Supported by:
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
based on a decision of the German Bundestag
European Climate Initiative EUKI

# CEE CLIMATE POLICY FRONTIER

## Learning from each other

## The impact of replicating local best practices on emissions in Central and Eastern European Countries


Bulgaria


Czechia


Hungary


Poland


Romania


Slovakia

25.10.2019

# Research Questions

## 1. What would be the emissions levels if the past trends (2000-2015) in the building and transport sectors continued until 2030?

- Purpose:
  - Illustrate the repercussions of continuing Business-as-Usual (BAU Scenario)
  - Finding out which determinants are the most important in leading to emissions increase (e.g. decreasing load factors)

## 2. What would be the emissions levels if optimal past trends from a climate perspective in the selected countries are applied universally until 2030?

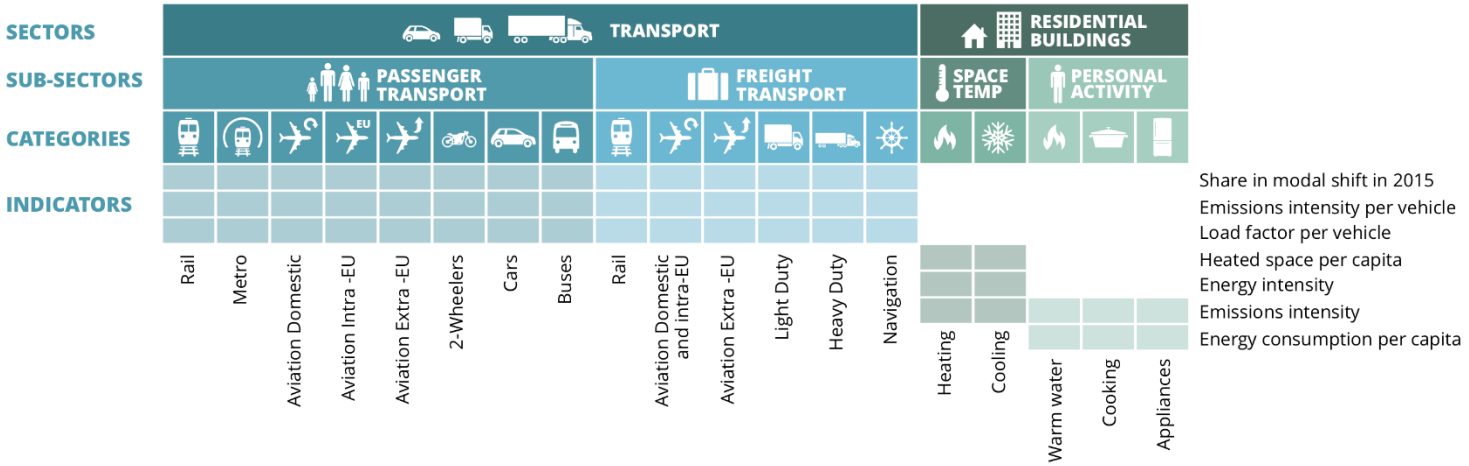
- Purpose:
  - Illustrate what emissions reductions are possible with current technologies in countries with similar levels of economic development
  - Finding out which indicators play a decisive role
  - Tracing back the policy or non-policy measures that resulted in the specific development

## 3. What emissions reductions are needed to be compatible with the Paris Agreement?

- Purpose:
  - Quantify the gap between the Best Practices Scenario and emissions levels needed for the Paris Agreement in the respective sectors
  - Which mix of indicators and their values would allow closing this gap?

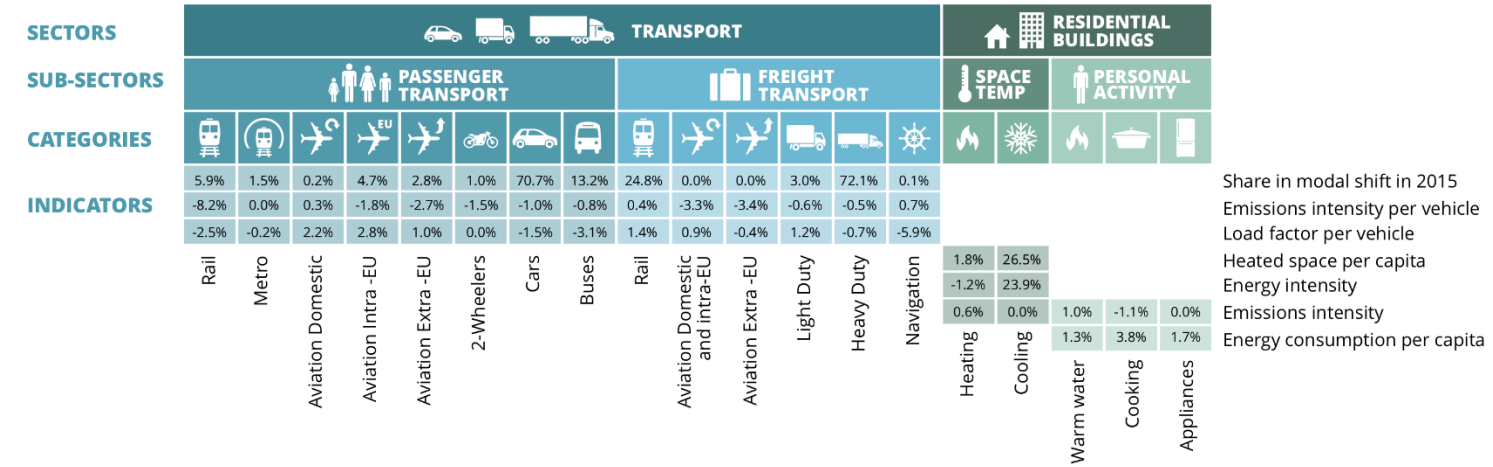
# Approach

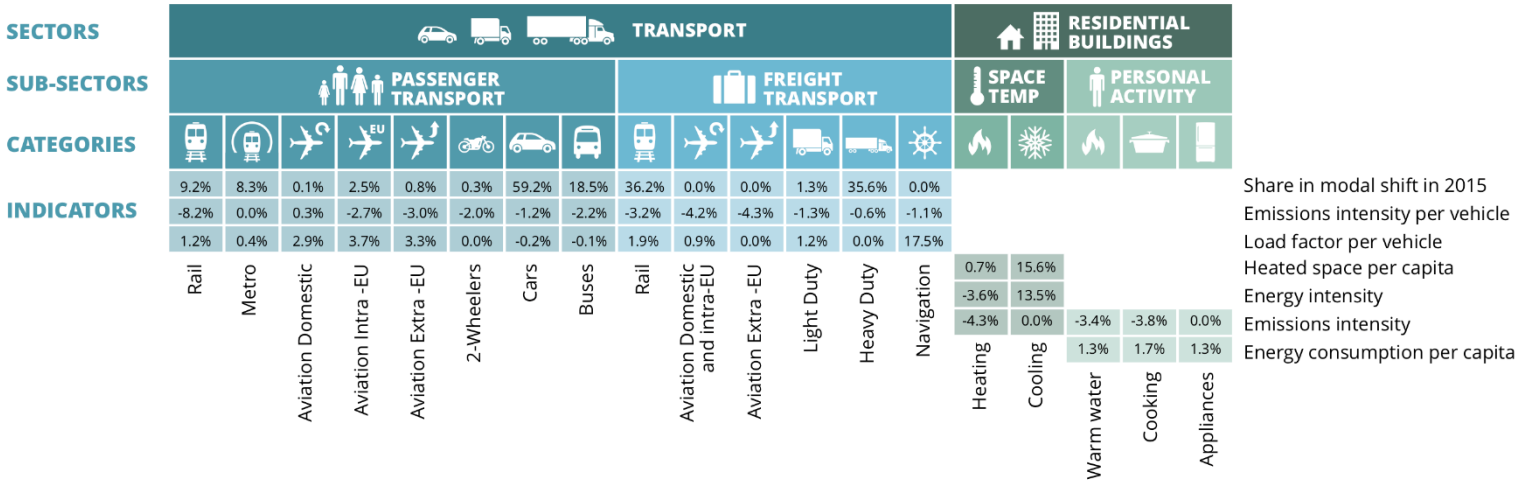
- Gathered data and investigated trends for **54 indicators** determining emissions in the transport and residential buildings sectors.
- **Sources:** JRC IDEES database complemented by Eurostat and other sources, especially for more recent years




- Identified the optimal **trends from the period 2000-2015** and developed a Best Practice scenario in which these optimal trends are **universally adopted** (e.g. decrease in emissions intensity for railways in Poland applied to all countries)
- Identified the gap between the Best Practice Scenario and emissions reduction levels needed for compatibility with the Paris Agreement

# Indicators


SECTORS
SUB-SECTORS
CATEGORIES
INDICATORS
TRANSPORT
RESIDENTIAL BUILDINGS
PASSENGER TRANSPORT
FREIGHT TRANSPORT
SPACE TEMP
PERSONAL ACTIVITY
5.9% 1.5% 0.2% 4.7% 2.8% 1.0% 70.7% 13.2% 24.8% 0.0% 0.0% 3.0% 72.1% 0.1%
-8.2% 0.0% 0.3% -1.8% -2.7% -1.5% -1.0% -0.8% 0.4% -3.3% -3.4% -0.6% -0.5% 0.7%
-2.5% -0.2% 2.2% 2.8% 1.0% 0.0% -1.5% -3.1% 1.4% 0.9% -0.4% 1.2% -0.7% -5.9%
1.8% 26.5%
-1.2% 23.9%
0.6% 0.0% 1.0% -1.1% 0.0%
1.3% 3.8% 1.7%
Rail
Metro
Aviation Domestic
Aviation Intra -EU
Aviation Extra -EU
2-Wheelers
Cars
Buses
Rail
Aviation Domestic and intra-EU
Aviation Extra -EU
Light Duty
Heavy Duty
Navigation
Heating
Cooling
Warm water
Cooking
Appliances
Share in modal shift in 2015
Emissions intensity per vehicle
Load factor per vehicle
Heated space per capita
Energy intensity
Emissions intensity
Energy consumption per capita


SECTORS
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CATEGORIES
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PASSENGER TRANSPORT
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SPACE TEMP
PERSONAL ACTIVITY
9.2% 8.3% 0.1% 2.5% 0.8% 0.3% 59.2% 18.5% 36.2% 0.0% 0.0% 1.3% 35.6% 0.0%
-8.2% 0.0% 0.3% -2.7% -3.0% -2.0% -1.2% -2.2% -3.2% -4.2% -4.3% -1.3% -0.6% -1.1%
1.2% 0.4% 2.9% 3.7% 3.3% 0.0% -0.2% -0.1% 1.9% 0.9% 0.0% 1.2% 0.0% 17.5%
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Rail
Metro
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2-Wheelers
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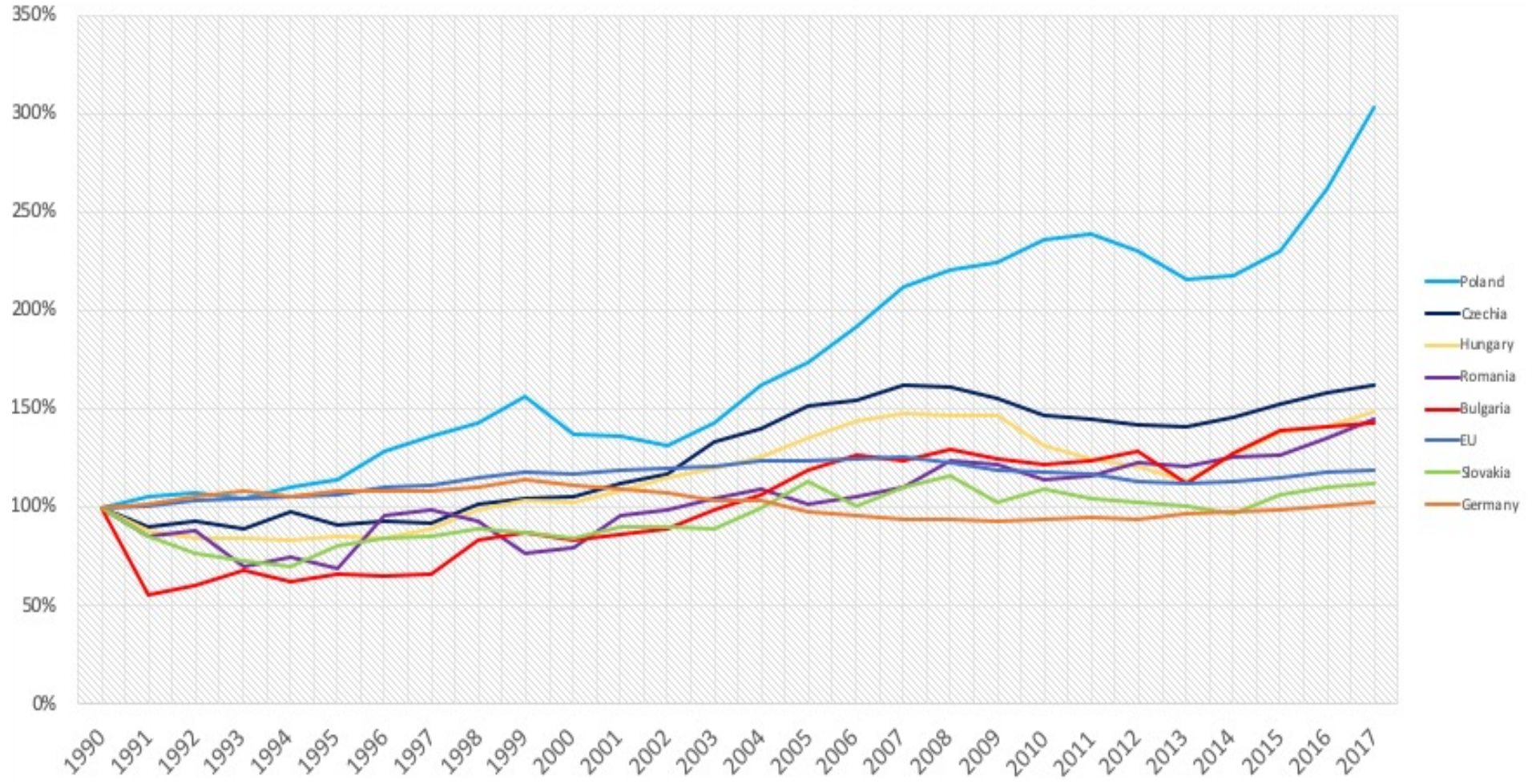
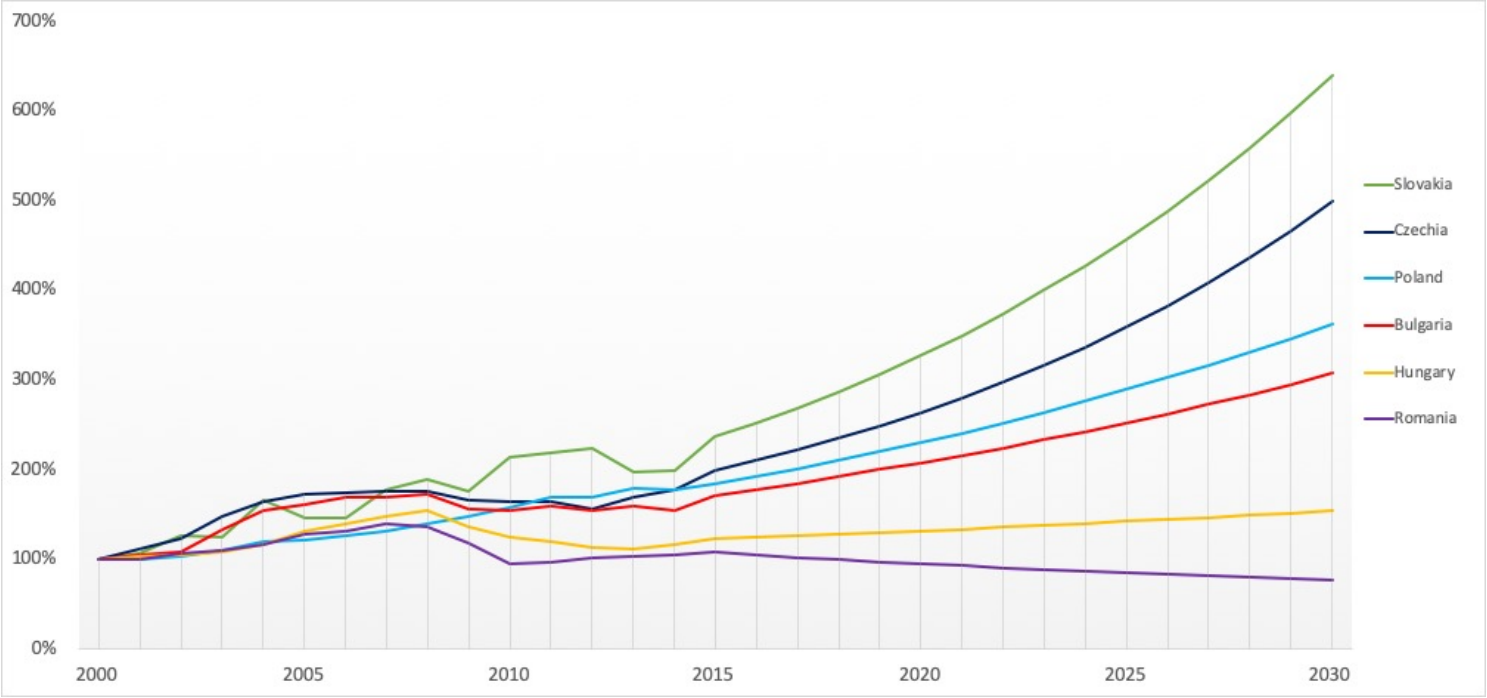
# Change in emissions from transport between 1990-2017




Based on data from European Environmental Agency

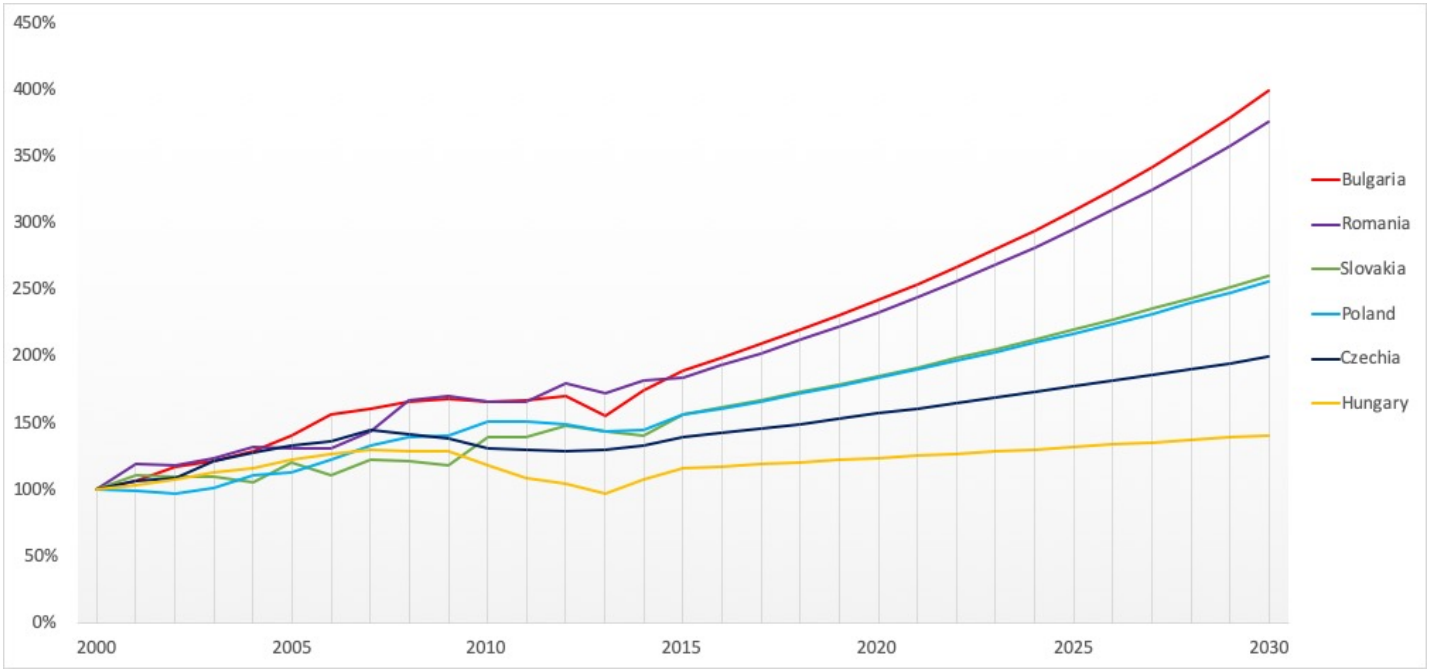
# Drivers of emissions – freight transport (BAU)

- Between 2000 and 2015 transport freight emissions increased in all countries – the fastest in Slovakia (+136%) and Czechia (+98%)
- Emissions intensity (gCO2/vkm) decreased for almost all countries and means of transport
- Slovakia transports the most products by train: 36.2% - Bulgaria the least (23.1%) but Poland next to it – 24.8%
- Emissions intensity for passenger rail decreased the fastest for Poland (-8.2% annually) – but increased for rail freight (by 0.4%) for the same country
- The overall tkm increased the fastest in Poland – by 3.3% - most of it by heavy duty vehicles (increase by 5.4% annually)



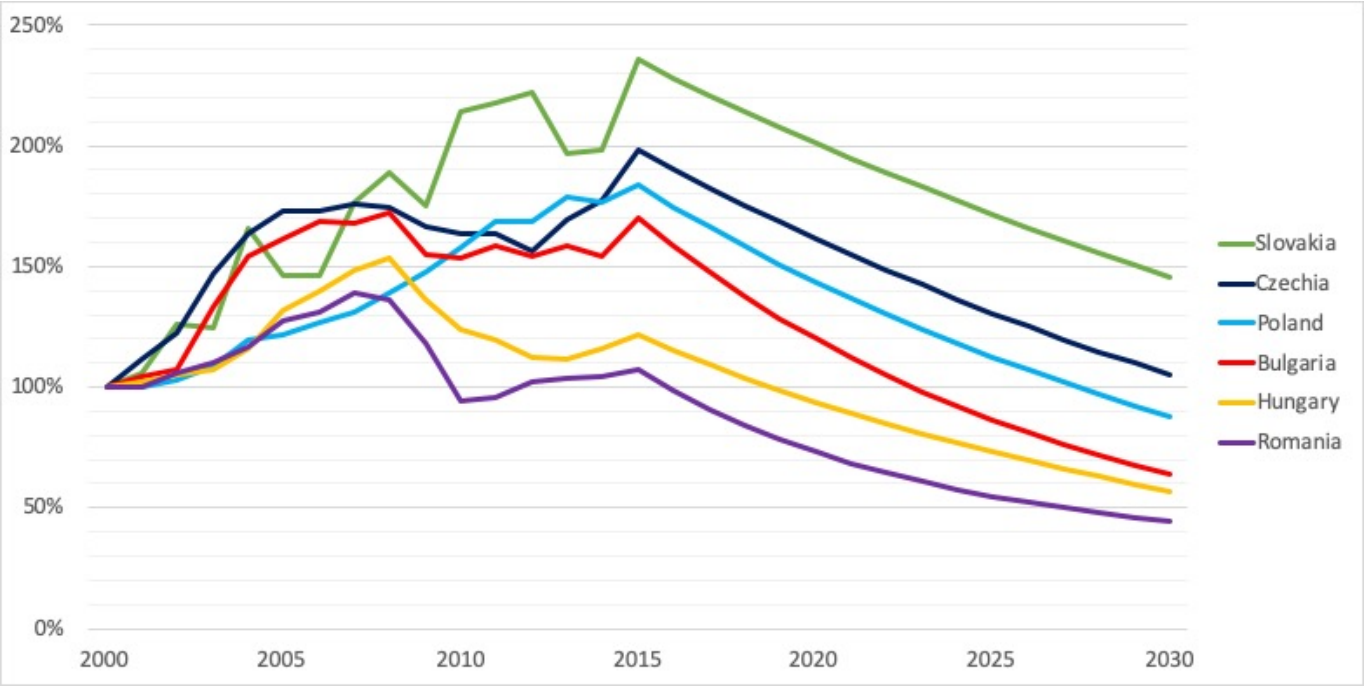
# Drivers of emissions – passenger transport (BAU)

- Emissions intensity increased for domestic aviation and decreased for intra-EU and extra-EU aviation
- Despite the overall trend, emissions intensity for passenger cars increased significantly (+2.6% annually) for Slovakia
- The load factor for rail decreased in all countries except for Slovakia. The most in Bulgaria (-4.7%) and Hungary (-3.1%)
- Passenger cars got bigger and emptier – from 2.0 passengers per car in Bulgaria to 1.4 in Poland
- Flights got fuller: an increase of load factor from 1.3% for domestic flights in Czechia to 3.7% annually for intra-EU flights for Hungary
- Czechs are travelling the most – 11.180 km/person. But significantly below the EU average of 15.542 km/person
- Slovakia leads in terms of share of railway in the trips – 10.2% - Bulgaria last with 2.0%
- Czechs fly the most extra-EU – 5.1%.
- Bulgarians travel the most by car: 74.4%



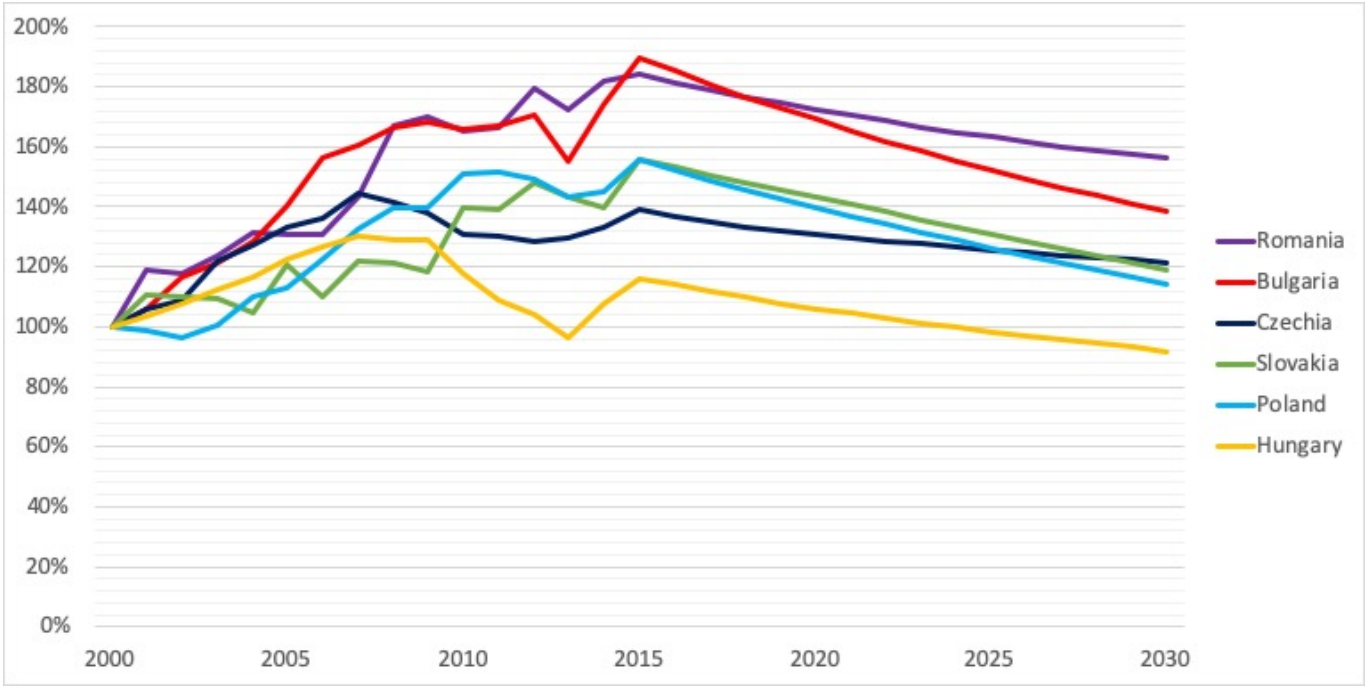
# Local Best Practice Scenario – Freight Transport

- Implementation of optimal trends would lead to emissions reduction in all countries – by between 38% (Slovakia) and 63% (Bulgaria).
- The main contribution to the decrease in emissions in freight transport would results from:
  - Decreasing emissions intensity from rail by 3.2% annually (like in Bulgaria) and by 0.6% (like in Czechia) – instead of an increase like in Poland (+0.4% for trains) or Slovakia (0.5% for heavy duty vehicles)
  - Keeping load factor of heavy duty constant – instead of decreasing (even by 4% annually in Slovakia)
  - Increasing the role of railways to 36% - even if all 6 countries are above EU‘s level of 16%

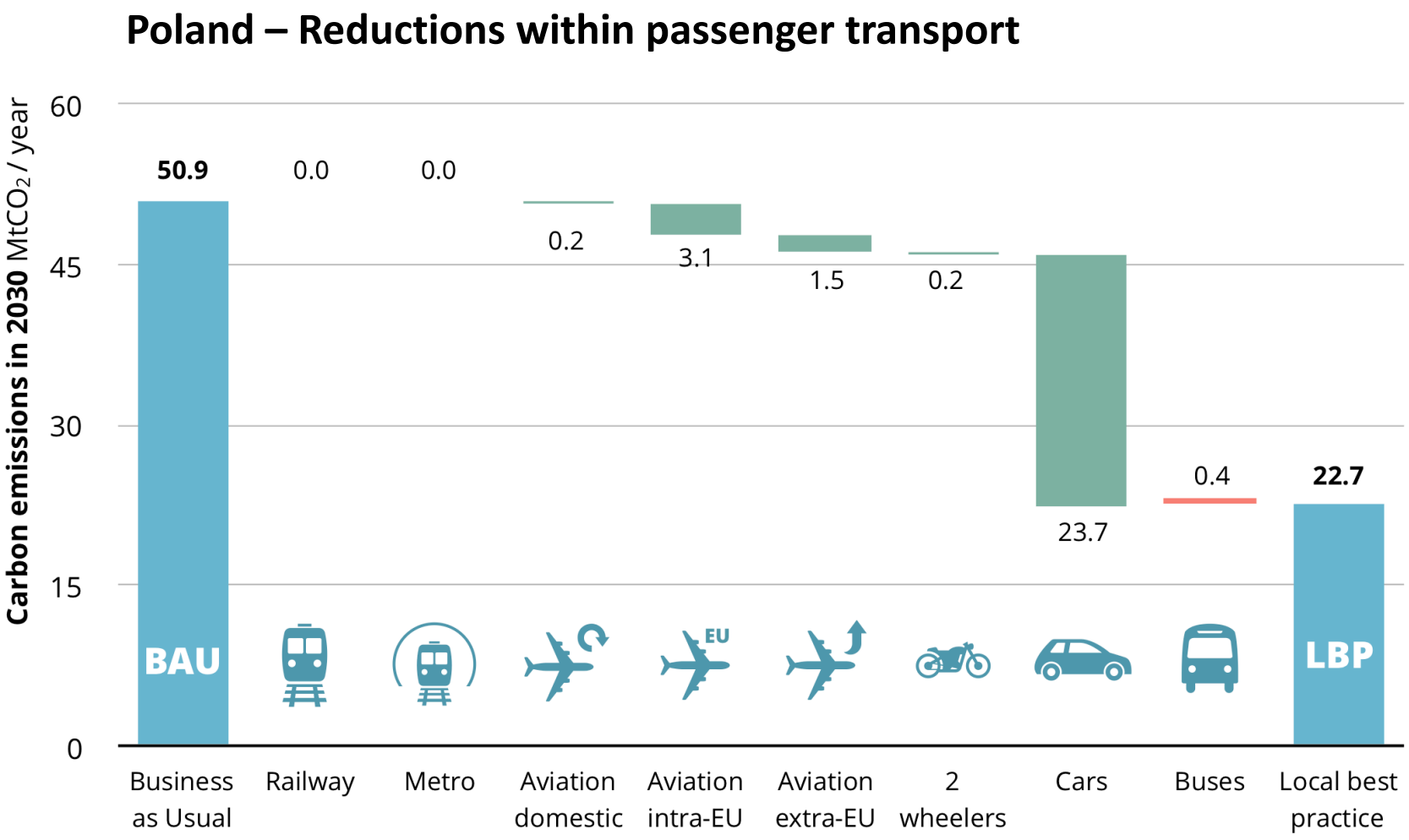


# Local Best Practice Scenario - Passengers

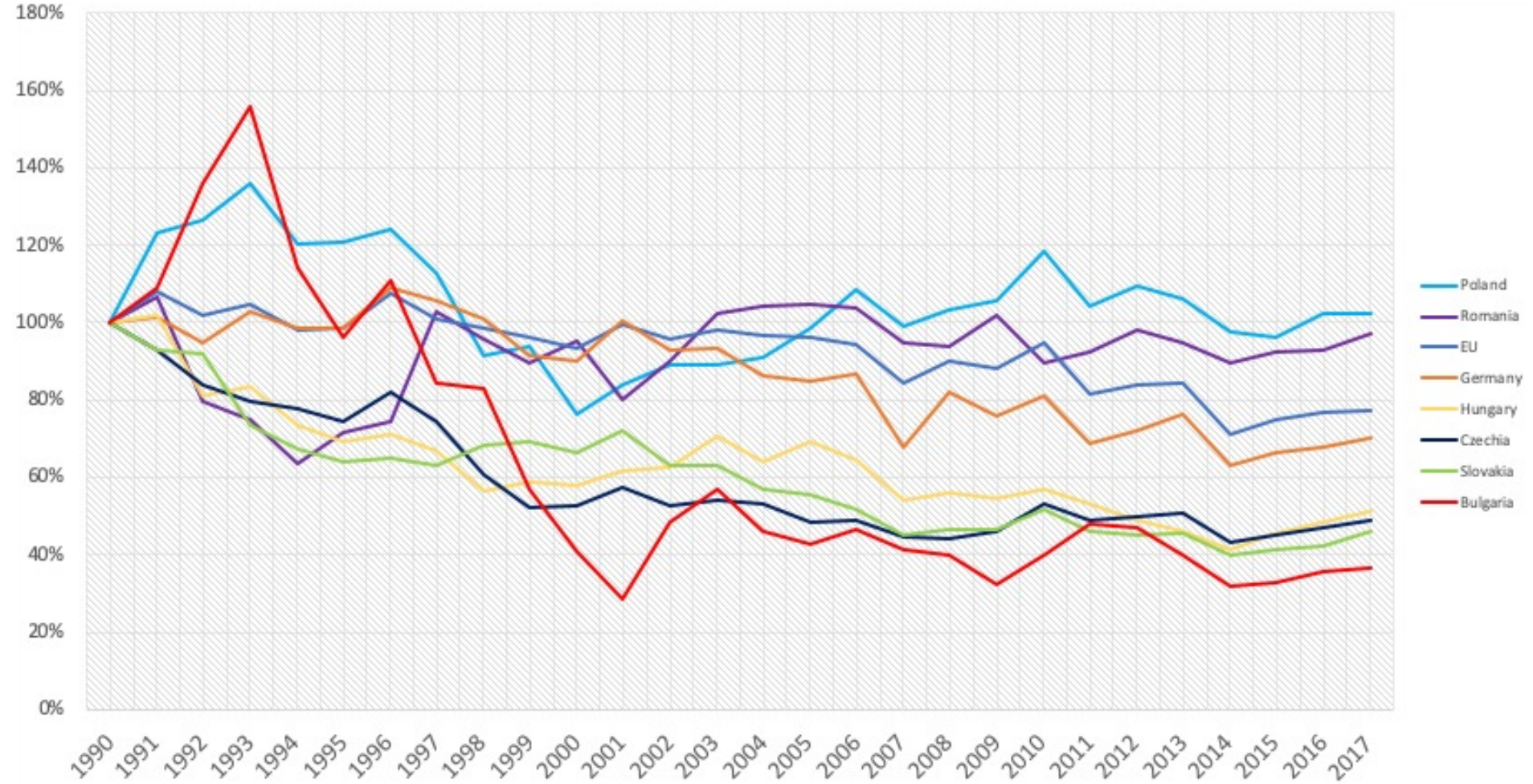
- Implementation of optimal trends would lead to emissions reduction in all countries – by between 12% (Czechia) and 27% (Poland and Bulgaria)
- The main contribution to the decrease in emissions in freight transport would results from:
  - Slowing down a decrease in load factor of passenger cars to 0.2% (like in Slovakia) annually from 0.7-1.8%
  - Decreasing emissions intensity by 1.2% for passenger cars (like in Romania)
  - Decreasing activity factor for passenger cars from 0.9-4.7% to 0.4% for Czechia
  - Increasing the share of railways from 2 (e.g. Bulgaria) to 9% (like in Slovakia)



# Results


Poland – Reductions within passenger transport
Carbon emissions in 2030 MtCO2 / year
60
45
30
15
0
50.9
0.0
0.0
0.2
3.1
1.5
0.2
23.7
0.4
22.7
BAU
EU
LBP
Business as Usual
Railway
Metro
Aviation domestic
Aviation intra-EU
Aviation extra-EU
2 wheelers
Cars
Buses
Local best practice

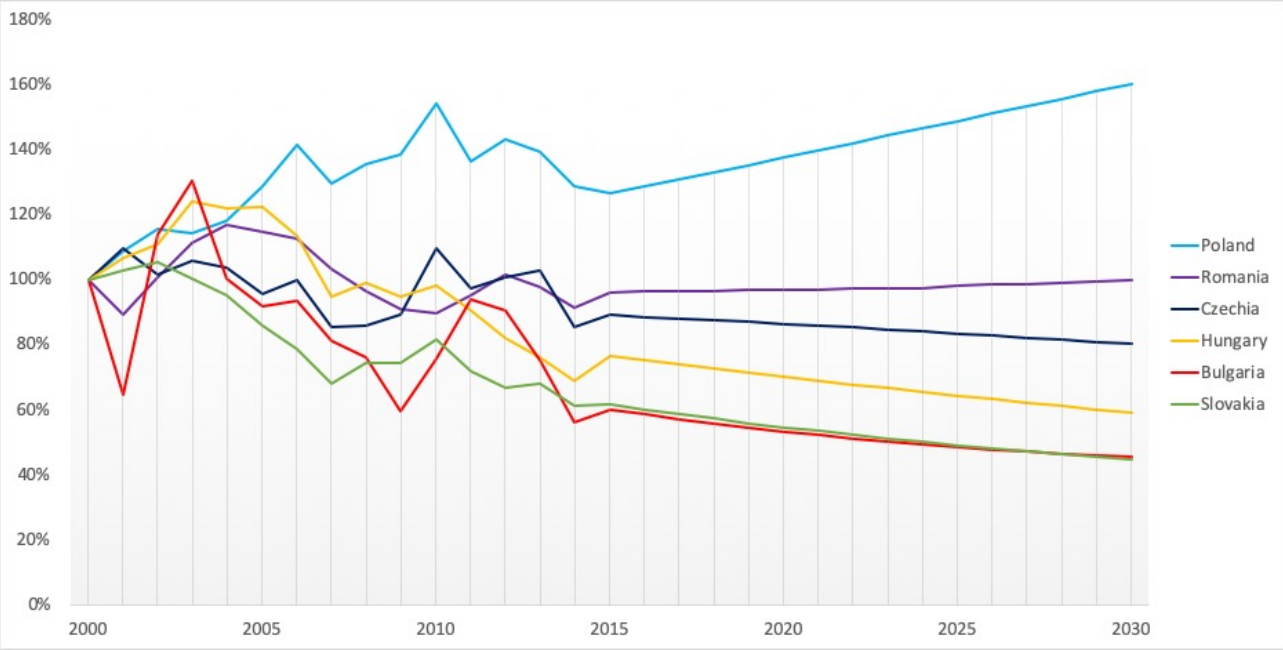
# Change in emissions from buildings between 1990-2017




Based on data from European Environmental Agency

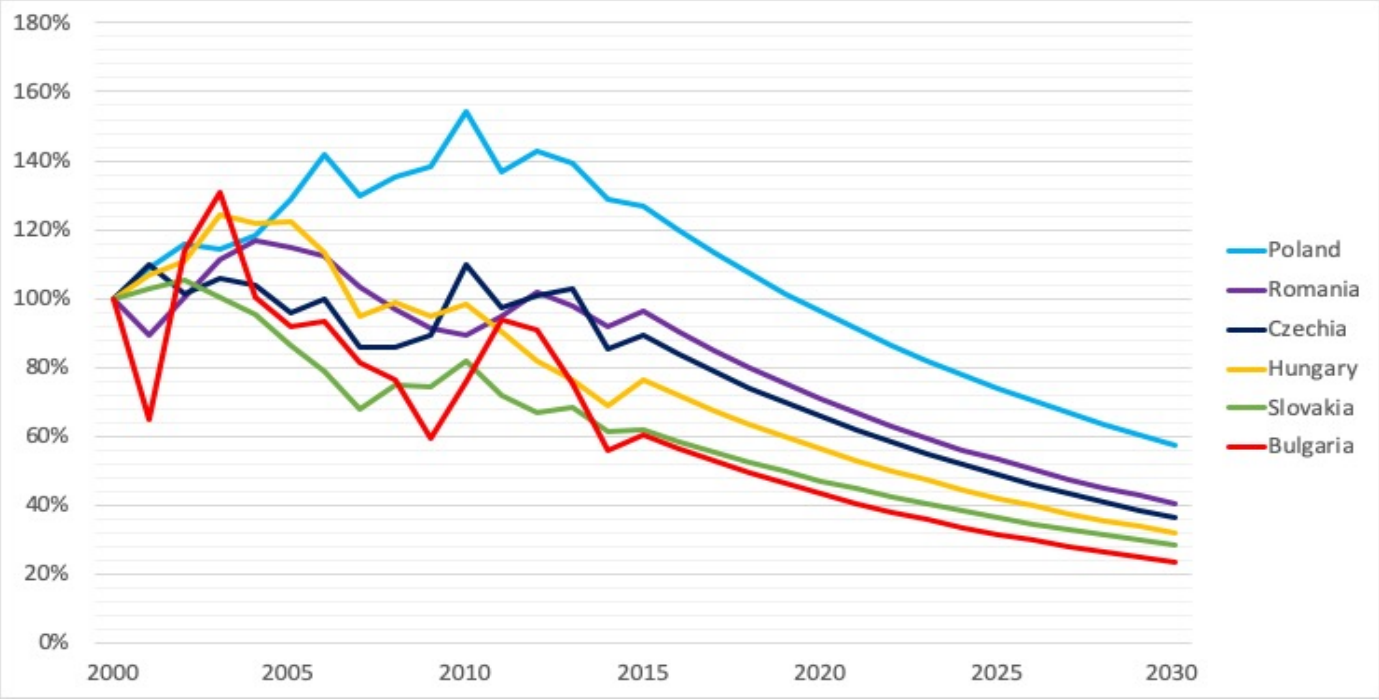
# Drivers of emissions – Residential Buildings (BAU)

- Between 2000-2015 emissions from residential sector decreased in all countries – e.g. Slovakia or Bulgaria (-40%) with the exception of Poland (+27%)
- The major drivers of emissions were those relating to space heating responsible for between 49% (Romania) and 75% (Hungary) of energy consumed in the buildings.
- The space of dwellings increased in all analysed countries by between 10% and 33% in this period.
- Despite these increases, Eastern Europeans had much less space at their disposal than average Europeans: between 17.4 $m^2$ (Romania) and 33.6 $m^2$ (Czechia) in comparison to 40.4 $m^2$ in the EU and 48.3 $m^2$ in Germany.
- In all countries, except for Hungary, less energy was used for heating per unit of space in 2015 than in 2000.
- In all countries more energy was used for water heating (1.3% - 3.1%), cooking (1.7% - 3.8%), and appliances (1.3% - 4.7%).

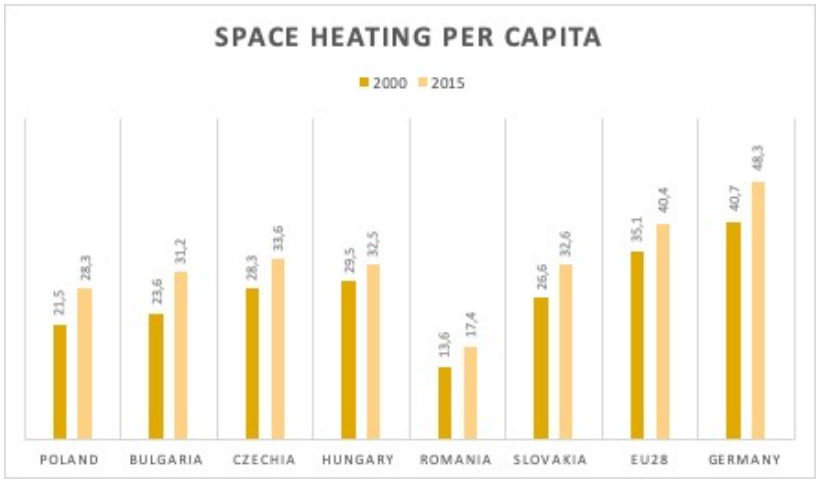


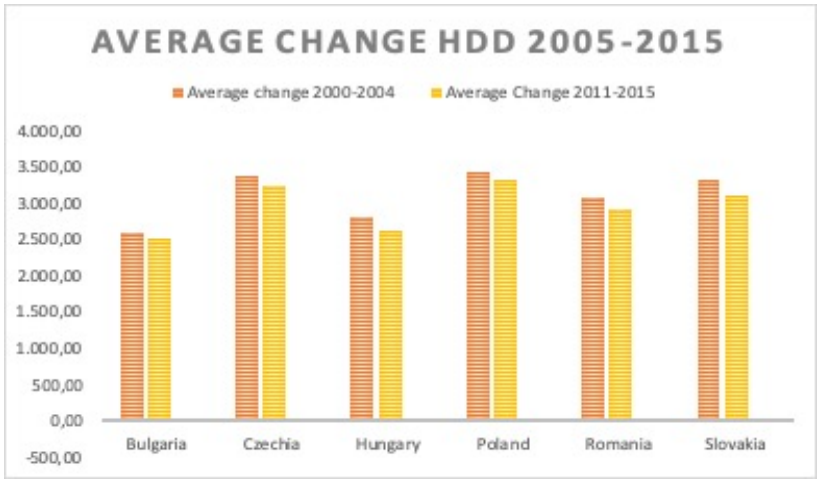
# Local Best Practice Scenario – Residential Buildings

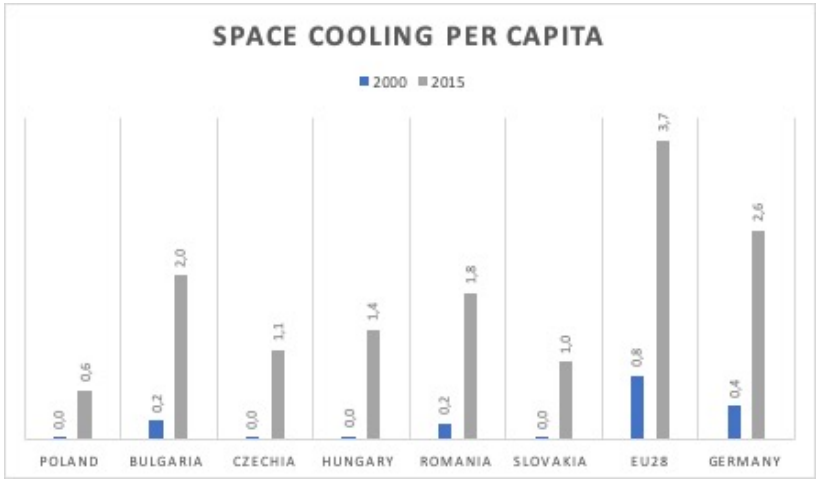
- A universal application of optimal trends will lead to a significant emissions reduction in all countries in the range between 43% (Poland) and 77% (Bulgaria) in comparison to 2000
- Applying LBP in Poland would allow reducing emissions by 73% from the space heating.
- Continuation of past growth in heated space (1.8% annually instead of 0.7%) would allow for emissions reduction by 68%
- The major impact in space heating results from decreasing energy consumption per square meter by 3.6% annually (like Slovakia) instead of 1.2%

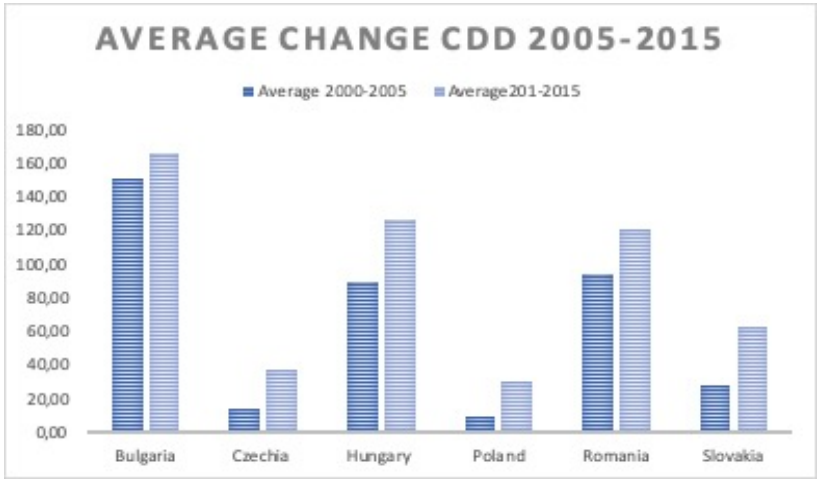


# Space heating/cooling per capita - Change in HDD and CDD



# Relevance

**Assess the impact of policy and policy-independent developments on the emissions**

- Will the introduction of self-driving cars counterbalance improvement in efficiency?
- Can operators of bus lines learn from airlines in increasing the load factors?
- What will be the impact of the aging population on emissions from the buildings?
- Urbanization and the impact on emissions due to smaller apartments?
- Increasing role of urban sprawl in the CEECs influencing the size of the apartments and travel distance

**Assess the blind spots in the policy-making**

- Going beyond emissions intensity for cars
- Which policy-measures can increase the utilization rate of the means of transportation?
- How can the modal split be influenced?
- The impact of social policy on emissions intensity.
- City management policies and measures

# THANK YOU FOR YOUR ATTENTION

andrzej.ancygier@climateanalytics.org