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Investment needs for 2030 energy and climate targets in Czechia

Buildings and renewable energy supply sectors

Executive Summary

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About the project

This is the executive summary to the report entitled "Investment needs to meet 2030 energy and climate targets of Czechia". The report is a contribution to Output indicator I.1 of the project "Climate investment capacity (CIC): climate finance dynamics & structure for financing the 2030 targets". The project aims to strengthen capacity of the public sector in Latvia and Czechia, gearing and adapting the implementer's knowledge and know-how to the country challenges with help of the implementing partners. Using a learning-by-doing approach, the partners cooperate with the target group to jointly develop prototypes of (i) investment gap & need analyses to reach 2030 climate and energy targets, (ii) climate & energy investment maps to track public finance and private investment flows, and (iii) capital-raising plans to close the investment gap. The report analyses the investment needs to reach the 2030 climate and energy targets in Czechia. It focuses on two sectors: buildings and renewable energy supply sector, which are key in the low-carbon transition.

Disclaimer

This project is part of the European Climate Initiative (EUKI – www.euki.de) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). It is the overarching goal of the EUKI to foster climate cooperation within the European Union (EU) in order to mitigate greenhouse gas emissions. The opinions put forward in this report are the sole responsibility of the authors and do not necessarily reflect the views of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

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Executive summary

In view of the need to tackle climate change, Member States of the European Union have set relatively ambitious climate and energy targets. These goals bring enormous opportunities, but they also mean the need to increase activity in the field of climate and energy investments quite significantly. The Investment Plan for Europe therefore calls for a smarter use of financial resources, removing barriers to investment and ensuring visibility and technical assistance to investment projects. To achieve this, the European Member States are preparing National Energy and Climate Plans (NECPs), which describe their approach to achieving the goals of the Energy Union by 2030.

Investment needs in the area of climate and energy can be defined as the amount of funds necessary to achieve the climate and energy goals in a given time horizon that is in our case by 2030 and beyond. Investment activities include the introduction of new and renovation and refurbishment of existing technologies, buildings and infrastructure. Investments are one (but not the only) of the means of achieving the climate and energy goals. Together with policy measures and behavioural change (which may not require investment at all), they represent a set of activities necessary for the transition to a low-carbon economy. In this sense, estimates of investment needs should not be seen as independent or alternative targets but as one of the necessary factors to be monitored and understood in order to achieve climate and energy goals.

We focus on two sectors, which will also be major contributors to the achievement of the climate and energy goals - buildings and renewable energy supply sector, including the appropriate infrastructure necessary for its development. We provide an overview of the amount and structure of investment needs in these two sectors in the Czech Republic by 2030, and compare them to the current investment flows identified in the two sectors in our previous report[1].

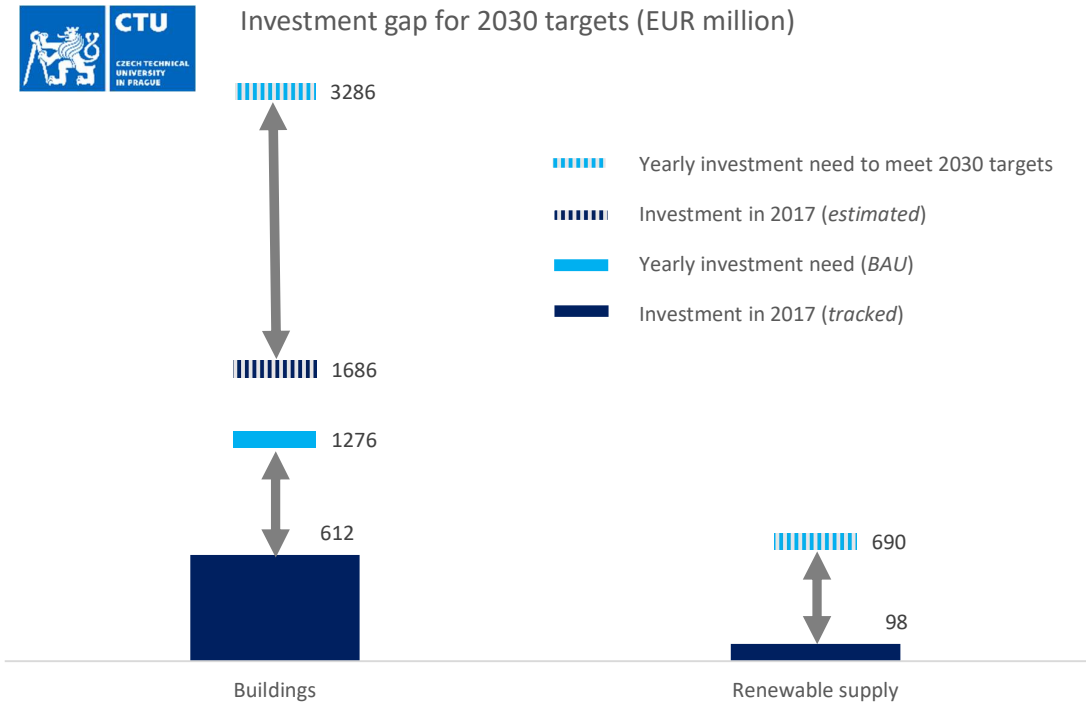
Investment gap

The following figure presents a comparison of the monitored investments for 2017[2] and the estimated amount of investment resources in the area of buildings and renewable energy supply sector needed to achieve the climate and energy targets by 2030.

[1] Valentová, Michaela, Jaroslav Knápek, and Aleksandra Novikova. 2019. 'Climate and Energy Investment Map – Czechia. Status Report 2017: Buildings and Renewable Energy Supply and Infrastructure'. Prague: Czech Technical University in Prague, https://www.ikem.de/wp-content/uploads/2019/12/CVUT_MValentova-et-al_2019_Climate_Energy_Investment_Map_Czechia_2017_Full-report-1.pdf

[2] As reported in Valentová, Michaela, Jaroslav Knápek, and Aleksandra Novikova. 2019. 'Climate and Energy Investment Map – Czechia. Status Report 2017: Buildings and Renewable Energy Supply and Infrastructure'. Prague: Czech Technical University in Prague, www.ikem.de/wp-content/uploads/2019/12/CVUT_MValentova-et-al_2019_Climate_Energy_Investment_Map_Czechia_2017_Full-report-1.pdf

Figure 1 Comparison of the tracked levels of climate and energy investment in 2017 and the estimated annual amount of investment needs to achieve the 2030 climate and energy targets (EUR million)



In total, the **yearly business-as-usual estimated investment needs in buildings are EUR 1,276 million** as presented in Figure 1. The volume was derived from estimates of the Chance for Buildings' report[3] as discussed in the next section, and investment needs for renewable energy sources (RES) integrated in the buildings as quantified in this report, including small PVs, heat pumps, biomass boilers, and solar thermal panels. The average annual investment need for the buildings sector in the business-as-usual scenario is EUR 690 million, and the investment needs for the renewable energy sources integrated in the buildings amounts to EUR 586 million annually.

The business-as-usual scenario does not meet the required parameters in terms of greenhouse gas emission reductions. The average annual investment needs for scenario 3 of "slow but energy-intensive renovation of the building stock" are even higher – EUR 1,873 million including RES, and **in the hypothetical, ideal scenario 5 the average annual investment needs for the buildings sector is EUR 3,294 million including RES**. It is reflected in the Figure 1 with dashed marks.

Our climate-energy investment study estimated the current investment into the buildings sector at EUR 612 million. However, we were not able to fully identify all flows - especially

[3] As referenced in the Czech National Energy Efficiency Action Plan from 2017: https://www.mpo.cz/assets/cz/energetika/energeticka-ucinnost/strategicke-dokumenty/2017/11/_17_III_Aktualizace-NAPEE-2016_vlada_final.pdf

those that do not go through public support programs. If we covered all investment flows, we estimate that the total **volume of current investment in buildings** would increase to about **EUR 1,686 million**, i.e. roughly at the level of scenario 3. It should be noted that this is a rough estimate and we have no detailed information on the depth of renovation and measures taken.

The average annual amount of investment into renewable energy supply sector needed to meet the 2030 climate and energy goals, as also stated in the Czech Republic's NECP **is EUR 690 million (**Figure 1). This excludes technologies integrated in buildings. In 2017, we identified **the volume of flowing investments into the sector of EUR 98 million**, including related infrastructure. The current system of non-financial and financial support for renewable energy sources, or the setting of parameters of this system, does not lead to sufficient development of RES in order not only to meet the 2030 targets, but also to transform the whole economy towards an efficient, low- carbon system.

Further, we provide the details of investment need and gap estimates for each sector covered by our analysis.

Buildings

There are two major studies assessing the investment needs related to climate and energy targets in buildings: the climate policy of the Ministry of the Environment, and the study by Chance for Buildings.

The Climate Policy of the Ministry of the Environment[4] defines three categories of scenarios to reduce greenhouse gas emissions in Czechia. Of the defined scenario categories, only those identified as "C" in climate policy meet the 80% greenhouse gas emission reduction target in 2050. All scenarios in this category "C" assume a significant increase in energy efficiency and a change in consumer behaviour, differing mostly in the structure of renewable energy and nuclear installations. The related costs include discounted variable costs (in particular fuel costs and other operating costs), fixed operating costs and investment costs. Investments in the sector of buildings amount to about CZK 2 to 3 trillion (7% of all costs), i.e. about CZK 50 billion (EUR 2 billion) per year in order to achieve the goals of reducing greenhouse gas emissions by 2050.

By contrast, the Chance for Buildings scenarios[5] estimate the cumulative investment needs in buildings by 2050 to EUR 22 billion to EUR 65 billion, or about CZK 0.6 to 1.7 trillion, slightly lower than the estimates contained in Climate Protection Policy. The lower value of the estimate represents the investment need in the business as usual scenario, while the upper limit is defined by the hypothetical scenario. An intermediate scenario depicting a slow but thorough renovation of buildings is achievable with an estimated cumulative cost of about EUR 39 billion. However, this scenario brings about 45% emission savings from 44.6 Mt CO_2 in

[4] Ministry of the Environment. 2017. 'The Climate Protection Policy of the Czech Republic'. https://www.mzp.cz/en/climate_protection_policy

[5] Chance for Buildings. 2016. 'Strategie Renovace Budov Podle Článku 4 Směrnice o Energetické Účinnosti (2012/27/EU)' [Building renovation strategy according to Art. 4 of the EED], as featured in the Czech National Energy Efficiency Action Plan (see note 3).

2016 to about 24 Mt CO_2 in 2050[6]. Thus, significantly less than the indicative target stated in climate policy.

Renewable energy supply sector

The final Czech National Energy Climate Plan[7] expects the RES share of in gross final consumption to be 22% by 2030. The breakdown of the RES contribution by sector for the base year 2020 and the end year 2030 is given in Table 1. Based on the structure presented, we quantified the investment needs to meet the expected NECP values in the RES sector. The scenarios for the possible development of RES are based on the basic scenarios presented in the NECP, which were in some cases corrected by expert estimates by the authors.

Table 1 RES as to sectors in 2020 and 2030 according to the Czech National Energy and Climate Plan [TJ]

Final consumption RES	**2020**	**2030**
Electricity	33,512	44,540
Transport	20,399	30,577
Heating and cooling	120,222	164,600
Total	**174,133**	**239,717**

We have first estimated the contribution of individual types of RES and technologies for their use, including electricity, heat, and biomethane. Consequently, we have estimated the specific investment costs for individual types of RES and used technologies. We have used the current investment costs, and adjusted them for learning curve effect, assuming that as technology develops massively, the costs decrease, and price development the technology. The estimate of the price growth of individual RES technologies is based on the division of investment costs into two basic categories - technologies and construction work. Both of these categories are escalated separately. The total investment needs represent the undiscounted sum of the investment cost values at the given year's prices, i.e. all investment costs are escalated by the coefficients from the price level of the starting year 2019 to the price level of the relevant year, and we do not take into account the time value of money[8].

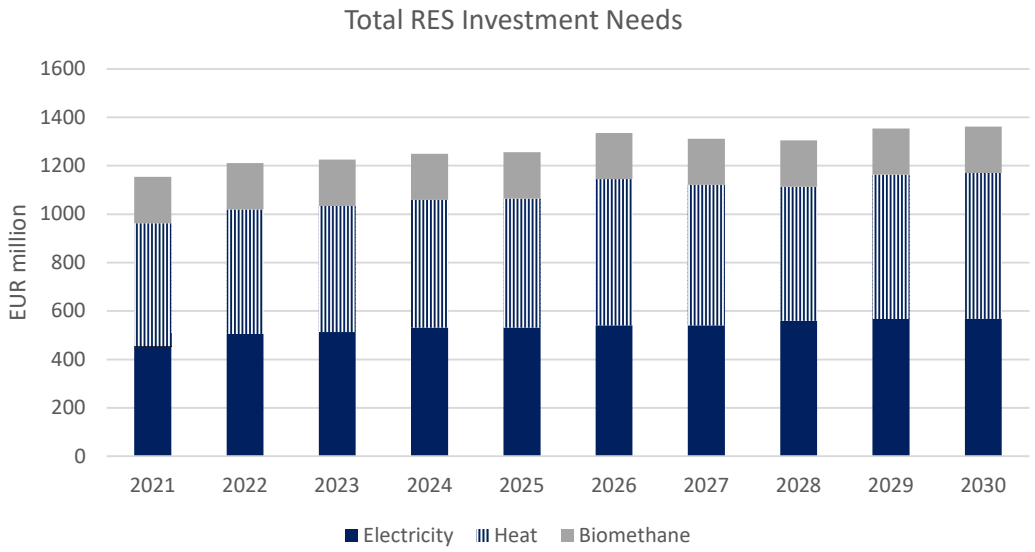
The results of modelling investment needs in the RES sector show that the total investment need is EUR 12.8 billion between 2021 and 2030. This is the sum of the values for the RES for electricity, heat, and biomethane (transport) segments. The total costs for the period 2021 to 2030 consist of 41.4% of the RES costs for electricity generation, 43.2% of the RES costs for heat generation, the rest is due to biomethane (Figure 2).

[6] Lupíšek, Antonín. 2016. 'Potenciál Úspor Emisí Skleníkových Plynů ČR Pomocí Rekonstrukcí Budov [Potential for GHG Savings through Renovation of Buildings in Czechia]'. UCEEB ČVUT. https://sanceprobudovy.cz/wp-content/uploads/2018/04/univerzitni-centrum-energeticky-efektivnich-budov_potencial-uspor-emisi-sklenikovych-plynu-cr-pomoci-rekonstrukci-budov.pdf.

[7] https://ec.europa.eu/energy/en/topics/energy-strategy/national-energy-climate-plans

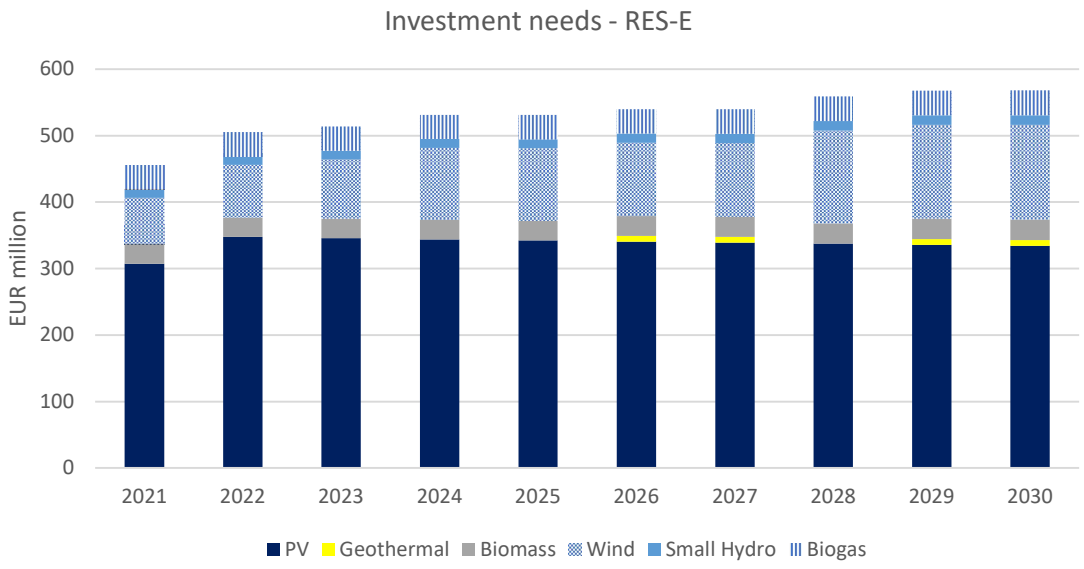
[8] In order to obtain information about the total financial demands of the RES sector with respect to the time value of money (according to individual groups of investors), we would have to discount the value of investments in individual years by the appropriate discount rate for households and business sector.

Figure 2 Investment needs for RES development in 2021 – 2030 (EUR million)



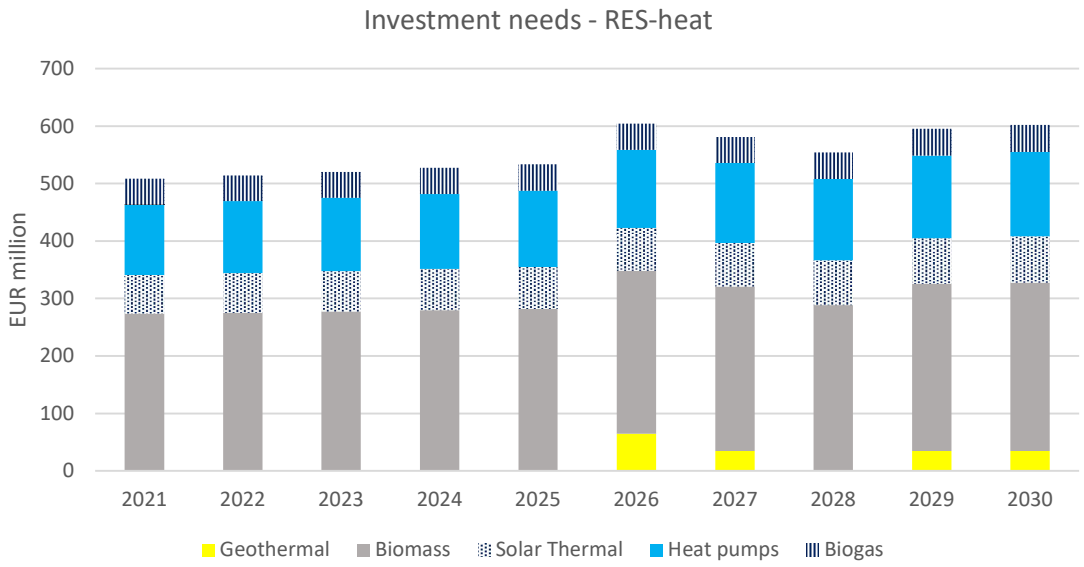
In case of electricity production from RES, photovoltaic power plants account for the largest share of investment needs in this segment, with a total of 64% (Figure 3). Wind power plants account for 21% of the total investment need. The remaining technologies (geothermal, small hydro power plants, biomass and biogas) account for 15 % of total investment needs.

Figure 3 Investment needs – RES electricity production 2021 – 2030 (EUR million)



In case of RES for heat production (Figure 4), the most important segment is the combustion of solid biomass, accounting for about 51 % of the total investment needs, followed by heat pumps with 24 % of total investment needs, and solar thermal (13 %).

Figure 4 Investment needs – RES heat production 2021 – 2030 (EUR million)



The modelling results complement the data contained in the NECP. Data in NECP have different logic, primarily focusing on the operational support rather than addressing the direct investment needs.