

CEE CLIMATE POLICY FRONTIER

Identification and promotion of current best practices

DECLINE IN EMISSION INTENSITY OF PASSENGER CARS (G OF CO₂/KM) SINCE 2010

- Emissions intensity of passenger cars has **decreased** in all evaluated countries since 2005.
- Czech Republic has performed quite similarly to the EU average in terms of this indicator, while Slovakia has **outperformed** all countries considered in terms of absolute value of passenger cars' emissions intensity in each year between 2005 and 2015.
- Emissions intensity of passenger cars in Romania in 2005 was **the same** as the EU average. The strong fluctuations that followed 2006, ended around 2010. Afterwards, the indicator value has been falling sharply, reaching the European average again in 2015.
- Taking the 5-years relative decline indicator of **13%** into account, Romania is **the best performer** in terms of emissions intensity of passenger cars.

Figure 1. Emissions intensity of passenger cars (grams of CO₂/km), 2005-2015

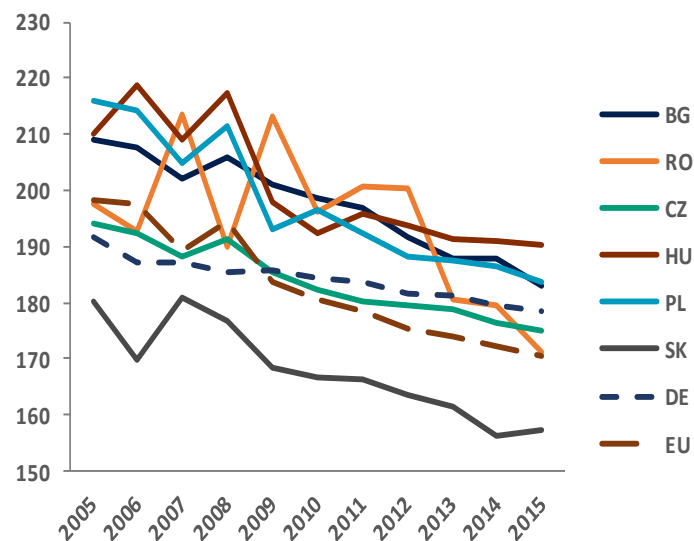
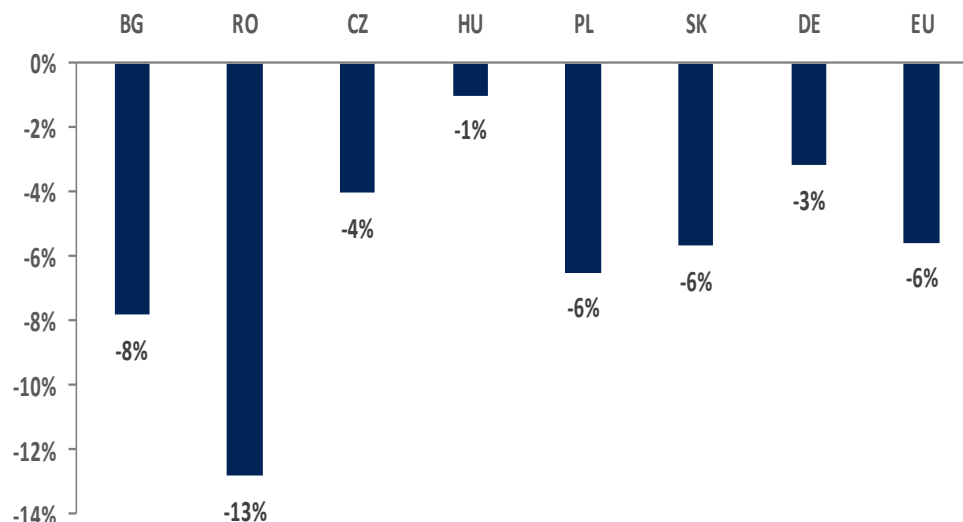


Figure 2. Relative decrease in emissions intensity of passenger cars in 2015, compared to the 2010 level



ROMANIA: “RABLA” PROGRAM (CAR SCRAPPAGE SCHEME)



Name of the regulation: “Rabla” program (car scrappage scheme)

Category: Subsidy

Timeframe: ongoing

- For the reduction of GHG emissions in transport, the most notable policy measures actually introduced in recent years consist of: increases of fuel excises; introduction of an environment / registration tax; and the “Rabla” program.
- The measure most visible to the general public is a program that has been introduced in 2005 and adjusted incrementally: a vehicle scrappage scheme called the “Rabla” program.
- The objective of the program is to **encourage the removal of the oldest and highest polluting vehicles** from the fleet, and the purchase of new, less polluting models.
- In total, the budget for the “Rabla program” between 2005-2019 amounts to almost **3.5 billion RON (750 million EUR)**. The program is financed through earmarked environment taxes and transfers from the state budget, and its total budget is administered by the **Environment Fund Agency AFM**.
- Program beneficiaries consist of **individual car purchasers** (since 2005) and **companies** (since 2010).

ROMANIA: “RABLA” PROGRAM (CAR SCRAPPAGE SCHEME)

RESULTS AND IMPACTS

“Rabla” program has helped scrap almost **600,000** ageing and high-polluting vehicles and subsidized the purchase of around **357,000** more efficient vehicles

The estimated CO2 emissions saved in the past 4 years is about **44 million g CO2**. The sales of electric vehicles reached **3%** of the sales of new cars.

The program “peaked” in 2010, with almost **190,000** cars scrapped, and has since fallen to much lower levels (**20-30,000 yearly**), though it is expected to pick up again in 2019.

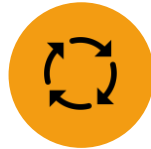
The Rabla Plus program has stimulated the acceleration of electric vehicles sales in 2018, where consumers bought 370 pure electric cars and 97 plug-in hybrid cars under the scheme.

ROMANIA: “RABLA” PROGRAM (CAR SCRAPPAGE SCHEME)

SUCCESS FACTORS



Relative predictability



Process approach to implementation

CHALLENGES



Uncertainties about funds and the number of tickets for related with annual approval of the budget



Correlation with existing strategies and action plans

CASE STUDY



- Romania has the most generous bonus for electric vehicles in the EU, with a subsidy of up to 45,000 RON (about 10,000 EUR) for electric vehicles and 4,500 EUR for a hybrid vehicle, but no more than 50% of the vehicle's price. The total number of electric cars purchased in 2018 was 847, increasing 2.2 times compared to 2017; and 3169 hybrid units compared to 1,980 in 2017.
- In 2018, the announced support through Rabla Plus for electric and hybrid cars was for an estimated number of 2,000 new vehicles in the two categories. The increase in eco vehicles indicates consumer willingness to purchase cleaner cars; the main impediment to faster penetration of electric and hybrid vehicles is, however, the poor infrastructure, which lags far behind the potential for this new market. There is also not a reliable monitoring of improvements in indicators such as air quality to show the impact.

SHARE OF EFFICIENT CARS IN TOTAL SALES IN 2015

- The share of efficient cars in yearly sales started **growing rapidly** after 2012 in all six considered countries. Despite this, all scores in 2015 were **significantly lower** than the EU average (which amounted to almost **21%**).
- The best percentage in the region, at over **15%**, was recorded in Bulgaria, followed by Romania with slightly over **14%**. The share of efficient cars in total sales in each of the remaining four countries was around **8%**.
- The **growing pace** of percentage increase every year in all of the considered CEE countries is worth noting. It is faster than in Germany, which, while still having a higher indicator value than Hungary, Slovakia, Czech Republic and Poland in 2015, is increasing comparably slower.

Figure 3. Annual sales of efficient vehicles (<100g CO₂) as a percentage of the total, 2010-2015

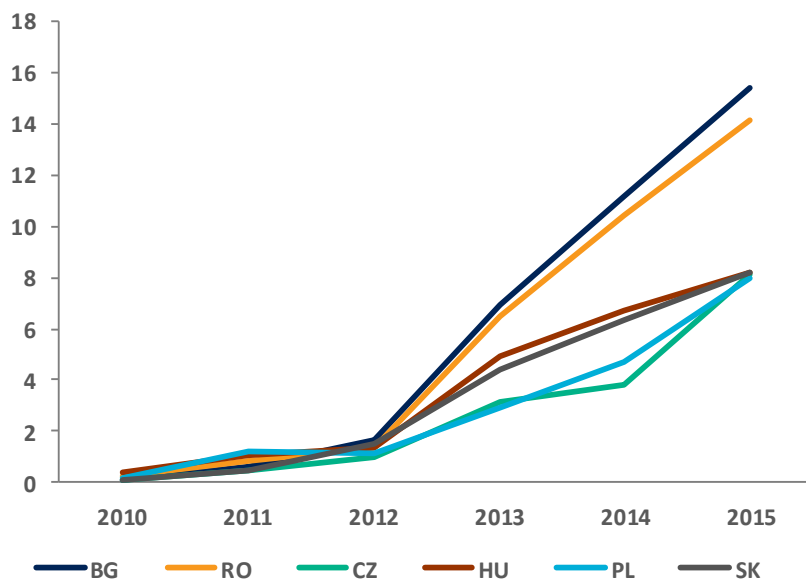
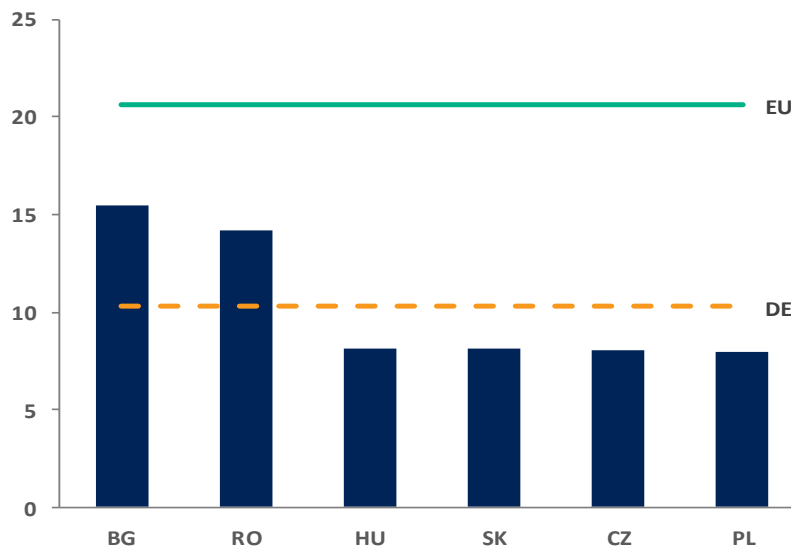


Figure 4. Annual sales of efficient vehicles (<100g CO₂) as a percentage of the total, 2015



Source: WiseEuropa based on Odysee data

BULGARIA: REVISION OF TAXATION ON VEHICLES



Name of the regulation: Revision of Taxation on Vehicles

Category: Regulatory and Financial

Timeframe: ongoing

- The gradual introduction of tax incentives changing the previous reverse tax structure would probably create the biggest impact in the **five years**. This means that the more expensive the car, the higher the tax. Such tax code has resulted in disincentives for purchasing more efficient cars. The tax reforms are still relatively new, so they cannot fully justify this positive trend.
- The Vehicle Tax is formed from **three main components** including: power-based tax rate, eco-standards and nationally-set age.
- The tax measures are **not funding** the purchase of more efficient vehicles but serve as **negative incentives**. In terms of direct state support for improving the efficiency of the road transport and reducing emissions, there is limited budget of around **EUR 500,000** since 2016 for the purchase of electric vehicles by government administrations but anecdotal evidence shows that there is little uptake of EVs even in public institutions.
- The policy is targeting final consumers of vehicles including both **commercial and household users**.
- The change in behaviour resulting in more efficient vehicles on the street has been mostly driven by **socio-economic and technical** factors rather than policies. However, the recent tax changes could potentially change the consumption patterns of drivers in the next couple of years if municipal authorities implement the new tax rates consistently and are bold enough not to create new loopholes for drivers using old cars.

BULGARIA: REVISION OF TAXATION ON VEHICLES

RESULTS AND IMPACTS

It is too early to measure the results or the direct impact of the tax reform.

SUCCESS FACTORS



Determining the amount of tax
by municipal councils

BULGARIA: REVISION OF TAXATION ON VEHICLES

CHALLENGES



Negative effect on municipal tax revenue



Inconsistencies within Vehicle Tax system



Lack of enough technical equipment for emissions measurement



Enforcement gaps and outright corruption practices

CASE STUDY



- The biggest impact on the actual tax rate comes from the power and age-based coefficients. In fact, the age does not provide any positive incentive to drivers as the newer the car, the higher the multiplier coefficient. This means that for the most popular cars in Bulgaria with an age of around 10-15 years and with power up to 100 kW, most drivers would pay a maximum tax of around **EUR 50** per annum, **hardly a deterrent** to driving polluting old cars. Driving a new car with the same power could in fact increase the tax by more than 100%.
- The **Burgas and Stara Zagora municipalities** have proposed some of the steepest tax discounts for newer and more efficient vehicles and some of the highest tax rates for powerful engines. This is reflection of the relatively lower number of new vehicles in these two cities in comparison with the two biggest cities in the country, Sofia and Plovdiv. Hence, the negative effect on municipal tax revenue would be **lower** and financially more acceptable. In addition, the two cities have mayors with high popular appeal, and would find it much easier to justify socially controversial tax policies. This is not the case in the other cities, which have a much more competitive political environment.

SHARE OF ELECTRIC CARS IN TOTAL SALES IN 2018

- In the CEE region, the country with **the most active electric passenger vehicles market is Hungary**. Its share of e-cars in new registrations in 2018 was 1.4%, which is undoubtedly the best score in the region – the second best performer is Bulgaria with half of that share (at 0.7%).
- The electric passenger cars market in the CEE region is **less developed than it is in the EU in general**. When taking the number of operating electric cars into consideration, the best score in the region – Hungary's 381 vehicles per million people – is still **5 times lower** than EU average.
- The electric cars market has been growing relatively fast in the recent years in most countries considered. However, following the current trends, the **CEE region is unlikely to reach similar levels of electric cars per capita in the upcoming years as the EU**.

Figure 5. Electric cars stock per million people in the CEE region, Germany and the EU, 2008-18

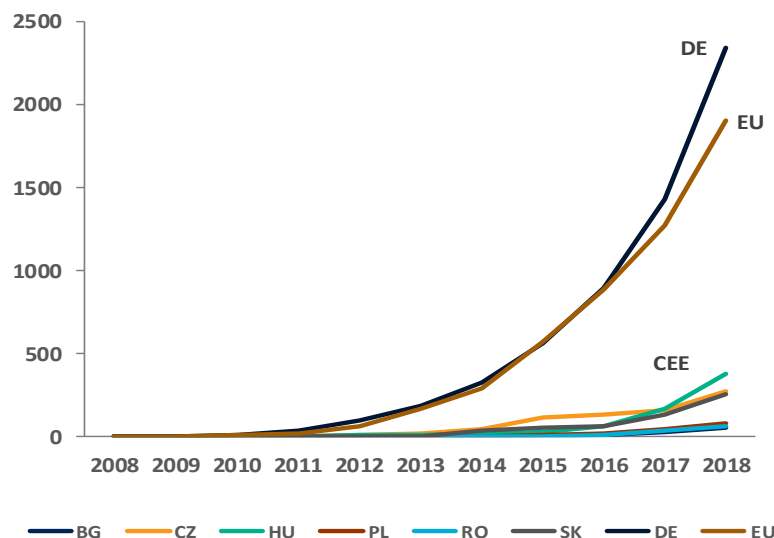
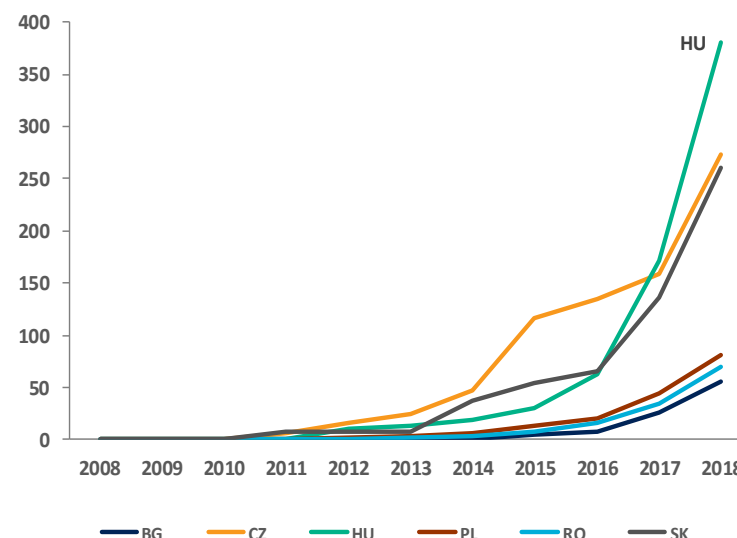


Figure 6. Electric cars per million people in the CEE region, 2008-18



HUNGARY: JEDLIK ÁNYOS ACTION PLAN OF 2015 (JÁT)



Name of the regulation: Jedlik Ányos Action Plan of 2015 (JÁT)

Category: legislative/informative, legislative/normative, fiscal, infrastructure

Timeframe: ongoing

- The JÁT's general objective is reportedly to **promote electromobility** in Hungary, however it was never made formally published online or offline.
- The Government Resolution No. 1487/2015, establishes the legislative tasks related to the JÁT that covers i.a. **development of electric charging infrastructure and introduction of the green number plate for EVs and hybrids.**
- Both **individuals and businesses** may apply for the EV-purchase subsidy grant and by virtue of receiving the green number plate, they are all automatically eligible in the other tax benefits and fee waivers.
- The government used EU ETS auction revenues for funding up to **500 charging points with a total of c.a. 4 million EUR.**
- The grants of 20% to purchase a new BEV (up to a maximum of 4700 EUR) amounts to an **additional circa 15 million EUR.**
- In 2015, the government supported the purchase of **20 EV buses by the city of Budapest with 12.2 million EUR.**

HUNGARY: JEDLIK ÁNYOS ACTION PLAN OF 2015 (JÁT)

RESULTS AND IMPACTS

As the JÁT itself is not available to the public, it is not possible to evaluate whether the programme has met its objectives.

However, the most visible outcome of the Jedlik Plan is the **spreading of green number plates for electric vehicles**.

According to press reports it appears that since 2016, cca EUR 16.5 M has been made available for vehicle subsidies and the purchase of about 1200 cars.

As a result of resolution No. 1487/2015 8500 EVs and hybrids (among them 3700 BEVs) were eligible for a green number plate in 2018.

Resolution No. 1487/2015 contributed to the development of charging network: 7 EVs per charging stations – better result than the overall EU rate of 8 cars per charging points.

HUNGARY: JEDLIK ÁNYOS ACTION PLAN OF 2015 (JÁT)

SUCCESS FACTORS



Generous subsidies



Active and positive communication by the government about programme



Additional benefits such as free parking and charging at public charging stations

CASE STUDY



- The most visible outcome of the Jedlik Plan is the **spreading of green number plates for electric vehicles**. As of late 2018, there are more than **8500** vehicles with green number plates. This is still only **0.23%** of the entire passenger vehicle fleet, and half of their share is in Germany, but strong growth is noticed.
- Having a green number plate comes with many benefits: free parking in Budapest and other cities, free charging at public charging stations, a price subsidy of up to **4700 EUR**, exemption from all taxes and duties etc.

CHALLENGES



Implementation challenges



Limited subsidies in the long-term perspective



Necessity to adapt the green number plate regulation to the capabilities of all social groups

ELECTRIC BUS FLEET PER CAPITA IN 2018

- The first electric buses in operation were introduced in the CEE region in 2015 in Poland. Since then, **Poland has the biggest fleet** both in absolute terms and adjusted for population.
- At the current rate of developing the e-bus fleet, **Poland is likely to reach or surpass the EU average** in the upcoming years.
- Compared to the EU average though, the **entire CEE region is lagging behind** – the number of electric buses in operation in Bulgaria in 2018 was **29 times lower** than in EU and in Romania, Czechia and Slovakia respectively **16, 11 and 2.5 times lower**.
- Hungary with a **3.4 e-buses per million inhabitants** is the second best performer in the CEE region. Slovakia, with **1.7 e-buses per million inhabitants** in 2018, has less than a half of the number in Hungary or Poland, but at the same time performs substantially better than Czech Republic, Romania and Bulgaria.

Figure 7. Number of electric buses in operation per million capita, 2018

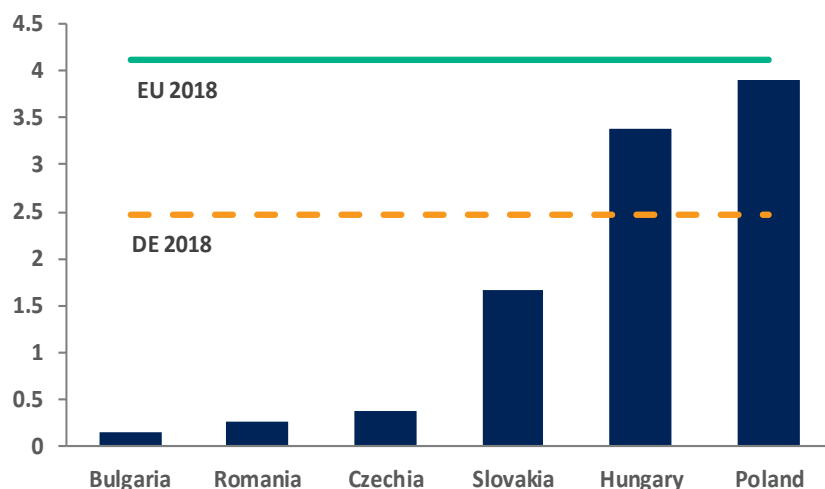
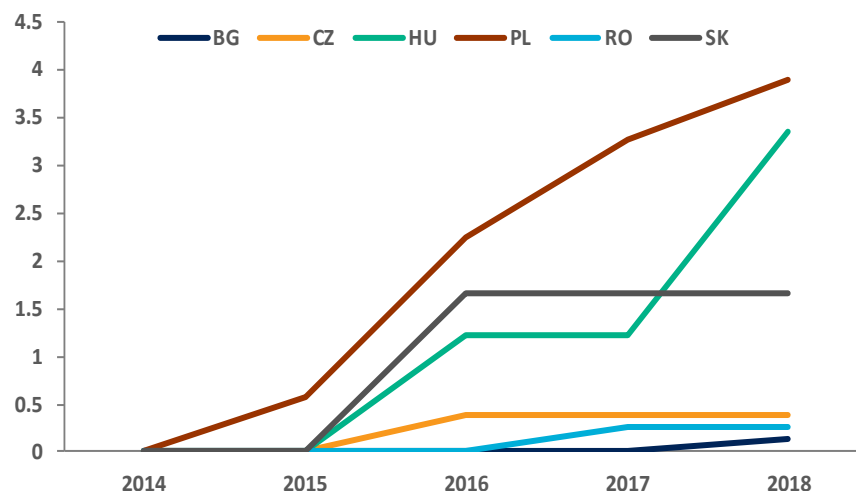


Figure 8. Number of electric buses adjusted for population (per million inhabitants), 2014-2018



POLAND: ROLLOUT OF ELECTRIC PUBLIC TRANSPORTATION BUS FLEETS



Name of the regulation: Rollout of electric public transportation bus fleets

Category: financial

Timeframe: ongoing

- E-mobility is regarded by the Polish government as **one of the key focus areas** of economic development in the country.
- The objective set in the “Act for Electromobility” requires for all communities over 50 000 inhabitants to have **at least 30%** of their public transport bus fleets emissions-free by 2028.
- The policy is addressed to city halls and local public transport providers.
- Budget: **2 704 921 948 EUR** until 2023 funded by the Infrastructure and Environment Programme within the European Cohesion Fund for projects concerning development of low-emissions public transport in municipalities in Poland. The EU funds can cover **up to 85%** of the eligible costs of an investment.
- On the national level, the National Fund for Environmental Protection and Water Management has introduced the GEPARD programme in the year 2017, which has a budget of **200 000 000 PLN** over 3 years (until 2020).
- The aim of the GEPARD programme is to **develop e-mobility in smaller towns**, as the big projects in cities such as Warsaw or Cracow have been rather successful in obtaining funding on the European level.

POLAND: ROLLOUT OF ELECTRIC PUBLIC TRANSPORTATION BUS FLEETS

RESULTS AND IMPACTS

Deployments of electric bus fleets in numerous Polish municipalities. Currently the biggest bus fleet is in **Warsaw** (30 buses), followed by **Cracow** (26 buses).

In 2014, Poland did not have any electric buses in operation – in 2018 however, the number is already **148**.

Increase in the number of public orders - for example, Warsaw already ordered additional **130** electric 18-metre long Solaris buses and Zielona Gora ordered **47** Ursus electric buses.

Further examples include Szczecin, Gdynia and Poznan, all of whom signed subsidies contracts with the GEPARD programme to obtain **6** new electric buses each.

As the manufacturers are gaining market scale thanks to big public orders, the subsequent **price reduction** in the upcoming years is very likely.

POLAND: ROLLOUT OF ELECTRIC PUBLIC TRANSPORTATION BUS FLEETS

SUCCESS FACTORS



Generous international and national funding



Proactive involvement of the strong local manufacturing base combined with the pressure to improve air quality in urban areas

CHALLENGES



Difficulties in estimating the battery lifetime in the buses



Uncertainty of future electricity prices makes

CASE STUDY



- The first city that established a fully electric bus route in Poland is **Cracow**. In 2014, the local public transport enterprise (MPK Krakow) started testing electric buses that were temporarily made available by several manufacturers. In 2016, an auction was carried out to purchase **20** electric buses, which was financed thanks to the European Regional Development Fund within the Common Regional Policy. The expense amounted to about **43 million PLN** (net value). Moreover, the city is partnering with the National Center for Research and Development in a big-scale e-mobility project with a goal of deploying large bus fleets in many Polish cities – **over 100** in Cracow itself.
- Currently in the Warsaw there are **30 e-buses** operating in the city – the first 10 were deployed in 2015, followed by 20 more in 2017 (12m buses). An auction for a delivery of the next **130** (this time articulated, not 12m) electric buses ended in February 2019 and was subsidised from the European Cohesion Fund with **41 million EUR**. Warsaw spends around **25%** of its entire budget on public transport, and currently **50%** of it is fuelled by electricity.

INCREASE IN RAIL TRANSPORT SHARE IN PASSENGER TRANSPORT SINCE 2005

- The share of railway transport in overall passenger transportation in the CEE region in the years 2005-2016 has generally remained **below 10%**, with the only exception being Hungary in the beginning of the period considered.
- All CEE countries except for Slovakia and Czech Republic have **decreased** their shares of rail transportation between 2005-2016.
- The indicator value in terms of EU average and for Germany itself **increased**, reflecting the different tendency in this regard between the west and the CEE region.
- Slovakia is indicated as **the best performer** in terms of rail transport share in passenger transport in the years 2005 – 2016. The total volume of rail transport increased **60%** between 2005-2016, and the distance travelled by railways yearly per citizen rose from 406.1 km in 2005 to 629.2 km in 2016 (**58%** increase).

Figure 9. Share of rail transport in passenger transport

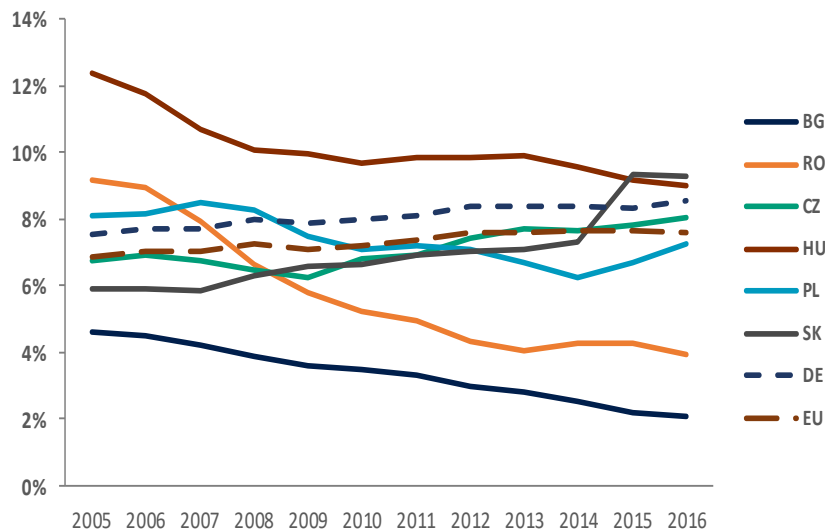
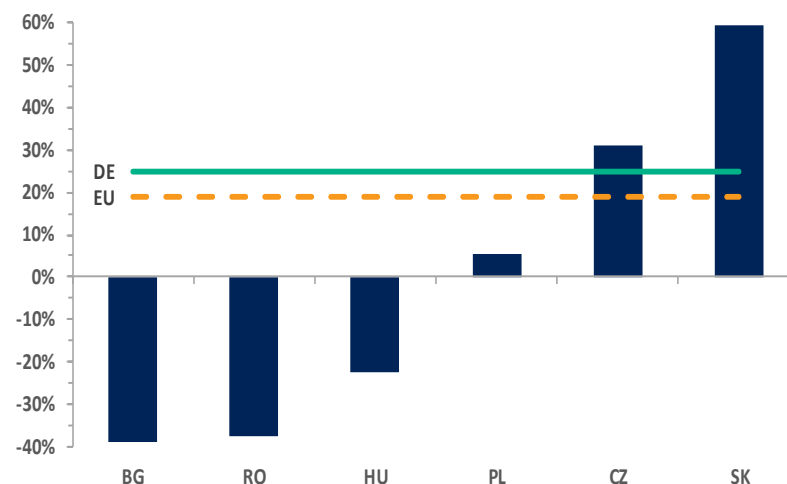


Figure 10. Total rail transport volume change, 2015/2005



SLOVAKIA: MODERNIZATION OF THE RAILWAY SYSTEM



Name of the regulation: Modernization of the railway system

Category: infrastructure

Timeframe: ongoing

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- According to the Slovak Strategic Transport Development Plan the rail transport should be the **backbone part of the public transport system** at the international, inter-regional and suburban level.
 - Slovakia has modernised more than **121 km** of rails since the accession to the EU.
 - The main impact on the increase of passengers had three policy measures: **modernisation of the railway system, strengthening regional connectivity and the introduction of zero-fare transport service for children, students and pensioners.**
 - The policies are addressed to Railways of the Slovak Republic (ŽSR) and Railway Company Slovakia (ZSSK).
 - Budget: **1 020 599 283 €** funded by Operational Programme Transportation for the modernization of infrastructure and rail fleet were allocated for ŽSR and **88 510 567 €** for ZSSK between 2007-2013; For the period 2014-2020 **1 185 966 346 €** has been allocated for further modernisation of railway infrastructure and rolling stock upgrading for this transport.
 - The regional transport to Bratislava was in 2012 opened for **private company** RegioJet due to demand for increase the comfort of the passengers.

SLOVAKIA: MODERNIZATION OF THE RAILWAY SYSTEM

RESULTS AND IMPACTS

Modernization of infrastructure and replacement of the old trains and wagons which operate mainly in Bratislava and Košice region during rush hours.

Comfortable service for the passengers due to the opening of the market to the new railway operator.

Increase in the number of passengers due to the extension of new regional lines and better integration of rail transport with public transport in Bratislava.

Increase in safety of the infrastructure and speed increase.

SLOVAKIA: MODERNIZATION OF THE RAILWAY SYSTEM

SUCCESS FACTORS



EU funds for modernisation of the railway infrastructure



The increase of frequency of regional trains during rush hours and the integration with other kinds of urban public transport



Modernisation of platforms

CHALLENGES



Harmonization of public transport timetables between trains and city public transport



Increase of electricity in total final consumption of energy sources in transport



Improvement of insufficient capacities of some lines and inadequate equipment of trains and stations

CASE STUDY



- Regional rail track Bratislava – Komárno – Dunajská Streda connects capital city Bratislava with towns and villages with southern part of the country. Ministry of Transport decided to open public tender and to involve **private company**. The contract with the winning company RegioJet is valid from 2012 until 2020. In 2011 the track was operated by ZSSK with **790 000 passengers** per year. In 2018 the number of passengers reached almost **3,8 million**, which was even one million higher compared to 2017. The train transports about **500 – 700 passengers** during rush hours. The trains were the first that were equipped with wi-fi connections, air condition and they are also equipped for disabled people.

INCREASE IN SHARE OF BUSES, COACHES, TRAM AND METRO IN PASSENGER LAND TRANSPORT SINCE 2005

- The share of public transport in total passenger land transport is **substantially higher** in the CEE region than the EU average.
- Among the CEE countries, **Czech Republic** and **Hungary** are leading in terms of public transport share, with **27.7%** and **26.9%**, respectively, in 2016.
- Almost all countries considered saw a **decrease** in the share of public transport in land passenger transportation between 2005 and 2016. The sole exception is **Czech Republic** which increased it by **8%**. The biggest **reductions** – **38%** and **36%** respectively – were recorded in **Bulgaria** and **Poland**.
- The country leading the region in terms of distance travelled by public transport per capita in 2016 is **Czech Republic** with a register value over **2500 km**.

Figure 11. Share of public transportation in passenger land transport, 2005-2016

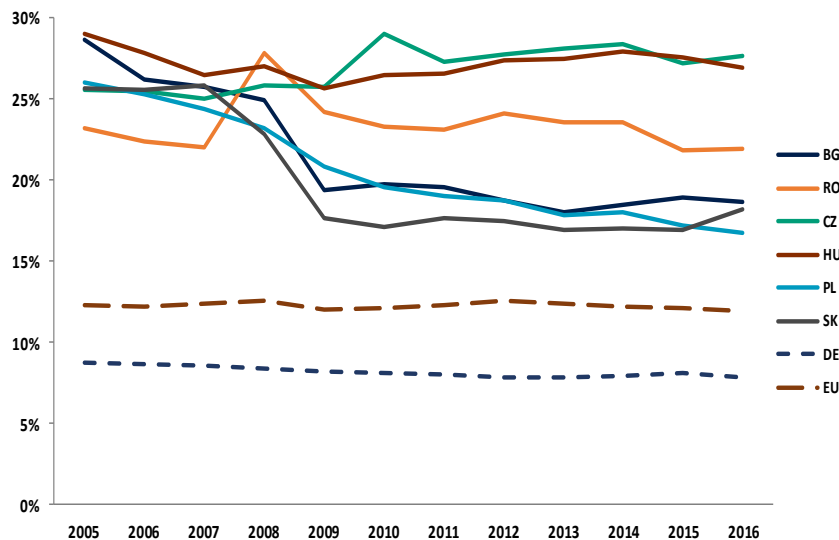
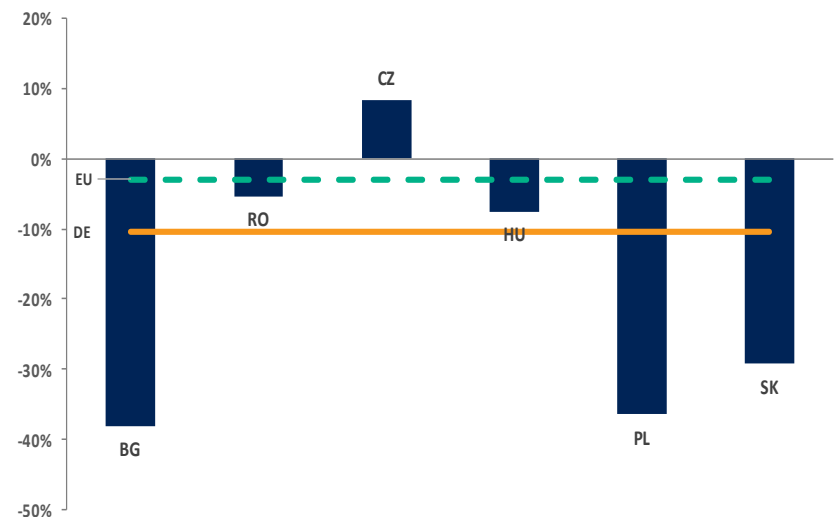


Figure 12. Public transport share change between 2005 and 2016



Source: WiseEuropa based on DG Move data

CZECH REPUBLIC: LAW ON THE PUBLIC SERVICES IN PUBLIC TRANSPORT



Name of the regulation: Zákon o veřejných službách v přepravě cestujících a o změně dalších zákonů
(Law on the public services in public transport)

Category: financial/fiscal/legislative

Timeframe: Ongoing

- The reason for establishing the integrated public transport system is to provide the public transport service in more effective way and to bring more passengers to the public transport.
- The goal of the regulation is to provide public transport connections to all more than **6 200 settlements** in Czechia via delegated authority to the 14 regional administrations, offices, and in certain cases coordinators of the integrated public transport.
- The main beneficiaries are **residents of the Czech Republic** - around 10,5 million people, as well as **tourist**. Children, students, seniors and people with health disabilities are provided with **discharge** for the long-term tickets.
- To make the market economically viable, the state guarantees so called **retroactive compensations** of proven business losses of individual transportation companies procured via open and transparent tenders.
- The nominal amount of the overall compensations in all 14 regions has increased quite significantly in the last eight years from **4.9 billion Czech crowns** in 2009 to **6.8** in 2017.

CZECH REPUBLIC: LAW ON THE PUBLIC SERVICES IN PUBLIC TRANSPORT

RESULTS AND IMPACTS

The overall number of passengers in regional bus transport has remained more or less the same since 2005 in spite of the growing number of purchased and owned individual cars.

The regional public transport systems all around the country have remained significant actors in the national transport.

Thanks to the modernisation of vehicle fleet and remaining subsidies the regional public transport is still able to compete with the individual car transport.

SUCCESS FACTORS



Historical background - the presence of public transport since 1989



Modernisation of the majority of vehicles



Establishing regional administrations and in some cases regional transport coordinators



Geography of the Czech Republic



Partial privatisation but at the same existence of attractive regulated fares

CZECH REPUBLIC: LAW ON THE PUBLIC SERVICES IN PUBLIC TRANSPORT



CHALLENGES



Growing number of cars
and individual car transport



Dependence on the public
(regional) budgets



Insufficient number of first
class roads and highways

CASE STUDY



- The regional administration together with the municipality of the city of Olomouc established a **coordinator of the Olomouc Regional Integrated public transportation system**. The coordinator is responsible for network defining, timetable solution, common fare and transportation directives, controlling, revenues division and marketing.
- Transport accessibility of the Olomouc region is provided by **3582 km** of roads, of which only **12.3%** are first class roads. There is **601 km** of railways in the region. Important rail junctions are in Olomouc and Přerov. The railway network is spread equally all over the Region's territory.
- Civil fares and **discounted fares** are provided for student and 65+ senior fares, children younger than 2 years travel for free. The relative prices of the tickets are generally several times (2-4x) **less expensive** than the individual car transport.
- **Dense network** of the city public transport ensures convenient travel throughout the city of Olomouc. Besides that Olomouc is one of the nation railway station nodes, the regional railway transport as well as the regional bus transport is **fully integrated** with the city public transport. The public transport provider (DPMO) is fully owned and run by the city itself.

OVERALL ENERGY EFFICIENCY GAINS IN HOUSEHOLDS SINCE 2000 (ODEX)

- The progression of energy efficiency gains in households in the years 2000-2015 is significantly **disparate** between the considered countries.
- Since 2000, Romania was **constantly increasing** its energy efficiency and consistently outperformed other CEE countries, as well as the EU and Germany.
- Quick energy efficiency improvements have also been observed in Slovakia, which within 15 years increased its energy efficiency by **36%** (3 p.p. less than the best performer – Romania). Energy efficiency in Poland, Czech Republic, Hungary and Bulgaria has been growing over the considered period, however, the growth has been much **lower** than the EU average, Germany, Slovakia and Romania.
- **Romania** was the best performer in terms of energy efficiency gains in households (39%) in 2015 (relative to 2000), followed closely by Slovakia (36%), with a result nearly **twice** as large as in the other CEE countries.

Figure 13. Energy efficiency gains in households progression since 2000 (indexed to the level of the year 2000)

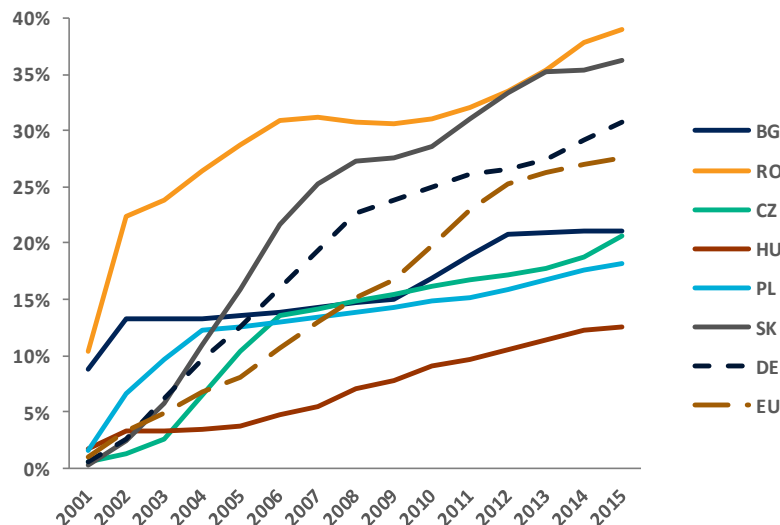
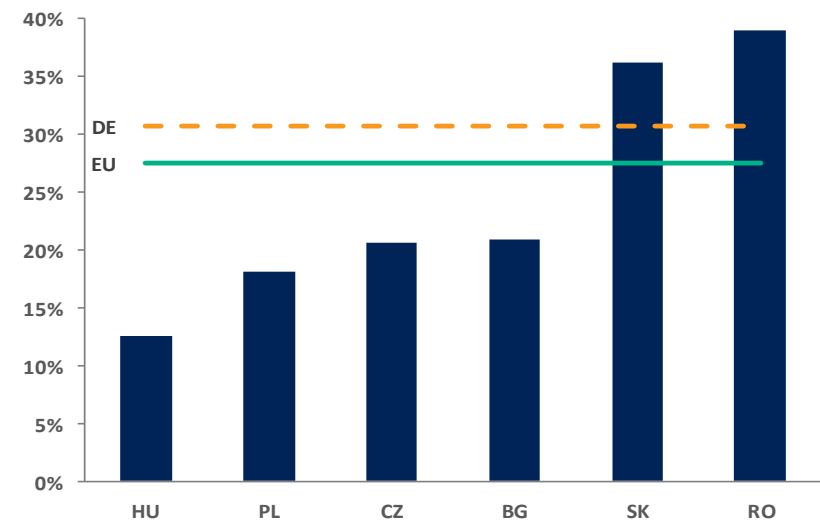


Figure 14. Energy efficiency gains in households since 2000



ROMANIA: THERMAL INSULATION – EIB LOANS



Name of the regulation: Energy efficiency measures in residential buildings – thermal insulation, EIB loans

Category: Financial

Timeframe: completed (2008-2018)

- Over the years, several measures have been introduced by the central and local governments for thermal insulation in residential buildings, though information, just like the policies, is quite **fragmentary and incomplete** (e.g. there is no aggregate data on municipal programs, nor any information about private initiatives).
- Among various initiatives and measures for the thermal insulation of buildings, **the most effective program** consists of a series of **EIB loans for multi-family buildings**, which were started in 2010.
- EIB has provided loans for energy efficiency amounting to about **600 million EUR** for **2,200** buildings in several districts (1,2,3,4,6) in Bucharest. The finalization of the thermal insulation under this program would achieve a saving of **1,000 GWh/year** once the projects are completed. By 2015, about **440 million EUR** loans had been signed.
- The direct beneficiaries are the **homeowners in multi-apartment buildings**. Homeowners associations apply to the city hall with the request to be included in the program and they are considered on a first come, first serve basis

ROMANIA: THERMAL INSULATION – EIB LOANS

RESULTS AND IMPACTS

Rehabilitated buildings would **save 50%** of the current energy consumption after the finalization of the project.

The main benefit for consumers from the thermal insulation programs consists of **improved comfort of living**.

The total energy savings at the end of the EIB projects in the 5 districts of Bucharest (1,2,3,4,6) would be **1000 GWh/year**, but the program does not leverage future investments with other sources of financing, so the impact will be **limited** to the buildings finalized under the on-going projects.

District heating prices are the only subsidized energy prices and most multi-family buildings are still connected to district heating. As a result, home owners are **unwilling to invest** in thermal insulation to reduce utility bills and thus recover the initial investment.

District 1 has obtained **50%** of the total amounts in EIB loans, so the EE gains in this district alone can be estimated at **500 GWh/year**.

ROMANIA: THERMAL INSULATION - EIB LOANS

SUCCESS FACTORS



Supervision of independent evaluators

CHALLENGES



Crowding out a private financing



Insignificant role of homeowners



Internalization of the benefits of the thermal insulation programs by homeowners

CASE STUDY



- District 1 was from the beginning the most advanced in the implementation of the EIB program. In 2007-2014, the district had finalized **820** buildings (84% of the total multi-family buildings eligible for financing), and the remaining **150** blocks have been finalized after 2015.
- The municipal budget provided mostly co-financing for EIB loans and full financing for a very small number of multi-family buildings. The works done include **external insulation**, while no works are done inside individual apartments. Though additional energy efficiency gains could be achieved by works **inside apartments**, these would create additional complications that everyone wanted to avoid.
- One of the contractors for the EIB project (TUD) has prepared an application which allows the visualization of the implementation of the project by building, including all relevant technical details, such as the Energy Performance Certificate, details of the intervention (design and construction), status of implementation of the works. Energy savings for the finalized buildings, as reported in EPCs, are above 40%.

DECLINE IN ENERGY CONSUMPTION FOR THERMAL USES PER SURFACE AREA SINCE 2005 (KWH/SQM)

- Energy consumption for thermal uses per surface area **decreased** in all six CEE countries, Germany and the EU in general since the beginning of the 21st century.
- While Bulgaria showed the lowest value of the indicator in each year between 2005 and 2015, **Slovakia improved** the most over the 10 years period, going from **195 to 115 kWh** per square meter (**35%** reduction) thus it **exceeded** the German (-27%) and EU (-24%) reduction rates.
- Except for Bulgaria and Slovakia, which both recorded lower levels of energy consumption for thermal uses per surface area than Germany and the EU average, all other CEE countries showed levels **substantially higher**.
- Romania's value has been **the highest** among the countries considered – however, it also declined significantly (18% reduction) in the 10 years period.

Figure 15. Energy consumption per surface area (kWh per sqm), 2005-2015

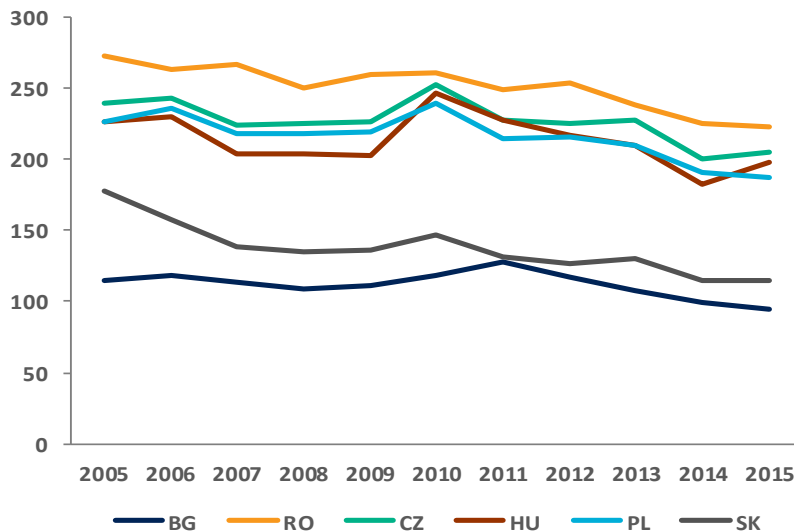
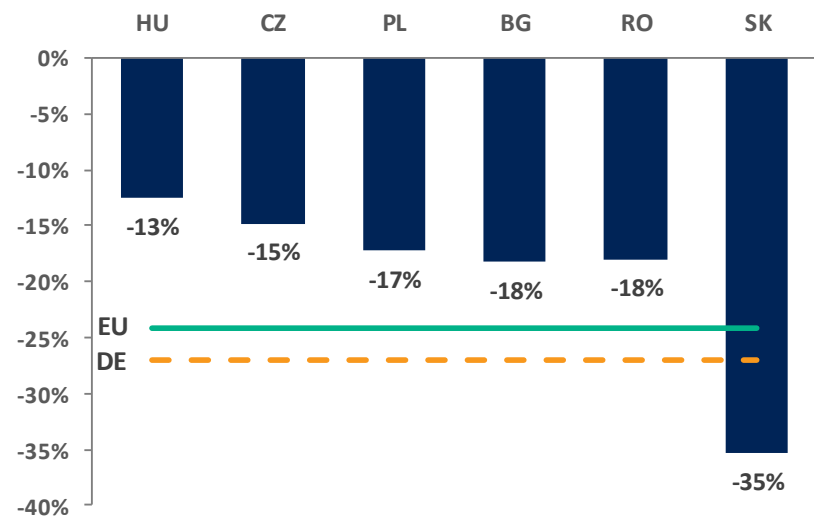


Figure 16. Decline in energy consumption for thermal uses per surface area, 2015 (relative to 2005)



SLOVAKIA: INSULATION/RETROFIT



Name of the regulation: Insulation/retrofit

Category: financial

Timeframe: ongoing

- Slovak State Fund for Housing Development has been created to support not only **retrofits** of ageing buildings, but also their **insulation** and **improvement** of their energy efficiency.
- Policy aimed at refurbishing in particular by thermal insulation of buildings and system faults removal has been implemented **since 1992**.
- The Fund's main tool is an offer of long-term low-interest **loans** for special purposes of dwellings refurbishment and/or insulation. These loans have often **0%** interest – in 2017 **69,9%** of all Fund's loans had 0% interest. The loan can be used to **insulate the facade, refurbishment and insulation of the roof and refurbishment of windows and doors**.
- The main beneficiaries are **households** and **flat owners** represented by building management companies who can benefit from low-interest loans for refurbishment and insulation of their building.
- Between 1996 and 2016, the Fund provided **803 million Euro** in loans for both refurbishment and insulation. Financing of the Fund is done with own funds, state budget and EU funds. The overall revenues in 2017 were **394 million Euro** and total costs of **195 million Euros**.

SLOVAKIA: INSULATION/RETROFIT

RESULTS AND IMPACTS

It is estimated that more than half of residential buildings (apartment buildings, **58,3%**) and more than one third of family houses (**37,5%**) underwent refurbishment by the end of 2016.

The State Housing Policy expects an annual increase of **29 thousand** units in residential buildings and **22 thousand** family houses to be refurbished in the upcoming years

Increase in the number of insulated and refurbished blocks of flats during the 1996-2016 contributed to **decrease of energy consumption** in housing sector and increase of energy efficiency in the whole sector.

The buildings sector was the main contributor of energy savings in Slovakia in period 2014-2016 when it altogether contributed to the overall goal of energy consumption decrease with **5 016TJ** (out of 9 617 TJ).

SLOVAKIA: INSULATION/RETROFIT

SUCCESS FACTORS



Generous subsidies and preferential loans



Large number of programmes focused on improvement of thermal efficiency of buildings

CHALLENGES



Dependence on behaviour of owners of flats



Large number of old, inefficient buildings

CASE STUDY



- The State Fund for Housing Development started to implement project Joint European Support for Sustainable Investment in City Areas (Jessica) as an institution responsible for management of this project in 2013.
- The first phase of the project in Slovakia (Jessica 1) focused on the **insulation of apartment buildings** in city areas, the second one (Jessica 2) had a wider focus and supported **complex refurbishment** of residential buildings.
- The project supported insulation in way of **long-term** (15-20 years) **low-interest rates** (0-1.5% p.a., depending on year) and loans from the Fund for insulation. The maximum loan was **EUR 200 000** that could cover up to **80%** of overall costs of the insulation project. The objective of the project was to decrease heating costs of the supported buildings by at least **20%**.
- Jessica 1 supported altogether **72** projects focused on insulation of residential buildings with **EUR 11 483 006,41**. For example, in 2014 the projects financed with the help of Jessica 1 scheme, enabled insulation of residential buildings with altogether **3308** units and the estimated energy savings were more than **28 TJ**.

RELATIVE DECLINE IN CO2 EMISSIONS PER UNIT OF ENERGY CONSUMED FOR THERMAL USES SINCE 2005

- Almost all countries considered saw a **decrease** in emissions per unit of energy consumed between 2005 and 2015, despite slight fluctuations. Generally, from 2006, all CEE countries except for Poland and emitted **less** than Germany and the EU average.
- From the beginning of the century, **Bulgaria** has been the country with **lowest emissions** per unit of energy consumed in each year until 2015, when it emitted **2** times less CO2 than Romania, **4.4** times than Germany and **4.7** less than Poland.
- **Bulgaria** also led the CEE region in relatively reducing CO2 emissions per unit of energy consumed for thermal uses in the years 2005-2015 - it averaged way better than the EU average and Germany as well.
- The only country with a positive increase in emissions is **Poland** - this may indicate its continuing **strong attachment** to high-emission solutions.

Figure 17. Emissions per unit of energy consumed (kg CO2 per MWh), 2000-2015

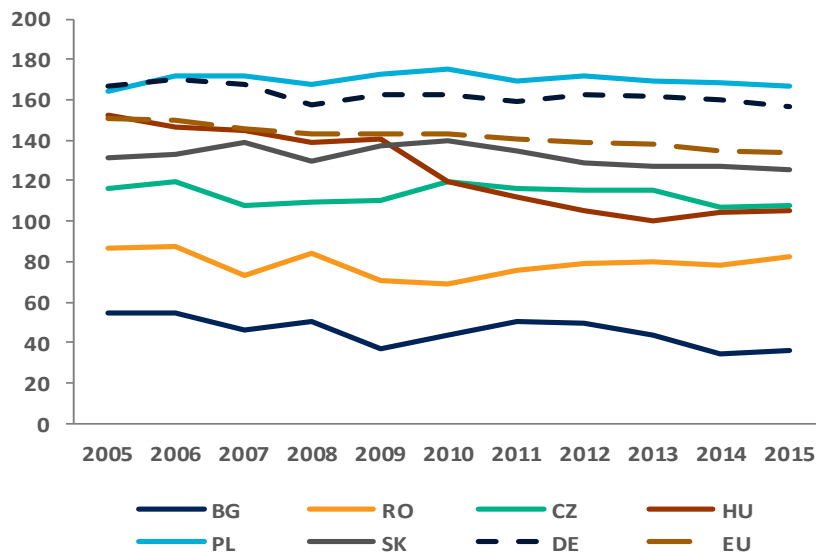
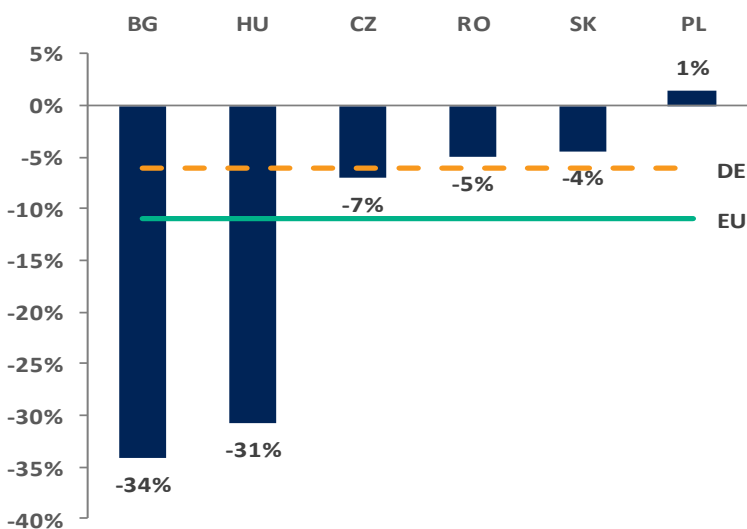


Figure 18. Relative decline in emissions per unit of energy consumed between 2005 and 2015



Source: WiseEuropa based on JRC IDEES data

BULGARIA: REDUCTION OF HEAT LOSSES IN THE HEAT DISTRIBUTION NETWORKS



Name of the regulation: Reduction of Heat Losses in the Heat Distribution Networks / Investment in the Energy Efficiency of Public Buildings

Category: Regulatory and Financial

Timeframe: ongoing

- A spin-off program from the main regulatory framework for improving the energy efficiency has been the **National Program for Energy Efficiency of Multi-family Buildings**. It is the key instrument aimed at improving energy efficiency in multi-family residential buildings, mainly by installing wall insulation and energy-efficient windows.
- The government has leveraged **EUR 500 million** in budget funding to develop the energy efficiency program for multi-family buildings, as well as the budget under the EU operational program Regions in Growth 2014 – 2020.
- The latter has targeted administrative and municipal buildings as the program includes a dedicated priority axis targeting periphery regions, through which local municipalities manage smaller scale projects. The allocated budget to the priority axis is about **EUR 105.7 million**, of which over **40%** have already been disbursed for **170** projects, **36** of which also include multi-family residential buildings.
- The regulatory framework and the funding streams have been directed to **legal persons operating power, heat and gas distribution businesses**, as well as the **management of public and multi-family residential buildings**.

BULGARIA: REDUCTION OF HEAT LOSSES IN THE HEAT DISTRIBUTION NETWORKS



RESULTS AND IMPACTS

The large-scale investments in improvements in the energy efficiency of buildings have led to a significant overall **improvement** of the energy efficiency in Bulgaria over the past 15 years.

In terms of the multi-family residential program, the government claims that a total of **1 TWh** has been saved due to the refurbishment of apartment blocks.

Upon the completion of the first phase **2022** contracts had been signed with homeowners' associations across the country, although only **782** buildings had been completed. The remaining buildings are expected to be completed in the current phase, which has also received **EUR 500 million**.

Since there are no ex-ante assessments done, there is no reliable way to measure the impact of large energy efficiency programs.

BULGARIA: REDUCTION OF HEAT LOSSES IN THE HEAT DISTRIBUTION NETWORKS



SUCCESS FACTORS



Mandatory nature of energy saving targets for large consumers



Utilization of EU regional funds for public buildings renovation



Non-discriminatory and fully-funded residential energy efficiency investment program

CHALLENGES



Insufficient information about the benefits of improving energy efficiency



Limited administrative capacity of municipalities



Lack of technical supervision of projects

CASE STUDY



- Zooming in on the National program for multi-family residential buildings, by the end of 2018, **the highest number** of completed buildings is in the Black Sea municipality of Burgas, where **219** projects have been finalized out of **236** contracts.
- In the Blagoevgrad municipality, another star performer, all **189** contracted multi-family buildings have been renovated.
- In the third largest city, Stara Zagora, energy efficiency projects were completed in **105** out of **111** contracted buildings; the numbers for the Haskovo and Pazardjik municipalities are **147** and **68**, respectively.
- The capital city, Sofia, has been largely disappointing despite the highest potential for energy efficiency renovations of residential buildings. Only **36** buildings are already in exploitation out of **167** contracted projects. The delays in Sofia are symptomatic of the many governance deficits.

INCREASE IN SHARE OF SOLAR WATER HEATING IN FINAL ENERGY CONSUMPTION (EXCL. ELECTRICITY) SINCE 2010

- Share of solar water heating in final energy consumption in the CEE region is **substantially lower** than on average in the EU.
- Between 2010 and 2017, the percentage **increased** in all countries (except for Romania). The biggest relative increase occurred in Poland where the indicator value rose from **0.03%** in 2010 to **0.24%** in 2017.
- In terms of the share of solar water heating in final energy consumption in each year between 2010 and 2017, Bulgaria is the best performer in the region. However, when taking into consideration the share's relative increase in this period, **Poland** is the leader with over **600%** increase.
- At the beginning of the period considered, Poland had the smallest share of solar water heating in FEC, and Bulgaria had the biggest share (0.29%). Until 2017, Poland surpassed Hungary and Czech Republic, reaching the third spot in the CEE region with a value of **0.24%** – after Bulgaria and Slovakia.

Figure 19. Share of solar water heating in FEC, 2017

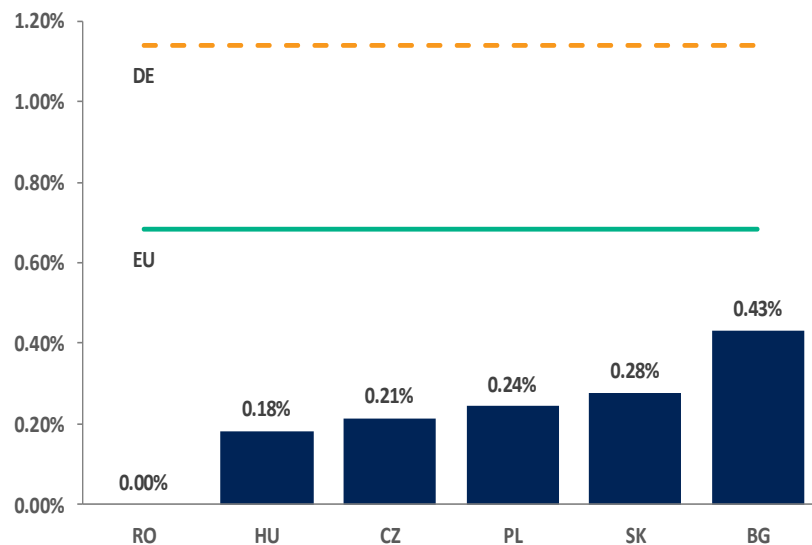
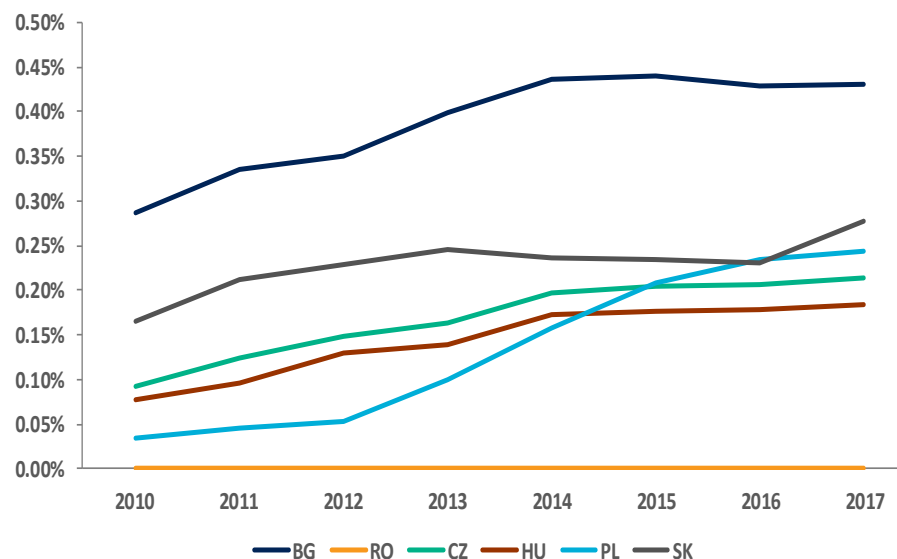


Figure 20. Share of solar water heating in CEE countries, 2010-2017



Source: WiseEuropa based on JRC Ideas data

POLAND: PROMOTION OF SOLAR COLLECTORS IN HOUSEHOLDS SECTOR



Name of the regulation: Promotion of solar collectors in households sector

Category: financial

Timeframe: completed

- National Fund for Environmental Protection and Water Management (NFOŚiGW) launched program payments to bank loans for **purchase and installation of solar collectors**. The main problem, addressed by the subsidy program, is the high carbon footprint of households.
- The main objective of the program was **reduction or avoidance CO2 emissions** by increasing thermal energy production from renewable sources.
- Financial support was granted for the **purchasing and assembling of solar collectors** for heating of service water and for an additional energy supply for other heat receivers in buildings used for residential purposes.
- The policy has been addressed to **natural persons** who have the right to take decisions about the residential building, or the right to take decisions about a residential building under construction and to housing communities installing solar collectors on their own multi-family buildings.
- The budget included **104 million EUR** to pay grants in the form of loan agreements concluded in the years 2010-2014.

POLAND: PROMOTION OF SOLAR COLLECTORS IN HOUSEHOLDS SECTOR

RESULTS AND IMPACTS

The results of the program overachieved the assumed target. Over **67 thousand** installations were completed, which contributed to reduce approximately **75.1 kt CO2 emission** per year for 2010-2014.

According to NFOŚiGW statistics from 2014, within the project **61.4%** hard coal, **11.2%** electricity, **18.8%** natural gas and **8.6%** other energy carriers have been replaced by solar energy.

Grants from NFOŚiGW contributed to **35%** of all installations of solar collectors in Poland.

Significant increase in collector sales - in this terms, Poland was promoted from **9th place** in 2009 to **3rd** in 2012 among European countries.

Accelerated industry development and emergence of new companies on the market, which contributed to the employment growth in the solar collectors industry.

POLAND: PROMOTION OF SOLAR COLLECTORS IN HOUSEHOLDS SECTOR

SUCCESS FACTORS



Natural persons as recipients of the program



Effective cooperation with the banking sector



Possibility of simultaneous co-financing from other sources



Comprehensive program preparation

CHALLENGES



Improve the competitiveness of domestic companies



Expectation of short-term profits



Lack of coordination and stable regulation



Installation costs

CASE STUDY



- Silesian voivodeship, which is one of the most polluted regions in Poland, is one of the main beneficiaries of the subsidy program according to the number of installed solar collectors and its supplies – **17%** of all installation.
- The vast majority of domestic producers are located in the region of southern Poland, in particular in the Lesser Poland and Silesian province.
- In 2015, after the finalization of the subsidy program, **1047** solar enterprises were registered in the Business Navigator database, of which their number differed significantly between individual voivodships: **Silesia** has the largest number – **178** - companies associated with solar industry.

INCREASE IN SHARE OF HEAT PUMPS IN FINAL ENERGY CONSUMPTION (EXCL. ELECTRICITY) SINCE 2005

- In terms of the share of heat pumps, the clear leader in the CEE region is **Czech Republic**. Out of the six analyzed countries, in three the recorded share in 2017 was **0%**, while in Hungary and Poland it amounted to, respectively, **0.1%** and **0.2%**.
- Czech Republic was the only country following a similar path to the EU average in introducing heat pumps since 2003. Compared to Germany, Czech Republic performs **slightly worse** (**1.4%** share compared to Germany's **1.8%**).
- Regarding the volume of energy obtained from heat pumps per capita, **Czech Republic** actually **surpasses** the EU average at **9.4** toe per thousand inhabitants (compared to EU's 8.8) in 2017. Germany recorded higher scores in both the share in final energy consumption (1.8%) and the volume per capita (12).
- The figures for Hungary and Poland are both approximately **9 times lower** than for Czech Republic.

Figure 23. Share of heat pumps in FEC, 2003-2017

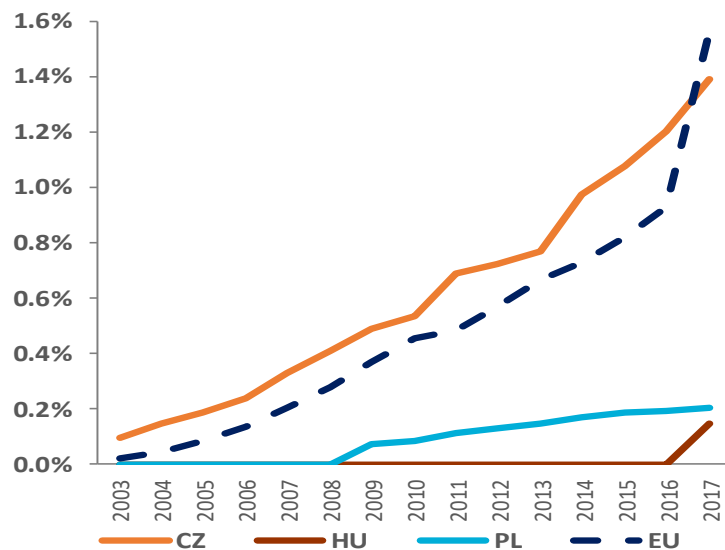
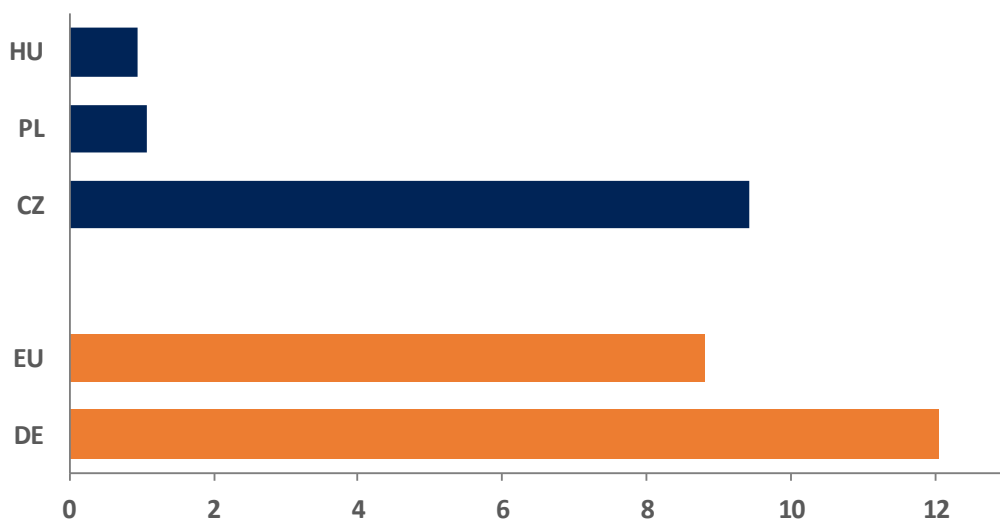


Figure 24. Ambient heat (from heat pumps) per thousand inhabitants (toe), 2017



Source: WiseEuropa based on Eurostat data

CZECH REPUBLIC: NEW GREEN SAVINGS AND KOTLÍKOVÉ DOTACE



Name of the regulation: Zelená úsporám/Nová zelená úsporám 2013/Nová zelená úsporám (New Green Savings) and Kotlíková dotace

Category: funds/fiscal/financial

Timeframe: ongoing

- New Green Savings objective is to **improve** the state of the environment by **reducing** the production of pollutant and greenhouse gas emissions, as well as to **increase heat production** from renewable energy sources by 3.7 PJ. Other objectives were to create or maintain **30,000** jobs and to improve the housing conditions for **250,000** households.
- The programme supports energy savings in single-family houses and apartment blocks, installation of low -emission biomass-fired heat sources, **efficient heat pumps** and solar collectors as well as the construction according to passive energy standards.
- The main beneficiaries of New Green Savings are **owners and builders** of family and multiple-dwelling houses, while beneficiaries of Kotlíková dotace are primarily family and apartment houses owners and **inhabitants of regions with heavy air pollution**.
- The main aim of Kotlíková dotace is to **promote** the replacement of existing hand-filled solid fuel boilers for new, low-emission automatic coal, biomass or coal-and-biomass fired boilers or heat pumps, focused in the “coal” region.
- Budget: New Green Savings – up to **CZ 25 billion** obtained through selling „Emission Credits”; Kotlíková dotace – **EUR 350 million** received from the EU funds.
- The final provider of subsidies in both programs are regional administrations and regional contact centers of SFŽP (the State Environmental Fund of the Czech Republic).

CZECH REPUBLIC: GREEN SAVINGS AND KOTLÍKOVÉ DOTACE



RESULTS AND IMPACTS

New Green Savings: **3.36** PJ energy savings and **384 000** t of annual CO₂ savings every year.

In 2010-2017, a total of **7869** heat pumps were subsidised from New Green Savings programme.

The program did cause certain **incremental increase** in the heat pump installations in 2010 and the growing trend remained more or less the same.

Between 2010-2017, **7225** heat pumps were supported from the **Kotlíková dotace** and **43 396** old polluting solid fuel heating boiler were replaced by new ones (**30%** heat pumps). Moreover, it contributed to **388 162** t/year CO₂ savings and **1 813 439** GJ/year energy savings.

Overall, between 2010-2017, **15 094** heat pumps were supported by either the first, or the second dotation program.

CZECH REPUBLIC: GREEN SAVINGS AND KOTLÍKOVÉ DOTACE



SUCCESS FACTORS



Solidarity among the individual participating state actors



Engagement of the regional contacting centers

CHALLENGES



Ineffective and complicated approval process



Low public knowledge about heat pumps

CASE STUDY



- The “best practice” of a heat pump installation in the Czech Republic would be a hybrid installation where the technology is present as part of a complex, smart energy unit supplying a modern passive house with an emphasis on **efficiency and energy savings**.
- Presented **passive house** is a new building in the village Zlonín situated 7 km Northwest of Prague. The main element of heating, cooling, ventilation (HVAC) and water warming system is a unit with regulatory module connected to a AC unit installed outside the house (air/water heat pump). For water heating, separated solar panels are installed and the pipes for the heated water are connected to a water tank that can also be heated with the **heat pump unit**, as well as by electricity from the FV panels/batteries/grid.
- Construction of the house was supported from the **New Green Savings** program with the amount of **CZK 450.000** and **CZK 150.000** for the hybrid system combining FVE and the heat pump unit for heating the house as well as water.



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