



ENERGY EFFICIENCY SITUATION OF CENTRAL AND EASTERN EUROPEAN REGIONS

Central and Eastern European
Sustainable Energy Network

Introduction

About PANEL 2050 project and CEESEN

The PANEL 2050 project has the aim to create durable and replicable sustainable energy networks at local (municipality/community) level, where relevant local stakeholders collaborate for the creation of a local energy visions, strategies and action plans. The aim of these networks is to contribute to and actively work for the transition towards low carbon communities in 2050.

The PANEL 2050 partnership will provide support for the creation of first successful local energy networks in the CEE countries – CEESEN. In the course of the project, organisations from 10 CEE countries will collaborate on creating regional energy strategies and action plans.

Synthesis report

In the course of the described project 10 CEE regions each developed a Regional Energy Profile. This profile constitutes the groundwork for the preparation of a Regional Energy Roadmap and related Action Plans and will be essential for the communication with regional stakeholders. This report represents deliverable D3.2.

The present synthesis report presents a summary and interpretation of the 10 Regional Energy Profiles concentrating on collected energy data and described framework conditions.

The profiles themselves can be accessed under: <https://ceesen.org/>.

Data collection methods

Energy data was collected on regional level by the members of the CEESE Network. As the local assessment showed, energy statistics and data on regional level are not yet comprehensively collected in all of the survey countries and had to be partly completed by expert assessments and interpolation from available national data.

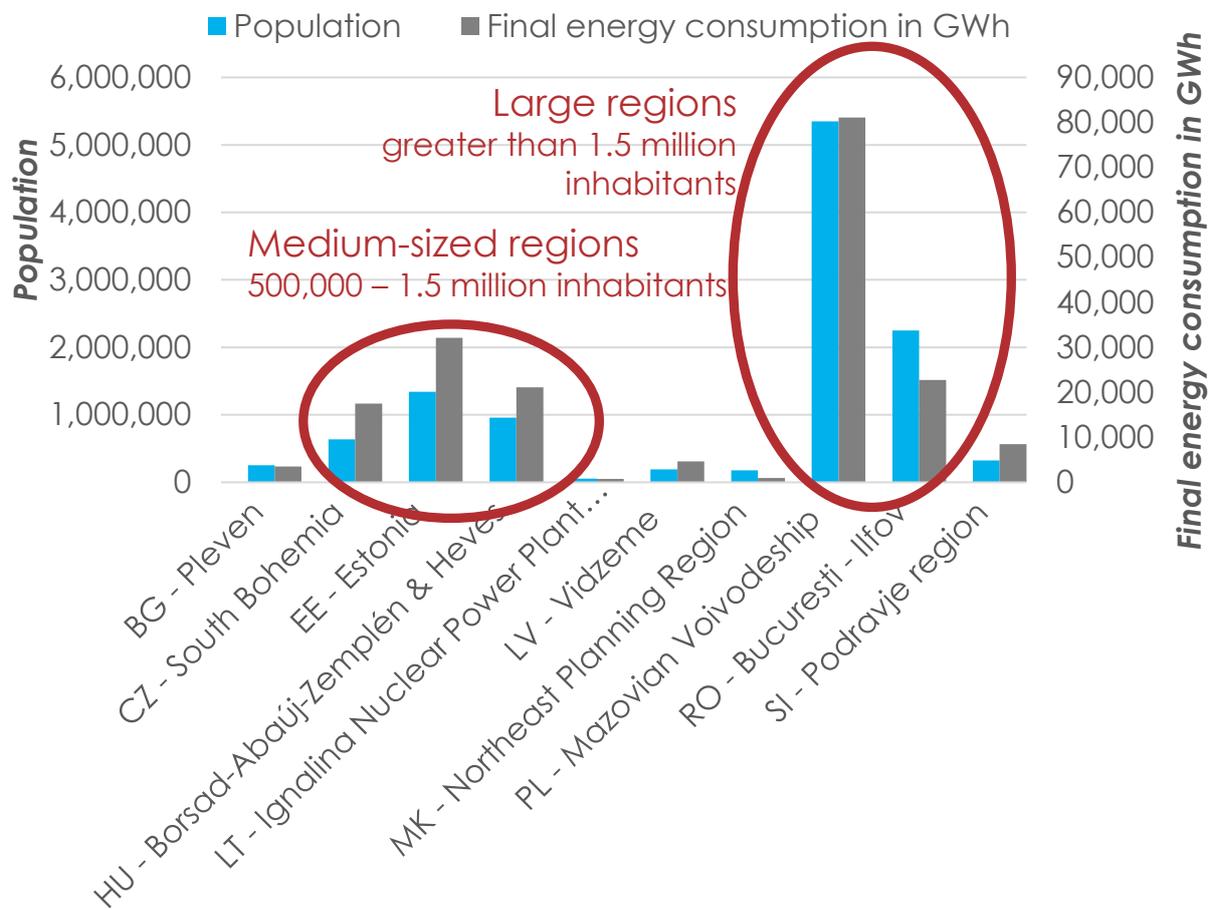
Data collection took place from January to June 2017. The final data presented in the REP documents and this report are accurate for 2015 and 2016.

For more details on collection, method and data sources per region please refer to the respective Regional Energy Profile under <https://ceesen.org/>.

Key Figures

Summary of partner regions

The 10 presented regions can be categorised according their population size and final energy consumption.

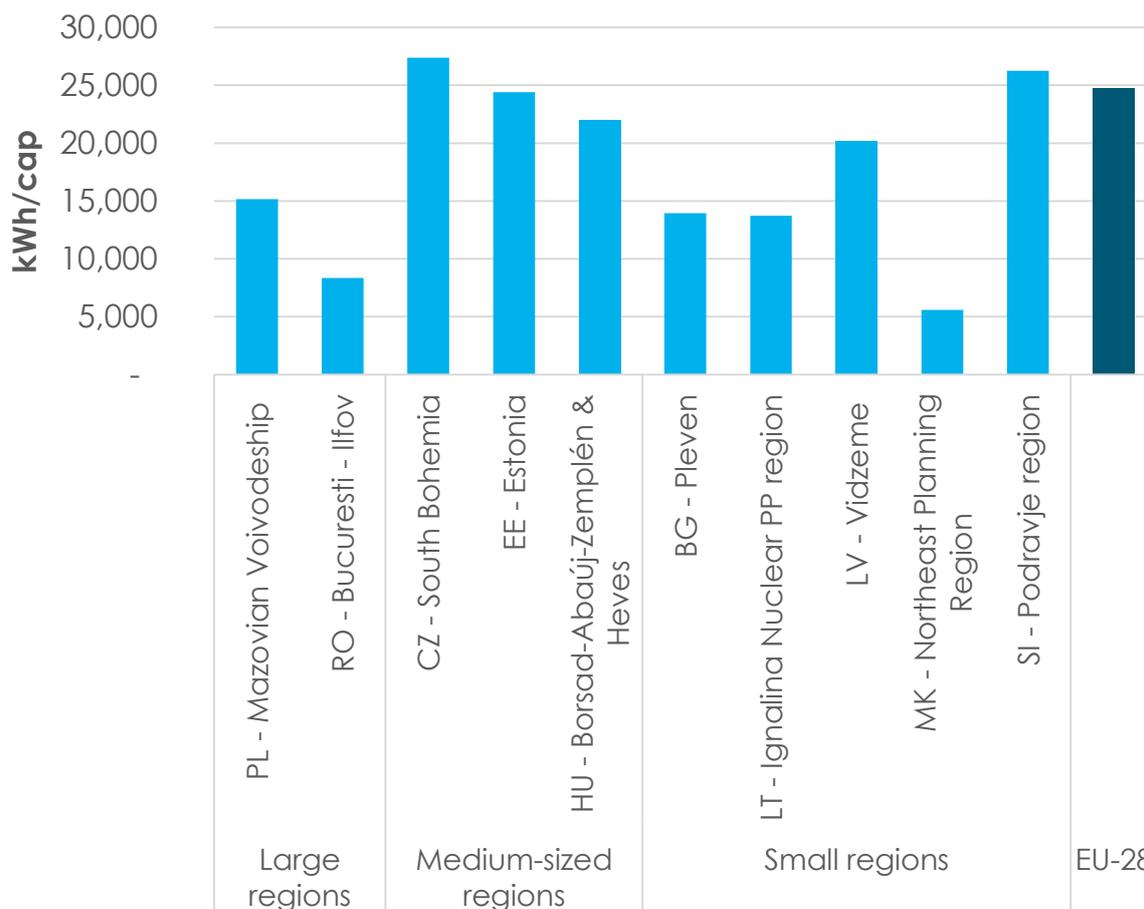


Energy Consumption per Capita

The larger regions Mazovian Voivodeship (PL) and Bucuresti-Ilfov (RO) show a lower final energy consumption per capita than the most other regions – which is not surprising as the energy consumed by general infrastructure and economic activities are communally shared by a larger size of population.

But this trend cannot be observed comparing the other size groups. A possible explanation that these regions are quite different in economic activity, which proves to be a larger influencing factor than population.

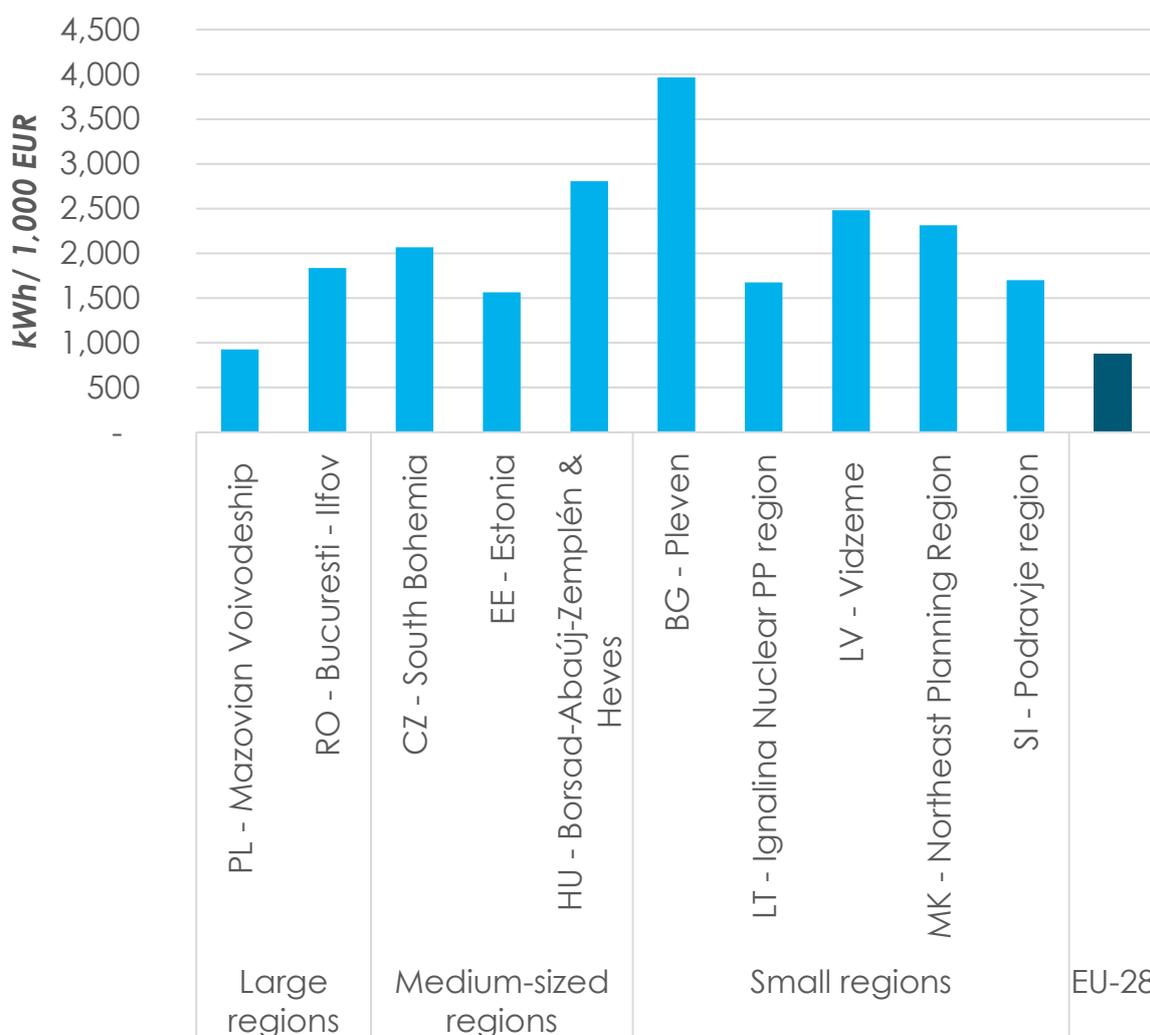
Most of the regions are in the area of the EU-28 average (25,000 kWh/cap).



Energy Intensity

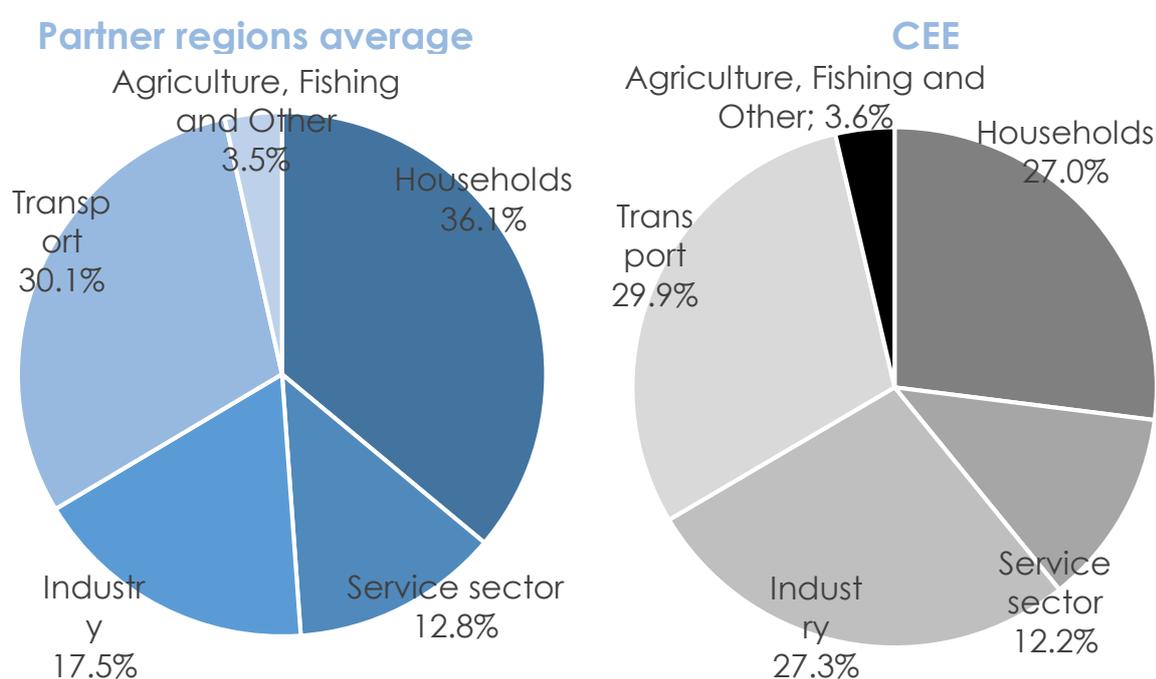
Looking at energy intensity of the regional economy using the indicator kWh per 1,000 EUR GDP. Again the regions covered here are quite different and can't be divided into specific categories.

The EU-28 average considering only final energy consumption lies below all of the presented Central and Eastern European regions (880 kWh/ 1,000 EUR), which is in line with the finding that Eastern European countries are generally above the EU average due to a lack of investments in the past. Although energy intensity is recently decreasing at a higher rate than in member states of western Europe.



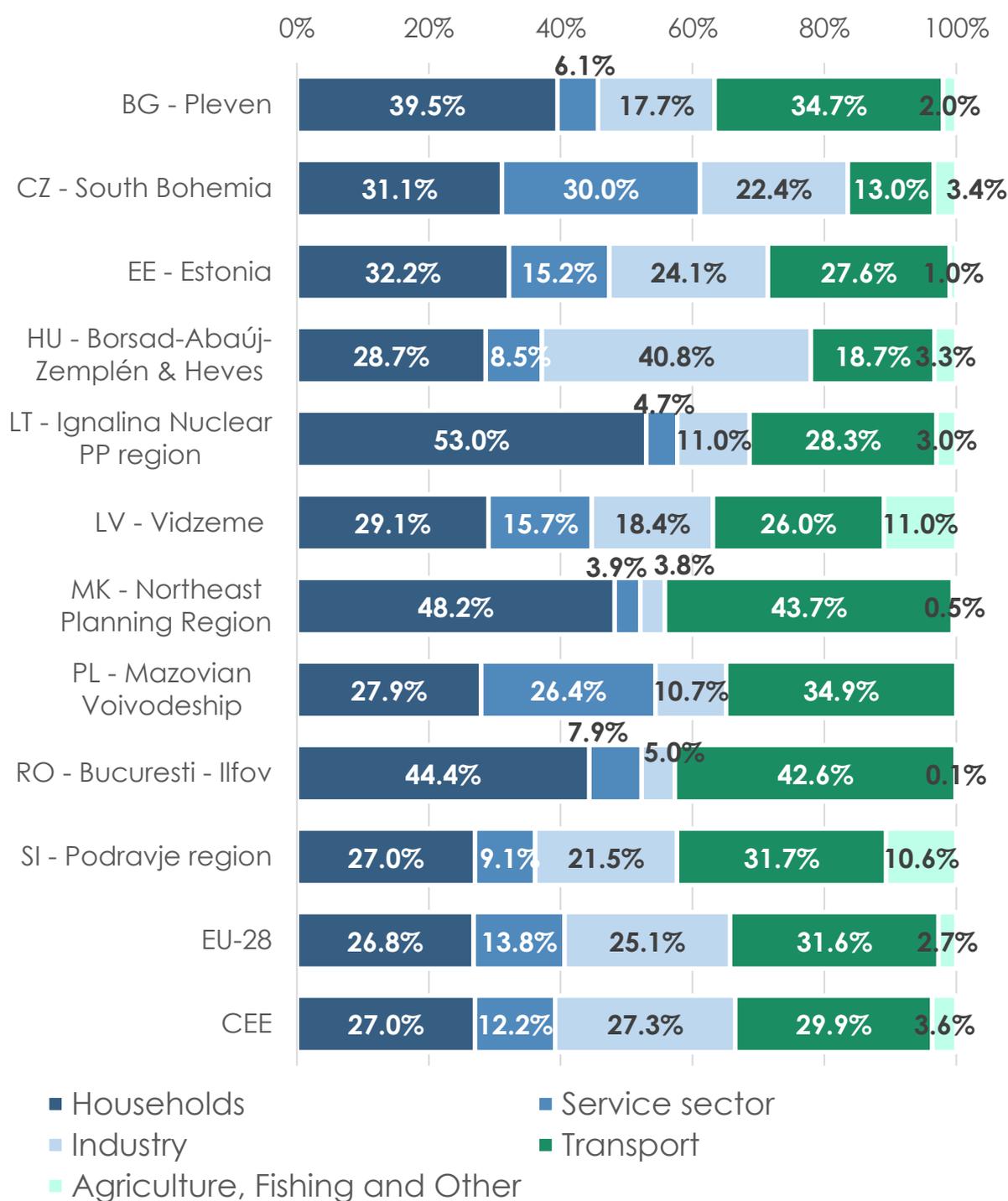
Final Energy Consumption per sector

For most of the analysed regions the households present the largest energy consuming sector with 30-50 % of the regions final energy consumption. The transport sector makes a close second place with 15-40 %.

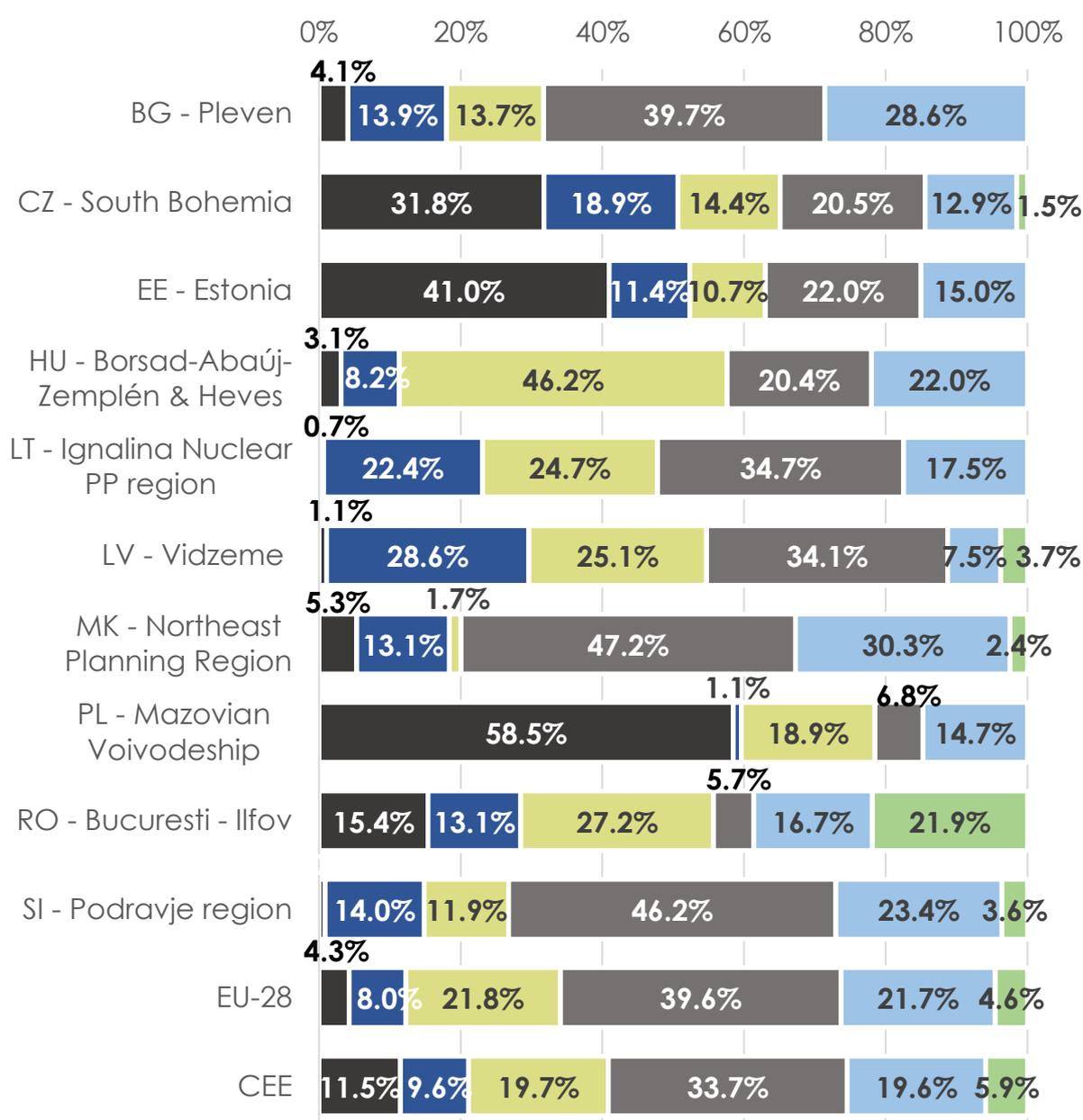


The energy consumption of the service and industry sector highly depends on the characteristics of the region. E.g. energy consumption of the industry sector ranges from more than 40 % in Hungarian regions Borsad-Abaúj-Zemplén & Heves to only a view percentage point in the Macedonia Northeast Planning Region, see next page. In direct comparison with EU-28 and CEE average, the industry and service sectors are the sectors with largest variation in the surveyed regions. It was observed (see following page) that when these two sectors are rather insignificant for the region, final energy consumption of the residential sector carries more weight, as can be observed for Ignalina Nuclear PP region (LT) and Northeast Planning Region (MK).

Final Energy Consumption per sector



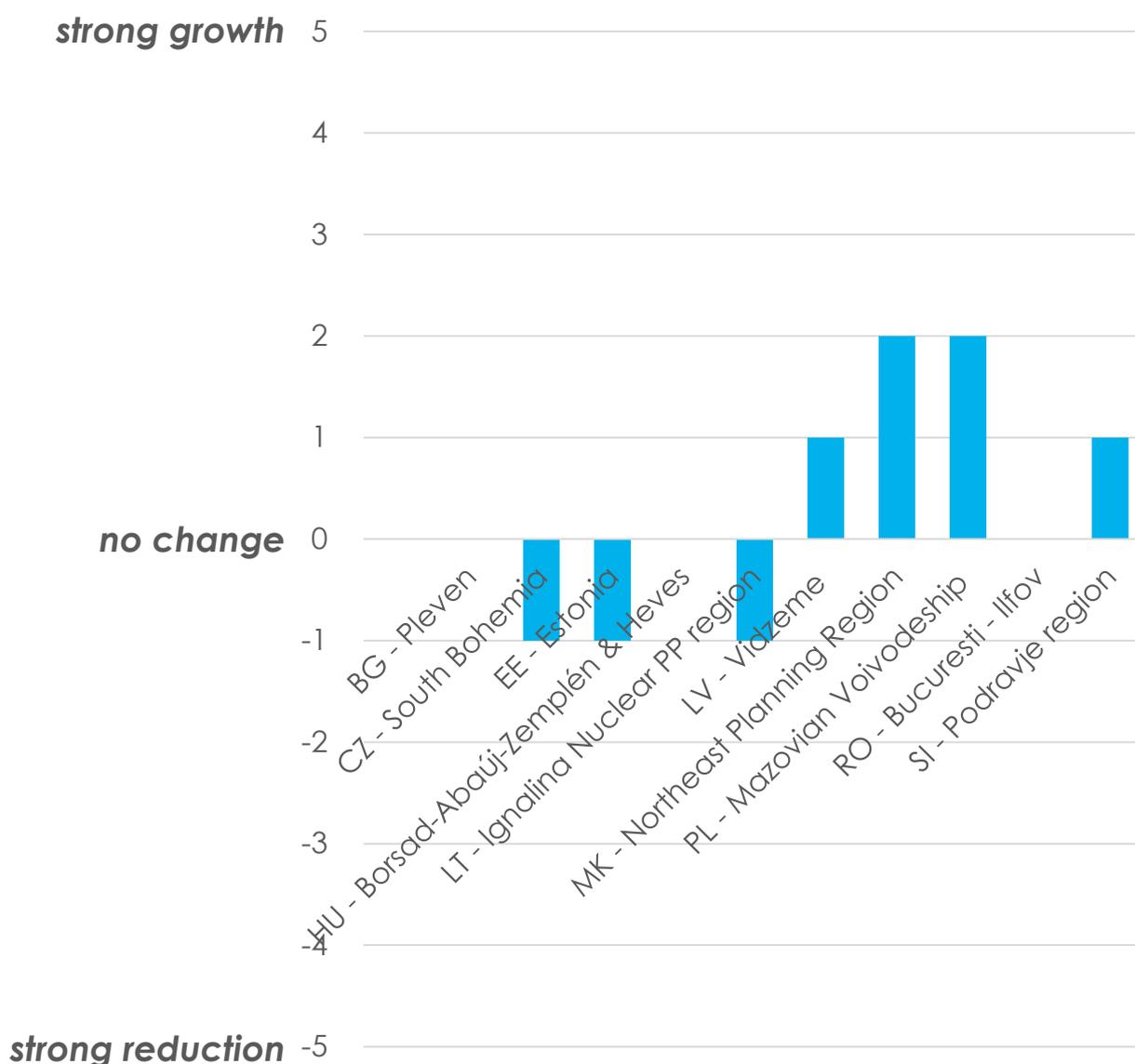
Final Energy Consumption per fuel



- Coal, lignite and oil shale
- Natural gas
- Electricity
- Renewables and waste
- Oil, petroleum and products
- Other fuels

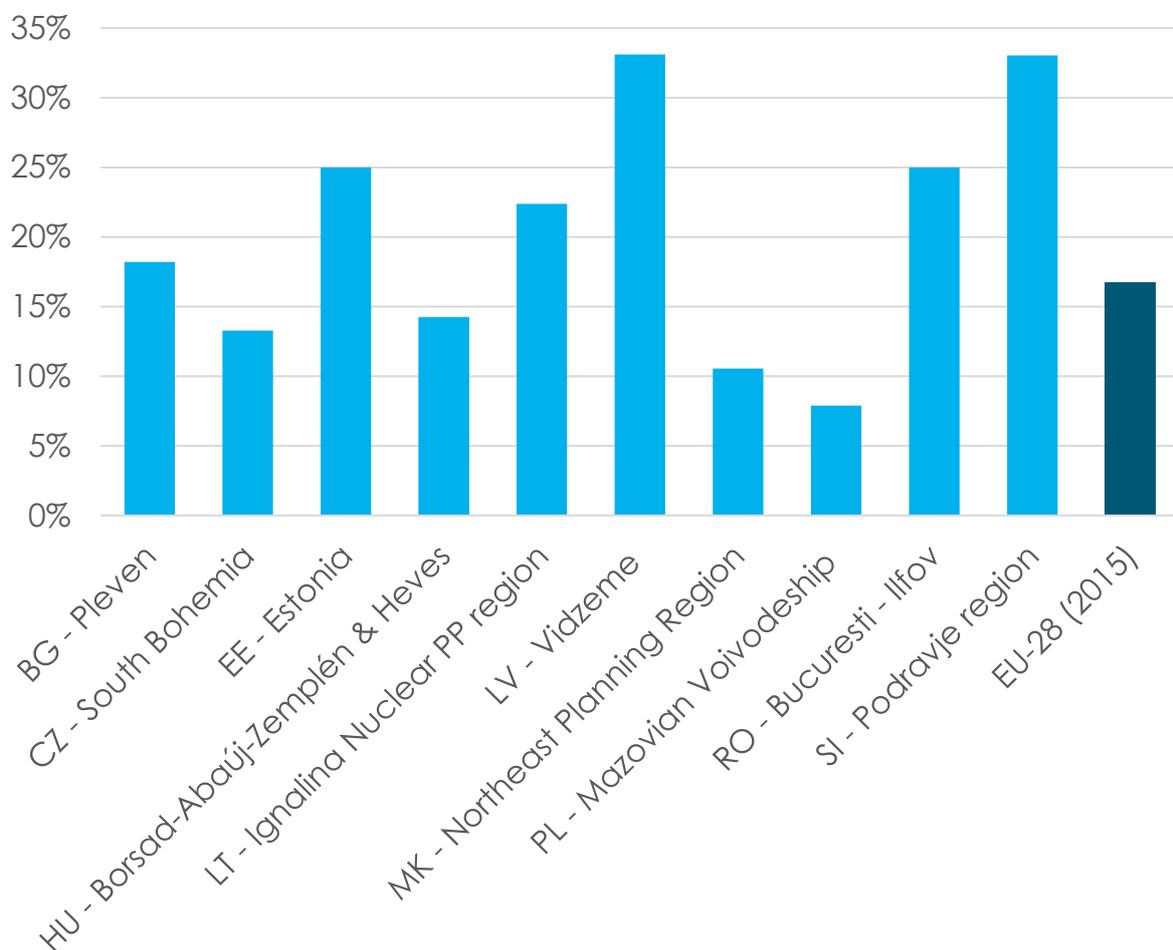
Final Energy Consumption Trends

Trends of regional final energy consumption were analysed. The assessment of survey data showed that trends are rather different in the regions. Although all regions have national or even regional energy efficiency goals to follow, i.e. the reduction of final energy consumption as strategic goal, a majority of the regions (4 of 10) nonetheless predict an increase in energy consumption for the coming years.



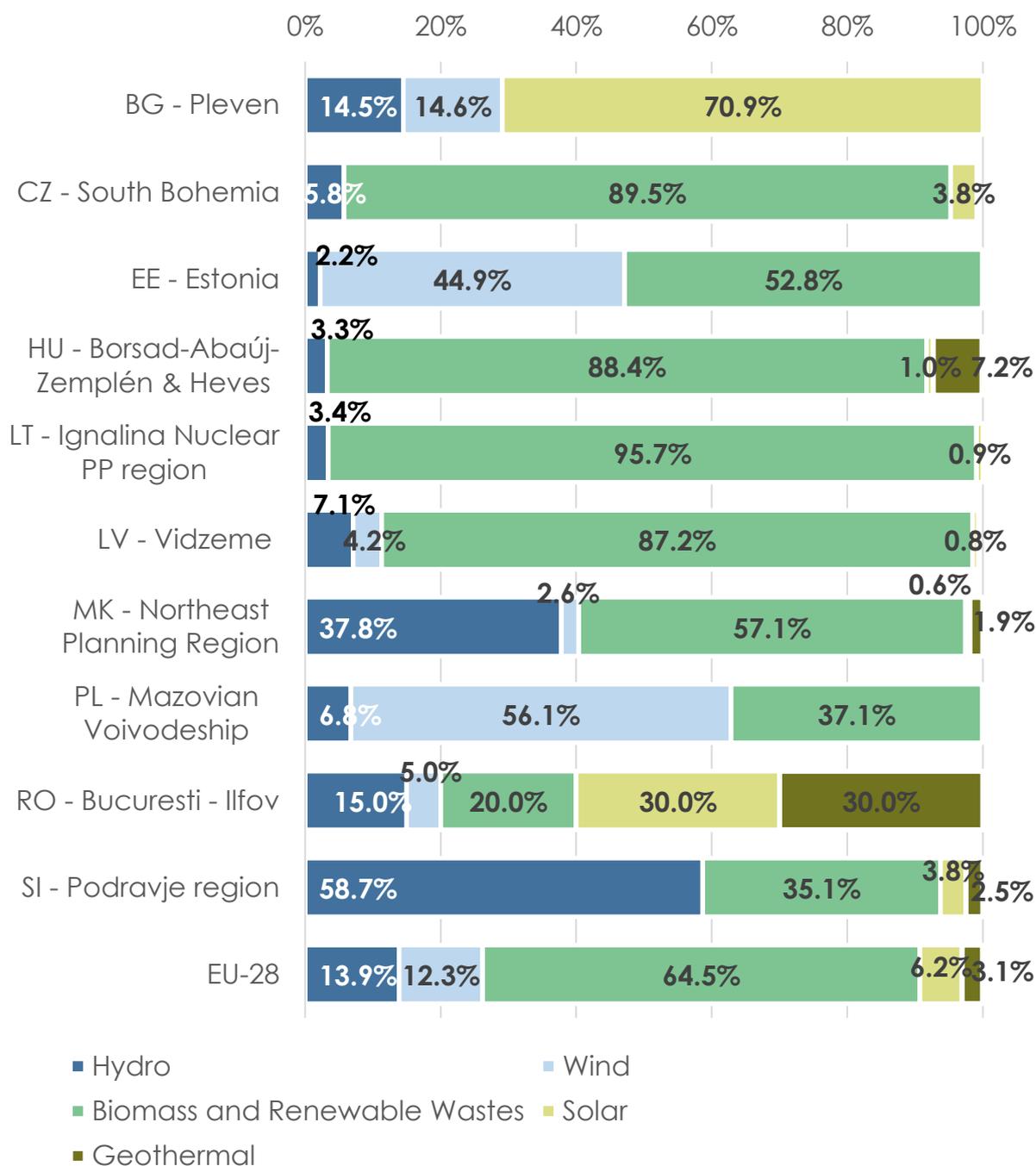
Renewables in Final Energy Consumption

As the graph shows the regions are on quite different levels regarding their share of energy production from renewable sources. Ranging from low significance up to 33 % for Podravje region (SI) or Vidzeme (LV).



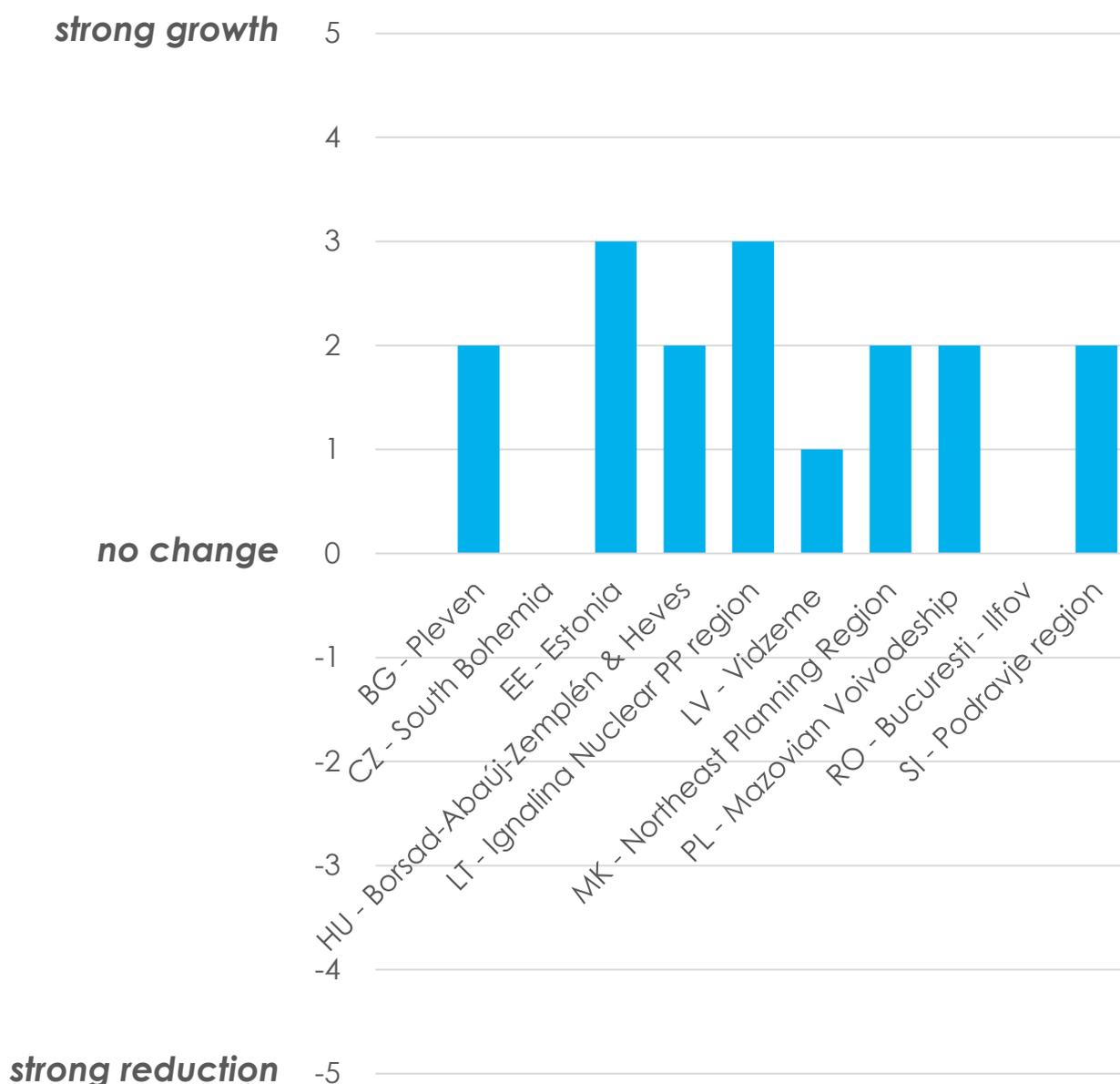
Renewable Energy by Fuel

For almost all of the regions biomass is the most relevant renewable fuel. Depending on regional resources either wind and hydro energy take a large share as well. And in the case of Pleven region (BG) also solar.



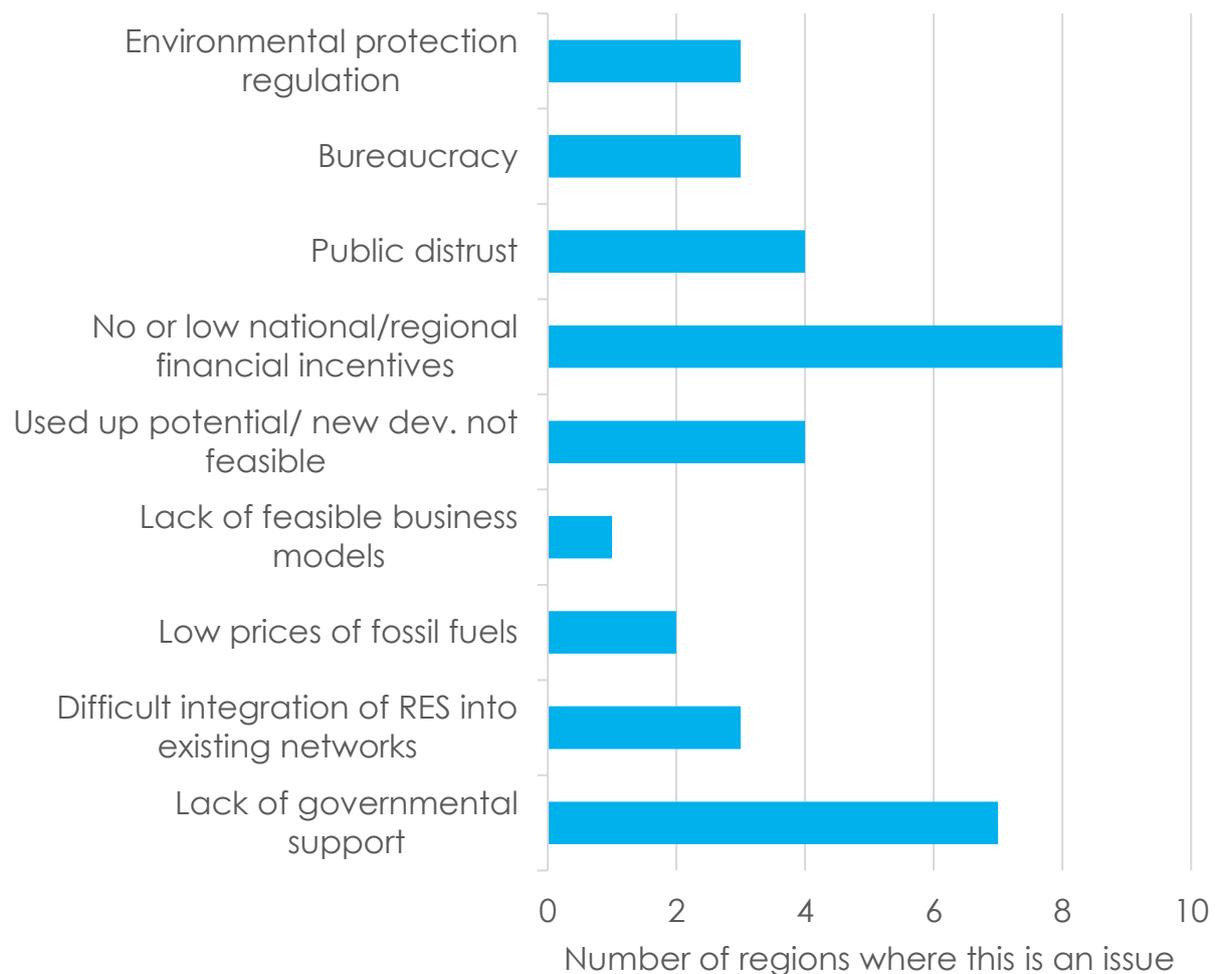
Renewable Energy Production Trends

Different from the observed trends in energy consumption, the regions show a clear trend when it comes to renewable energy production. Almost all regions expect a slight to medium growth of renewable energy capacities in the coming years.



Barriers for Renewable Energy Development

The lack of financial incentives and other governmental support was identified as the main barrier for renewable energy development – mentioned in 8 (respectively 7) of 10 regional energy profiles. Apart from a lack of financial incentives, other strong barriers for CEE regions mostly concerned with framework conditions for REN applications and a relative high number (4 regions) mentioned that there is still public distrust to overcome regarding REN technologies.



SWOT analysis for the CEE regions

Strengths

- High RES potential/ availability of natural resources
- Know-how and good examples already exist
- High awareness in population

Weaknesses

- Lack of energy data
- Lack of energy planning on regional level
- Weak economy & limited public finances
- Strong lobby for fossil fuels and nuclear energy policy

- Use of different REN potentials
- New technologies available
- EU support programmes

Opportunities

- Climate change
- Energy projects show low feasibility-> high reliance on subsidies
- Slow-down due to missing incentives/lack of policy support
- Reliance on changing energy prices
- Changing demographics

Threats

* Large statements apply to most of the regions, small ones to less.

The SWOT-Analyses of all 10 regions were summarized in the preceded matrix. The size of the different statements should represent the importance of the issue to the regions as well as signify the number of regions where this was an issue.

Almost all regions stated the **high availability of renewable energy sources is a major strength** of their regions. But only about half of the regions stated that there is a high awareness for sustainable energy in the population. Accordingly this statement was presented in a smaller font than the others. On the other side stand the weaknesses of the regions. For most of the CEE regions surveyed, the **lack of adequate energy data** is a major weakness for sustainable energy planning. This is also connected to the lack of regional authorities/contact points responsible for energy planning. In some of the regions **conventional energy source have a strong lobby** and in combination with **missing (financial) incentives for sustainable energy**. This is a strong hindering factor for investments into renewables.

Climate change was identified as general threat for the CEE region. Specific to the energy sector a too **high reliance on public support**, e.g. in the form of subsidies, was identified as major threat. The sudden discontinuation or change of subsidy schemes can trigger a rapid decline of demand severely damaging a new or growing market for energy technology and services. For some regions changing demographics pose a threat for energy development. Particularly in the residential sector the **affordability of renewables or energy efficiency measures** depends on household income.

The **identified opportunities were very specific to the regions** and only a few overlaps were identified. The **usage of renewables was assessed as major opportunity** for the regional economy. **Technological progress** both in terms of renewable energy generation and energy efficiency technologies give CEE regions the opportunity for the development towards a low carbon economy. And finally the support given through EU-programmes was emphasised.

Status quo energy potentials

An analysis showed that energy potentials and framework conditions were quite differently assessed in the CEE regions. Regions with similar energy intensity (see page 4) were clustered in the following figures, as within these clusters the highest similarities between the regions was observed. Moreover, regions with high energy intensity might consider different development paths than regions with low energy intensity. For instance these regions might focus on actions for improved energy efficiency in industry in order to decouple economic development and energy consumption, which are mostly diametric development targets.

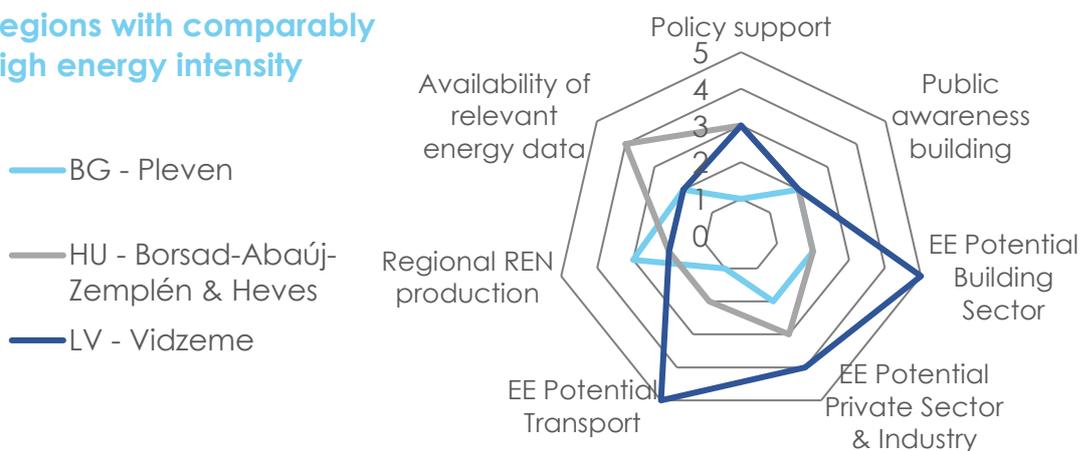
The assessment was done together with the SWOT-analysis presented on the previous page as a conclusion at the end of the development process of the Regional Energy Profiles. The listed framework conditions were assessed using a **scale from 1 (potential unused) to 5 (potential fully used)**.

The numbers thereby show only relative potentials. The following categories were assessed:

- Policy support for reaching energy and climate goals
- Building of public awareness
- Energy efficiency potential Households
- Energy efficiency potential Private Sector & Industry
- Energy efficiency potential Transport
- Regional renewable energy production
- Availability of relevant energy data

The SWOT-analysis yielded the result that the availability of natural resource for renewable energy production is considered a strength in most of the regions as well as an opportunity to increase the regional renewable share in energy production. It is surprising that the SWOT-analysis displayed energy efficiency measures neither as opportunity nor as challenge. As the assessment of the grid graphs show there is still considerable unused potential for energy efficiency improvements in different sectors.

Regions with comparably high energy intensity



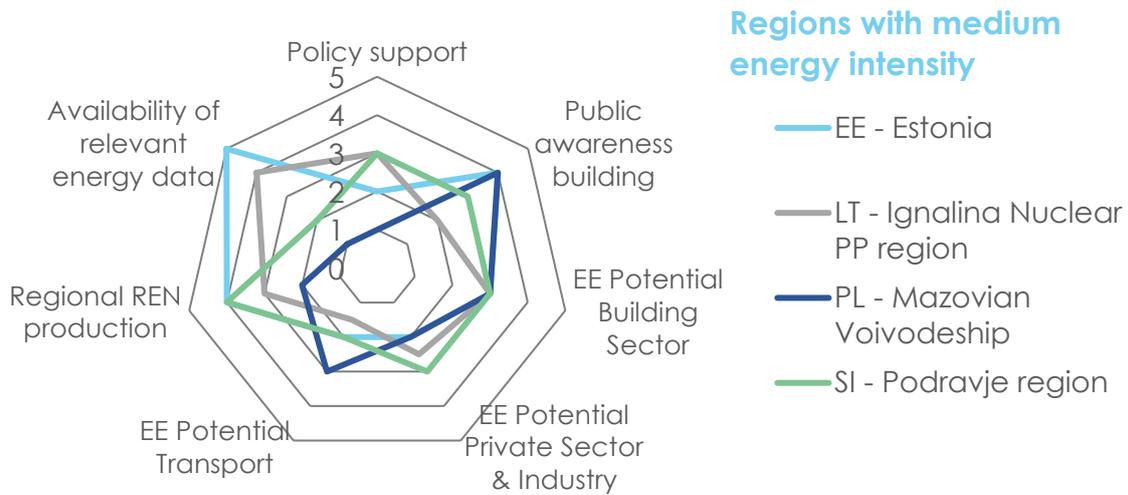
The grid analysis shows that in particular in the region Plevén (BG) there are a number of potentials still unused in comparison with the regions Vidzeme (LV) where energy efficiency potentials are to a large part already exploited. At the same time, the energy profile of Vidzeme stated that energy efficiency itself, e.g. in the transport sector is still low. The **next step for such situations could be to identify new, to this point unknown, potentials in order to push the decoupling of economic development and energy consumption.**

Additionally, **South Bohemia shows already a high degree of experience** and actions taken for improved energy efficiency in the private service and industry sector as well as the buildings sector. The **buildings sector is also the category in which most of the presented regions already show results for energy efficiency measures implemented.** This can - to a degree - be attributed to the EU Energy Performance of Buildings Directive.

On the other hand, the **transport sector** offers for most of the regions still **considerable unused potentials for energy efficiency improvements.** These can be taken as opportunities for innovative developments in particular regarding the electric mobility sector, where the CEE regions and most EU member states stand still at the beginning.

Another factor worth mentioning is that **public support for sustainable energy development was in all regions assessed to be rather on the low side.** Surprisingly, this seems not to have much influence on either energy efficiency actions, renewable energy share or public awareness. In relation with missing public support the SWOT-analysis identified the **threat of questionable feasibility for investments in the energy sector.** Public subsidies often take the role of bridging the gap to make new technologies more affordable during early development stages. The dependency on such subsidies is also a major threat for the market in case they are suddenly discontinued. Regardless of the

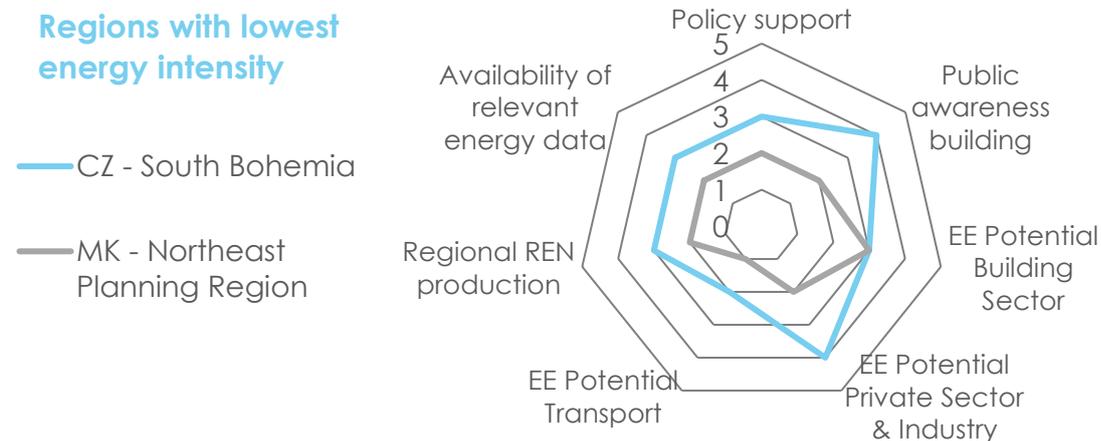
financial side **climate change was by most of the regions identified as major threat**, rather related to the development of



the region and its population than the energy sector only.

The **lack of adequate energy data** was identified as common challenge for most of the regions. While the regions Borsad-Abaúj-Zemplén and Heves (HU) and Ignalina Nuclear PP region (LT) show a high availability of energy data, public awareness for energy and climate issues is equal to regions with low data availability. This shows that the **availability of statistic data alone** – although, a good requisite – is **not enough to raise awareness** and facilitate the implementation of energy actions.

The results of the assessment for the **Northeast Planning Region (MK)**, which was the only non-EU member in the mix, shows that **energy efficiency and renewable production potentials are still underused**. In sum, the region is comparably with the region of Pleven, BG, although very different in terms of energy intensity, which might result in different prioritisation and implementation strategies in order to develop towards a sustainable energy region. In the same cluster of low energy intensity is South Bohemia, CZ. In comparison with the Northeast Planning Region, public awareness is high and with average of 3 points, framework conditions are quite favourable.



Compiled by:

Ms. Astrid Buchmayr
ConPlusUltra Ltd.
astrid.buchmayr@conplusutra.com

Mr. Jan Jares
AgEnDa z.s.
jares@os-agenda.cz

from data collected by the members of CEESEN, namely

AgEnDa presenting	South Bohemia, CZ
Balkan Development Solutions presenting	Northeast Planning Region, MK
Ignalinos Ae Regiono Pletros Agentura presenting	Ignalina Nuclear Power Plant region, LT
Local Energy Agency Bucharest presenting	Bucuresti – Ilfov region, RO
Local Energy Agency Spodnje Podravje presenting	Podravje region, SI
Mazowiecka Agencja Energetyczna presenting	Mazovian Voivodeship, PL
University of Life Sciences presenting	Estonia
Vidzeme Planning Region presenting	Vidzeme, LV
WWF Bulgaria presenting	Pleven region, BG
WWF Hungary presenting	Borsad-Abaúj-Zemplén and Heves regions, HU

With support from

Tartu Regional Energy Agency

University of Tartu

ConPlusUltra Ltd.



TARTU ÜLIKOOL



CENTRAL EASTERN EUROPEAN SUSTAINABLE ENERGY NETWORK



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 696173. Disclaimer: The sole responsibility for the content of this material lies with the authors. It does not necessarily represent the views of the European Union, and neither EASME nor the European Commission are responsible for any use of this material.

