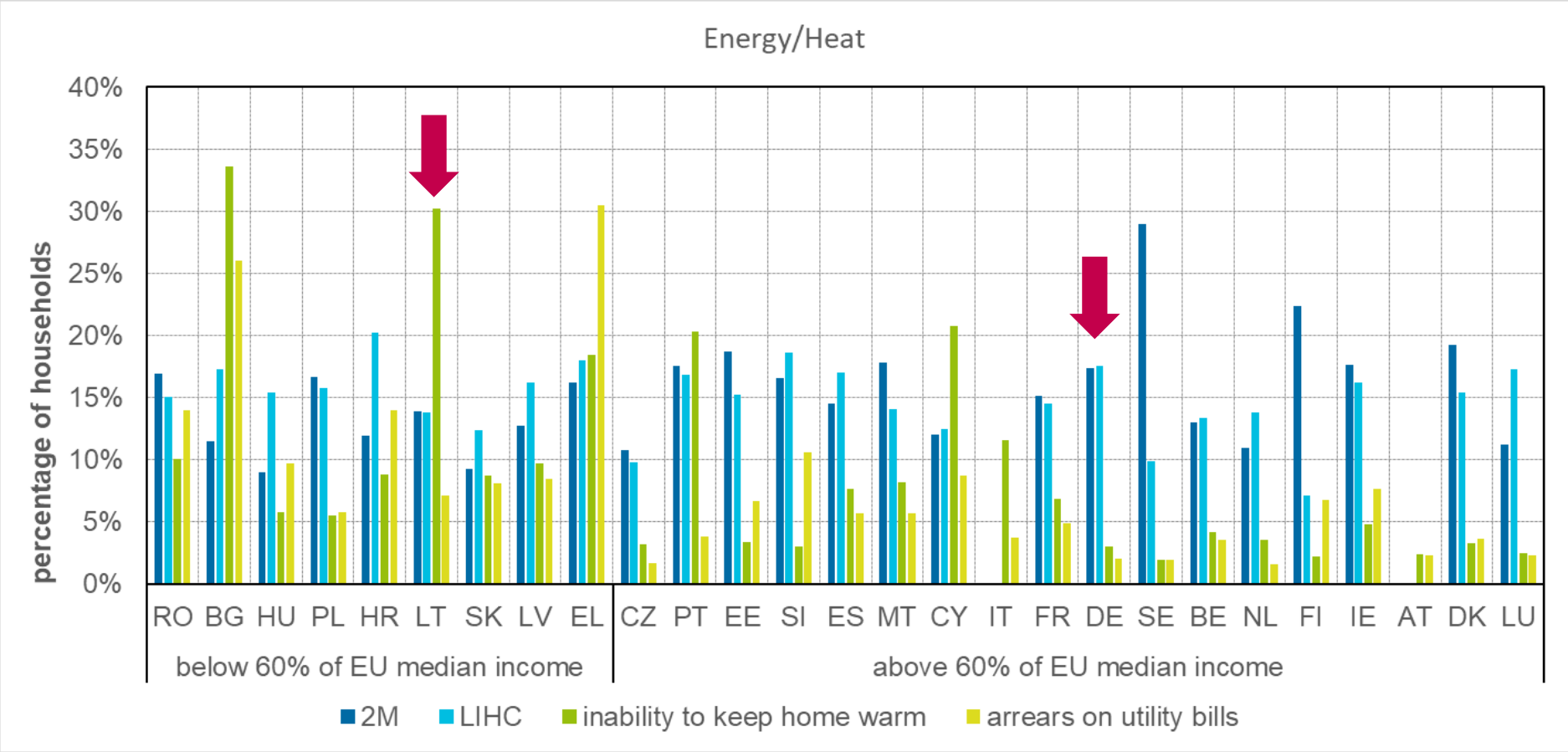
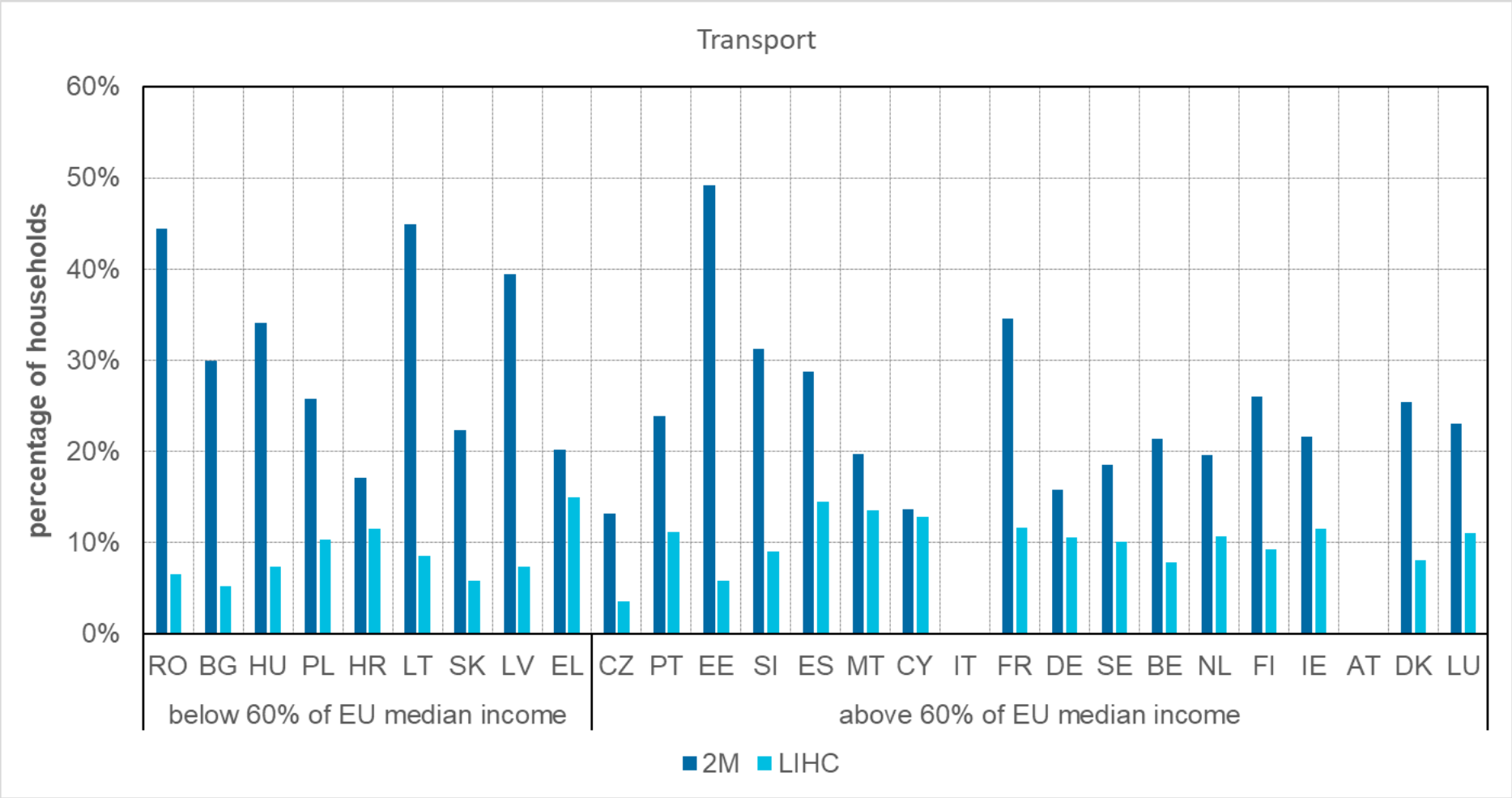
Share of households vulnerable related to the consumption of electricity and heat



- Different indicators measure different aspects of vulnerability
- Share of vulnerable HH varies depending on indicator used
- Share of self-reported vulnerability tends to be higher in lower income countries

Source: Own calculation based on the EU HBS data, year 2015, for the 2M-indicator and the LIHC indicator and based on the EU SILC data, year 2019, for the indicator looking at the inability to keep the home warm and the indicator looking at arrears on utility bills; HBS data missing for Italy and Austria; Vulnerability displayed as share of households.

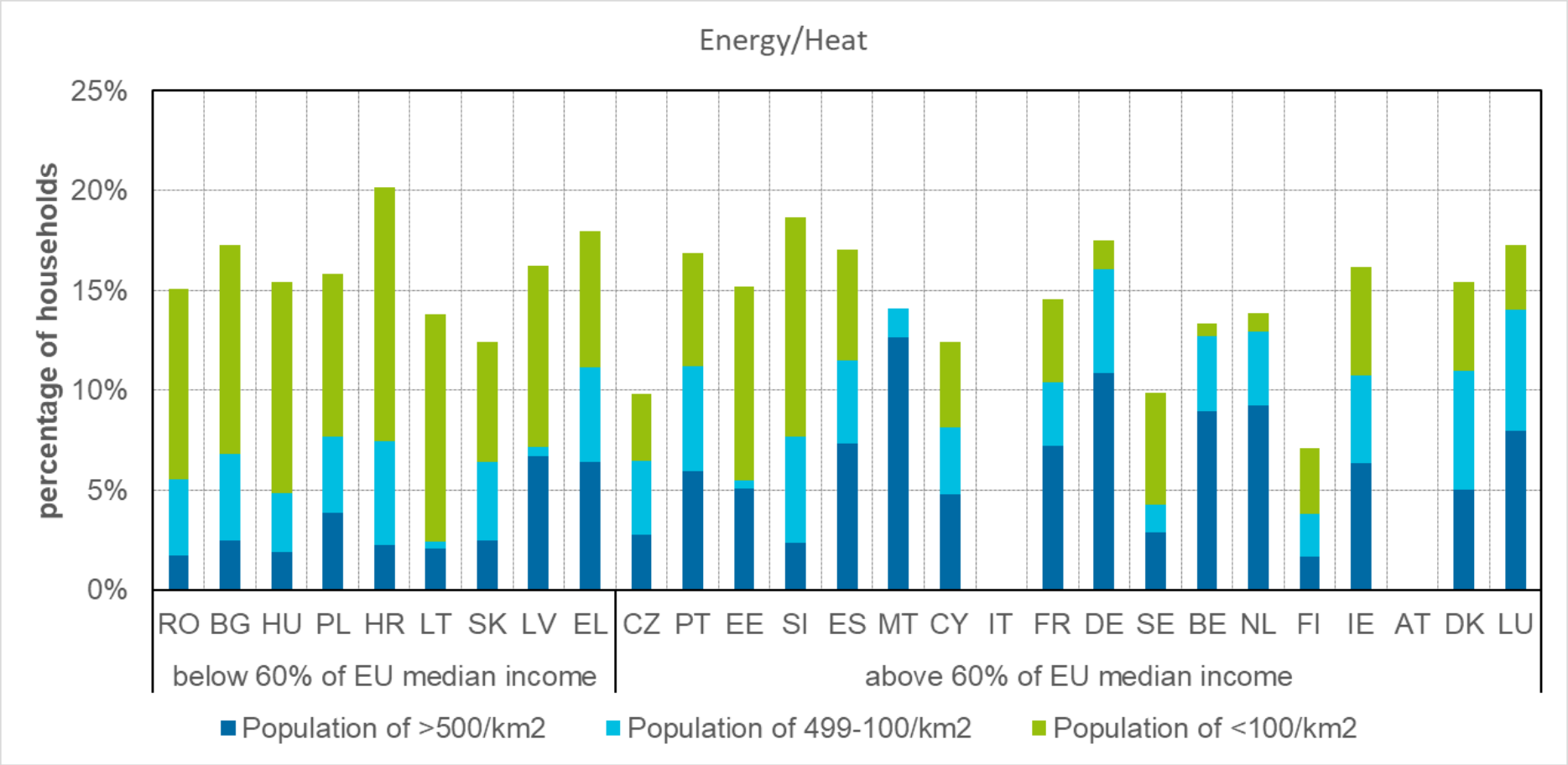
Share of households vulnerable related to mobility



- High variation in the share of vulnerable HH depending on the indicator used
- Share of vulnerable HH tends to be higher in lower income countries when using the 2M-Indicator

Source: Own calculation based on the EU HBS data, year 2015; HBS data missing for Italy and Austria; Vulnerability displayed as share of households.

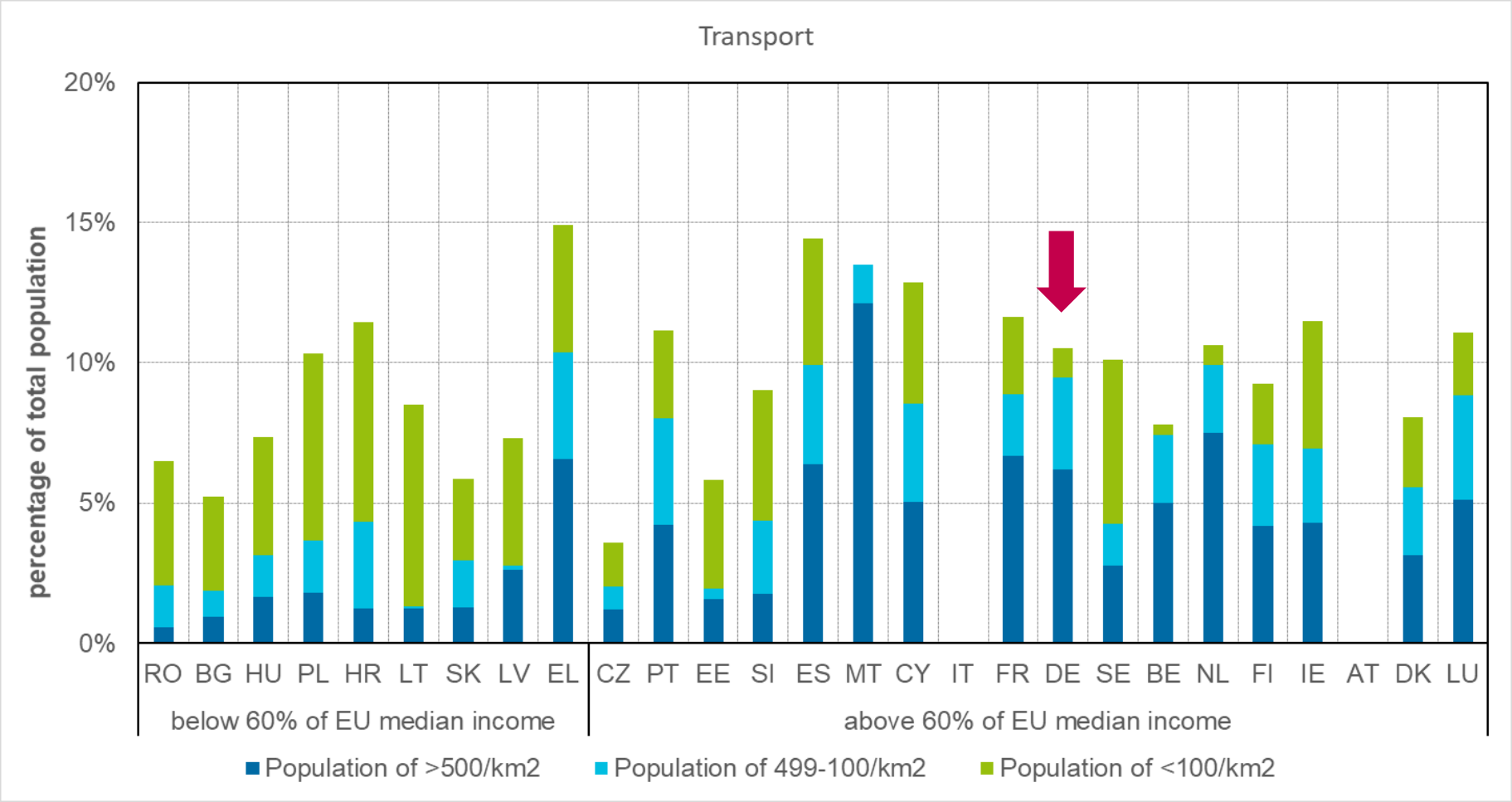
The relationship between vulnerability and regional characteristics using the LIHC-Indicator for the sector energy/heat



- Population density as a proxy for the degree of urbanization
- Being vulnerable is often connected to living in rural areas (other factors should also be considered)

Source: Own calculation based on the EU HBS data, year 2015; Data missing for Italy and Austria; Vulnerability measured using the Low Income – High Cost Indicator for the sector energy/heat and displayed as share households; Regional characteristics inside vulnerable groups displayed for each EU member state.

The relationship between vulnerability and regional characteristics using the LIHC-Indicator for the transport sector



- Population density as a proxy for the degree of urbanization
- Being vulnerable is often connected to living in rural areas (other factors should also be considered)

Source: Own calculation based on the EU HBS data, year 2015; Data missing for Italy and Austria; Vulnerability measured using the Low Income – High Cost Indicator for the transport sector and displayed as share households; Regional characteristics inside vulnerable groups displayed for each EU member state.

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Next steps

- Discussion on **individual indicators versus compound indicators** for the identification of the share of households vulnerable
- Comparison of the **impact of the introduction of a carbon price using different vulnerability indicators**
- **Calculation of the investment needs** if the most vulnerable determined in the previous analysis are to be compensated
- **Comparison of the investment needs to other compensation options** such as a lump-sum per capita rebate **considering the proposed distribution of funds from the SCF**

Thank you for your attention!

Do you have any questions?

Ongoing and completed work at Oeko-Institut related to vulnerability indicators

- *Transport poverty: definition, indicators, determinants and mitigation strategies* on behalf of the **European Commission (Directorate-General for Employment, Social Affairs & Inclusion)**
- *Facilitating Just Carbon Pricing in Central and Eastern Europe* on behalf of the **European Climate Initiative of the German Federal Ministry for Economic Affairs and Climate Action (BMWK)**
- *Evaluation and further development of the EU ETS in the context of the amendment of the ETS Directive and the European Green Deal with an economic focus* on behalf of the **German Emissions Trading Authority (DEHSt)**
- *Study on shifting public spending from compensatory mechanisms on domestic energy use to short-term energy efficiency and renewable energy measures* on behalf of the **European Climate Foundation (ECF)**
- Policy brief: Supporting households in the energy price crisis: A comparative analysis of approaches in Germany, Poland and Romania: https://www.oeko.de/fileadmin/oekodoc/EUKI-Policy-Brief-Supporting-Households-in-the-Energy-Price-Crisis.pdf
- Energy Affordability: Sharing Lessons from the EU and Australia's Low Carbon Transitions: https://www.climatecollege.unimelb.edu.au/documents/energy-affordability-sharing-lessons
- The Social Climate Fund – Opportunities and Challenges for the buildings sector: https://www.oeko.de/fileadmin/oekodoc/ECF_Social_Climate_Fund.pdf

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